



VOL.
6

Agriculture and Allied Sciences

Restructured and Revised Syllabi of Post-graduate Programmes

- Community Science



Education Division
Indian Council of Agricultural Research
New Delhi

Agriculture and Allied Sciences

Volume-6

Restructured and Revised
Syllabi of Post-graduate Programmes

Community Science

- Apparel and Textile Science
- Extension Education and Communication Management
- Food and Nutrition
- Human Development and Family Studies
- Resource Management and Consumer Science



Education Division
Indian Council of Agricultural Research
New Delhi

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त्रिलोचन महापात्र, पीएच.डी.

एक एन ए, एक एन ए एस सी, एक एन ए ए एस

सचिव एवं महानिदेशक

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FNA, FNASC, FNAAS
SECRETARY & DIRECTOR GENERAL

भारत सरकार

कृषि अनुसंधान और शिक्षा विभाग एवं
भारतीय कृषि अनुसंधान परिषद
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Foreword

THE ICAR has been continuously striving to bring necessary reforms for quality assurance in agricultural education. The Council has appointed National Core Group and BSMA Committees for revision and restructuring of Post-graduate and Doctoral syllabi in consultation with all the stakeholders to meet the challenges and harness opportunities in various disciplines of agriculture and allied sciences. It has been observed that a paradigm shift is necessary in academic regulations to comply with various provisions of National Education Policy-2020. It is heartening to note that the respective Committees have taken due care by following flexible, multi-disciplinary and holistic approach while developing the syllabus and academic regulations. The students are given opportunities to select the courses to support their planned research activities, to register for online courses and to pursue internship for development of entrepreneurship during Masters' programme. Further, the Teaching Assistantship has been introduced to provide experience to the Ph.D. scholars on teaching, evaluation and other related academic matters. This is an important part of doctoral training all over the world and it is expected to address the shortage of faculty in many institutions/universities. By intensive discussion with the subject experts and based on the feedback from the faculty and students, the syllabus of Masters' and Doctoral programmes in 79 disciplines was restructured and new courses were introduced. The syllabus has been revised suitably with the view to equip the students to gain knowledge, enhance their employability and skill sets to mould towards entrepreneurship and build themselves to prepare for global competitiveness. The opinions and suggestions invited from the concerned institutions, eminent scientists and other stakeholders were also reviewed by the Committees.

The Council sincerely thanks Dr Arvind Kumar, Chairman of the National Core Group and its members for the guidance to develop the syllabus in line with contemporary and projected national and global agricultural trends. The Council acknowledges the dedicated efforts and contribution of all the Chairpersons and members of 19 BSMA Committees for preparation of the syllabus. It gives me immense pleasure to express profuse thanks to the Agricultural Education Division for accomplishing this mammoth task under the guidance of Dr N.S. Rathore, former DDG and Dr R.C. Agrawal, DDG. I compliment Dr G. Venkateshwarlu, former ADG (EQR) for his sincere efforts and overall coordination of the meetings. Special thanks to DKMA for bringing out the entire syllabus in six volumes.

(T. Mohapatra)

Date: 13th August 2021
Place: New Delhi-110 001

Preface

THE curricula development is a part of the continued process and effort of the ICAR in this direction for dynamic improvement of national agricultural education system. In this resolve, the ICAR has constituted a National Core Group (NCG) for restructuring of Master's and Ph.D. curriculum, syllabi and academic regulations for the disciplines under agricultural sciences. On the recommendations of the NCG, 19 Broad Subject Matter Area (BSMA) Committees have been constituted by the ICAR for revising the syllabus. These Committees held discussions at length in the meetings and workshops organized across the country. The opinions and suggestions invited from institutions, eminent scientists and other stakeholders were also reviewed by the Committees. The respective BSMA Committees have examined the existing syllabus and analysed carefully in terms of content, relevance and pattern and then synthesized the new syllabus.

The revised curricula of 79 disciplines has been designed with a view to improve the existing syllabus and to make it more contextual and pertinent to cater the needs of students in terms of global competitiveness and employability. To mitigate the concerns related to agriculture education system in India and to ensure uniform system of education, several changes have been incorporated in common academic regulations in relation to credit load requirement and its distribution, system of examination, internship during Masters programme, provision to enrol for online courses and take the advantage of e-resources through e-learning and teaching assistantship for Ph.D. scholars. As per recommendations of the National Education Policy-2020, the courses have been categorized as Major and Minor/Optional courses. By following the spirit of Choice Based Credit System (CBCS), the students are given opportunity to select courses from any discipline/department enabling the multi-disciplinary approach.

We place on record our profound gratitude to Dr Trilochan Mohapatra, Director General, ICAR, New Delhi, for providing an opportunity to revise the syllabi for PG and Ph.D. programs in agriculture and allied sciences. The Committee is deeply indebted to Dr R.C. Agrawal, DDG (Agri. Edn), and to his predecessor Dr N.S. Rathore for their vision and continuous support. Our thanks are due to all Hon'ble Vice Chancellors of CAUs/SAUs/ DUs for their unstinted support and to nominate the senior faculty from their universities/ institutes to the workshops organized as a part of wider consultation process.

The revised syllabi encompass transformative changes by updating, augmenting, and revising course curricula and common academic regulations to achieve necessary quality and need-based agricultural education. Many existing courses were upgraded with addition and deletion as per the need of the present situation. The new courses have been incorporated based on their importance and need both at national and international level. We earnestly hope that this document will meet the needs and motivate different stakeholders.

G. Venkateshwarlu
Member-Secretary

Arvind Kumar
Chairman, National Core Group

Overview

A National Core Group has been constituted by ICAR for development of Academic Regulations for Masters and Ph.D. programmes, defining names and curricula of Masters' and Ph.D. disciplines for uniformity and revision of syllabi for courses of Masters' and Ph.D. degree disciplines. On the recommendations of the members of National Core Group, 19 Broad Subject Matter Area (BSMA) Committees have been constituted for revising the syllabus. These committees have conducted several meetings with the concerned experts and stakeholders and developed the syllabus for their respective subjects. While developing the syllabi, various provisions of National Education Policy-2020 have also been considered and complied to provide quality higher education and develop good, thoughtful, well-rounded, and creative individuals. Necessary provisions have been made in the curricula to enable an individual to study major and minor specialized areas of interest at a deep level, and also develop intellectual curiosity, scientific temper and creativity.

I express my gratefulness to Dr Arvind Kumar, Vice-Chancellor, Rani Lakshmi Bai Central Agricultural University, Jhansi and Chairman, National Core Group under whose guidance the syllabi for Master's and Doctoral programme is completed. His vast experience in agricultural education and research helped in finalising the syllabi. I wish to place on record the suggestions and directions shown by Dr N.S. Rathore, former Deputy Director General (Education) and Dr G. Venkateswarlu, ADG (EQR) and Member Secretary, National Core Group throughout the period without which the present target could not have been achieved. I am extremely thankful to 19 BSMA Committees for their stupendous job in restructuring and articulating curricula in the light of technological developments and employability prospects in agriculture and allied sciences. I also appreciate and acknowledge the efforts made by Dr S.K. Sankhyan, Principal Scientist (EQR), Dr S.K. Singh, Project Director (DKMA), Mr Punit Bhasin, Incharge, Production Unit (DKMA), Dr Kshitij Malhotra and Dr Sumit Saini, Research Associates to take up the work of editing, proof reading, finalizing and bringing out these six volumes of BSMA in this shape.

I also take this opportunity to express a deep sense of gratitude to Dr Trilochan Mohapatra, Secretary, DARE and Director General, ICAR for his guidance, cordial support and valuable input throughout the revision of the syllabus by BSMA, which helped in completing this task through various stages. The support and help extended by all Deputy Director Generals and the staff of Education Division is also greatly acknowledged.

During this comprehensive exercise of upgrading the course contents, the much-needed academic support, hospitality and participation rendered by Hon'ble Vice-Chancellors of CAUs/SAUs/DUs is greatly acknowledged. My deep sense of gratitude goes to Deans, Directors, Professors, Heads, faculty members and students at the universities who contributed by their effective participation and interaction.

R.C. Agrawal

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Common Academic Regulations for PG and Ph.D. Programmes

1. Academic Year and Registration
2. Credit requirements
- 2.1 Framework of the courses
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- 6.1 Prevention of plagiarism
7. Learning through online courses
8. Internship during Masters programme
9. Teaching assistantship
10. Registration of project personnel (SRF/ RA) for Ph.D.
11. Compliance with the National Education Policy-2020
12. Definitions of academic terms

1. Academic Year and Registration

- An academic year shall be normally from July to June of the following calendar year otherwise required under special situations. It shall be divided into two academic terms known as semesters. Dates of registration, commencement of instructions, semester end examination, end of semester and academic year, etc. The Academic Calendar shall be developed by the concerned University from time to time and notified accordingly by the Registrar in advance.
- An orientation programme shall be organized by the Director (Education)/ Dean PGS for the benefit of the newly admitted students immediately after commencement of the semester.
- On successful completion of a semester, the continuing students shall register for subsequent semester on the date specified in the Academic/ Semester Calendar or specifically notified separately. Every enrolled student shall be required to register at the beginning of each semester till the completion of his/ her degree programmes.

2. Credit requirements

2.1 Framework of the courses

The following nomenclature and Credit Hrs need to be followed while providing the



syllabus for all the disciplines:

	Masters' Programme	Doctoral Programme
(i) Course work		
Major courses	20	12
Minor courses	08	06
Supporting courses	06	05
Common courses	05	—
Seminar	01	02
(ii) Thesis Research	30	75
Total	70	100

Major courses: From the Discipline in which a student takes admission. Among the listed courses, the core courses compulsorily to be taken may be given *mark

Minor courses: From the subjects closely related to a student's major subject

Supporting courses: The subject not related to the major subject. It could be any subject considered relevant for student's research work (such as Statistical Methods, Design of Experiments, etc.) or necessary for building his/ her overall competence.

Common Courses: The following courses (one credit each) will be offered to all students undergoing Master's degree programme:

1. Library and Information Services
2. Technical Writing and Communications Skills
3. Intellectual Property and its management in Agriculture
4. Basic Concepts in Laboratory Techniques
5. Agricultural Research, Research Ethics and Rural Development Programmes

Some of these courses are already in the form of e-courses/ MOOCs. The students may be allowed to register these courses/ similar courses on these aspects, if available online on SWAYAM or any other platform. If a student has already completed any of these courses during UG, he/ she may be permitted to register for other related courses with the prior approval of the Head of Department (HoD)/ Board of Studies (BoS).

2.2 Supporting Courses

The following courses are being offered by various disciplines (The list is only indicative). Based on the requirement, any of the following courses may be opted under the supporting courses. The syllabi of these courses are available in the respective disciplines. If required, the contents may be modified to suit the individual discipline with approval of the concerned BoS:

Code	Course Title	Credit Hours
STAT 501	Mathematics for Applied Sciences	2+0
STAT 502	Statistical Methods for Applied Sciences	3+1

Course Code	Course Title	Credit Hours
STAT 511	Experimental Designs	2+1
STAT 512	Basic Sampling Techniques	2+1
STAT 521	Applied Regression Analysis	2+1
STAT 522	Data Analysis Using Statistical Packages	2+1
MCA 501	Computers Fundamentals and Programming	2+1
MCA 502	Computer Organization and Architecture	2+0
MCA 511	Introduction to Communication Technologies, Computer Networking and Internet	1+1
MCA 512	Information Technology in Agriculture	1+1
BIOCHEM 501	Basic Biochemistry	3+1
BIOCHEM 505	Techniques in Biochemistry	2+2

2.3 Syllabus of Common Courses for PG programmes

LIBRARY AND INFORMATION SERVICES (0+1)

Objective

To equip the library users with skills to trace information from libraries efficiently, to apprise them of information and knowledge resources, to carry out literature survey, to formulate information search strategies, and to use modern tools (Internet, OPAC, search engines, etc.) of information search.

Practical

Introduction to library and its services; Role of libraries in education, research and technology transfer; Classification systems and organization of library; Sources of information- Primary Sources, Secondary Sources and Tertiary Sources; Intricacies of abstracting and indexing services (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.); Tracing information from reference sources; Literature survey; Citation techniques/ Preparation of bibliography; Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services; Use of Internet including search engines and its resources; e-resources access methods.

TECHNICAL WRITING AND COMMUNICATIONS SKILLS (0+1)

Objective

To equip the students/ scholars with skills to write dissertations, research papers, etc. To equip the students/ scholars with skills to communicate and articulate in English (verbal as well as writing).

Practical (Technical Writing)

- Various forms of scientific writings- theses, technical papers, reviews, manuals, etc.;
- Various parts of thesis and research communications (title page, authorship contents page, preface, introduction, review of literature, material and methods, experimental results and discussion);
- Writing of abstracts, summaries, précis, citations, etc.;

- Commonly used abbreviations in the theses and research communications;
- Illustrations, photographs and drawings with suitable captions; pagination, numbering of tables and illustrations;
- Writing of numbers and dates in scientific write-ups;
- Editing and proof-reading;
- Writing of a review article;
- Communication Skills - Grammar (Tenses, parts of speech, clauses, punctuation marks);
- Error analysis (Common errors), Concord, Collocation, Phonetic symbols and transcription;
- Accentual pattern: Weak forms in connected speech;
- Participation in group discussion;
- Facing an interview;
- Presentation of scientific papers.

Suggested Readings

1. Barnes and Noble. Robert C. (Ed.). 2005. *Spoken English: Flourish Your Language*.
2. *Chicago Manual of Style*. 14th Ed. 1996. Prentice Hall of India.
3. *Collins' Cobuild English Dictionary*. 1995.
4. Harper Collins. Gordon HM and Walter JA. 1970. *Technical Writing*. 3rd Ed.
5. Holt, Rinehart and Winston. Hornby AS. 2000. *Comp. Oxford Advanced Learner's Dictionary of Current English*. 6th Ed. Oxford University Press.
6. James HS. 1994. *Handbook for Technical Writing*. NTC Business Books.
7. Joseph G. 2000. *MLA Handbook for Writers of Research Papers*. 5th Ed. Affiliated East-West Press.
8. Mohan K. 2005. *Speaking English Effectively*. MacMillan India.
9. Richard WS. 1969. *Technical Writing*.
10. Sethi J and Dhamija PV. 2004. *Course in Phonetics and Spoken English*. 2nd Ed. Prentice Hall of India.
11. Wren PC and Martin H. 2006. *High School English Grammar and Composition*. S. Chand & Co.

INTELLECTUAL PROPERTY AND ITS MANAGEMENT IN AGRICULTURE (1+0)

Objective

The main objective of this course is to equip students and stakeholders with knowledge of Intellectual Property Rights (IPR) related protection systems, their significance and use of IPR as a tool for wealth and value creation in a knowledge-based economy.

Theory

Historical perspectives and need for the introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement; Intellectual Property and Intellectual Property Rights (IPR), benefits of securing IPRs; Indian Legislations for the protection of various types of Intellectual Properties; Fundamentals of patents, copyrights, geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks, protection of plant varieties and farmers' rights and biodiversity protection; Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection; National

Biodiversity protection initiatives; Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

Suggested Readings

1. Erbisch FH and Maredia K. 1998. *Intellectual Property Rights in Agricultural Biotechnology*. CABI.
 2. Ganguli P. 2001. *Intellectual Property Rights: Unleashing Knowledge Economy*. McGraw-Hill.
 3. *Intellectual Property Rights: Key to New Wealth Generation*. 2001. NRDC and Aesthetic Technologies.
 4. Ministry of Agriculture, Government of India. 2004. *State of Indian Farmer*. Vol. V. Technology Generation and IPR Issues. Academic Foundation.
 5. Rothschild M and Scott N. (Ed.). 2003. *Intellectual Property Rights in Animal Breeding and Genetics*. CABI.
 6. Saha R. (Ed.). 2006. *Intellectual Property Rights in NAM and Other Developing Countries: A Compendium on Law and Policies*. Daya Publ. House.
- The Indian Acts - Patents Act, 1970 and amendments; Design Act, 2000; Trademarks Act, 1999; The Copyright Act, 1957 and amendments; Layout Design Act, 2000; PPV and FR Act 2001, and Rules 2003; The Biological Diversity Act, 2002.

BASIC CONCEPTS IN LABORATORY TECHNIQUES (0+1)

Objective

To acquaint the students about the basics of commonly used techniques in laboratory.

Practical

- Safety measures while in Lab;
- Handling of chemical substances;
- Use of burettes, pipettes, measuring cylinders, flasks, separatory funnel, condensers, micropipettes and vaccupets;
- Washing, drying and sterilization of glassware;
- Drying of solvents/ chemicals;
- Weighing and preparation of solutions of different strengths and their dilution;
- Handling techniques of solutions;
- Preparation of different agro-chemical doses in field and pot applications;
- Preparation of solutions of acids;
- Neutralisation of acid and bases;
- Preparation of buffers of different strengths and pH values;
- Use and handling of microscope, laminar flow, vacuum pumps, viscometer, thermometer, magnetic stirrer, micro-ovens, incubators, sandbath, waterbath, oilbath;
- Electric wiring and earthing;
- Preparation of media and methods of sterilization;
- Seed viability testing, testing of pollen viability;
- Tissue culture of crop plants;
- Description of flowering plants in botanical terms in relation to taxonomy.

Suggested Readings

1. Furr AK. 2000. *CRC Hand Book of Laboratory Safety*. CRC Press.



2. Gabb MH and Latchem WE. 1968. *A Handbook of Laboratory Solutions*. Chemical Publ. Co.

AGRICULTURAL RESEARCH, RESEARCH ETHICS AND RURAL DEVELOPMENT PROGRAMMES (1+0)

Objective

To enlighten the students about the organization and functioning of agricultural research systems at national and international levels, research ethics, and rural development programmes and policies of Government.

Theory

UNIT I History of agriculture in brief; Global agricultural research system: need, scope, opportunities; Role in promoting food security, reducing poverty and protecting the environment; National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions; Consultative Group on International Agricultural Research (CGIAR); International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility.

UNIT II Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.

UNIT III Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group – Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/ Non-Governmental Organisations. Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.

Suggested Readings

1. Bhalla GS and Singh G. 2001. *Indian Agriculture - Four Decades of Development*. Sage Publ.
 2. Punia MS. *Manual on International Research and Research Ethics*. CCS Haryana Agricultural University, Hisar.
 3. Rao BSV. 2007. *Rural Development Strategies and Role of Institutions - Issues, Innovations and Initiatives*. Mittal Publ.
 4. Singh K. 1998. *Rural Development - Principles, Policies and Management*. Sage Publ.
- 2.4 Mandatory requirement of seminars
- It has been agreed to have mandatory seminars one in Masters (One Credit) and two in Doctoral programmes (two Credits).
 - The students should be encouraged to make presentations on the latest developments and literature in the area of research topic. This will provide training to the students on preparation for seminar, organizing the work, critical analysis of data and presentation skills.
3. Residential requirements
- The minimum and maximum duration of residential requirement for Masters'

Degree and Ph.D. Programmes shall be as follows:

P.G. Degree Programmes	Duration of Residential Requirement	
	Minimum	Maximum
Masters' Degree	2 Academic Years (4 Semesters)	5 Academic Years (10 Semesters)
Ph.D.*	3 Academic Years (6 Semesters)	7 Academic Years (14 Semesters)

*Student may be allowed to discontinue temporarily only after completion of course work

In case a student fails to complete the degree programme within the maximum duration of residential requirement, his/ her admission shall stand cancelled. The requirement shall be treated as satisfactory in the cases in which a student submits his/ her thesis any time during the 4th and 6th semester of his/ her residentship at the University for Masters' and Ph.D. programme, respectively.

4. Evaluation of course work and comprehensive examination

- For M.Sc., multiple levels of evaluation (First Test, Midterm and Final semester) is desirable. However, it has been felt that the comprehensive examination is redundant for M.Sc. students.
- For Ph.D., the approach should be research oriented rather than exam oriented. In order to provide the student adequate time to concentrate on the research work and complete the degree in stipulated time, the examination may have to be only semester final. However, the course teacher may be given freedom to evaluate in terms of assignment/ seminar/ first test.
- For Ph.D., the comprehensive examination (Pre-qualifying examination) is required. As the students are already tested in course examinations, the comprehensive examination should be based on oral examination by an external expert and the evaluation should cover both the research problem and theoretical background to execute the project. This shall assess the aptitude of the student and suitability of the student for the given research topic. The successful completion of comprehensive examination is to obtain the "Satisfactory" remark by the external expert.

5. Advisory System

5.1 Advisory Committee

- There shall be an Advisory Committee for every student consisting of not fewer than three members in the case of a candidate for Masters' degree and four in the case of Ph.D. degree with the Advisor as Chairperson. The Advisory Committee should have representatives from the major and minor fields amongst the members of the Post-graduate faculty accredited for appropriate P.G. level research. However, in those departments where qualified staff exists but due to unavoidable reasons Post-graduate degree programmes are not existing, the staff having Post-graduate teaching experience of two years or more may be included in the Advisory Committee as member representing the minor.
- At any given time, a P.G. teacher shall not be a Chairperson, Advisory Committee (including Master's and Ph.D. programmes) for more than five students.



- The Advisor should convene a meeting of the Advisory Committee at least once in a Semester. The summary record should be communicated to the Head of Department, Dean of the College of concerned, Director (Education)/ Dean PGS and Registrar for information.

Advisor/ Co-guide/ Member, Advisory Committee from other collaborating University/ Institute/ Organization

- In order to promote quality Post-graduate research and training in cutting edge areas, the University may enter into Memorandum of Understanding (MOU) with other Universities/ Institutions for conducting research. While constituting an Advisory Committee of a student, if the Chairperson, Advisory Committee feels the requirement of involving of a faculty member/ scientist of such partnering university/ Institute/ Organization, he/ she may send a proposal to this effect to Director (Education)/ Dean PGS along with the proposal for consideration of Student's Advisory Committee (SAC).
- The proposed faculty member from the partnering institution can be allowed to act as Chairperson/ Co-guide/ Member, SAC, by mutual consent, primarily on the basis of intellectual input and time devoted for carrying out the research work at the particular institution. The faculty member/ scientist of partnering institutions in the SAC shall become a temporary faculty member of the University by following the procedure approved by the Academic Council.

Allotment of students to the retiring persons

Normally, retiring person may not be allotted M. Sc. Student if he/ she is left with less than 2 years of service and Ph.D. student if left with less than 3 years of service. However, in special circumstances, permission may be obtained from the Director (Education)/ Dean PGS, after due recommendation by the concerned Head of the Department.

Changes in the Advisory Committee:

- (i) Change of the Chairperson or any member of the Advisory Committee is not ordinarily permissible. However, in exceptional cases, the change may be effected with due approval of the Director of Education/ Dean PGS.
- (ii) Normally, staff members of the university on extra ordinary leave or on study leave or who leave the University service will cease to continue to serve as advisors of the Post-graduate students of the University. However, the Director (Education)/ Dean PGS may permit them to continue to serve as advisor subject to the following conditions:
 - (a) The concerned staff member must be resident in India and if he/ she agrees to guide research and must be available for occasional consultations;
 - (b) An application is made by the student concerned duly supported by the Advisory Committee;
 - (c) In case of a Ph.D. student, he/ she must have completed his/ her comprehensive examinations and the research work must be well in progress and it is expected that the student will submit the thesis within a year;
 - (d) The Head of the Department and the Dean of the College concerned agree to the proposal;

- (e) The staff member, after leaving the University service is granted the status of honorary faculty's membership by the Vice-Chancellor on the recommendation of the Director (Education)/ Dean PGS for guiding as Chairperson or Member, Advisory Committee the thesis/ theses of the student(s) concerned only.
- (iii) In case the Chairperson/ member of a Student's Advisory Committee retires, he/ she shall be allowed to continue provided that the student has completed his course work and minimum of 10 research credits and the retiring Chairperson/ member stays at the Headquarters of the College, till the thesis is submitted.
- (iv) If the Chairperson/ member proceeds on deputation to another organization, he/ she may be permitted to guide the student provided his/ her new organization is at the Headquarters of the College and his/ her organization is willing for the same.
- (v) The change shall be communicated to all concerned by the Head of Department.

6. Evaluation of research work

- It is highly desirable for Ph.D. programme and this should be done annually as an essential part of research evaluation. The Student Advisory Committee shall review the progress of research and scrutinize annual progress reports submitted by the student.
- Midterm evaluation of Ph.D. (to move from JRF to SRF) is a mandatory requirement for all the funding agencies. Hence, the second review of annual progress report need to be done after completion of two years. The successful completion enables the students to become eligible for SRF.

6.1 Prevention of plagiarism

- An institutional mechanism should be in place to check the plagiarism. The students must be made aware that manipulation of the data/ plagiarism is punishable with serious consequences.

7. Learning through online courses

- In line with the suggestion in new education policy and the initiatives taken by ICAR and MHRD in the form of e-courses, MOOCs, SWAYAM, etc. and also changes taking place globally in respect of learning through online resources it has been agreed to permit the students to enrol for online courses. It is expected that the provision of integrating available online courses with the traditional system of education would provide the students opportunities to improve their employability by imbibing the additional skills and competitive edge.

The Committee recommends the following points while integrating the online courses:

1. Board of Studies (BoS) of each Faculty shall identify available online courses and a student may select from the listed courses. The interested students may provide the details of the on-line courses to the BoS for its consideration.
2. A Postgraduate student may take up to a maximum of 20% credits in a semester through online learning resources.
3. The host institute offering the course does the evaluation and provide marks/ grades. The BoS shall develop the conversion formula for calculation of GPA and it may do appropriate checks on delivery methods and do additional evaluations, if needed.



8. Internship during Masters programme

Internship for Development of Entrepreneurship in Agriculture (IDEA)

Currently, a provision of 30 credits for dissertation work in M.Sc./ M.Tech/ M.F.Sc./ M.V.Sc. programmes helps practically only those students who aspire to pursue their career in academic/ research. There is hardly any opportunity/ provision under this system to enhance the entrepreneurship skills of those students who could start their own enterprise or have adequate skills to join the industry. Therefore, in order to overcome this gap, an optional internship/ in-plant training (called as IDEA) in lieu of thesis/ research work is recommended which will give the students an opportunity to have a real-time hands-on experience in the industry.

It is envisaged that the internship/ in-plant training would enhance the interactions between academic organizations and the relevant industry. It would not only enable the development of highly learned and skilled manpower to start their-own enterprises but also the industry would also be benefitted through this process. This pragmatic approach would definitely result in enhanced partnerships between academia and industry.

The main objectives of the programme:

1. To promote the linkages between academia and industry
2. To establish newer University – Cooperative R&D together with industry for knowledge creation, research and commercialization
3. Collaboration between Universities and industries through pilot projects
4. To develop methods for knowledge transfer, innovation and networking potential
5. To enhance skill, career development and employability

Following criteria for IDEA will be taken into consideration:

- At any point of time there will not be more than 50% of students who can opt under IDEA
- Major Advisor will be from Academia and Co-advisor (or Advisory Committee member) from industry
- Total credits (30) will be divided into 20 for internship/ in-plant training and 10 for writing the report followed by viva-voce similar to dissertation
- Work place will be industry; however, academic/ research support would be provided by the University or both. MoU may be developed accordingly
- The IPR, if any, would be as per the University policy

9. Teaching assistantship

- Teaching assistantship shall be encouraged. This will give the required experience to the students on how to conduct courses, practical classes, evaluation and other related academic matters. This is an important part of Ph.D. training all over the world and it is expected to address the shortage of faculty in many institutions/ universities.
- The fulltime doctoral students of the University with or without fellowship may be considered for award of Teaching Assistantships in their respective Departments. The Teaching Assistantship shall be offered only to those doctoral students who have successfully finished their course work. Any consideration for award of Teaching Assistantships must have the consent of the supervisor concerned.
- Teaching Assistantships shall be awarded on semester to semester basis on the recommendation of a screening/ selection committee to be constituted by the



ViceChancellor. All classes and assignments given to the Teaching Assistants, including tutorials, practicals and evaluation work shall be under the supervision of a faculty member who would have otherwise handled the course/ assignment.

- Each Ph.D. student may be allowed to take a maximum of 16 classes in a month to UG/ Masters students.
- No additional remuneration shall be paid to the students who are awarded ICAR JRF/ SRF. The amount of fellowship to be paid as remuneration to other students (who are receiving any other fellowship or without any fellowships) may be decided by the concerned universities as per the rules in force. However, the total amount of remuneration/ and fellowship shall not exceed the amount being paid as JRF/ SRF of ICAR.
- At the end of each term, Teaching Assistants shall be given a certificate by the concerned Head of the Department, countersigned by the School Dean, specifying the nature and load of assignments completed.

10. Registration of project personnel (SRF/ RA) for Ph.D.

- A provision may be made to enable the project personnel (SRF/ RA) to register for Ph.D. However, this can be done only if they are selected based on some selection process such as walk-in-interview. The prior approval of PI of the project is mandatory to consider the application of project personnel (SRF/ RA) for Ph.D. admission
- The candidates need to submit the declaration stating that the project work shall not be compromised because of Ph.D. programme. Further, in order to justify the project work and Ph.D. programme, the number of course credits should not be more than 8 in a semester for the project personnel (SRF/ RA) who intend to register for Ph.D.

11. Compliance with the National Education Policy-2020

- While implementing the course structure and contents recommended by the BSMA Committees, the Higher Education Institutions (HEIs) are required to comply with the provisions of National Education Policy-2020, especially the following aspects:
- Given the 21st century requirements, quality higher education must aim to develop good, thoughtful, well-rounded, and creative individuals. It must enable an individual to study one or more specialized areas of interest at a deep level, and also develop character, ethical and Constitutional values, intellectual curiosity, scientific temper, creativity, spirit of service, and 21st century capabilities across a range of disciplines including sciences, social sciences, arts, humanities, languages, as well as professional, technical, and vocational subjects. A quality higher education must enable personal accomplishment and enlightenment, constructive public engagement, and productive contribution to the society. It must prepare students for more meaningful and satisfying lives and work roles and enable economic independence (9.1.1. of NEP-2020).
- At the societal level, higher education must enable the development of an enlightened, socially conscious, knowledgeable, and skilled nation that can find and implement robust solutions to its own problems. Higher education must form the basis for knowledge creation and innovation thereby contributing to a growing national economy. The purpose of quality higher education is, therefore, more than the creation of greater opportunities for individual employment. It represents the key to more vibrant, socially engaged, cooperative communities and a happier,



cohesive, cultured, productive, innovative, progressive, and prosperous nation (9.1.3. of NEP-2020).

- Flexibility in curriculum and novel and engaging course options will be on offer to students, in addition to rigorous specialization in a subject or subjects. This will be encouraged by increased faculty and institutional autonomy in setting curricula. Pedagogy will have an increased emphasis on communication, discussion, debate, research, and opportunities for cross-disciplinary and interdisciplinary thinking (11.6 of NEP-2020).
- As part of a holistic education, students at all HEIs will be provided with opportunities for internships with local industry, businesses, artists, crafts persons, etc., as well as research internships with faculty and researchers at their own or other HEIs/ research institutions, so that students may actively engage with the practical side of their learning and, as a by-product, further improve their employability (11.8 of NEP-2020).
- HEIs will focus on research and innovation by setting up start-up incubation centres; technology development centres; centres in frontier areas of research; greater industry-academic linkages; and interdisciplinary research including humanities and social sciences research (11.12. of NEP-2020).
- Effective learning requires a comprehensive approach that involves appropriate curriculum, engaging pedagogy, continuous formative assessment, and adequate student support. The curriculum must be interesting and relevant, and updated regularly to align with the latest knowledge requirements and to meet specified learning outcomes. High-quality pedagogy is then necessary to successfully impart the curricular material to students; pedagogical practices determine the learning experiences that are provided to students, thus directly influencing learning outcomes. The assessment methods must be scientific, designed to continuously improve learning and test the application of knowledge. Last but not least, the development of capacities that promote student wellness such as fitness, good health, psycho-social well-being, and sound ethical grounding are also critical for high-quality learning (12.1. of NEP-2020).

Definitions of Academic Terms

Chairperson means a teacher of the major discipline proposed by the Head of Department through the Dean of the College and duly approved by the Director of Education/ Dean Post Graduate Studies (or as per the procedure laid down in the concerned University regulations) to act as the Chairperson of the Advisory Committee and also to guide the student on academic issues.

Course means a unit of instruction in a discipline carrying a specific number and credits to be covered in a semester as laid down in detail in the syllabus of a degree programme.

Credit means the unit of work load per week for a particular course in theory and/ or practical. One credit of theory means one class of one clock hour duration and one credit practical means one class of minimum two clock hours of laboratory work per week.

Credit load of a student refers to the total number of credits of all the courses he/ she registers during a particular semester.

Grade Point (GP) of a course is a measure of performance. It is obtained by dividing the per cent mark secured by a student in a particular course by 10, expressed and rounded off to second decimal place.

Credit Point (CP) refers to the Grade point multiplied by the number of credits of the course, expressed and rounded off to second decimal place.

Grade Point Average (GPA) means the total credit point earned by a student divided by total number of credits of all the courses registered in a semester, expressed and rounded off to second decimal place.

Cumulative Grade Point Average (CGPA) means the total credit points earned by a student divided by the total number of credits registered by the student until the end of a semester (all completed semesters), expressed and rounded off to second decimal place.

Overall Grade Point Average (OGPA) means the total credit points earned by a student in the entire degree programme divided by the total number of credits required for the P.G. degree, expressed and rounded off to second decimal place.

Restructured and Revised
Syllabi of Post-graduate Programmes

Vol. 6

Community Science
– Apparel and Textile Science

Preamble

(Apparel and Textile Science)

The field of Apparel and textiles is multidisciplinary with holistic approach to education. It is a combination of science, technology, fine arts, fashion, innovation, creative skills, soft skills, management, consumer education and many more. It provides trained personnel to the textile and apparel industry which accounts for 30% of the total employment generated in the country and 12% of the country's export earnings. It is imperative to develop skills in students so that they can cope with the present needs of textile and apparel industry and build career in the industry. The hands on trainings are necessary to implement the ideas and acquire the practical knowledge, which ultimately helps to implement the theoretical aspects into practical work. Keeping this in mind the course curricula of ATS is modified as per present needs.

The curriculum includes major, minor, supporting and compulsory courses which will strengthen the knowledge of the students both theoretically as well as practically. The students will be equipped with knowledge in apparel, textile chemistry, woven textile designing, Computer Aided Textile and Apparel Designing, Textile and Apparel Industrial Management, Historical Costumes, Textile Ecology (eco-friendly, natural clothing), Colour Application, Textile Conservation, Operational Management in Textiles and Apparels. The textile courses will focus on understanding the textile chemistry behind manufacturing, colouring and conservation of textiles. The apparel courses will highlight the designing using CAD application, fashion marketing and merchandising as well as socio-psychological aspects and revival of traditional costumes which reflects the culture of any country.

New subjects of current importance such as Textile and Apparel Product Development, Operation Management in Textiles and Apparels, Sustainability in Textile and Apparel Industry are introduced for brightening the career of the students and enterprise development. Students acquire advanced skills in all fields of apparel and textiles that increase their confidence to take up entrepreneurial activities online with the National policy on education 2020.

The Members of BSMA Community Science are thankful to faculty of different SAU's who have taken pains to share their experiences in the field and hope that the curriculum will be helpful for the PG students to learn, teach and undertake entrepreneurial activities which will fulfill the ever expanding requirements of Apparel and Textile industry, not only in India but abroad also.



Modifications Suggested in Courses in the Revised Curricula

M.Sc. (Community Science) Apparel and Textile Science

Course Code	Course Title	Credit Hours	Remarks
Core Courses (20 Credits)			
*ATS 501	Textile Chemistry	3(2+1)	Content updated
*ATS 502	Textile and Apparel Quality Analysis	3(2+1)	Two courses Merged
*ATS 503	Pattern Making and Draping	3(1+2)	Two courses Merged
*ATS 504	Woven Textile Design	3(2+1)	Content Modified
ATS 505	Wet Processing of Textiles	3(2+1)	Title changed
ATS 506	Computer Aided Textile and Apparel Designing	2(0+2)	
ATS 507	Textile and Apparel Industrial Management	3(3+0)	Content Modified
ATS 508	Historic Textiles and Costumes	2(1+1)	Content Modified
ATS 509	Textile Auxiliaries	3(2+1)	
ATS 510	Socio Psychological Aspects of Clothing	2(2+0)	
ATS 511	Sustainability in Textile and Apparel Industry	2(2+0)	New course
ATS 512	Textile and Apparel Product Development	2(1+1)	New course
ATS 513	Laboratory Techniques in Textile Research	2(0+2)	New course
ATS 514	Special Project	1(0+1)	
Minor Courses (08 Credits)			
FN 505	Nutrition and Physical fitness	3(2+1)	Minor Courses
FN 509	Food safety and Standards	3(2+1)	may be selected
FN 513	Human Physiology	3(3+0)	from subjects
EECM 502	Development communication	3(2+1)	closely related to a
EECM 505	Dynamic communication skills	2(0+2)	student's major
EECM 507	Organisational development and HRD	2(1+1)	subject. Apart from these
EECM511	Climate change management	2(1+1)	courses, a student can register any
HDFS 503	Methods and techniques of assessment in human development	3(2+1)	course offered by

Course Code	Course Title	Credit Hours	Remarks
HDFS 506	Management of differently abled	3(2+1)	any other department
Supporting Courses (06 Credits)			
	Research Methodology	3(2+1)	
	Statistical methods and application	3(2+1)	Course numbers will be assigned by the departments that offer these courses.
Common Courses (05 Credits)			
	Library and Information Services	1(0+1)	Common to all disciplines. The course numbers will be assigned by the departments that offer these courses
	Technical Writing and Communications Skills	1(0+1)	
	Intellectual Property and its management in Agriculture	1(0+1)	
	Basic Concepts in Laboratory Techniques	1(0+1)	
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)	
ATS 591	Seminar	1(1+0)	
ATS 599	Thesis/ Research	30	Increased credits for Research
Total		70	

*Core courses/ compulsory courses

Ph.D. (Community Science) Apparel and Textile Science

Course Code	Course Title	Credit Hours	Remarks
Major Courses (12 Credits)			
*ATS 601	Textile Ecology	2(2+0)	
*ATS 602	Technical Textiles	3(2+1)	Modified
ATS 603	Technological Developments in Textiles and Apparel	2(2+0)	
ATS 604	Colour Application in Textiles	2(1+1)	Content updated
*ATS 605	Functional Clothing	3(2+1)	



Course Code	Course Title	Credit Hours	Remarks
ATS 606	Textile Conservation	2(1+1)	Modified
ATS 607	Operational Management in Textiles and Apparel	2(2+0)	New
ATS 608	Technology of Nonwovens	2(2+0)	
ATS 609	Special Project	2(0+2)	
Minor Courses (06 Credits)			
CS/PGS 601	Research and Publication Ethics	2(1+1)	Minor Courses
FN604	Global Nutrition Problems	2(2+0)	may be selected
FN 608	Energy Metabolism	2(2+0)	from subjects
EECM 602	Impact Assessment of Development Programmes	3(1+2)	closely related to a student's major
EECM 603	Scaling Techniques for Behavioural Research	3(1+2)	subject. Apart from these
EECM 607	Media application and product promotion	4(2+2)	courses, a student can register any
HDFS 608	Qualitative research methods	3(2+1)	course offered by
RMCS 603	Globalization and Consumer Economics	3 (2+1)	any other department
RMCS 606	Environmental Issues and Challenges	2 (2+0)	
RMCS 607	Family Dynamics and Women Power	3 (2+1)	
Supporting Courses (05 Credits)			
A student can opt any course related to the topic of research offered by other faculties of agriculture university or SWAYAM portal or other online courses up to a maximum of 5 credits.			
ATS 691	Doctoral Seminar I (Major Field)	1(1+0)	
ATS 692	Doctoral Seminar II (Minor Field)	1(1+0)	
ATS 699	Research	75	Increased credits for Research
Total		100 Credits	

*Core courses/ compulsory courses

Course Title with Credit Load

M.Sc. in Apparel and Textile Science

Course Code	Course Title	Credit Hours
Major Courses (20 Credits)		
*ATS 501	Textile Chemistry	3(2+1)
*ATS 502	Textile and Apparel Quality Analysis	3(2+1)
*ATS 503	Pattern Making and Draping	3(1+2)
*ATS 504	Woven Textile Design	3(2+1)
ATS 505	Wet Processing of Textiles	3(2+1)
ATS 506	Computer Aided Textile and Apparel Designing	2(0+2)
ATS 507	Textile and Apparel Industrial Management	3(3+0)
ATS 508	Historic Textiles and Costumes	2(1+1)
ATS 509	Textile Auxiliaries	3(2+1)
ATS 510	Socio Psychological Aspects of Clothing	2(2+0)
ATS 511	Sustainability in Textile and Apparel Industry	2(2+0)
ATS 512	Textile and Apparel Product Development	2(1+1)
ATS 513	Laboratory Techniques in Textile Research	2(0+2)
ATS 514	Special Project	1(0+1)
Minor Courses (08 Credits)**		
FN 505	Nutrition and Physical fitness	3(2+1)
FN 509	Food safety and Standards	3(2+1)
FN 513	Human Physiology	3(3+0)
EECM 502	Development communication	3(2+1)
EECM 505	Dynamic communication skills	2(0+2)
EECM 507	Organisational development and HRD	2(1+1)
EECM511	Climate change management	2(1+1)
HDFS 503	Methods and techniques of assessment in human development	3(2+1)
HDFS 506	Management of differently abled	3(2+1)
Supporting Courses (06 Credits)		
	Research Methodology	3(2+1)
	Statistical methods and application	3(2+1)
Common Courses (05 Credits)		
	Library and Information Services	1(0+1)
	Technical Writing and Communications Skills	1(0+1)
	Intellectual Property and its management in Agriculture	1(0+1)



Course Code	CourseTitle	Credit Hours
	Basic Concepts in Laboratory Techniques	1(0+1)
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)
ATS 591	Seminar	1(1+0)
ATS 599	Thesis/ Research	30
	Total	70

*Core courses/ compulsory courses; **Apart from the courses listed under minor courses, the student may opt courses from any other department related to the research undertaken.

Course Contents

M.Sc. in Apparel and Textile Science

I. Course Title : Textile Chemistry

II. Course Code : ATS 501

III. Credit Hours : 3(2+1)

IV. Rationale

Fabrics made of different textile fibres exhibit varied properties. It is imperative to understand the structure and polymer content of the fibres. The reactions of these fibre polymers to different chemicals, finishing agents, dyes and other biological conditions provide an understanding for further processing and care of fabrics.

V. Aim of the course

- To provide knowledge on polymers and their molecular structure
- It provides understanding of the structure – property relations of textile fibres.
- To equip students to identify and evaluate different fibres and their performance.

VI. Theory

Unit I: Chemistry of polymers

Polymerization- types, degree and characteristics; Structure of textile fibres- molecular bonding, length, orientation; Requirements of fibre forming polymers; Bi-component and Bi-constituent fibres- types, characteristics, application and spinning (fibre forming systems)

Unit II: Structure-property relations of natural fibres

Repeating units, bonds, reactive groups; Reactions of cotton, linen, jute, silk, wool, and minor natural fibres to, heat, light, various chemicals and microorganisms.

Unit III: Structure-property relations of Man-made and Synthetic fibres

Repeating units, bonds, reactive groups and reactions of viscose rayon, modal (HWM), polyester, nylon, acrylic, spandex to heat, light, various chemicals and microorganisms; Fibre Blending- principles, types and scope.

Unit IV: Introduction to high performance fibres

Aramid, Ultra-High Molecular Weight Polyethylene (UHMWPE), High Density Polyethylene (HDPE), Carbon, Fibres with Limited Oxygen Index (LOI), Glass and Special fibres.

VII. Practicals

- Preparation of chemical solutions for fibre testing.
- Fibre testing – Natural fibres- cross sectional view of cotton, Jute, Linen, Wool and Silk.
- Cross sectional view of Man-made fibres – Viscose, polyester, acrylic and minor fibres.
- Effect of heat on cellulosic, protein and synthetic fibres.
- Effect of dilute and conc acids on cellulosic, protein and synthetic fibres.



- Effect of dilute and conc alkali on cellulosic, protein and synthetic fibres.
- Detection of acid damage on Cotton.
- Mercerization of cotton fibres and yarns- with and without tension.
- Effect of bleaching on textile fibres – Detection of damage due to over bleaching.
- Effect of finishing agents and solvents on cellulosic, protein and synthetic fibres.
- Detection of damage to cellulosic and protein fibres by acids and alkalies.
- Quantitative analysis of binary fibre blends.
- Conditioning and estimation of fibre blend ratio.
- Quantitative analysis of tertiary fibre blends.
- Conditioning and estimation of fibre blend ratio.
- End term Assessment.

VIII. Teaching Methods/ Activities

- Lecture
- Assignment (Reading/Writing)
- Student's Book/Publication Review
- Student presentation
- Demonstrations
- Customised testing
- Group Work

IX. Learning Outcome

After successful completion of this course, the students can:

- Differentiate the fibres based on the chemistry of polymers and fiber structures
- Analyse the properties of fibres based on their structure
- Get acquainted with the recent developments in fibres and finishing
- Understand the performance of blends

X. Suggested Reading

- Andrea Wynne. 1997. *Textiles*. Macmillian, USA
- Bernard P Corbman. 1983. *Textiles - Fiber to Fabric*. McGraw-Hill, USA
- Kathryn L Hatch 2014. *Textile Science*, West Pub, USA
- Lyle DS. 1976. *Modern Textiles*. John Wiley & Sons, UK
- Marjory L. Joseph. 1966. *Introductory Textile Science*. Rinehart & Winston, UK
- Mather RR, Wardman RH. 2011. *The Chemistry of Textile Fibres*. Royal Society of Chemistry, Cambridge.
- Needles HL. 2001. Textile Fibres, Dyes, Finishes and Processes. Standard Publishers Distributors, Delhi.
- Vilensky G. 1987. *Textile Science*. CBS, India
- Wingate IB. 1984. *The Fabrics - Their Selection*. Prentice Hall, USA
- Journal of Applied Polymer Science
<https://onlinelibrary.wiley.com/journal/10974628>
- Journal of Textile Science & Engineering
<https://www.omicsonline.org/textile-science-engineering.php>

Weekly Lecture Schedule

Duration (week)	Topics
1	Polymerization- types, degree and characteristics
2-3	Structure of textile fibres- molecular bonding, length, orientation
4	Requirements of fibre forming polymers
5	Bi-component and Bi-constituent fibres- types, characteristics, application and spinning

Duration (week)	Topics
6	Repeating units, bonds, reactive groups and reactions of cotton, linen, jute, silk, wool, and minor natural fibres to various chemicals, heat, light and microorganisms
7	Repeating units, bonds, reactive groups and reactions of Linen and jute to various chemicals, heat, light and microorganisms
8	Repeating units, bonds, reactive groups and reactions of silk and Wool to various chemicals, heat, light and microorganisms
9	Repeating units, bonds, reactive groups and reactions of minor natural fibres to various chemicals, heat, light and microorganisms
10	Repeating units, bonds, reactive groups and reactions of Rayon and Modal fibres to various chemicals, heat, light and microorganisms
11	Repeating units, bonds, reactive groups and reactions of nylon and Polyester fibres to various chemicals, heat, light and microorganisms
12	Repeating units, bonds, reactive groups and reactions of Acrylic and Spandex fibres to various chemicals, heat, light and microorganisms
13	Aramid, Ultra-High Molecular Weight Polyethylene (UHMWPE)
14	High Density Polyethylene (HDPE) and Carbon fibres
15	Fibres with Limited Oxygen Index (LOI)
16	Glass and Specialty fibres

I. Course Title : Textile and Apparel Quality Analysis

II. Course Code : ATS 502

III. Credit Hours : 3 (2+1)

IV. Rationale

Textiles of different varieties are available in the market, the quality and price of which range from low to high. The consumer is in great confusion to select fabrics for their end-use performance. Textile industries need to check the quality of fibre raw material used for making customised quality of the final product such as yarn in case of spinning or fabric in case of knitting or weaving. Fabric quality is paramount in predicting the garment performance.

V. Aim of the course

- To familiarise the students with the methods and techniques used to analyze textile fibres, yarns and fabrics for end-use performance.
- To acquaint the students with principles, test methods of different testing equipment and the internationally accepted textile and apparel quality standards.
- To equip the students to analyze and interpret the results and predict the quality of textile and apparel.

VI. Theory

Unit I: Quality analysis and control

Importance of quality analysis and control; Effect of moisture and humidity on properties of textiles; Standard conditions of testing; Sampling – methods and techniques for fibre, yarn and fabric

Unit II: Fibre and yarn testing

Fibre testing - length, linear density, maturity and strength; Yarn testing – yarn count, single and lea strength, twist, crimp and evenness.



Unit III: Fabric testing

Fabric testing – Geometrical properties - thread count, weight, thickness, strength - breaking, tearing and bursting; Abrasion resistance, pilling, crease recovery, stiffness, drapability, air permeability, thermal properties, flammability, water absorbency and repellency, dimensional stability, colour fastness; Comfort and fabric handle measurement.

Unit IV: Apparel quality Control

Yarn and fabric defects; Preliminary inspection- Quality specifications and standards in raw material purchasing – fabric and accessories; In-process inspection - Quality control in spreading, cutting and bundling products; Quality factors in sewing, pressing, folding and finishing; Quality aspects of trims and accessories; Tolerance limits for garment dimensions; Final inspection – general garment defects; Procedure for quality checking and reporting.

Unit V: National and international organizations for standards

National and international organizations for standards – BIS and other global standards; Quality auditing system – process and product audit, internal quality audit procedure.

VII. Practicals

1. Sampling techniques of fibre, yarn and fabric.
2. Testing of fibre – length, maturity and linear density.
3. Yarn Testing – count, twist, crimp and evenness
4. Fabric testing – Geometrical properties - weight, thickness and fabric count
5. Fabric testing – abrasion resistance, pilling
6. Fabric testing – crease recovery, stiffness and drapability
7. Fabric testing – air permeability and thermal properties
8. Fabric testing – water permeability, wicking and dimensional stability
9. Breaking Strength– tensile strength of fibre, yarn and fabric
10. Estimation of tearing and bursting strength of fabrics
11. Processing, statistical analysis of the test data and interpretation of results
12. Garment Quality - Inspection of raw materials and analysis of defects in raw materials
13. Product quality analysis with respect to specification sheets- raw materials, product dimensions, construction and labeling.
14. Study of quality auditing system in the industry.
15. Quality analysis of low priced, medium priced and high priced garments available in market – fabric quality, workmanship, fitting and sizing
16. Visit to textile testing laboratory

VIII. Teaching Methods/ Activities

- Lecture
- Demonstration
- Hands-on-experience on textile and apparel quality testing machinery
- Industrial exposure
- Assignment
- Publication Review
- Student presentation
- Group Work

- Case Analysis and case studies
- Guest Lectures from industry experts

IX. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Perceive quality in fibre, yarn and fabrics for end-use performance
- Pursue career in quality control labs and apparel industries

X. Suggested Reading

- AATCC. 2010. *Technical Manual-Vol 85*. American Association of Textile Chemist and Colorist, USA
- Angappan 1987. *Textile Testing*. SSM Institute of Technology, Komarapalayam, India.
- BIS.1982. *ISI Hand Book of Textile Testing*, BIS Publications, India.
- Booth JL. 1983. *Principles of Textile Testing*. Butterworth.
- Gerry Cooklin 1997. *Garment Technology for Fashion Designers*, John Wiley & Sons, UK
- Gerry Cooklin. 2006. *Introduction to Clothing Manufacture*, Wiley, UK
- Latham Barbara and Carr Harold. 1999. *The Technology of Clothing Manufacture*. Blackwell Science, UK
- Pradeep V Mehta. 1998. *Managing Quality in Apparel Industry*, New Age International, India
- Pradeep V Mehta. 2004. *An Introduction to Quality Assurance for the Retailers*, iUniverse, USA
- Ruth E Glock. 1990. *Apparel Manufacturing*. Macmillan Publ. USA
- Textile Research Journal- <https://journals.sagepub.com/home/trj>

Weekly Lecture Schedule

Duration (weeks)	Topic
1	Importance of textile testing, standardization and quality control; Effect of moisture and humidity on properties of textiles. Standard conditions of testing
2	Sampling – methods and techniques for fibre, yarn and fabric; Functions of BIS and other standards
3	Fibre testing - length, linear density, maturity
4	Yarn testing - count, twist, crimp and evenness.
5	Tensile Strength measurement of textiles- Principles of tensile testing; various testers for tensile testing of fibres, yarns and fabrics
6	Fabric testing – geometric parameters- Fabric count, thickness; tearing and bursting strength, abrasion resistance and pilling
7	Fabric testing- crease recovery, stiffness, drapability and air permeability
8	Fabric testing - thermal properties, flammability, water absorbency and repellency, dimensional stability
9	Colour fastness tests; Comfort and fabric handle measurement
10	Yarn and fabric defects
11	Preliminary Inspection in garment industry- Quality specifications and standards in raw material purchasing; quality control in spreading, cutting and bundling products.
12	In-process inspection- Quality factors in sewing, pressing, folding and finishing; quality aspects of trims and accessories.
13	Final Inspection- Quality considerations in construction and finishing. Tolerance limits for garment dimensions
14	Various inspection systems. Procedure for quality checking and reporting.
15	National and international organizations for standards.
16	Quality auditing system – process and product audit. Internal quality audit procedure.

-
- I. Course Title** : Pattern Making and Draping
II. Course Code : ATS 503
III. Credit Hours : 3 (1+2)

IV. Rationale

Pattern making helps to interpret a design with a practical understanding of garment construction. It is a connection step between design and product. Draping serves as a major function in the customization and fit of a garment. Both are the methods of creating a garment as per the design. It is understood that they are not totally exclusive methods, but some designs call for a combination of both the techniques in achieving design satisfaction for both the designer and consumer. It will enable students to make advance patterns and obtain perfect fit and enable the students to make pattern from sketch/photograph.

V. Aim of the course

- To Understand the style reading, pattern making, draping and garment construction techniques
- To acquire skill in advance pattern making and obtain perfect fit and harmony between the fabric and design of the garment
- To enable students to make pattern from sketch/photograph

VI. Theory

Unit I: Advanced techniques of pattern making and draping

Advanced techniques of pattern making and draping: incorporating style lines and fullness.

Unit II: Contouring

Contouring – principles, contour guide patterns, classic, empire, surplice, off-shoulder designs, halters

Unit III: Bodice - Sleeve variations

Raglan sleeve variations – one-piece raglan, deep armhole raglan, armhole-princess raglan, yoke raglan with bell sleeve; Drop shoulder, exaggerated armholes, caftan

Unit IV: Pattern Grading and Fitting

Pattern grading – principles, grading bodice, sleeve, collar; Fitting – principles, standards, fitting problems and remedies

VII. Practicals

1. Dart manipulation through pivotal transfer
2. Dart manipulation through slash and spread method
3. Methods of adding fullness and contouring
4. Developing designs with added fullness and contouring using darts
5. Developing designs with added fullness and contouring using pleats
6. Developing designs with added fullness and contouring using tucks & gathers
7. Contouring -application in classic and empire designs
8. Contouring -application in off-shoulder designs
9. Contouring -application in halter neckline designs
10. Contouring -application in surplice designs
11. Draping of dartless shirt designs
12. Incorporating style lines

13. Draping collars
14. Draping Cowls at neckline and underarm
15. Draping Cowls in skirts
16. Draping Built-in necklines
17. Draping Flounces
18. Draping Ruffles
19. Draping Peplums
20. Draping designs with knit fabrics and making patterns
21. Pattern making for variations in sleeves
22. Pattern making for variations in skirts
23. Pattern making for variations in trousers
24. Pattern grading- Bodice and sleeves
25. Pattern grading of skirts; men's and woman's garments
26. Designing garment 1 based on both the methods of pattern making and draping and making patterns
27. Designing garment 2 based on both the methods of pattern making and draping and making patterns
28. Designing garment 3 based on both the methods of pattern making and draping and making patterns
29. Construction of custom garment 1
30. Construction of custom garment 2
31. Construction of custom garment 3
32. Assessment of custom garments for quality and body fit

VIII. Teaching Methods/ Activities

- Lecture
- Demonstration
- Design Scrapbook
- Student presentation
- Group Work
- Design Analysis
- Guest Lectures
- Assignment

IX. Learning Outcome

After successful completion of this course, the students are able to:

- Understand the style reading, pattern making, draping and garment construction techniques
- Get knowledge about advance pattern and obtain perfect fit and harmony between the fabric and design of the garment

X. Suggested Reading

- Amaden-Crawford C. 2018. *The Art of Fashion Draping*. V Edition Bloomsbury Publishing Inc, USA
- Bane A. 1996. *Creative Clothing Construction*. MC Graw-Hill
- Connie Amaden- Crawford. 1989. *The Art of Fashion Draping*. Fair Child Publ.
- Cooklin G. 2004 *Pattern Grading for women's Clothes*. Blackwell Publishing, France
- International Journal of Clothing Science and Technology
<https://www.emeraldinsight.com/loi/ijcst>
- Janine Mee & Michal Purdy. 1987. *Modeling on the Dress Stand*. BSP Professional Books
- Joseph-Armstrong H. 2005. *Patternmaking for Fashion Design*. Pearson Education Inc. India

- Journal of Textile Engineering & Fashion Technology
<https://medcraveonline.com/JTEFT/>
- Natalie Bray. 1994. *Dress Fitting*. Blackwell

Weekly Lecture Schedule

Duration (week)	Topics
1 & 2	Techniques of pattern making-drafting, flat pattern and draping
3 & 4	Use of style lines and fullness in pattern making
5,6 & 7	Understanding principles of contouring, surplice/off shoulder and halter designs
8 & 9	Types of Built -in necklines, cowls and collars
9,10 & 11	Introduction to advanced sleeve variations, exaggerated armholes, pockets and bias-cut dresses.
12, 13 & 14	Types of Skirts and pants
15 & 16	Pattern adoption to knits

I. Course Title : Woven Textile Design

II. Course Code : ATS 504

III. Credit Hours : 3 (2+1)

IV. Rationale

Consumers are seeking variety in woven textiles having new, interesting textures and functionality. Constant innovation in woven textiles is possible through textile design which combines elements from aesthetic creativity with technical skills. Knowledge on textile designing, aesthetics, materials, and techniques help in constructing new fabrics in tune with a new season's forecast.

V. Aim of the course

- To expose students to different looms and types of weaves
- To gain skills in designing woven patterns and weaving

VI. Theory

Unit I: Types of looms, scope and importance

Shuttleless looms –scope, importance and types -projectile, rapier, air jet, water jet weaving; multiple shed loom; Circular weaving; Tri-Axial looms; Pre-weaving processes for advance weaving; Automation in weaving.

Unit II: Woven designs and various weaves

Woven Design – fabric textures; Graphical representation of design, draft and peg plan; Classification of weaves; Warp weight and weft weight calculations; Twill weave and its modification; Colour and weave effects.

Unit III: Types of textured and decorative weaves

Construction of crepe, toweling- honeycomb, huck-a-back, bedford cord and curtain weaves-mockleno; Construction and production of complex structures - leno, double cloth, extra warp and extra weft figuring, terry pile and velveteens.

Unit IV: Specialty fabrics

Construction and production of damask and brocade fabrics using jacquard patterning devices; Methods of carpet making; Use of specialty fibres, specialty yarns, designing and production of specialty fabrics.

VII. Practicals

1. Weaving introduction – Procurement of yarn, setting up loom
2. Analysis of woven samples from different weaves
3. Construction of design, draft and peg plans for different weaves
4. Weaving samples of basic weave variations- plain and satin
5. Weaving samples of basic twill weave variations
6. Developing woven designs for weaving
7. Motif preparation and placement in different styles
8. Developing colour and texture plans
9. Weaving of the fabric with woven designs
10. Contd weaving of the fabric with woven designs
11. Documentation of traditional textile designs
12. Development of modified textile designs
13. Documentation of modified textile designs
14. Visit to Modern Weaving Mill with shuttleless looms
15. Portfolio development with woven samples and created designs
16. End term Assessment

VIII. Teaching Methods/ Activities

- Lecture
- Assignment
- Fabric structure Analysis
- Develop Compendium of woven designs and swatches
- Scrapbook of woven designs and weave calculations
- Student presentation
- Group Work
- Guest Lectures

IX. Learning Outcome

After successful completion of this course, the students are expected to:

- Be able to analyze different weave patterns
- Identify different woven designs
- Be confident in producing woven patterns on sample looms

X. Suggested Reading

- Grosick ZJ. 1975. *Watson's Textile Design & Colour*. Butterworths. Grosick ZJ. 1980.
- Grosick ZJ. 1989. *Watson's Advanced Textile Design - Compound Woven Structures*. Universal Publ.
- Gupta S. 1959. *Weaving Calculations*. DB Taraporawala Sons.
- Hayavadana J. 2017. *Woven Fabric Design and Product Planning*, Wood Head Publishers, New Delhi.
- Marjory J. 1972. *Illustrated Guide for Textiles*. RineHort & Winsoten, New York.
- Talukdar MK. *Weaving Machines, Mechanism and Management*. Mahajan Publications
- Mgbakoigba: Journal of African Studies- <https://www.ajol.info/index.php/mjas>
- ACM Digital Library- <https://dl.acm.org/>

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Shuttleless looms – scope, importance and types - projectile, rapier, air jet, water jet weaving
2	Multiple shed loom; Circular weaving; Tri-Axial looms

Duration (week)	Topics
3	Pre-weaving processes for advance weaving- machinery involved
4	Automation in weaving- Automatic controls
5	Woven Design – fabric textures; Graphical representation of design, draft and peg plan
6	Classification of weaves; Warp weight and weft weight calculations
7	Twill weave and its modification
8	Colour and weave effects for different weaves
9-10	Construction of crepe, toweling- honeycomb, Huck-a-back, bedford cord and curtain weaves-mockleno
11	Construction and production of complex structures - leno, double cloth, extra warp and extra weft figuring
12	Construction and production of complex structures- terry pile and velvetens
13	Construction and production of damask and brocade fabrics using jacquard patterning devices
14	Methods of carpet making
15	Use of specialty fibres, specialty yarns Designing and production of specialty fabrics.
16	Discussion on selection of weave for customized weaving

I. Course Title : Wet Processing of Textiles

II. Course Code : ATS 505

III. Credit Hours : 3 (2+1)

IV. Rationale

Almost all fabrics produced undergo some form of wet processing or other based on the market demand. Consumers do not prefer grey fabrics but rather demand specialised prints, textures and functional fabrics – all of which are produced with various wet processing techniques.

V. Aim of the course

- To develop knowledge about types of dyes and theory of dyeing
- To acquire skills in advanced dyeing and printing techniques
- To familiarize with the finishing treatments specific to fibre type

VI. Theory

Unit I: Chemistry of dyes and pigments

Theory of dyeing; Chemistry of dyes and pigments- composition, structure, properties, affinity towards fibres, method of application, fixing, after treatments and fastness properties; Dyeing with natural dyes and role of mordants.

Unit II: Advanced Dyeing and Printing Techniques

Dyeing of blends; Advanced dyeing techniques – macro, micro and nano; Dyeing machines used at the cottage and industrial level for fibre, yarn and fabric; Dyeing and printing defects and remedies; Advanced printing techniques- digital printing, 3D prints, automated flat bed and rotary screen printing; Assessment of colour fastness.

Unit III: Textile Finishes

Textile finishes – concept, scope and importance ; functional finishes on different fabrics – antimicrobial, soil and stain release, durable press, UV protective, flame

retardancy; Comfort imparting finishes - application, uses, characteristics, problems and evaluation; Finishing with enzymes; Finishing of blended fabrics.

VII. Practicals

1. Preparation of fabrics for dyeing
2. Preparation of fabrics for printing
3. Preparation of fabrics for finishing
4. Developing shade cards on different substrate with various classes of dyes and colour matching.
5. Developing shade cards and colour matching.
6. Natural dyes
7. Dyeing with different mordants
8. Advanced techniques of fabric printing
9. Identification of finishing agents
10. Application of finishing agents
11. Eco-friendly finishing of textiles
12. Assessment of properties of finished fabrics
13. Study of labels pertaining to finishes
14. Theme based project work –Theme selection
15. Project preparation
16. End-term assessment

VIII. Teaching Methods/ Activities

- Lecture
- Assignment (Reading/Writing)
- Compendium of fabric shades
- Student's Swatch Book of printed textiles
- Student presentation
- Group Work
- Case Analysis and case studies
- Guest Lectures

IX. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Select dyes as per the fiber type
- Produce dyed and printed portfolios
- Showcase skill in surface enrichment with combination techniques of dyeing and printing

X. Suggested Reading

- Gopal Krishnan D and Karthik T. 2016. *Basics of Textile Chemical Processing*. Daya Publishing House, Astral International Pvt. Ltd., New Delhi.
- Hall AJ. 1955. *Handbook of Textile Dyeing & Printing*. The National Trade Press.
- Koushik CV and Josico AI. 2003. *Chemical Processing of Textiles: Preparatory processes and dyeing*. NCUTE, New Delhi.
- Nisbel H. 1978. *Grammer of Textile Design*. D.B. Taraporevale Sons.
- Prayag RS. 1988. *Textile Finishing*. Sri T Printers.
- Sekhri S. 2011. *Text Book of Fabric Science: Fundamentals to Finishing*. PHI Learning, Pvt.Ltd, New Delhi.
- Shanai. 1976. *Chemistry of Textile Auxiliaries*. Sevak Publ.
- Shenai VA. 1985. *Technology of Printing, Technology of Textile Processing*. Vol. IV. SevakPubl.
- Shenai VA. 1994. *Technology of Dyeing*. Sevak Publ.

- Shenia. 1995. *Technology of Bleaching & Mercerizing*. Sevak Publ.
- Story J. 1974. *The Thames & Hudson Manual of Textile Printing*. Thames & Hudson.
- Sule AD. 1997. *Computer Colour Analysis Textile Application*. New Age International.
- Vaidya A and Trivedi. 1975. *Textile Auxiliaries & Finishing Chemicals*. ATIRA, Ahmedabad.
- Vidyasagar PV. 1998. *A Handbook of Textiles*. Mittal Publ.
- Vilensky G. 1987. Textile Science. CBS.
- Wynne A. 1997. Textiles. Macmillian
- Journal of Saudi Chemical Society
<https://www.sciencedirect.com/journal/journal-of-saudi-chemical-society>
- Chemistry International
<http://bosaljournals.com/chemint/>

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Concept of colour and its relation to light. Classification of dyes/colouring matter
2	Theories of dyeing.
3&4	Chemistry of dyes and pigments- composition, structure, properties, affinity towards fibres, method of application, fixing, after treatments and fastness properties
5	Dyeing with natural dyes and role of mordants.
6	Dyeing of blends.
7	Advanced dyeing techniques – macro, micro and nano
8	Dyeing machines used at the cottage and industrial level for fibre, yarn and fabric
9	Dyeing and printing defects and remedies
10&11	Advanced printing techniques
12	Assessment of colour fastness
13	Textile finishes – concept, scope and importance
14	Application of functional finishes on different fabrics
15	Comfort imparting finishes - application, uses, characteristics, problems and evaluation
16	Finishing with enzymes. Finishing of blended fabrics.

I. Course Title : Computer Aided Textile and Apparel Designing

II. Course Code : ATS 506

III. Credit Hours : 2 (0+2)

IV. Rationale

Computers have become vital component in the fashion and textile designing arena. Computers have varied use in design room of a fashion/textile designer thereby reducing the demand for several manual skills and augment the industry in keeping up with high turnaround times.

V. Aim of the course

- To impart skill in computer aided textile and apparel designing
- To develop CAD portfolios as per fashion forecast
- To build design libraries in textiles and apparel styles

VI. Practicals

1. CAD commands
2. Textile designing softwares

3. Creation of textile designs (2D and 3D)
4. Application of Textile designs for different end uses.
5. Creating stripes using various commands
6. Creating checks using various commands
7. Creating weave library
8. Assigning weaves to the designed stripes and Checks for weaving.
9. Introduction to commands from different tool groups- file menu, freehand, geometric, selection, selection utility, colour utilities and general utilities.
10. Practicing on above tools
11. Developing motifs by scanning and drawing using the CAD commands
12. Creating full design/ repeat using drop devices.
13. Creating weaves and storing in Jacquard weave library.
14. Assigning weaves to the design plan.
15. Learning print commands- simulation and graph/ point paper.
16. Developing a computer aided portfolio of different motifs
17. Introduction to different software - Command bars and assistants. Menu bar and options. Drawing tools.
18. Colour rendering;
19. Fill, pattern and repeat
20. Creation of Special effects Layers and layer settings;
21. Apparel pattern making modules.
22. Development of basic pattern through CAD.
23. Principles of pattern making and basic blocks.
24. Adaptation of styles
25. Fundamentals of grading and marking.
26. Introduction to draping mode.
27. Outlining, creation of grid and editing the object
28. Draping scanned pictures
29. Texture mapping and creating effects
30. Development of library and printing designed patterns
31. Preparation of portfolio of developed designs,
32. Product designing and development of trims, foot wears, hand bags, buttons, buckles, belts, hats, scarf and jewellery.

VII. Teaching Methods/ Activities

- Demonstration
- Working with customised software
- Student's e Book on apparel and textile designs
- Student presentation
- Group Work
- Design Analysis & discussion
- Guest Lectures

VIII. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Customise the designs based on the clients requirement
- Build competency for a career in design studios and textile industry

IX. Suggested Reading

- Davis L Msrisn. 1980. *Visual Design in Dress*. Prentice Hall.

- Luther C. 2008. *Career in Textile and Fashion Designing*. Abhishek Publications, Chandigarh.
- Prakash K. 1994. *Impression – A Classic Collection of Textile Designs*. Design Points.
- Prakash K. 1995. *Traditional Indian Motifs for Weaving & Textile Printing*. Design Points.
- Rene Weiss Chase. 1997. *CAD for Fashion Design*. Prentice Hall.
- Srivastva M and Deepthi SS. *Computer aided designing – e-manual (TXAD)*. ecourse.iasri.res.in.
- Vastrad J, Sakshi and Deepthi SS. Computer aided designing – textile designing – e-manual (TXAD). ecourse.iasri.res.in.
- Winfred Aldrich. 1992. *CAD in Clothing & Textiles*. BSP Professional Books.
- Yates MP. 1996. *Textiles – A Handbook for Designers*. W.W. Norton.
- International Journal of Fashion Design, Technology and Education
<https://www.tandfonline.com/toc/tfdt20/current>
- Iowa State university digital repository- <https://lib.dr.iastate.edu/>

I. Course Title : Textile and Apparel Industry Management

II. Course Code : ATS 507

III. Credit Hours : 3 (3+0)

IV. Rationale

Textile and apparel industry occupy a prominent position in India next to agriculture providing employment to millions of people. The diverse culture and ethnicity in the country gives India a competitive advantage to cater to the needs of both the domestic and global clientele. Deep understanding of textile and apparel industry prepares the students to position themselves better in terms of future career prospects.

V. Aim of the course

- To identify the role of textile and garment industry in the Indian economy, industry trends and various export- import policies
- To understand the management issues related to apparel and textile industry
- To develop awareness about the quality standards and automation in enhancing productivity

VI. Theory

Unit I: Indian Textile industry

Textile industry- history, development and status; export and import policies of Government; Textile research associations; Textile crafts councils.

Unit II: Status of garment industry in India

Status of garment industry in India-production, marketing, distribution, consumption and export trends over last five years; problems of apparel industry and remedial measures. Complexity of management in garment industries: objective and expectations.

Unit III: Management in Apparel industry

Classification of apparel industry- large, medium, small and role of MSMEs; Infrastructural facilities and personnel management in apparel industry; Techniques in managerial application of cost volume profit analysis; Productivity analysis, case studies.

Unit IV: Trade related organisations

Apparel parks, apparel export promotion council, National fashion and design institutes; GATT, TUF, ISO 9001: 2015, 14001: 2015 and 26000: 2010 standards;

WTO and its impact on textile and apparel industries; Effect of trade globalization on apparel industry.

Unit V: Automation in apparel and textile industries

Recent advancements in CAD/CAM applications; automation in the industry; role of robotics in productivity management

VII. Teaching Methods/ Activities

- Lecture
- Assignment (Reading/Writing)
- Publication Review - Discussion
- Student presentation
- Group Work
- Case Analysis and case studies
- Guest Lectures

VIII. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Enhance knowledge on management systems in apparel and textile industries
- Apply appropriate standards to augment and productivity through automation.

IX. Suggested Reading

- Cooklin G. 1997. *Garment Technology for Fashion Designers*. Blackwell.
- Dickerson K. 1995. *Textiles & Apparels in Global Economy*. Merrill Prentice Hall.
- Glock R. 1990. *Apparel Manufacturing*. Macmillan.
- Karpan 2004. *Change in Trends in Apparel Industry*. Abishek Publ.
- Kathryn MG.1978. *Fashion Innovation & Marketing*. Macmillan Co.
- Mehta PV. 1998. *Managing Quality in Apparel Industry*. New Age International.
- Uncertain Supply Chain Management
<http://m.growingscience.com/beta/uscm/>
- University of Wollongong Research
<https://ro.uow.edu.au/>

Weekly Lecture Schedule

Duration (weeks)	Topic
1&2	Introduction to Indian Textile Industry and its SWOT Analysis. History and development of textile industry. Export and Import policies of Government.Objectives and contributions of Textile Research Associations: NITRA, SITRA, BTRA and ATIRA and Textile Crafts Council.
3&4	Introduction to Indian Garment industry and its SWOT Analysis. Current status of garment industry in India in terms of production, marketing, distribution and consumption. Export trends of garments over the last five years.
5	Problems of apparel industry: lack of skilled manpower and automation, meeting lead times, logistic issues, maintaining optimum inventory levels, changing customer needs, cut throat competition, maintaining multichannel sales, managing supply chain and sustainability.Remedial Measures: ERP solutions, logistic and marketplace integration, centralized inventory management, following leagile supply chains, robust omnichannel solutions, progress report tracking, meeting corporate social responsibility, upgradation of skills of workforce and technology upgradation.
6	Strategic management in garment industry: top, middle and lower level management, objectives and expectations. Role of a Manager in a garment industry.
7	Classification of apparel industry: large, medium, small and MSME.Industry and infrastructure: need, existing facilities and challenges. Trade infrastructure for



Duration (week)	Topics
8&9	export scheme (TIES) and its role in infrastructure development of export oriented units. Personnel Management in apparel industry: recruitment, training, work scheduling, compensation and rewards, motivation and promotion.
10&11	Cost Volume Profit (CVP) Analysis: need and assumptions. Factors affecting CVP Analysis: volume of production, product mix, internal efficiency, method of production and size of plant. Techniques of CVP analysis: break-even analysis and profit-volume analysis.
12&13	Key performance indicators(KPI) in apparel manufacturing. Productivity analysis and improvement in labour, equipment and resources productivity. Importance of productivity rate analysis. Technology upgradation of apparel units: use of CAD, CAM and CIM solutions, automated inspection (AIN), automated material handling devices (AMHD), Production planning/ inventory management software (PPIC) and pick-place robots (PPR).
14	Governmental schemes for boosting apparel exports: Scheme for Integrated Textile Parks (SITP), Technology Upgradation Fund Scheme (TUFS), Market Access Initiative (MAI) and Market Development Initiative (MDI).General Agreement on Trade and Tariff (GATT): Purpose and its effect on trade.World Trade Organization(WTO): organizational structure and functions. Impact of WTO on textile and apparel industries.
15	Apparel Export Promotion Council: role, vision and various AEPC's in India.
16	ISO textile testing standards. ISO 9000, 14000 and 26000 standards: their aim and application in textiles and apparel industries.
	Globalization: definition, advantages and disadvantages for textile and apparel industry. Effect of trade globalization of apparel industry.

I. Course Title : Historic Textiles and Costumes

II. Course Code : ATS 508

III. Credit Hours : 2 (1+1)

IV. Rationale

Understanding the textiles and costumes worn in the past is way to learn the history inside out. Learning about the historic textiles and costumes is a definitive way to move forward as it generates new research questions and strengthens the student's design sensibilities. The style variations in the historic costumes inspire the student in creating contemporary styles.

V. Aim of the course

- To enable students to learn the historical development in Western textiles and costumes from ancient world to 21st century
- To acquaint students with textiles and costumes of western countries.
- To get design inspiration from historic costumes and textiles

VI. Theory

Unit I: Study of traditional textiles

Study of traditional dyed, printed, embroidered and non-woven textiles in terms of fibre content, fabrics, motifs, colours, designs and dyes used in Egypt, Greece, Rome, France, America, Japan and China.

Unit II: Study of traditional costumes

History and evolution of traditional costumes and accessories for men and women of Egypt, Greece, Rome, Japan, France, America and China.

VII. Practicals

1. Collection and documentation of traditional textile prints and surface designs of Egypt & Greece
2. Collection and documentation of traditional textile prints and surface designs of Rome & France
3. Collection and documentation of traditional textile prints and surface designs of America & Japan
4. Collection and documentation of traditional textile prints and surface designs of China
5. Developing textile surface designs with combination of motifs of different countries
6. Developing textile surface designs with combination of motifs of different countries
7. Documentation of various styles of men's garments of various countries
8. Documentation of various styles of women's garments of various countries
9. Designing and adaptation of outfits for men from historic costumes according to current trends.
10. Designing and adaptation of outfits for women from historic costumes according to current trends.
11. Visit to the museum 1
12. Visit to the museum 2
13. Reporting and Presentation of the visits
14. End term Assessment

VIII. Teaching Methods/ Activities

- Lecture
- Assignment (Reading/Writing)
- Develop costume style catalogue
- Create textile motif catalogue
- Student presentation
- Group Work
- Museum visits and videos
- Guest Lectures

IX. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Distinguish the patterns and designs in western textiles from ancient times to the present day.
- Portray style variations in ancient costumes of western countries across centuries.

X. Suggested Reading

- Annalce G. 1987. *One World of Fashion*. Fair Child Publ.
- Bhatnagar P. 2005. *Decorative Design History in Indian Textiles and Costumes*. Abhishek Publication, Chandigarh.
- Blanche P. 1965. *History of Costumes from the Ancient Egyptian to the Twentieth Century*. Harper & Row.
- Jack Cassin-Scott. 1994. *The Illustrated Encyclopedia of Costume and Fashion*. Studio Vista.
- Meadows CS. 2003. *Know Your Fashion Accessories*. Fairchild Books, New York.
- Peacock J. 1996. *A Complete Guide to English Costume Design and History - Costume 1066-1990's*. Thames & Hudson.

- Peacock J. 2000. *Fashion Accessories- The Complete 20th Century Source Book*. Thames and Hudson, London.
- Stecker P. 1996. *Fashion Design Manual*. Mac Millan.
- International Journal of Scientific Research in Science and Technology- <http://ijsrst.com/>
- DigitalCommons@University of Nebraska – Lincoln- <https://digitalcommons.unl.edu/>

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Introduction to historic textiles and costumes, and their application in textile and costume designing.
2	Traditional dyed, printed and embroidered textiles of Egypt with reference to fibre content, fabrics, motifs, colours, dyes and designs.
3	Characteristic features of male and female Egyptian costumes, accessories and hair styles.
4	Features of Grecian textiles with respect to fibre content, fabrics, motifs, colours, dyes and designs.
5	Characteristic features of male and female costumes of Greece, accessories and hair styles.
5, 6 & 7	Details of historic textiles of Rome and their symbolism in ancient Roman Empire. Costumes, accessories and hair styles worn by Romans.
8 & 9	Historical account of evolution of textiles, costumes, accessories and hair styles of France.
10 & 11	Colonial textiles of America with respect to fibre content, fabrics, motifs, colours, dyes and designs.
12 & 13	Characteristic features of male and female colonial costumes, accessories and hair styles worn in America.
14, 15 & 16	Brief account of traditional textiles, costumes, accessories and hair styles used in Japan and China.

I. Course Title : Textile Auxiliaries

II. Course Code : ATS 509

III. Credit Hours : 3 (2+1)

IV. Rationale

Textile auxiliaries are widely used in the wet processing industry to bring out fabrics with special properties. In addition to improving the efficiency of the various wet processes, the auxiliaries help in cost optimisation and add to the functional properties of a textile. The role played by the textile auxiliaries in the industry is pivotal and hence it is essential for a student to learn of the new developments in the industry.

V. Aim of the course

- Become familiar with various textile auxiliaries used in textile processing
- Gain knowledge about the judicial use of auxiliaries based on end use performance

VI. Theory

Unit I: Introduction to auxiliaries

Textile auxiliaries- definition, classification, selection and uses in processing operations.

Unit II: Surface active agents

Chemistry and synthesis of surface-active agents - essential requirements of surfactants, classification and biodegradability; Physical principles of cleansing efficiency; Scouring, bleaching and mercerizing auxiliaries.

Unit III: Dyeing and Printing auxiliaries

Dyeing auxiliaries - Wetting, leveling, stripping, dye fixing, swelling, dispersing agents and carriers; Printing auxiliaries – thickeners and their classification, wetting, hygroscopic, antifoaming, reducing, oxidizing agents and pigment binders, fixers and miscellaneous auxiliaries.

Unit IV: Finishing auxiliaries

Stiffening, cross linking, optical brighteners, softeners, water proof/repellents, flame proof/ retardants, soil release, anti-pilling, antimicrobial, moth and mildew proofing; methods of producing nanoparticles of auxiliaries for textile finishing.

VII. Practicals

1. Textile auxiliaries-An Introduction
2. Market survey of different Textile auxiliaries
3. Analysis of the surfactant properties of surfactant 1
4. Analysis of the surfactant properties of surfactant 2
5. Preparation of detergent
6. Preparation of sizing combination 1
7. Preparation of sizing combination 2
8. Analysis of the sized samples
9. Selection of suitable combinations
10. Assessment of whiteness index of fabrics finished with various bleach 1
11. Assessment of whiteness index of fabrics finished with various bleach 2
12. Assessment of whiteness index of fabrics finished with optical brightening agent 1
13. Assessment of whiteness index of fabrics finished with optical brightening agent 2
14. Assessment of whiteness index of fabrics finished with detergent 1
15. Assessment of whiteness index of fabrics finished with detergent 2
16. End term Assessment

VIII. Teaching Methods/ Activities

- Lecture
- Assignment (Reading/Writing)
- Discussion on suitability of auxiliaries
- Problem solving approach
- Publication Review
- Student presentation
- Group Work
- Guest Lectures

IX. Learning Outcome

After successful completion of this course, the students are expected to:

- Select appropriate auxiliaries for end-use performance
- Skill in analysing the textiles finished with various auxiliaries.

X. Suggested Reading

1. Bogley M. 1977. *Textile Dyes, Finishing and Auxiliaries*. Garland Publ.

2. Fiscus G and Grunenwald D. 1996. *Textile Finishing: A Complete Guide*. Textile Institute, Manchester.
3. Hall KJ. 1966. *Textile Finishing*. Heywood.
4. NPCS Board of Consultants and Engineers (2019). *Handbook on Textile Auxiliaries, Dyes and Dye Intermediates Technology*, Asia Pacific Business Press Inc., New Delhi
5. Textile Finishing Chemicals: An Industrial Guide
http://library.aceondo.net/ebooks/Home_Economics/Textile_Finishing_Chemicals.pdf
6. Chemosphere- <https://www.journals.elsevier.com/chemosphere>
7. Journal of Hazardous Materials
<https://www.journals.elsevier.com/journal-of-hazardous-materials>
8. *Textile auxiliaries and chemicals*
https://www.academia.edu/30859937/Textile_Auxiliaries_and_Chemicals_Ebook

Weekly Lecture Schedule

Duration (week)	topics
1	Definition and classification of textile auxiliaries
2	Selection of textile auxiliaries and uses in processing operations
3 & 4	Chemistry and synthesis of surface-active agents - essential requirements of surfactants, classification and biodegradability
5	Physical principles of cleansing efficiency.
6	Scouring, bleaching and mercerizing auxiliaries
7	Dyeing auxiliaries- wetting, levelling
8	Dyeing auxiliaries- stripping, dye fixing, swelling
9	Dyeing auxiliaries- dispersing agents and carriers
10,11 &12	Printing auxiliaries – thickeners and their classification, wetting, hygroscopic, antifoaming, reducing, oxidizing agents and pigment binders, fixers
13	Miscellaneous auxiliaries
14,15& 16	Finishing auxiliaries-stiffening, cross linking, optical brighteners, softeners, water proof repellents, flame proof/retardants, soil release, anti-pilling, antimicrobial, moth and mildew proofing; Methods of producing nanoparticles of auxiliaries for textile finishing.

I. Course Title : Socio-psychological Aspects of Clothing

II. Course Code : ATS 510

III. Credit Hours : 2 (2+0)

IV. Rationale

Study of dress and human behaviour throws an insight into the definite relationship between dress, the body, and the self. Clothes act as a stimulus influencing one's behaviour and self esteem of both the wearer and the viewer. There exists a specific relationship between dress and specific social and cultural identities and changing attitudes concerning dress among several ethnic groups. Study of socio-psychological aspects of clothing of consumers will help the industry to come up with saleable solutions that the market can easily embrace.

V. Aim of the course

- To study the socio-psychological effects of clothing on the individual in social situations
- To develop understanding about consumer behaviour.

VI. Theory

Unit I: Clothing

Clothing-origin, theories, functions and modern philosophy of clothing in relation to culture; Clothing symbolism; Factors effecting clothing -fashion, fad, custom, tradition, culture contact, status, age, education, technology and role of legislation.

Unit II: Socio-psychological aspects of clothing

Socio-psychological aspects of clothing-first impression, individual values, interest, attitude, motivation in clothing choices, self-respect, self-enhancement, self-expression, gender desirability and individuality, clothing and society, clothing and social behaviour, influence of religion; beliefs, customs and traditions; clothes and conformity; cloths and occupation; socio-psychological impact of clothing among different age groups; significance of uniforms and national costumes. Clothes for conformity, mobility, aesthetic appearance. Health and sanitation related to clothing.

Unit III: Consumer behaviour

Consumer behaviour: concept and importance, consumer needs and motivations, consumer perspective and viewpoints; environmental influence; individual differences. Consumer resources: involvement and motivation; knowledge, attitudes; individual differences in behaviour; psychological processes.

Consumer decision-making processes; model of consumer decision-making; consumer analysis and marketing strategy; retailing; consumer trends; market segmentation; diffusion of innovation; Counterfeit textiles and consumer protection measures; consumerism and role of media.

Unit IV: Marketing concept

Marketing concept; Types of customers; Understanding consumers and customer demand; Market segmentation and consumer adopter categories- their characteristics, psychographics and the interrelationship with production, price zones and marketing strategies in relation to fashion cycle; Theories of fashion adoption; Role of fashion influencers.

VII. Teaching Methods/ Activities

- Lecture
- Case Analysis and case studies
- Assignment (Reading/Writing)
- Publication Review
- Student presentation
- Group Work
- Guest Lectures

VIII. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Relate clothing to socio-psychological aspects of the individual.
- Establish backward linkage to the industry by passing on consumer oriented inputs

IX. Suggested Reading

- Cranz RLM. 1972. *Clothing Concepts*. Collier Macmillan.
- Horn MJ. 1981. *The Second Skin – An Interdisciplinary Study of Clothing*. Houghton Mifflin and Hill House.
- Marion S. 1963. *Dress Selection and Design*. The Macmillan Co.

- Mary Kefgen and Phyllis 1971. *Individuality in Clothing Selection & Personal Appearance.* The Macmillian Co.
- Ryan MS. 1966. *Clothing - A Study in Human Behaviour.* Winston
- Stecker P. 1996. *Fashion Design Manual.* Mac Millan.
- European Scientific Journal
<http://eujournal.org>
- Journal of Fashion Marketing and Management: An International Journal
<https://www.emeraldinsight.com/loi/jfmm>

Weekly Lecture Schedule

Duration (weeks)	Topic
1	Origin, theories, functions and modern philosophy of clothing in relation to culture. Clothing symbolism.
2	Factors effecting clothing -fashion, fad, custom, tradition, culture contact, status, age, education, technology and role of legislation
3&4	Socio-psychological aspects of clothing: first impression, individual values, interest, attitude, motivation in clothing choices, self-respect, self-enhancement, self-expression, gender desirability and individuality
5	Clothing and society: clothing and social behaviour, influence of religion, beliefs, customs and traditions; clothes and conformity; clothes and occupation; socio-psychological impact of clothing among different age groups.
6	Significance of uniforms and national costumes. Clothes for conformity, mobility, aesthetic appearance. Health and sanitation related to clothing.
7	Consumer behaviour: concept and importance, consumer needs and motivations, consumer perspective and view points.
8	Environmental influence; individual differences in behavior and psychological processes.
9	Marketing concept. Types of customers. Understanding consumers and customer demand.
10&11	Market segmentation and consumer adopter categories- their characteristics, psychographics and the interrelationship with production, price zones and marketing strategies in relation to fashion cycle.
12	Theories of fashion adoption. Role of fashion influencers.
13	Consumer decision-making processes; model of consumer decision-making; consumer analysis and marketing strategy; retailing
14	Consumer trends; market segmentation; diffusion of innovation.
15&16	Counterfeit textiles and consumer protection measures; consumerism and role of media.

I. Course Title : Sustainability in Textile and Apparel Industry

II. Course Code : ATS 511

III. Credit Hours : 2 (2+0)

IV. Rationale

Incorporating sustainability into the supply chain is becoming a key priority for many textile and apparel companies owing to its detrimental effects to the eco system. Sustainability in terms of product strategy, investment, performance evaluation, corporate social responsibility, and environmental management system adoption contribute to the development of sustainable supply chain management in the textile and apparel industry. To safeguard the planet, sustainable eco measures need to be studied and improved upon.

V. Aim of the course

- To expose students to global environmental issues and strategies
- To understand the measures undertaken for maintaining ecological balance in micro and macro environment of Textile industry.

VI. Theory

Unit I: Impact of textile sector on environment

Environmental threats in textile and apparel industry- raw materials and processes; Banned dyes and chemicals in India; Concept of green supply chain; Certified organic, renewable and low impact raw material; Reduced toxicity in fiber processes and treatments; Effluent Treatment Plants; Concept of zero wastage and lean manufacturing; Pre -consumer and post-consumer textile wastage; 3-R approach and its advantages; Environmental friendly packaging and eco labeling; Certified agencies imparting eco label.

Unit II: Natural dyes

Natural dyes – importance, classification of natural pigments; extraction methods including the concept of supercritical dyeing, microwave and ultrasonication, mordants and dyeing methods; Role of natural dyes in safeguarding the environment.

Unit III: Reduced energy processes

Reduced energy processes; Use of alternative sources of energy during product lifecycle; Importance of carbon credits in textile and apparel manufacturing.

VII. Teaching Methods/ Activities

- Lecture
- Assignment (Reading/Writing)
- Publication Review
- Student presentation
- Group Work
- Videos
- Case Analysis and case studies
- Exposure visit to ETP (Effluent Treatment Plants)
- Guest Lectures

VIII. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Identify the ecologically safe processes, dyes and chemicals
- Offer ecological solutions for mitigating the harmful effects of the textile effluents on environment

IX. Suggested Reading

- Blackburn RS. 2009. *Sustainable Textiles INNBUNDET*. Woodhead Publishing House.
- Miraftab M and Horrocks AR. 2004. *Ecotextiles: The Way Forward for Sustainable Development in Textiles*. Woodhead Publishing House.
- Subramanian SM. *Sustainability in the Textile Industry* (Textile Science and Clothing Technology).
- Wang Y. *Handbook of Sustainable Textile Production. 1st Edition. Recycling in Textiles*. Woodhead Publishing House.
- *Journal of Environmental Science and Health*
<https://www.tandfonline.com/toc/lesa20/current>
- *Ecological Economics*
<https://www.sciencedirect.com/journal/ecological-economics>

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Environmental threats in textile and apparel industry- raw materials and processes
2	Banned dyes and chemicals in India
3	Concept of green supply chain
4	Certified organic, renewable and low impact raw material
5	Reduced toxicity in fiber processes and treatments
6	Effluent Treatment Plants
7	Concept of zero wastage and lean manufacturing;
8	Pre -consumer and post-consumer textile wastage
9	3-R approach and its advantages; Environmental friendly packaging and eco labeling;
10	Certified agencies imparting eco label
11	Natural dyes – importance, classification and chemical groups of natural pigments
12	Natural dye extraction methods including the concept of supercritical dyeing, microwave and ultrasonication
13	Natural dye application on textiles- mordants used; mordanting and dyeing methods; Role of natural dyes in safeguarding the environment.
14	Reduced energy processes; Use of alternative sources of energy during product lifecycle;
15	Importance of carbon credits in textile and apparel manufacturing and estimation of carbon points
16	Discussion on adoption green technologies in Textile and apparel industries

I. Course Title : Textile and Apparel Product Development

II. Course Code : ATS 512

III. Credit Hours : 2 (1+1)

IV. Rationale

Product development in the field of apparel and textiles is identifying the market opportunity, create product that appeal the customers, developing technical specifications, testing and modification for production. Skill in product development provides immense career opportunities as merchandisers in industries.

V. Aim of the course

- To impart the knowledge about various product standards and product specifications
- To learn the process of product development towards market need

VI. Aim of this Course

The course is designed to impart both basic and applied knowledge on the subject of sustainability in textile and apparel industry. This course will impart the knowledge about various product standards and product specifications to the students. Further, students will learn the process of product development towards market need.

VII. Theory

Unit I: Textile and apparel product development

Textile and apparel product development – concept, history, objective; product design, product life cycle and new product development. Merchandising – role,

responsibilities, use of calendar, branding, labelling and retailing.

Unit II: Product testing

Product – testing, economics, standards and specifications; product quality control; technical services, positioning and marketing.

Unit III: Organizational behaviour

Organizational behaviour; accounting; product intellectual property law.

Unit IV: Commercial product development

Commercial product development - Role of computers and related software in product development. e-marketing – concepts and application.

VIII. Practicals

- Product review- Analyzing existing products of textile in terms of design, life cycle and assessment of market need for new product development.
- Development of survey Performa for preparation of product profile of Textile product-1.
- Development of survey Performa for preparation of product profile of Textile product-2.
- Development of survey performa for preparation of product profile of Apparel product-1.
- Development of survey performa for preparation of product profile of Apparel product-2.
- Survey on selected products from textiles field.
- Survey on selected products from apparel field.
- Product testing and analysis of selected textiles – quality, serviceability, material.
- Product testing and analysis of selected textiles – construction, performance.
- Product testing and analysis of selected textiles – Products standard ,specifications and cost.
- Product testing and analysis of selected apparels – quality, serviceability, material.
- Product testing and analysis of selected apparels – construction, performance.
- Product testing and analysis of selected apparels – Products standard, specifications and cost.
- Product planning on the basis of- market needs, aesthetic, functional requirements and producibility.
- Production of new product- with aesthetic, functional requirements and producibility.
- Project work.

IX. Teaching Methods/ Activities

- Lecture
- Assignment
- Publication Review
- Student presentation
- Group Work
- Case Analysis and case studies
- Guest Lectures

X. Learning Outcome

After successful completion of this course, the students are expected to:

- Know about various product standards and product specifications

- Acquire skill in customized product development

XI. Suggested Reading

- Bhargav R. 2005. *Design Ideas and Accessories*. Jain Publ.
- Harold C and Pomeroy J. 1996. *Fashion Design and Product Development*. Blackwell Science.
- The International Journal of Advanced Manufacturing Technology
<https://link.springer.com/journal/170>
- References, Conservation and Recycling
<https://www.sciencedirect.com/journal/References-conservation-and-recycling>

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Concept, history and objectives of product development in textiles and apparel.
2&3	Product design process, stages of product life cycle and steps of product development
4	Role of merchandiser in product development and use of merchandising calendar
5	Branding, labelling and retailing
6	Importance of product testing, concept and types of market test
7	Product economics-analysis of design cost, product profitability and design profits or Economic analysis-market potential, estimation of sales, cost breakeven analysis, return on investment
8	Product standards and specifications.
9&10	Product Quality control- fabric, garment or design and manufacturing specifications
11	Importance of product positioning in marketing plan.
12&13	Organizational behavior-B2B buying decisions, Stages of organizational buying process, R&D accounting
14	Role of Intellectual property law in product development
15	Role of computers in design development and manufacturing of product
16	Basic principles and concepts of e-marketing-chain of activities, ethical code and marketing mix

I. Course Title : Laboratory Techniques in Textile Research

II. Course Code : ATS 513

III. Credit Hours : 2 (0+2)

IV. Rationale

Textile research can include a wide gamut of areas – fibre, fabric and apparel. A researcher should have a broad understanding of the tools and equipment used in research- be it qualitative or quantitative. A prior knowledge of these tools/ techniques will equip the student to focus intensely on the areas of interest.

V. Aim of the course

- To impart knowledge on laboratory techniques in textile research.
- To provide hands on training on analytical instruments

VI. Practical

1. Preparation of buffers for pre-processes.
2. Preparation of reagents for pre-processes.
- 3-4. Preparation of standard solutions for pre-processes.
- 5-6. Demonstration on Microencapsulation– Preparation and application; assessment through TEM.

- 7-8. Demonstration on Microencapsulation– Preparation and application; assessment through SEM.
- 9-10. Demonstration on Microencapsulation– Preparation and application; assessment through FTIR.
11. Demonstration on Nano synthesis – Preparation and application; assessment through TEM.
12. Nano synthesis – Preparation and application; assessment through SEM.
13. Nano synthesis – Preparation and application; assessment through and FTIR.
14. Optimization of variables for various dyes.
15. Optimization of variables for various printing.
16. Optimization of conditions for various finishing treatments.
17. Optimization of conditions for various enzyme treatments.
18. Analysis of water- pH, TDS.
19. Analysis of dye extracts.
20. Analysis of finishing extracts.
- 21-22. Analysis of water -dye effluents, BOD, COD, anions, cations.
23. Laboratory techniques for assessing colour strength.
24. Laboratory techniques for assessing reflectance.
25. Laboratory techniques for assessing Spectrophotometry-visible, ultraviolet.
26. Laboratory techniques for assessing Spectrophotometry-infrared and chromatographic techniques.
27. Use of different scales to assess light fastness.
28. Use of different scales to assess washing fastness.
29. Use of different scales to assess rubbing fastness.
30. Management and interpretation of data generated.
31. Statistical analysis of test results in SPSS package.
32. End term Assessment.

VII. Teaching Methods/ Activities

- Demonstration on technical equipment handling/learning operations
- Assignment
- Laboratory manuals/Specification sheets
- Student interactive session
- Group Work on textile testing
- Use of SPSS Software for statistical analysis

VIII. Learning Outcome

After successful completion of this course, the students are expected to be able to:

- Confident in handling advanced instruments
- Prepare common analytical reagents for qualitative and quantitative analysis of dyes and finishes.

IX. Suggested Reading

- Roger Carpenter. 1999. *Vision Research: A Practical Guide to Laboratory Methods*, Oxford University Press, Oxford
- Research papers on functional testing, performance of textiles, Herbal treated/ Nano finished/ microencapsulated apprals and textiles, etc.
- Equipment manuals on Nano synthesis - assessment through SEM,TEM and FTIR.
- E book on- Principles of Textile Finishing by Asim Kumar Roy Choudhury
- E book on -A Practical Guide to Textile Testing By K. Amutha



Course Title with Credit Load Ph.D. in Apparel and Textile Science

Course Code	Course Title	Credit Hours
Major Courses (12 Credits)		
*ATS 601	Textile Ecology	2(2+0)
*ATS 602	Technical Textiles	3(2+1)
ATS 603	Technological Developments in Textiles and Apparel	2(2+0)
ATS 604	Colour Application in Textiles	2(1+1)
*ATS 605	Functional Clothing	3(2+1)
ATS 606	Textile Conservation	2(1+1)
ATS 607	Operational Management in Textiles and Apparel	2(2+0)
ATS 608	Technology of Nonwovens	2(2+0)
ATS 609	Special Project	2(0+2)
Minor Courses (06 Credits)		
CS/PGS 601	Research and Publication Ethics	2(1+1)
FN604	Global Nutrition Problems	2(2+0)
FN 608	Energy Metabolism	2(2+0)
EECM 602	Impact Assessment of Development Programmes	3(1+2)
EECM 603	Scaling Techniques for Behavioural Research	3(1+2)
EECM 607	Media application and product promotion	4(2+2)
HDFS 608	Qualitative research methods	3(2+1)
RMCS 603	Globalization and Consumer Economics	3 (2+1)
RMCS 606	Environmental Issues and Challenges	2 (2+0)
RMCS 607	Family Dynamics and Women Power	3 (2+1)
Supporting Courses (05 Credits)**		
ATS 691	Doctoral Seminar I (Major Field)	1(1+0)
ATS 692	Doctoral Seminar II (Minor Field)	1(1+0)
ATS 699	Research	75
Total		100 Credits

*Core courses/ compulsory courses; **A student can opt any course related to the topic of research offered by other faculties of agriculture university or SWAYAM portal or other online courses up to a maximum of 5 credits.

Course Contents

Ph.D. in Apparel and Textile Science

- I. Course Title** : Textile Ecology
II. Course Code : ATS 601
III. Credit Hours : 2 (2+0)

IV. Rationale

The textile wet processing industry is considered as the highest polluting industry as the chemicals used are toxic and harmful to both human and the environment. Some of the dyes and chemicals are banned by the government due to their toxic nature and Effluent treatment is made mandatory. It is high time for the students who would like to take up career in these industries or personnel already working in the industry to acquire knowledge in effluent pollution and its mitigation processes. Hence the course.

V. Aim of the course

- To impart knowledge among the students about types of pollution caused by textile industry, effect on the environment and mitigating strategies.
- To understand the health hazards faced by textile workers and the remedial measures adopted.

VI. Theory

Unit I: Textile ecology

Textile ecology – concept and importance; Industrialization, eco-balance and sustainability; Air, noise and water pollution by mechanical and chemical textile processing units and their effect. Organic and coloured cotton, natural dyes and detergents.

Unit II: Treatment and disposal of textile effluents

Particulate matter and pollution control devices ; Treatment processes of sewage. Waste minimization and management strategies; Recovery and reuse of water and chemicals

Unit III: Banned dyes and chemicals used in Textile industries

Banned dyes, heavy metals, pesticides and auxiliaries in Textile and related industries. Health hazards of textile workers and their remedial measures; Colour removal technologies

Unit IV: Indian and international environmental legislations

Indian and international environmental legislations. Eco-standards, eco-labeling, management and auditing. Management of packaging waste.

VII. Teaching Methods/ Activities

- Lectures
- Assignment
- Student's presentation

- Case studies
- Guest Lectures
- Exposure visits
- Mini Project

VIII. Learning Outcome

After successful completion of this course, the students are expected to:

- Develop awareness on the types of pollution from textiles processing units and their effect on environment
- Design processes to reduce or alleviate pollution in wet processing
- Handle remedial measures to mitigate health hazards of textile workers

IX. Suggested Reading

- Bogley M. 1977. *Textile Dyes, Finishing and Auxiliaries*. Garland Publication, New Wood, London.
- Fiscus G and Grunenwald D. 1996. *Textile Finishing: A Complete Guide*. Textile Institute, Manchester.
- Mark KH, Woodlings and Atlas SM. 1971. *Chemical after Treatment of Textiles*. John Wiley & Sons.
- M Clark. 2011. *Handbook of textile and industrial dyeing*, Woodhead Publishing, New Delhi.
- Patricia Dolez. 2017. *Advanced Characterization and Testing of Textiles*. Woodhead Publishing, California.
- Shahid-ul-Islam and Butola B.S. 2019. *The Impact and Prospects of Green Chemistry for Textile Technology*. A volume in The Textile Institute Book Series
- Slater K. 2003 *Environmental Impact of Textiles-Production, Processes and Protection* Woodhead publication
- <http://scvswap.com/2015/05/09/ecological-balance-and-its-importance/>
- <https://www.eionet.europa.eu/gemet/en/concept/2441>
- <https://www.textileschool.com/368/what-is-eco-textiles/>
- <https://scialert.net/fulltextmobile/?doi=jas.2005.1843.1849>

Weekly Lecture Schedule

Duration (week)	Topics
1	Textile ecology – concept and importance
2	Industrialization, eco-balance and sustainability
3-4	Air, noise and water pollution by mechanical and chemical textile processing units and their effect
5	Organic and coloured cotton, natural dyes and detergents.
6	Particulate matter and pollution control devices
7-8	Treatment processes of sewage
9	Waste minimization and management strategies
10	Recovery and reuse of water and chemicals
11	Banned dyes, heavy metals, pesticides and auxiliaries in Textile and related industries.;
12	Health hazards of textile workers and their remedial measures
13	Colour removal technologies
14	Indian and international environmental legislations.
15	Eco-standards, eco-labeling
16	Management and auditing, Management of packaging waste

I. Course Title	: Technical textiles
II. Course Code	: ATS 602
III. Credit Hours	: 3 (2+1)

IV. Rationale

Textile materials are finding ways into various walks of life from home to industry to warfare, with technical performance, meeting the demands of varied fields. The global demand for a variety of such textiles has continuously increased in end use industries. Demand is on the rise from these end use industries, such as automotive, construction, healthcare, protective clothing, agriculture, sports equipment/ sportswear and environmental protection. In India the area of technical textiles has to pace up to meet the ever growing demands of industry and other applications. The area of technical textiles provides immense research opportunities to the students to develop/ customize functional performance of clothing.

V. Aim of the course

- To impart knowledge regarding types, composition, characteristics and uses of technical textiles.
- To acquaint the students with manufacturing techniques and uses of nanofibres and micro fibres.

VI. Theory

Unit I: Introduction to technical textiles

Technical textiles- importance, classification, types of fibres and materials.

Unit II: Developments in nano fibre and micro fibres

Types of nano and micro fibres, performance characteristics, production and application; Developments in nano fibre based non-wovens

Unit III: Technical textiles in industrial applications

Agro tech, Build tech, Geo tech, Mobil tech, pack tech, indu tech and oeko tech.

Unit IV: Technical textiles in personal environment

Medi tech, Pro tech, Sport tech, Home tech and Cloth tech.

Unit V: Smart textiles

Factors affecting the selection and uses of smart textiles, phase change materials, chromic materials, shape memory materials. Conductive materials and other functional materials- characteristics and its applications.

VII. Practicals

1. Introduction to all types of Technical textiles – showcasing the fabric samples and their applications.
- 2-3. Survey for technical textiles in the market and collection of swatches.
4. Identification of swatches, preparation of technical textile portfolio.
5. Preparation of nano particles for an end-use and their characterization.
6. Application on textiles.
7. Assessment of the functional property of nano finish on textiles.
- 8-9. Agri tech applications- mulch formation for nursery raising (interface with Agricultural college).
10. Medi tech applications – preparation of any anti-microbial finishing solution for application on hospital textiles/ patient monitoring/ similar application.

11. Application of anti-microbial finish on fabric.
- 12-13. Assessment of anti-microbial finish on fabric – visit to the lab having microbiology facility.
- 14-15. Mini project (group activity)- Designing technical textiles/ smart textiles using phase change materials/ shape memory materials/ dopplers, etc. for specific functional performance.

VIII. Teaching Methods/ Activities

- Lecture
- Videos and films
- Video conferencing
- Assignments
- Student's presentation
- Group activity
- Exposure visits to Centre of Excellence for Technical Textiles

IX. Learning Outcome

After successful completion of this course, the students are expected to:

- Understand the functions and uses of various technical textiles, nanofibres and microfibers.
- Aware of recent development in the field of technical textiles
- Design and customize protective wear for various end uses

X. Suggested Reading

- Cooklin. 2012. *Garment Technology for Fashion Designers*. Wiley-Blackwell Publications Inc., New Jersey
- K Amutha. 2016. *A Practical Guide to Textile Testing*. Woodhead Publishing, Cambridge, UK.
- Patricia Dolez. 2017. *Advanced Characterization and Testing of Textiles*. Woodhead Publishing, USA.
- Susan M Watkins. 1995. *Clothing the Portable environment*. Iowa State University Press. Ames
- VT Bartels. 2011. *Handbook of Medical Textiles*. Woodhead Publishing Series in Textiles. Woodhead Publishing, USA.
- https://www.trade.gov/topmarkets/pdf/Textiles_Top_Markets_Report.pdf 2016 Top Markets Report Technical Textiles A Market Assessment Tool for U.S. Exporters U.S. Department of Commerce | International Trade Administration | Industry & Analysis (I&A) May 2016
- <http://nasdonline.org/1246/d001050/health-hazards-in-agriculture-an-emerging-issue.html>
- <https://careertrend.com/info-8239121-materials-do-firefighters-wear.html>
- https://www.technicaltextile.net/articles/advances-in-protective-fabrics-2560?no_redirect=true
- <http://textilelearner.blogspot.in/2014/04/applications-of-agro-textiles.html>
- <http://www.fibre2fashion.com/industry-article/1579/agro-textiles-a-rising-wave?page=1>
- <http://www.bch.in/agro-textiles.html>
- <http://www.technicaltextile.net/agro-textiles/>
- http://www.ijarse.com/images/fullpdf/1373424521_APPLICATION_OF_TEXTILE_IN_AGRICULTURE.pdf

Weekly Lecture Schedule

Duration (week)	Topics
1	Technical textiles-Introduction, definitions, scope Classification of technical textiles- areas of application

Duration (week)	Topics
2	Fibres used in technical textiles-domestic fibres, high functional fibers, Form of Textile Fibers in technical textiles, Finishing of technical textile materials
3	Growth of textile materials, Progress of Technical textiles in Global Market
4	Developments in nanofibre and micro fibres
5	Types of nano and micro fibres, performance characteristics
6	Production and application, Developments in Nano-fibre, microfibre
7	Production and application, Developments in nanofibre based non-wovens
8	Technical textiles in industrial applications: Agro tech, Build tech
9	Technical textiles in industrial applications: Geo tech, Protech
10	Technical textiles in industrial applications: indu tech and oeko tech.
11	Technical textiles in industrial applications: Mobil tech, pack tech
12&13	Smart textiles: Factors affecting the selection and uses of smart textiles phase change materials, chromic materials, shape memory materials
14	Conductive materials, - characteristics and its applications.
15	Other functional materials- characteristics and its applications.
16	

I. Course Title : Technological Developments in Textiles and Apparel

II. Course Code : ATS 603

III. Credit Hours : 2 (2+0)

IV. Rationale

The advancements in Science and Technology have brought in revolutionary changes in the field of textiles and apparel. The application of these technologies improved the functional characteristics of textiles and made a beginning of functional clothing for variety end-use performance. The advancements in innovative fibre production, spinning, weaving, wet processing, dyeing and printing, garment production technology offer wide opportunities for research.

V. Aim of the course

- To develop awareness about the recent advances in production, manufacturing, processing, testing and quality control of various textiles and apparels.

VI. Theory

Unit I: Recent advances in manufacture of textile and garments

Recent researches in production and manufacture of textile fibres, yarns, fabrics and garments. Chemical processing of natural and synthetic textiles and their conversion into clothing.

Unit II: Developments in the field of functional textiles

Developments in the field of functional textiles; Use of special techniques in textile processing.

Unit III: Innovations in garment technology and apparel manufacturing

Innovations in apparel designing; Developments in garment manufacturing technology; Advances in retailing; merchandising; biological and psychological aspects of clothing.

Unit IV: Research issues

Thrust areas of contemporary research and future projections

VII. Teaching Methods/ Activities

- Lecture
- Videos/films
- Assignment
- Student's presentation
- Guest Lectures
- Expose visits
- Participation in seminars

VIII. Learning Outcome

After successful completion of this course, the students are expected to:

- Possess in depth knowledge of latest developments in textile and apparel industry
- Develop a perspective on contemporary research issues in the field of textiles and apparel.

IX. Suggested Reading

- <http://www.craftmark.org/sites/default/files/Gota%20Patti%20Craft.pdf>
- <http://www.cohands.in/handmadepages/pdf/91.pdf>
- <http://blog.ninecolours.com/gota-patti-all-about-sophistication/>
- <http://handicrafts.nic.in/CmsUpload/2039201602393132%20craft%20process.pdf>
- http://shodhganga.inflibnet.ac.in/bitstream/10603/35363/6/07_chapter%201.pdf
- http://jalsnet.com/journals/Vol_1_No_1_June_2014/7.pdf
- <https://www.journals.elsevier.com/dyes-and-pigments>
- Many online Journals

ISSN Name of the Journal

1528	<i>Journal of Industrial Textiles</i>
0970	<i>Cotton Research Journal</i> (Journal of the Indian Society for Cotton Improvement)
0143	<i>Dyes and Pigments</i>
1229	<i>Fibers and Polymers</i>
0266	<i>Geo textiles and Geo-membranes</i>
0971	<i>Indian Journal of Fibre and Textile Research</i>
2250	<i>International Journal of Textile and Fashion Technology</i>
0972	<i>Journal of Cotton Research and Development</i>
1558	<i>Journal of Engineered Fibers and Fabrics</i>
1528	<i>Journal of Industrial Textiles</i>
1544	<i>Journal of Natural Fibers</i>
1388	<i>Journal of Nano particle Research</i>
1533	<i>Journal of Nano-science and Nanotechnology</i>
0163	<i>Journal of Natural Products</i>
0368	<i>Journal of the Textile Association</i>
0377	<i>Man Made Textile in India</i>
0369	<i>Pigment and Resin Technology</i>
0040	<i>Textile Research Journal</i>
0040	<i>The Journal of the Textile Institute</i>

Weekly Lecture Schedule

Duration (week)	Topics
1	Recent advances in production and manufacturing of textile fibres.
2	Recent advances in production and manufacturing of textile yarns and blends.
3	Recent advances in production and manufacturing of fabrics and garments.
4	Chemical processing of natural and synthetic textiles and their conversion into clothing

Duration (week)	Topics
5	Developments in the field of functional textiles
6&7	Special techniques in textile processing with reference to functional textiles
8	Innovations in apparel designing, softwares used
9	Innovations in textile designing, software used
10	Developments in garment manufacturing technology
11	Advances in merchandising
12	Advances in retailing
13	Biological and psychological aspects of clothing.
14	Future projections in apparel research
15&16	Future projections in textile research

I. Course Title : Colour Application in Textiles

II. Course Code : ATS 604

III. Credit Hours : 2 (1+1)

IV. Rationale

Colour plays a very important role in selection of textiles and apparel. The key issue in colouration of textiles is the colour control system in the industries where colour matching among the batches of dyed textiles is paramount. Knowledge of colour measurement is imperative to the students to take up research in the field of dyeing and printing and pursue career in the wet processing industries.

V. Aim of the course

- To give an in depth knowledge into theories of dyeing and dye chemistry.
- To acquaint the students with different color matching systems and its assessment.

VI. Theory

Unit I: Colour theory and Dye Structure

Theory of colour science. Dyeing theories- physical, chemical, fibre complex, solid solution and pigment. Dye structure- size, shape and molecular weight of dye, state of the dye, electrical nature of dye molecule, chemical groups attached to dye and dyeing parameters.

Unit II: Colour measurement system

Colour measurement systems- Spectrophotometer- features, types and viewing systems; Software and hardware for colour measuring systems; Objective specification of colour- tristimulus values, colour strength, colour difference, shade sorting and various colour spaces; Assessment of whiteness, yellowness and brightness; Assessment of fastness of colour.

Unit III: Computer Colour Matching

Computer Colour Matching- Theory, Isomeric and metameric colour matching, accuracy of match prediction, measurement of reflectance, benefits; Pass Fail Systems.

VII. Practicals

- 1-2. Identification of dye classes: primary and confirmatory tests- direct, basic, acid, sulphur, vat, and reactive dyes.
- 3-4. Handling colour spectrophotometer- familiarization of commands to use Software

- 5-6. Recording reflectance values of coloured samples, recording colour strength.
 7. Assessment of colour fastness and recording the grey scale fastness grades
 8. Colour assessment techniques for assessing dyed fibre, yarn and fabric.
 9. Determination of relative dye strength in solution
- 10-13. Creation of data files and reproduce dyed samples with the match prediction
14. Management and interpretation of data generated
 15. Exposure to Pass/ Fail system in industry
 16. End-term assessment

VIII. Teaching Methods/ Activities

- Lecture
- Demonstrations and hands on experience
- Assignment
- Guest Lectures
- Exposure visits

IX. Learning Outcome

After successful completion of this course, the students are expected to

- Be Confident in handling the Spectrophotometers
- Assess the dyed fibre, yarn and fabric
- Predict computer colour matching

X. Suggested Reading

- Amutha K. 2016. *A Practical Guide to Textile Testing*. Woodhead Publishing, India.
- Booth JE. 2018. *Principles of Textile Testing*. CBS publishers and Distributors, New Delhi.
- Gulrajani ML. 2010. *Colour Measurement: Principles, Advances and Industrial Applications*. Woodhead Publishing Series in Textiles, UK.
- Janet. 2017. *Best Colour Design: Theories and Applications*. (The Textile Institute Book Series) 2nd Edition Woodhead Publishing, Cambridge, England.
- Padmanabhan AR. 1988. *A Practical Guide to Textile Testing*, SITRA, Coimbatore.
- Sule AD. 1997. *Computer Colour Analysis Textile Applications*. ATIRA Publication, Ahmadabad.
- Xin J. 2006. *Total Colour Management in Textiles*. Woodhead Publishing.
- <https://www.elsevier.com/books/total-colour-management-in-textiles/xin/978-1-85573-923-9>

Weekly Lecture Schedule

Duration (week)	Topics
1	Theory of colour science.
2	Dyeing theories- physical, chemical, fibre complex,
3	Dyeing theories- solid solution and pigment
4	Computers match prediction in dyeing fibres, yarns, fabrics and formulation of dyeing recipes
5	Dye structure- size, shape and molecular weight of dye, state of the dye
6	Electrical nature of dye molecule,
7	Chemical groups attached to dye; Dye and dyeing parameters.
8	Colour measurement systems- principles, types and uses in colour assessment
9	Software and hardware for colour measuring systems
10	Objective specification of colour, colour difference,
11	Shade sorting and various colour spaces.
12	Assessment of whiteness, yellowness & brightness
13	Assessment of fastness of colour

Duration (week)	Topics
14	Computer Colour Matching-Theory, Isomeric and metameric colour matching
15	Accuracy of match prediction, measurement of reflectance, benefits
16	Pass - Fail Systems

I. Course Title : Functional Clothing**II. Course Code : ATS 605****III. Credit Hours : 3 (2+1)****IV. Rationale**

Today clothing is considered not only for aesthetic aspect but also to perform specific function. Functional clothing represents the evolutionary segment of the technical textiles market, representing an area where clothing crosses the conventional boundaries and integrates with the domains of medicine, biotechnology, nanotechnology, physics and computing among others, to meet the multifaceted and complex requirements of the user. Immense customised research opportunities make this course very interesting to the students.

V. Aim of the course

- To understand the importance of functional and portable clothing
- To identify and analyse the functional features in special purpose clothing
- To develop skill in designing functional clothing for special purpose

VI. Theory**Unit I: Introduction to functional clothing and other associated aspects**

Clothing as a portable environment. Comfort in clothing - principles of heat transfer in apparels, thermal insulation, clothing systems for thermal protection, breathable textiles.

Unit II: Clothing design for special groups

Functional Design Process; Clothing design for special groups – expectant and lactating mothers, clothing design to accommodate differently abled. Geriatric clothing; Impact theory- designing impact-protective clothing

Unit III: Functional and protective clothing

Requirements and designing of functional and protective clothing – sports, farm, military, industrial workers, fire fighters, mines, space and marine. Fastening systems in clothing.

VII. Practicals

- 1-2. Survey on selected functional clothing available in the market.
3. Functional designing process- Assessment of functional aspects
4. Designing clothing for expectant woman
5. Designing clothing for nursing mothers.
6. Designing garments for physically handicapped – disabled hands.
7. Designing garments for physically handicapped – disabled legs
8. Designing garments for physically handicapped – wheel chair incumbent
9. Designing protective clothing for pesticide applicators and analysis
10. Designing protective clothing for selected industrial workers and analysis

11. Designing protective clothing for fire fighters and analysis.
12. Designing impact clothing- use of different material and techniques of padding
13. Designing locale specific sports clothes and analysis.
- 14-15. Mini Project- Designing customized functional clothing
16. End-term assessment

VIII. Teaching Methods/ Activities

- Lecture
- Assignment
- Publication Review
- Student presentation
- Group Work
- Case Analysis and case studies
- Guest Lectures
- Video

IX. Learning Outcome

After successful completion of this course, the students are expected to:

- Design functional clothing
- Customize clothing for a special purpose

X. Suggested Reading

- Cooklin G. 2012. *Garment Technology for Fashion Designers*. Wiley-Blackwell, New Jersey
- Dwight Garner. 2018. *Bill Cunningham, Style Maven, Leaves Behind a Memoir and It's 'a Real Dilly'*. Patricia Wall. New York
- Gandhi Kim. 2019. *Woven Textiles Principles, Technologies and Applications*. Woodhead Publishing, UK.
- Karen L LaBat. *Clothing Fasteners*. <http://fashion-history.lovetoknow.com/clothing-closures-embellishments/clothing-fasteners>
- Kilgus R (Ed.). 1999. *Clothing Technology*. Europa Lehrmittel, Textile Institute, Manchester.
- K Amutha. 2016. *A Practical Guide to Textile Testing*. Woodhead Publishing India in Textiles, Cambridge.
- McCarthy J. 2011. *Textiles for Hygiene and Infection Control*. Woodhead Publishing Series in Textiles, UK
- Meinander Harriet and Varheen maa Minna. 2002. *Clothing and textiles for disabled and elderly people*. VTT Tiedotteita – Research Notes 2143. 57 p. + app. 4 p. www.inf.vtt.fi/pdf/
- Patricia Dolez. 2017. *Advanced Characterization and Testing of Textiles*. Woodhead Publishing, California
- Susan M Watkins. 1995. *Clothing the Portable environment*. Iowa State University Press. Ames
- Anonymous Disability SA. 2008. *Dressing: aids and equipment* [www] Available from: [http://www.sa.gov.au/upload/franchise/Community%20Support/Disability/Information%20sheets%20-%20Disability%20SA/Dressing%20-%20aids%20and%20equipment%20\(PDF%20185kb\).pdf](http://www.sa.gov.au/upload/franchise/Community%20Support/Disability/Information%20sheets%20-%20Disability%20SA/Dressing%20-%20aids%20and%20equipment%20(PDF%20185kb).pdf)
- www.ijrdet.com (ISSN 2347-6435(Online) Volume 3, Issue 2, August 2014)
- <http://www.sun-protection-and-products-guide.com/UV-protective-clothing.html>
- <http://www.sunprotection.net/sunprotectionclothing.html>
- <http://www.umaniitoba.ca/>

Weekly Lecture Schedule

Duration (week)	Topics
1	Introduction to functional; Concept clothing and other associated aspects
2	Clothing as a portable environment.

Duration (week)	Topics
3	Comfort in clothing, Types of comforts
4	Principles of heat transfer in apparels
5	Thermal insulation, clothing systems for thermal protection; Breathable textiles
6	Functional Designing Process
7	Requirements and designing functional clothing for special groups – expectant and lactating mothers
8	Key requirements in designing functional clothing for special groups- physically handicapped
9	Impact theory- designing impact-protective clothing- Ballistic materials & bullet proof vests
10	Requirements and designing of functional and protective sports clothing
11	Requirements and designing of functional and protective farm clothing
12	Key issues in designing of functional and protective clothing military
13	Requirements and designing of functional and protective clothing industrial workers
14	Requirements and designing of functional and protective clothing fire fighters
15	Requirements and designing of functional and protective clothing mines, space and marine
16	Fastening systems in clothing.

I. Course Title : Textile Conservation

II. Course Code : ATS 606

III. Credit Hours : 2 (1+1)

IV. Rationale

Textiles and costumes of bygone era are valued for their historic interest, their aesthetic appeal and their cultural significance. A course on Textile conservation helps to understand the techniques to be adopted for addressing the damage of textile or a costume due to storage.

V. Aim of the course

- To impart basic knowledge on textile conservation.
- To develop awareness about textile conservation and skill in assessment of damage, repair and stabilization of textiles.

VI. Theory

Unit I: Introduction to textile conservation

Importance of textile conservation; Important terminologies in conservation; Various methods for analysis of textiles - fibre content, yarn and fabric structure.

Unit II: Object examination and Assessment

Object examination; Damage causing agents – insects, pests, microorganisms, mildew, and environmental factors; Condition assessment, repair and stabilization of textiles and apparel in museum collections; Recording, handling and preparations in conservation; Materials and methods used for conservation treatments.

Unit III: Support and Considerations in textile conservation

Support and Considerations in textile conservation; Reassembly and Finishing;



Examination of storage and exhibition techniques; Transportation of artifacts/historic textiles; Equipment and the workspace for textile conservation

Unit IV: Principles of cleaning fragile textiles

Principles of cleaning fragile textiles; Dry, aqueous and solvent cleaning; Conservation of Linen and Flags, historic costumes and feather work, lace, leather goods, tapestries and carpets; Proper conditions for storage and display of various textiles.

VII. Practicals

- 1-2. Visit to a museum and study of various textile conservation methods
- 3-4. Analysis of aged textiles - fibre content, yarn and fabric structure
- 5-6. Assessment of damage
- 7-9. Repair and stabilization of textiles
15. Determination of colour strength
- 11-12. Exposure to cleaning techniques
- 13-15. Mini Project work
16. End-term assessment

VIII. Teaching Methods/ Activities

- Lecture
- Videos/films
- Visit to Museums
- Student's presentation
- Case study

IX. Learning Outcome

After successful completion of this course, the students are expected to

- Develop skill in textile conservation and assessment of damage, repair and stabilization of textiles
- Become confident to take up career in Museum and related institutes

X. Suggested Reading

- Balazsy. 2012. Chemical Principles of Textile Conservation. Routledge, UK.
- Frances Lennard. 2012. *Textile Conservation: Advances in Practice*. A Butterworth-Heinemann, UK.
- Harris J. (Ed.). 2011. *Five Thousand Years of Textiles*. Smithsonian Books, UK.
- Leene JE. 1972. *Textile Conservation*. Butterworths, UK.
- Williams JC. 1977. *Preservation of Paper and Textiles of Historic and Artistic Value*. American Chemicals Society.
- https://en.wikipedia.org/wiki/Conservation_and_restoration_of_textiles#Display
- <https://scindeks-clanci.ceon.rs/data/pdf/0351-9465/2017/0351-94651701094D.pdf>
- <https://www.researchgate.net/publication/318014663>
- http://webspace.utexas.edu/ecb82/textile_care.doc

Weekly Lecture Schedule

Duration (week)	Topics
1	Importance of textile conservation; Important terminologies in conservation; Various methods for analysis of textiles - fibre content, yarn and fabric structure.
2	Various methods for analysis of textiles - fibre content, yarn and fabric structure.
3	Object examination. Damage causing agents – insects, pests, micro organisms, mildew, and environmental factors.

Duration (week)	Topics
4	Condition assessment, repair and stabilization of textiles and apparel in museum collections.
5	Recording, handling and pre-preparations in conservation; Materials and methods used for conservation treatments
6	Support and Considerations in textile conservation; Reassembly and Finishing
7	Examination of storage and exhibition techniques.
8	Transportation of artifacts/ historic textiles; Equipment and the workspace for textile conservation
9	Principles of cleaning fragile textiles Dry, aqueous and solvent cleaning.
10	Conservation of Linen and Flags
11	Conservation of historic costumes and feather work, lace
12	Conservation of leather goods, tapestries and carpets, etc.
13	Proper conditions for storing of various textiles
14	Proper conditions for display of various textiles – curtains, bedsheets, flat fabrics, carpets, tapestries, etc
15	Categorization of Display Techniques Mannequins, Slanting Technique, Mounting Technique
16	Categorization of Display Techniques, Hanging Technique, Vacuumed with Inert Gas

I. Course Title : Operations Management in Textiles and Apparel

II. Course Code : ATS 607

III. Credit Hours : 3 (3+0)

IV. Rationale

The very essence of any business is to cater needs of customer by providing services and goods, and in process create value for customers and solve their problems. Production and operations management talks about applying business organization and management concepts in creation of goods and services. Proper management of References based on effective planning, reduction in production costs through control of material handling, improving the productivity, ergonomic interventions, and so on contribute to success of the industry.

V. Aim of the course

- To enable students to understand the importance of operations management in textiles and apparel industries.
- To impart in depth knowledge about various concepts of production and operations management for textiles and apparel units.

VI. Theory

Unit I: Scope of production and operations management in textiles and apparel

Scope of production and operations management in textiles and apparel, methods and measurement of capacity planning. Plant climatology-Plant building and its significance, considerations of building design, types of industrial building- plant lighting; need, types and factors governing. Importance of ventilation.

Unit II: Plant location

Plant location; factors governing, types of location; rural, sub-urban and urban, merits and demerits. Plant layout; objectives of scientific layout, principles of layout, types of material flow, factors governing the layout, types of layouts, merits and demerits.

Unit III: Material handling

Material handling- need, classification, handling costs, principles and types of material handling equipment; Maintenance management- need, types, organisation of maintenance department, maintenance audit, maintenance cost, maintenance indices.

Unit IV: Work study

Work study- need, objectives from apparel and textile industry point of view; Method study- steps in method study, tools of record. Time study-time and motion economy, steps, elements, allowances, work measurement and derivation for standard minute value (s m v or s a m) – calculations from apparel industry; Ergonomics- meaning, scope in apparel and textile industry, impact on working conditions and productivity, recommendations for better ergonomically conditions.

Unit V: Automation in Textile & Apparel Industries & Government Policies:

Mechatronics in Apparel & Textile Industries; Scope for Robotics and applications in Apparel & textile Industries; Policies of the government in export and import of materials and made-ups. Government initiatives for various sectors of textile and apparel industry.

VII. Teaching Methods/ Activities

- Lecture
- Assignment (Reading/Writing) and student's presentation
- Group Work
- Guest Lectures
- Exposure visits

VIII. Learning Outcome

After successful completion of this course, the students are expected to:

- Acquired in depth understanding of various concepts of production and operations management in textiles and apparel units
- Prepare for management careers in Apparel and textile units

IX. Suggested Reading

- Aswathappa and Rao S. 2009. *Production and Operations Management*. Himalaya Publishing House, New Delhi.
- Chunnavala and Patel. 2007. *Production and Operations Management*. Himalaya Publishing House, New Delhi.
- Rao S. 2009. *Production Management*. Himalaya Publishing House, New Delhi.
- Vidyasagar P.V. 2010. *Encyclopedia of Textiles*. Vol 2 & 3. Mittal Publications, New Delhi
- <http://www.fibre2fashion.com/industry-article/1579/agro-textiles-a-rising-wave?page=1>
- <http://www.bch.in/agro-textiles.html>
- <http://www.technicaltextile.net/agro-textiles/>
- http://www.ijarse.com/images/fullpdf/1373424521_APPLICATION_OF_TEXTILE_IN_AGRICULTURE.pdf

Weekly Lecture Schedule

Duration (week)	Topics
1	Scope of production and operations management in textiles and apparel, methods and measurement of capacity planning.
2	Plant climatology-Plant building and its significance, considerations of building design
3	Types of industrial building- plant lighting: need
4	Ventilation- Importance and factors governing.
5	Plant location: factors governing, types of location: rural, sub-urban and urban, merits and demerits
6	Plant layout: objectives of scientific layout, principles of layout
7	Types of material flow, factors governing the layout, types of layouts, merits and demerits
8	Material handling- need, classification, handling costs
9	Principles and types of material handling equipment
10	Maintenance management- need, types, organisation of maintenance department; Maintenance audit, maintenance cost, maintenance indices
11	Work study- need, objectives from apparel and textile industry point of view; Method study- steps in method study, tools of record
12	Time study-time and motion economy, steps, elements, allowances; Work measurement and derivation for standard minute value calculations from apparel industry
13	Ergonomics- meaning, scope in apparel and textile industry, impact on working conditions and productivity, recommendations for better ergonomical conditions
14	Mechatronics in Apparel & Textile Industries
15	Scope for Robotics and applications in Apparel & textile Industries
16	Policies of the government in export and import of materials and madeups. Government initiatives for various sectors of textiles and apparel industry

I. Course Title : Technology of Nonwovens

II. Course Code : ATS 608

III. Credit Hours : 2(2+0)

IV. Rationale

Nonwoven textiles are one of the most popular multi-utility textiles produced in the world. These encompass a large variety of raw materials and production technologies and characteristics. Knowledge of nonwovens will help in increasing the competency of the students in the field of textiles.

V. Aim of the course

- To acquaint the students with raw materials used, manufacturing techniques, characteristics and uses of nonwovens
- To impart knowledge related to testing and evaluation of nonwoven textiles.

VI. Theory

Unit I: Development of the nonwovens industry

Development of the non-woven industry. Types of Nonwovens- dry, wet and polymer-laid non-woven, web formation, bonding and raw materials.

Unit II: Types of web formation

Types of web formation, mixing and blending, card clothing, cross lapping.

Developments, physical properties and practical applications of air laid fabrics. Wet-laid fabrics- raw materials, bonding systems, finishing and product application. Polymer- laid fabrics- raw materials, bonding techniques, spun-bond fabrics, characteristics, properties and other extrusion properties.

Unit III: Types of bonding

Types of bonding: Mechanical bonding- stitch, needle punching, hydro entanglements process technology and applications. Thermal bonding- raw materials, contact, thermal reaction/ infrared and ultrasonic bonding and applications. Chemical bonding- chemicals, binder polymers, mechanism, drying and applications.

Unit IV: Non-woven fabric finishing

Non-woven fabric finishing - wet, chemical, lamination, mechanical, surface and other developing technologies. Fabric inspection.

Unit V: Characterization of non-woven fabrics

Characterization of non-woven fabrics - weight, thickness, density and other structural parameters. General standards for testing non wovens- absorption, strength, bonder and optional properties.

VII. Teaching Methods/ Activities

- Lecture
- Videos/films
- Assignment
- Student's presentation
- Group Work
- Guest Lectures
- Field visits

VIII. Learning Outcome

After successful completion of this course, the students are expected to:

- Develop knowledge about fundamental techniques of nonwoven textiles.
- Undertake testing and evaluation of nonwoven textiles.

IX. Suggested Reading

- Amutha K. 2016. *A Practical Guide to Textile Testing*. Woodhead Publishing, UK.
- Chapman ARA. 2010. *Applications of Nonwovens in Technical Textiles*. Woodhead publishing limited, New Delhi.
- Dharmadhikary RK Gilmore TF Davis HA and Batra SK. 1995. *Thermal Bonding of Nonwoven Fabrics*. Textile Progress, Vol.26, No.2, Textile Institute Manchester, ISBN: 1870812786.
- Gohl. 2005. *Textile Science: An Explanation of Fibre Properties*. CBS Publishers & Distributors, New Delhi
- Jirsak O and Wadsworth LC. 2004. *Nonwoven Textiles*. Textile Institute, Manchester, 1999, ISBN: 0 89089 9788.
- Lewin M. 2006. *Handbook of Fiber Chemistry*. Taylor and Francis e-books. Boca Raton
- Lunenschloss J Albrecht W and David S. 1985. *Nonwoven Bonded Fabrics*. Ellis Horwood Ltd., New York, ISBN: 0-85312-636-4.
- Mrstina V and Feigl F. 1990. *Needle Punching Textile Technology*. Elsevier, New York,
- Russel SJ. 2007. *Handbook of Nonwovens*. Woodheadpublishing limited, Cambridge, England.
- Vidyasagar PV. 2008. *Handbook of Textiles*. BS Publications, New Delhi, India
- Wilson J. 2001. *Hand book of Textile Science*. Woodhead Publishing, UK of Textile Design

Weekly Lecture Schedule

Duration (week)	Topics
1	Development of the non-woven industry.
2	Types of Non wovens- dry, wet and polymer- laid non-woven, web formation, bonding and raw materials.
3	Types of web formation, mixing and blending, card clothing, cross lapping
4	Development, physical properties and practical applications of air laid fabrics. Wet-laid fabrics- raw materials, bonding systems, finishing and product application
5	Polymer- laid fabrics- raw materials, bonding techniques, spun-bond fabrics, characteristics, properties and other extrusion properties.
6	Types of bonding: Mechanical bonding- stitch, needle punching, hydro entanglements
7	Process technology and applications. Thermal bonding- raw materials, contact, Thermal reaction/ infrared and ultrasonic bonding and applications.
8	Chemical bonding- chemicals, binder polymers, mechanism, drying and applications.
9	Non-woven fabric finishing - wet, chemical, lamination, Fabric inspection.
10	Non-woven fabric finishing - mechanical, surface and other developing technologies. Fabric inspection.
11	Characterization of non-woven fabrics - weight, thickness, density and other structural parameters.
12	General standards for testing non wovens- absorption, strength, bonder and optional properties.
13	Testing and evaluating of Laminated fabrics

I. Course Title : Research and Publication Ethics

II. Course Code : ATS 611

III. Credit Hours : 2 (1+1)

IV. Aim of the course

- To focus on basics of philosophy of science and ethics, research integrity, publication ethics
- To provide hands-on experience to identify research misconduct and predatory publications, Indexing and citation databases, open access publications, research and plagiarism tools

V. Theory

Unit I: Philosophy and Ethics

Introduction to philosophy- definition, nature and scope, concept, branches; Ethics: definition, moral philosophy, nature of moral judgments and reactions

Unit II: Scientific Conduct

Ethics with respect to science and research; Intellectual honesty and research integrity; Scientific misconducts- Falsification, Fabrication, and Plagiarism (FFP); Redundant publications; duplicate and overlapping publications, salami slicing; Selective reporting and misrepresentation of data

Unit III: Publication Ethics

Publication ethics- definition, introduction and importance; Best practices/ standards setting initiatives and guidelines- COPE, WAME, etc.; Conflicts of interest;



Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types; Violation of publication ethics, authorship and contributorship; Identification of publication misconduct, complaints and appeals; Predatory publishers and journals

VI. Practicals

Unit IV: Open Access Publishing

Open access publications and initiatives; SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies; Software tool to identify predatory publications developed by SPPU, Journal finder/journal suggestion tools, viz., JANE, Elsevier Journal Finder, Springer Journal Suggested, etc.

Unit V: Publication Misconduct

Group Discussions - Subject specific ethical issues, FFP, authorship; Conflicts of interest; Complaints and appeals: examples and fraud from India and abroad
Software tools- Use of plagiarism software like Tumitin, Urkund and other open source software tools

Unit VI: Databases and Research Metrics

Databases- Indexing databases; Citation databases: Web of Science, Scopus, etc.
Research Metrics - Impact Factor of journal as per Journal Citation Report, SNIP, SIR, IPP, Cite Score; Metrics: h-index, g index, i10 index, altmetrics.

Restructured and Revised
Syllabi of Post-graduate Programmes

Vol. 6

Community Science
– Extension Education and Communication
Management

Preamble

(Extension Education and Communication Management)

Specialisation in Extension Education and Communication Management, should foster unique capabilities and competitive skills among students to satisfy the community that is with versatile information needs. This is exceedingly challenging in the world of digital media device and product development, as well as their usage. Extension education being an advisory system of application of latest scientific and technological innovations, its amalgamation with communication management for effective and sustainable human development is the cutting edge. Moreover the Education Policy lays meticulous emphasis on the development of creative potential of each individual, for remunerative career opportunities. Professionalism in planning of extension systems and implementation through effective communication thus becomes an integral part of this component. In the advent of change in the nomenclature from Home Science to Community Science where the sphere of clientele enlarged, it has become all the more crucial for improvisation.

Accordingly, the courses being offered were critically reviewed for their contribution in molding students as professional extension scientists. Based on this, some courses are continued, but with addition of content in view of contemporary developments. New courses, six and four course in M.Sc. and Ph.D., respectively are included to fill the gaps. Overall, the courses can be categorized into three: i) Extension systems and processes, ii) Media development and management and iii) Extension research. With adequate practical component, all the courses persuade participative learning.

A multi-dimensional approach is adopted to deal with the techniques/ technologies to encourage entrepreneurship development. Innovative methodologies are suggested to advance the understanding and vision of the students. Simulated learning through project mode i.e. attachment of students to AICRP units for transfer of technology, and University Extension programmes is incorporated. Knowledge entrepreneurship development education by means of special projects for teaching/learning materials for differently able groups is planned to enlarge the creativity of students. Special project encourages outsourcing of students skills, thus making them specialized service providers. Teaching methods like Inter-university exchange through online group discussions make students competitive.



Modifications Suggested in Courses in the Revised Curricula

M.Sc. Community Science (Extension Education & Communication Management)

Course Code	Course Title	Credit Hours	Remarks
Major Courses			
EECM 501	Global Extension Systems	3 (3+0)	Content modified in view of emergence of innovative processes in extension systems
EECM 502	Development communication	3 (2+1)	Title changed and content modified to suit to developmental challenges
EECM 503*	ICT and New Media	4 (1+3)	Credits enhanced and content modified by focusing ICT in community education
EECM 504*	Technology Transfer and Management	3 (1+2)	New course to engage students for on-hands training by attaching to AICRP/KVKs
EECM 505*	Dynamic Communication skills	3 (1+2)	New course for development of holistic communication skills.
EECM 506	Participatory Programme Management	3 (1+2)	Content modified for practical orientation to application and analysis in different situations

Course Code	Course Title	Credit Hours	Remarks
EECM 507	Organizational Development and HRD	2 (1+1)	New course to orient students towards professional management of organizations.
EECM 508	Educational Technology	3 (2+1)	Content modified to achieve proficiency in teaching and learning.
EECM 509	Group Dynamics	2 (2+0)	Content modified, highlighting adoption of SHG for simulated learning
EECM 510	Community Development and Outreach	3 (2+1)	New course to stimulate strong connection with community and communication.
EECM 511*	Climate change management	2 (1+1)	New course to mold students as service providers in climate change management.
EECM 512	Gender Sensitization for Empowerment	2 (2+0)	Content modified to promote interest in national gender sensitive issues.
EECM 513	Special Project- Out sourcing for Media product development	2 (0+2)	New course for entrepreneurial skills.

Minor Courses

FN 505	Nutrition and Physical fitness	3(2+1)	Proposed minor courses from subjects closely related to a student's major subject.
FN 509	Food Safety and Standards	3(2+1)	Apart from these courses a student can register any other course
FN 513	Human Physiology	3(3+0)	
HDFS 503	Methods and Techniques of Assessment in Human Development	3(2+1)	
HDFS 506	Management of differently abled	3(2+1)	
ATS 512	Apparel and Textile Product Development	2(1+1)	
ATS 513	Laboratory Techniques in Textiles Research	2(0+2)	



Course Code	Course Title	Credit Hours	Remarks
RMCS 513	Environmental Resource Management	2(1+1)	offered by any other departments
RMCS 508	Product Design	3(1+2)	
RMCS 507	Consumer Issues and Legislations	2 (2+0)	
Supporting Courses			
	Research methodology	3(2+1)	Course numbers will be assigned by the departments that offer these courses.
	Statistics	3(2+1)	
	Total	6(4+2)	
Common Courses			
	Library and Information Services	1(0+1)	The common courses will be registered with the respective departments that offer these courses
	Technical Writing and Communication Skills	1(0+1)	
	Intellectual Property and its management in Agriculture	1(0+1)	
	Basic Concepts in Laboratory Techniques	1(0+1)	
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)	
		5(0+5)	
EECM591	Seminar	1(0+1)	
EECM599	Thesis/Research	30	
	Total	70	

*Compulsory core courses

Ph.D. Community Science (Extension Education and Communication Management)

Course Code	Course Title	Credit Hours	Remarks
Major Courses			
EECM 601*	Managerial Skills for Extension Professionals	3 (2+1)	Content updated for delivery of specialized extension support in competitive environment

Course Code	Course Title	Credit Hours	Remarks
EECM 602	Impact Assessment of Development programmes	3 (1+2)	New title, by taking a part of content from HECM 606 , Monitoring, Evaluation and Impact Assessment. Content focuses on Case study method
EECM 603*	Scaling Techniques for Behaviour Research	3 (1+2)	New course, to provide expertise in development of scales.
EECM 604	Design and Development of e-Extension Project	3 (0+3)	New course to provide comprehensive experience of Extension-Research-Education through digital communication.
EECM 605	Sustainable Livelihood Systems	2 (1+1)	Content updated, highlighting sustenance processes to different contexts and situations of uncertainty
EECM 606	Extension Research Project Management	3 (1+2)	Title of HECM 604 Research project management is changed and content modified to focus on Extension research
EECM 607	Media application and Product Promotion	4 (2+2)	Basics of media are covered at UG and M.Sc. level. Hence HECM 603 Advanced media management is



Course Code	Course Title	Credit Hours	Remarks
EECM 608	Advocacy and Behavior Change Management	3 (1+2)	modified for application skills in media product development New course to provide skills for logical thinking in planning behaviour change communication programme.
	Total	24 (9+15)	
Minor Courses			
FN 604	Global Nutrition Problems	2(2+0)	Proposed minor courses from subjects closely related to a student's major subject. Apart from these courses a student can register any other course offered by any other departments
FN 608	Energy Metabolism	2(2+0)	
HDFS 608	Qualitative research methods	3(2+1)	
ATS 602	Technical Textiles	3(2+1)	
ATS605	Functional Clothing	3(2+1)	
ATS 607	Operational Management in Textiles and Apparel	2(2+0)	
RMCS 603	Globalization and Consumer Economics	3 (2+1)	
RMCS 606	Environmental Issues and Challenges	2 (2+0)	
RMCS 607	Family Dynamics and Women Power	3 (2+1)	

Supporting Courses

Student can choose any course relevant to the research from other faculties of the University or from Swayam portal or online courses.

EECM 691	Doctoral Seminar I Optional Field)	1 (1+0)
EECM 692	Doctoral Seminar II (Core Field)	1 (1+0)
EECM 699	Research	75
	Total	100 Credits

*Compulsory core courses

** Detail missing

Course Title with Credit Load

M.Sc. (Community Science) in Extension Education and Communication Management

Course Code	Course Title	Credit Hours
EECM 501	Global Extension Systems	3 (3+0)
EECM 502	Development communication	3 (2+1)
EECM 503*	ICT and New Media	4 (1+3)
EECM 504*	Technology Transfer and Management	3 (1+2)
EECM 505*	Dynamic Communication skills	3 (1+2)
EECM 506	Participatory Programme Management	3 (1+2)
EECM 507	Organizational Development and HRD	2 (1+1)
EECM 508	Educational Technology	3 (2+1)
EECM 509	Group Dynamics	2 (2+0)
EECM 510	Community Development and Outreach	3 (2+1)
EECM 511*	Climate change management	2 (1+1)
EECM 512	Gender Sensitization for Empowerment	2 (2+0)
EECM 513	Special Project- Out sourcing for Media product development	2 (0+2)
Minor Courses**		
FN 505	Nutrition and Physical fitness	3(2+1)
FN 509	Food Safety and Standards	3(2+1)
FN 513	Human Physiology	3(3+0)
HDFS 503	Methods and Techniques of Assessment in Human Development	3(2+1)
HDFS 506	Management of differently abled	3(2+1)
ATS 512	Apparel and Textile Product Development	2(1+1)
ATS 513	Laboratory Techniques in Textiles Research	2(0+2)
RMCS 513	Environmental Resource Management	2(1+1)
RMCS 508	Product Design	3(1+2)
RMCS 507	Consumer Issues and Legislations	2 (2+0)
Supporting Courses		
	Research methodology	3(2+1)
	Statistics	3(2+1)
	Total	6(4+2)
Common Courses		
	Library and Information Services	1(0+1)
	Technical Writing and Communication Skills	1(0+1)



Course Code	Course Title	Credit Hours
	Intellectual Property and its management in Agriculture	1(0+1)
	Basic Concepts in Laboratory Techniques	1(0+1)
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)
	Total	5(0+5)
EECM591	Seminar	1(0+1)
EECM599	Thesis/Research	30
	Total	70

*Compulsory core courses

Course Contents

M.Sc. (Community Science) in Extension Education and Communication Management

- I. Course Title** : Global Extension Systems
II. Course Code : EECM 501
III. Credit Hours : 3 (3+0)

IV. Rationale

India has the pre and post-independence history of extension programmes. In course of time many changes occurred in policies and plans based on ever changing needs. Based on lessons learned with in the country and from other developing countries, all the time new efforts are being made making extension system more strategic. This course provides such information with an analytical perspective of Indian extension system in comparison with other countries over the Globe. It will give an opportunity to the students to get an insight into the strengths and weakness of each of the system, to mould themselves as policy contributors and planners.

V. Aim of the course

- To appraise students the perspectives of extension systems in India
- To enable students for comparative analysis of Indian extension systems with other countries
- To acquaint students with the extension systems in ICAR and SAUs.

VI. Theory

Unit I: Orientation to extension systems

Early extension efforts; Indian extension systems - reforms, challenges of extension management in India; Paradigm shift in extension systems; Extension approaches in view of globalization and market liberalization; Privatization of extension services – introduction, scope, advantages, limitations and experiences; Decentralization of extension systems; Revolution in extension systems.

Unit II: Governance and extension systems

Indian governance and role of extension systems - retrospection on Indian governance; Role of extension system; Ministries - rural development, agriculture, science and technology, human resource development, health, industries, education and women and child development; NGO collaboration; Review of five year plans.

Unit III: ICAR extension system

History; Extension system; Organisational structure; Policy issues; Existing extension systems and challenges; National and regional institutions - vision, objectives, activities, innovations, programmes; Extension systems in SAUs - organisational structure, personnel, roles, innovations, SWOT analysis.

Unit IV: Extension management and training organisations and institutions

FAO, IFAD, IFPRI, WFO, WHO, *Biodiversity international*, MANAGE, NIRD, National Institute of Agricultural Marketing (NIAM), NAARM, EEI, SAMETI, FTC.

Unit V: Comparative analysis of extension system

India with USA, UK, Israel, China, Pakistan, Bangladesh, Japan, Italy, South Africa, Island, Indonesia, Philippines and Brazil - history, approaches, organizational structure, methodology, services, problems and research linkages.

VII. Teaching Methods/ Activities

- Lectures
- Assignment
- Student's Book/Publication Review
- Students' presentation
- Online group discussion

VIII. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend different national and other global extension systems and their focus areas.
- Compare and analyse the differences in extension systems between nations in terms of their approaches and priorities.
- Explain extension systems in ICAR and SAU.
- Conceptualise the challenges in execution of extension systems.

IX. Suggested Reading

- Azadi H and Filson G. 2009. *Comparative Study of Agricultural Extension Systems-A Systemic View Outlook on Agriculture*. <https://www.rug.nl/research/portal/publications>.
- Sagar M. 2013. *Text Book of Agricultural Extension with Global Innovations*. Kalyani Publishers, Ludhiana, ISBN: 978-93-272-2877-9.
- Salahuddin A and Magor NP. 2005. *Innovations in Rural Extension: Case Studies from Bangladesh*. CABI Publishing, Wallingford, UK.
- Sangeet G and Mithilesh V. 2011. *Global Extension Systems: A Textbook*. New Academic Publications ISBN-10: 8186772464 ISBN-13: 978-8186772461.
- Singh KK et al. 2015. *Agricultural Extension Explorer*. Kalyani Publishers, Ludhiana.
- *Global Approaches to Extension Practice: A Journal of Agricultural Extension*
- *International Journal of Agricultural Extension*
- *Indian Research Journal of Extension Education* published by Society for Extension Education Agra

Weekly Lecture Schedule

Duration (week)	Topic
1.	Early extension efforts, Indian Extension systems – Reforms, Challenges of extension management in India, Paradigm shift in extension systems.
2.	Extension approaches in view of globalization and market liberalization, Privatization of extension services - Introduction, Privatization of extension services – Scope, Advantages and limitations.
3.	Privatization of extension services – Experiences, Decentralization and devolution of extension services, Revolution of extension systems.
4.	Retrospection on Indian governance, role of extension system , Ministry of Rural Development, Ministry of Agriculture and Farmers' Welfare.
5.	Ministry of Science and Technology, Ministry of Human Resource Development, Ministry of Industries.
6.	Ministry of Women and Child Development, Ministry of Health and Family Welfare.
7.	NGO collaboration, Review of five year plans.

Duration (week)	Topics
8.	History of extension systems in ICAR organisational structure of extension system, Policy issues, Existing extension systems and challenges, National and regional extension institutions – Vision and objectives.
9.	National and regional extension Institutions - Programmes and activities, National and regional extension institutions- Innovations and interventions, National and regional extension Institutions- Case studies and success stories.
10.	Extension systems in SAUs - Organisational structure, Personnel and roles, Extension systems in SAUs – Role of extension in academic, Research and training activities, Innovative extension systems in SAUs- Case studies.
11.	SWOT analysis of extension system in SAUs, Introduction, FAO and IFAD. WFO (World Farmers' Organisation) and WHO.
12.	<i>Bioversity International</i> , MANAGE, NIRD.
13.	NIAM, NAARM, EEI.
14.	SAMETI and FTC, IFPRI, India and USA, UK - History, Approaches, Organizational structure, Methodology, Services, Problems and research linkages.
15.	India with Israel, China - History, Approaches, Organizational structure, Methodology, Services, Problems and research linkages, India and Pakistan, Bangladesh - History, Approaches, Organizational structure, Methodology, Services, Problems and research linkages, India and Japan, Italy - History, Approaches, Organizational structure, Methodology, Services, Problems and research linkages.
16.	India and South Africa, Island - History, Approaches, Organizational structure, Methodology, Services, Problems and research linkages, India and Indonesia, Philippines - History, Approaches, Organizational structure, Methodology, Services, Problems and research linkages, India and Brazil - History, Approaches, Organizational structure, Methodology, Services, Problems and research linkages.

I. Course Title : Development Communication

II. Course Code : EECM 502

III. Credit Hours : 3 (2+1)

IV. Rationale

Globally, development communication is an approach for sustainable growth in versatile areas of quality life. Communication refers to the use of different types of media for the process of development, while development refers to the process of betterment of a society. Students specializing in EECM play multiple roles in the process of addressing various development issues pertaining to sustainable development goals, which the globe is looking at. This course imparts knowledge and skill to communicate responsive information aiming at feedback. The scope of innovation, creativity and continuity motivates students to make public programmes and policies real, meaningful and sustainable.

V. Aim of the course

- To familiarize students with global perspective of development communication issues
- To impart analytical skills with regard to the process of development communication
- To understand the role and use of media in attaining sustainable development goals.

VI. Theory

Unit I: Over view of development communication- Hypothetical concepts and theories- Press theories

Normative - authoritarian, libertarian, social responsibility, democratic participant theory; Sociological - uses & gratification, agenda setting; two-step flow; Psychological; Bullet theory; Theories of persuasion and advocacy; Critical theory of frank furt school; Attitude change theories; Political economy theory; Critical cultural theory of birmingham school and framing theory.

Unit II: National and international perspectives of development communication

National and international perspectives; Evolution of development communication concept; Government and non-government initiatives; Government and non-government organisations - FAO, UNDP, WHO, UNICEF, CARE and strategies.

Unit III: Millennium development goals (MDGs) and sustainable development goals (SDGs)

Achievements of MDGs - analytical review and recommendations; SDGs - document, vision and objectives; Targets and strategies for implementation.

Unit IV: Research perspectives of development communication:

Emerging issues; Measurable and variables of development communication; Existing research projects; Research lag and supporting organisations.

Unit V: Media initiatives for development communication:

Conventional and contemporary media technologies; Globalisation and media convergence; Ethical issues and media impact analysis.

VII. Practical

1. Research review on hypothetical concepts and theories of Development communication
2. Presentation on hypothetical concepts and theories of Development communication
3. Critical analysis of Sustainable Development goals (SDGs)
4. Report writing and presentation on critical analysis of SDGs
5. Case study preparation focusing national and international organisation efforts for development communication.
6. Presentation of national and international organisation efforts
7. Critical review on ongoing Development Communication research projects in respective SAUs
8. Presentation on ongoing Development Communication research projects
9. Interaction with personnel and consumers of development communication projects and group discussion.
10. Interaction with personnel and consumers of development communication projects and group discussion.
11. Selection of contemporary media for development of communication issue, dissemination through existing channels of respective SAUs
12. Analysis of contemporary media for development of communication issue
13. Analysis of contemporary media for development of communication issue

14. Presentation of media analysis of the issue
15. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignment
- Student's Book/Publication Review
- Simulation exercise
- Media development and transmission
- Student presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend the theories and perspectives of development communication
- Critically analyse SDGs in terms of niche research in development communication
- Understand the process of development communication in various national and international organizations
- Recognise the efforts of SAUs for development communication
- Plan and disseminate communication media on development issues

X. Suggested Reading

- Huesca R. 2003. Participatory Approaches to Communication for Development. In Mody B (Ed.) *International and Development Communication: A 21st Century Perspective*. Sage, California.
- Joshi Uma *Understanding Development Communication*. Dominant Publications, New Delhi.
- Karin G, Wilkins Thomas T and Rafael O. 2014. *The Handbook of Development Communication and Social Change*. Kindle Publication, ISBN: 9781118505311.
- Mefalopulos P. 2008. *Development Communication Sourcebook- Broadening the Boundaries of Communication*, The World Bank Publication.
- Mikkelsen and Britha. 2002. *Methods for Development Work and Research*. Sage Publications, New Delhi.
- Narula and Uma. 2007. *Development Communication Theory and Practice*. Har-Anand Publication, Ltd. New Dehli.
- Mefalopulos Paolo. 2008. *Development Communication Sourcebook Broadening the Boundaries of Communication*. Washington DC ISBN 978-0-8213-7522-8.
- Servaes Jan. 2008. *Communication for Development and Social Change*. Sage Publications, New Delhi.
- *Journal of Development Communication*. Asian Institute for Development Communication
- *Journal of Development and Communication Studies*. Asian Journal of Communication

Weekly Lecture Schedule

Duration (week)	Topic
1.	Over view of Development communication- Introduction to hypothetical concepts theories, Press theories, Normative – Authoritarian.
2.	Libertarian, Social Responsibility.
3.	Democratic Participant theory, Sociological - Uses and gratification
4.	Agenda setting, Two-step flow.
5.	Psychological, Bullet theory.
6.	Theories of persuasion and advocacy, Critical theory of Frankfurt school.
7.	Attitude change theories, Political economy theory.
8.	Critical cultural theory of Birmingham school and framing theory. National and

Duration (week)	Topics
9.	international perspectives of development communication - Evolution of development communication concept.
10.	Government and non-government initiatives, Organisations and strategies – FAO.
11.	Organisations and strategies - UNDP, Organisations and strategies - WHO.
12.	Organisations and strategies - UNICEF, Organisations and strategies - CARE.
13.	Millennium development goals (MDGs) and sustainable development goals (SDGs) - Achievements of MDGs - Analytical review and recommendations, Achievements of MDGs - Analytical review and recommendations.
14.	SDGs - Document, Vision and objectives of SDGs.
15.	Targets and strategies for implementation, Research perspectives of development communication - Emerging issues, Measurable and variables of development communication.
16.	Existing research projects, Research lag and supporting organisations, Media initiatives for development communication - Conventional and contemporary media technologies, Globalization and convergence.
	Mass media and ethical issues, Mass media impact analysis.

I. Course Title : ICT and New Media

II. Course Code : EECM 503

III. Credit Hours : 4 (1+3)

IV. Rationale

A revolution has occurred in information technology, significantly impacting human communication; thereby human development. The speed and rapidity of information process due to information technology revolution, maximised the gadget adoption and usage irrespective of geographical and demographical range. Thus, a new set of relationships and responsibilities emerged among the information processors to satisfy the information needs of versatile users. This course provides such competency among the students for interactive communication in a flash to any corner of the world.

V. Aim of the course

- To familiarize students with ICT and new media technologies and provide application skills through industry attachment
- To provide hands-on-experience on application of ICT tools and devices
- To expertise in analytics tracking to analyse information reach.

VI. Theory

Unit I: Information communication technology

Information communication technology - components of ICT, role of ICT in community education; IT enabled services - call centre, helpdesks, data warehouse; Current status of application; Government policy on ICT; Emerging research issues.

Unit II: Perspective of new media

Definitions, Soft and hardware components, Traditional media transition to new media; Knowledge management and archiving; Networks; Social Media - advantages and limitations.

Unit III: Multimedia - concept and evolution

Digital Audio - sound design and mixing, digital videography and photography, digital text writing.

Unit IV: Web and blog designing

Hosting; Introduction of HTML and basic tags and HTML document structure; Cascading style sheets; Text in CSS and working.

VII. Practical

1. Multimedia and emerging technologies - Introduction to Video-on demand, internet - radio and web television
2. Introduction to Internet and the browsers
3. Introduction to Internet access and browsing
4. Introduction to Internet access and browsing extension related websites, blogs and data bases
5. Exposure to network
6. Compose e-mails, send and receive mails
7. Video on demand- different video formats
8. Creating a Basic Video Clips with Video Editing software.
9. Adding audio into developed videos
10. Editing of existing videos and audios
11. Video on demand-accessing downloads and editing of required video formats
12. Internet radio- Accessing different radio channels in online websites and browsing
13. Web Television- Exposure and accessing
14. Impact of new media on traditional media- listing of various traditional media and new media formats- collection of literature
15. Group discussion/debate on advantages and disadvantages of traditional media and new media
16. Writing on specialized area on the web
17. Writing for general interest web- script writing concepts, principles for web
18. Writing for online- script writing concepts, principles, styles for online
19. Writing for net newspapers and editions- script writing concepts, principles, styles for online
20. Writing for blogs and search engines- script writing concepts, principles, styles for online
21. Writing for video logs, citizen journalism- script writing concepts, principles, styles for online
22. Evaluation of e-journals- Exposure to electronic journals, browsing sites, accessing and down loading the journal articles
23. Evaluation of e-journals
24. Submission of reports
25. Unique features of web language-, open source softwares, viz., wordpress, joomla, moodle
26. Introduction and basics to Advanced HTML
27. Introduction of Cascading Style Sheets
28. Orientation – java script and HTML scripts
29. Designing web page- Home page(landing page), hyperlinks with using CSS
30. Practical exercise on designing a web page by using HTML5 and CSS3.
31. How to create responsive (Mobile friendly) Pages with Using HTML5 and CSS3.



32. Designing web page- Home page, hyperlinks - open source softwares, viz., Wordpress
33. Explanation of WordPress Dashboard and creating blog in Wordpress
34. Hosting a WordPress Blog online
35. Creating Google Analytics
36. Adding Google Analytics into HTML page and Wordpress Pages
37. Introduction to interactive web media- web animation
38. Understanding web animation- jquery, dream weaver and Photoshop
39. Exposure to animated graphics in the web
40. Introduction to designing interactive elements, sound addition
41. Introduction to web visual editor, creation and editing.
42. Acquiring a domain and webhosting to host the website/blog.
43. Familiarisation with FTP and Cpanel
44. Hosting website into Online
45. Updating/change the contents and images online Website after Hosting.
46. How to take the backups of the website after hosting a website.
47. Tracking Web Traffic from Analytics
48. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignment
- Student's Book/Publication Review
- Practice sessions
- Media development and transmission
- Student presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend the role of ICT based services for community education and development
- Figure out the required soft and hard ware components in application of new media for interactive communication
- Develop content for web sites
- Design, develop and manage websites
- Track web analytics and analyse the impact

X. Suggested Reading

- Andleig PK and Thakrar K. 2003. *Multimedia Systems Design*. PHI: New Delhi.
- Chrisanthi Avgerou, Robin Mansell, Danny Quah and Roger Silverstone. 2009. *The Oxford Handbook of Information and Communication Technologies*.
<http://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199548798.001.0001/oxfordhb-9780199548798>.
- Earnshaw RA and Vince JA. 1995. *Multimedia Systems and Applications*. London: Academic Press.
- Grace Kite. 2012. *The Impact of Information Technology Outsourcing on Productivity and Output: New Evidence from India Volume 1*. Pages 239-48.
- ST Nandasara. 2009. *Information Communication Technology – Grade 11*. Educational Publications Department, Ministry of Education, Sri Lanka
<https://www.researchgate.net>.
- Thatchinamoorthi J and C Meenambigai. 2018. *Textbook of Extension Communication & Information Technology*. ISBN-10: 9788183214681 ISBN-13: 978-8183214681.

- Vanaja and Rajasekar. 2016. *Information & Communication Technology (ICT) In Education.* First Edition, Neelkamal ISBN- 0: 8183165192 ISBN-13: 978-8183165198.
- <https://www.india.gov.in/topics/communication/information-and-technology>
- Smart Villages Through Information Technology – Need of Emerging India <https://www.researchgate.net/publication>
- http://atcm.mathandtech.org/EP2009/papers_full/2812009_17282.pdf
- <https://www.emeraldinsight.com/doi/abs/10.1108/eb047157>

Weekly Lecture Schedule

Duration (week)	Topic
1	Information communication technology - Components of ICT.
2	Role of ICT in community education.
3	IT enabled services - Call centre, Helpdesks, Data warehouse.
4	Current status of application.
5	Government policy on ICT.
6	Emerging research issues.
7	Perspective of New media - Definitions, Soft and hardware components.
8	Traditional media transition to new media.
9	Knowledge management and archiving, Networks.
10	Social Media - Advantages and limitations.
11	Multimedia - Concept and evolution - Digital Audio - Sound design and mixing.
12	Digital videography and photography.
13	Digital text writing.
14	Web and blog designing – Hosting.
15	Introduction of HTML and basic tags and HTML document structure.
16	Cascading style sheets, Text in CSS and working.

I. Course Title : Technology Transfer and Management

II. Course Code : EECM 504

III. Credit Hours : 3 (1+2)

IV. Rationale

Technology transfer is the process of transferring skills and knowledge of a proven technology to users for application to enhance and sustain qualitative life. It is the mandate of Agricultural universities to ensure that scientific and technological developments are accessible to a wider range of users who can then further develop and exploit the technology into new products, processes, applications, materials or services. On the other hand, the importance of technology transfer has been increasing with the growing need for modern technologies, innovation, inventions and R&D. In this context, it is pertinent to provide adequate skill and knowledge to the students in transfer of technology and management.

V. Aim of the course

- To acquaint students with the process of TTM
- To provide hands-on-experience in TTM
- To sensitise students towards technology transfer career.

VI. Theory

Unit I: Introduction to technology transfer

Transfer of Technology - Definition and importance; Models of technology transfer -



different models, qualitative technology transfer models, dimensions of technology transfer, features of technology package, routes of technology transfer; FLD, OFT, Minikits.

Unit II: Technology acquisition

Technology acquisition; Alternatives for acquiring new technologies; Reasons; Management of acquired technology; Measures of scale and mechanisms for acquiring technologies - economy of scale, levels of scale, measurement of scale, factors affecting the choice of scale.

Unit III: Introduction to technology management

Concept and meaning of technology management; Evolution and growth of technology management.

Unit IV: Role and significance of technology management

Impact of technology on society; Technology and competition; Key issues in managing technological innovation, Forms of technology - product and process technologies; Technology forecasting - methods and principles; Role of government in technology management.

Unit V: Technological change

Characteristics of technological change; Classification of technological change; Impact of technological change; Technology life cycle; Technology transformation; Technology policies and policy instruments.

Unit VI: Technology assessment

Technology choice; Technology assessment and refinement; Technology assessment process; Technology leadership and followership; Writing technology assessment report.

Unit VII: Invention, innovation and creativity

Meaning and differences; Innovation management; Intellectual property management.

Unit VIII: Technology adoption, diffusion, and absorption

Technology adoption diffusion and absorption; Role of technology absorption - benefits, constraints in technology absorption, technology package and technological dependence, Indian experience in technology absorption efforts, issues involved in the management of technology absorption and government initiatives.

Unit IX: Development of technology

Development process and steps; Technology development and competition; Managing research & development (R & D); Reforms in technology development.

Unit X: Social issues in technology management

Technological change and industrial relations; Implementation of rationalization and automation in India.

VII. Practical

Note: Students may be attached to AICRP on Home Science/ Research project all through the semester for practical experience with either one of the departments, or for a stipulated duration with every department may be left to the discretion of course-in-charge. Students' report may consist the following information.

1. Enlisting of technologies already transferred under five disciplines/ research project.
2. Selection of technologies for observation of change attained and preparation of observation schedule
3. Field visit and interaction with clientele to collect data
4. Analysis of data and preparation of report
5. Presentation of report
6. Group discussion on technology refinement/ sustainability issues
7. Enlisting and description of technologies transferred by the concerned scientist/s during the semester
8. Description of invention, innovation and creativity of the selected technology
9. Description of transfer of technology model
10. Design and development of transfer of technology process
11. Presentation of technology transfer process
12. Preparation and finalisation of work plan for participation in technology transfer
- 13–25. Execution of work plan as per time line
26. Analysis of technology adoption and diffusion stages
28. Preparation of report on technology transfer
29. Presentation of report
30. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignment
- Student's Book/Publication Review
- Implant training/ Placement
- Student presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend technology transfer perspectives
- Select and execute technology in accordance with the needs of community
- Practice the management process
- Analyse the stages of technology adoption, diffusion and absorption
- Write the report on TTM

X. Suggested Reading

- A Inzelt and Jan Hilton. 1999. *Technology Transfer: From Invention to Innovation*. Springer Science and Business Media, Kluwer academic publishers.
- Albert E Muir. 1997. *The Technology Transfer System: Inventions: Marketing, Licensing, Patenting, Setting, Practice, Management, Policy*. Book News, Inc., Portland.
- Ali Hussein Saleh Zolai. 2012. *Knowledge and Technology Adoption, Diffusion, and Transfer: International Perspective*. University of Bahrain, Bahrain ISBN13: 9781466617520.
- Avid B, Audretsch Erik E, Lehmann Albert N, Link Alexander Starnecker. 2012. *Technology Transfer in a Global Economy*. Springer Science & Business Media, ISBN 146146102.
- Thomas J Allen. 1984. *Managing the Flow of Technology*. Edition III, Massachusetts Institute of Technology, ISBN 0262510278.
- *International Journal of Technology Transfer and Commercialisation*. Interscience Publishers, Genève.



Weekly Lecture Schedule

Duration (week)	Topic
1	Introduction to technology transfer - Transfer of technology models, Traditional technology transfer models, Qualitative technology transfer models, Dimensions of technology transfer features of technology package, Routes of technology transfer, FLD, OFT, Minikits.
2	Technology acquisition - Technology acquisition, Alternatives and reasons for acquiring new technologies, Management of acquired technology, Measures of scale and mechanisms for acquiring technologies, Economy of scale.
3	Technology acquisition - Levels of scale, Measurement of scale factors affecting the choice of scale, Introduction to technology management - Concept and meaning of technology management, Evolution and growth.
4	Role and Significance of technology management, Impact of technology on society technology and competition, Key issues in managing technological innovation.
5	Forms of technology; Product and process technologies, Technology forecasting- Methods and principles.
6	Role of government in technology management, Technological change - Characteristics and classification of technological change.
7	Technological change - Impact of technological change, Technology life cycle, Technology transformation, Technology policies and policy instruments.
8	Technology assessment - Technology choice, Technology assessment process, Technology leadership and followership.
9	Technology assessment - Reporting technology assessment - Method, Invention, Innovation and creativity - Meaning and differences.
10	Invention, Innovation and creativity - Innovation management, Intellectual property management.
11	Technology adoption, diffusion, and absorption - Technology adoption diffusion and absorption, Role of technology absorption- Benefits.
12	Technology adoption, diffusion, and absorption - Constraints in technology absorption, Technology package and technological dependence.
13	Technology adoption, diffusion, and absorption - Indian experience in technology absorption efforts, Issues involved in the management of technology absorption government initiatives.
14	Development of technology - Developmental process and steps, Managing research & development (R & D).
15	Development of technology - Technology development and competition, Reforms in technology development.
16	Social issues in technology management - Technological change and industrial relations, Implementation of rationalization and automation in India.

I. Course Title : Dynamic Communication Skills

II. Course Code : EECM 505

III. Credit Hours : 3 (1+2)

IV. Rationale

Academic success and career achievement depend much on communication and presentation skills. As master's student, the individual is expected to analyse, prepare and present the content in the class room, conferences and seminars and also write technically and scientifically. Hence dynamic communication includes both oral and written communication. This course builds awareness, understandings and frameworks for skills development in the qualities and attributes of

presentational formats that involve the voice and the body when used together with technologies to present ideas and concepts that not only inform but also seek to persuade and motivate.

V. Aim of the course

- To develop competency of students in effective oral communication skills.
- To develop skills in science communication
- To understand corporate and business communication.

VI. Theory

Unit I: Need and importance of communication in present context

Types of communication skills - verbal, non-verbal and written communication; Types of corporate and business communication skills - oral presentations, group discussions, facing interviews, e-mail, memos, business letters, blogs, inter office memorandums, report writing; Hard and soft skills; difference between hard and soft skills.

Unit II: Scientific communication

Meaning; Need and importance; Fora of scientific writing - conference, seminar, symposium, workshop and colloquia; Writing for scientific journals; Thesis writing and writing articles for popular media; Farm journalism and its importance in agriculture and allied sectors; Science communication and formats for scientific writing; Writing for scientific journals and their ratings; NAAS rating; Impact factor and h-index; Oral and poster presentation; Reading and comprehension of - print and audio video media; General and technical articles.

Unit III: Introduction to public speaking

Types of speeches - persuasive, informative, and motivational or inspirational speech; Structuring the speech - introduction, body content and conclusion; Effective delivery - voice modulation, appearance during speeches and delivery; Platform performance - posture, gesture, eye contact, emphasis, pause, voice pitch, overcoming fear and anxiety of public speaking; Visuals in presentation - type of visuals for public speaking, tips for effective use, computer aided visual presentation, body language.

Unit IV: Importance of listening

Introduction; Listening styles - active & passive and direct & indirect listening, thinking & listening, adjusting listening style to that of speaker, social situations & listening; Listening improvement techniques.

VII. Practical

1. Orientation to NAAS rated Journals related to respective discipline
2. Enlisting relevant national and international journals
3. Exercise on writing a review article on given topics
4. Presentation of the topic
5. Exercise on writing popular articles for Newspapers, Magazines and farm journals in English
6. Presentation and group discussion
7. Exercise on writing popular articles for Newspapers, Magazines and farm journals in vernacular language
8. Presentation and group discussion
9. Exercise on writing thesis in UAS format

10. Presentation and group discussion
11. Exercise on Numbers, Units, Abbreviations and nomenclature
12. Presentation and group discussion
13. Scientific style and use of English in research paper
14. Presentation and group discussion
15. Exercise on writing business letters, e mail, blogs, Internet etiquettes
16. Presentation and group discussion
17. Exercise on listening skills
18. Presentation and group discussion
19. Exercise on presentation skills
20. Presentation and group discussion
21. Exercise on writing for radio
22. Presentation and group discussion
23. Message preparation for SMS
24. Practice on modalities of SMS dissemination
25. Presentation and group discussion
26. Learning skills of indexing, footnote and bibliographic procedures
27. Presentation and group discussion
28. Tips for public speaking
29. Exercise on public speaking
30. Organising public speaking- Impromptu, Extemporaneous, Manuscript and Memorized
31. Evaluation of public speaking
32. End term assessment

VIII. Teaching Methods/ Activities

- Participatory lectures
- Assignment
- Simulation exercises
- Online group discussions
- Organise public speaking
- Student's Book/Publication Review
- Students' presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Understand the importance of communication skills for goal achievement
- Differentiate scientific writing from other writings
- Write for different contexts and different media
- Organise and present public speaking
- Recognise the importance of NAAS rating for professional career

X. Suggested Reading

- D'Souza YK. 2000. *Encyclopedia of Advanced Journalism*. Vols. I-III. Anmol Publ.
- Khan PM. 2002. *Textbook of Extension Education*. Himanshu Publications, New Delhi.
- Lamerton J. 2001. *Everything You Need to Know Public Speaking*. Harper Collins Glasgow.
- Ravindran RK. 1999. *Hand Book of Reporting and Editing*. Anmol Publ.
- Ray GC. 1991. *Extension Communication & Management*. Kalyani Publishers, Ludhiana.

Weekly Lecture Schedule

Duration (week)	Topic
1	Need and importance of communication in present context - Types of communication skills - Verbal, Non-verbal and written communication.
2	Types of corporate and business communication skills - Oral presentations, Group discussions, Facing interviews, E-mail, Memos, Business letters, Blogs, Inter office memorandums, Report writing.
3	Hard and soft skills; difference between hard and soft skills.
4	Scientific communication - Meaning; Need and importance; Fora of scientific writing - Conference, Seminar, Symposium, Workshop and colloquia.
5	Writing for scientific journals; Thesis writing and writing articles for popular media.
6	Farm journalism and its importance in agriculture and allied sectors.
7	Science communication and formats for scientific writing; Writing for scientific journals and their ratings; NAAS rating; Impact factor and h-index; Oral and poster presentation.
8	Reading and comprehension of - Print and Audio Video Media; General and technical articles.
9	Introduction to public speaking - Types of speeches - Persuasive, Informative, and Motivational or Inspirational speech.
10	Structuring the speech - Introduction, Body content and conclusion; Effective delivery- Voice modulation, Appearance during speeches and delivery.
11	Platform performance - Posture, Gesture, Eye contact, Emphasis, Pause, Voice pitch, Overcoming fear and anxiety of public speaking.
12	Visuals in presentation - Type of visuals for public speaking.
13	Tips for effective use, Computer aided visual presentation, Body language.
14	<i>Importance of Listening</i> -Introduction.
15	Listening styles - Active & passive and direct & indirect listening, Thinking & listening.
16	Adjusting listening style to that of speaker, Social situations & listening; Listening improvement techniques.

I. Course Title : Participatory Programme Management

II. Course Code : EECM 506

III. Credit Hours : 3 (1+2)

IV. Rationale

In the context of community development, the participatory programme planning and management is a process by which a community undertakes to reach a given socio-economic goal by consciously diagnosing its problems and charting a course of action to resolve those problems. The belief behind participatory programme management is its capability in leading to increased productivity, motivation and quality assurance. This is very essential for students of all disciplines to learn, especially for those who will be undertaking change agent career. This course creates a learning experience for students to develop positive attitude towards management of programme with the participation of people, rather than working in isolation.

V. Aim of the course

- To orient the students towards principles, procedure and approaches PPM
- To facilitate application of PPM techniques in field situation.

VI. Theory

Unit I: Overview to PPM

Concept; Meaning; Importance; Types of participation in development; Advantages and disadvantages of participation by different stakeholders; Role of government and non profit organizations in promoting participation; Conceptual framework of extension programme planning; Objectives; Principles and process.

Unit II: Participatory planning

Concept; Importance; Process; Techniques of participatory planning - RRA, PRA, PLA and their application in extension; Approaches of participatory planning - cooperative, democratic, bottom up and down.

Unit III: Project management techniques

Administration of the Project; Concept of Professional management - stakeholder analysis, force field analysis, SWOT analysis, logical framework analysis, PERT, CPM.

Unit IV: Monitoring and evaluation

Concept; Meaning and importance of monitoring and evaluation; Components of M&E - physical, financial, staff performance; Technical aspects - output, outcome & impact; Trends in people's participation in M & E; Contribution of right to information Act.

VII. Practicals

1. Literature survey and research review on different perspectives of PPM
2. Presentation of review reports
3. Observation of PPM techniques in SHGs (female groups)
4. Observation of PPM techniques in SHG village federations
5. Observation of PPM techniques in SHG mandal/block level federations
6. Observation of PPM techniques in SHG district level federations
7. Observation of PPM techniques in SHGs (male groups)
8. Observation of PPM techniques in watershed management groups
9. Preparation of case study and presentation
10. Preparation of case study and presentation
11. Preparation of case study and presentation
12. Application of PRA methods – Critical analysis of different methods through research review- Mapping techniques
13. Application of PRA methods – Critical analysis of different methods through research review- Ranking techniques
14. Application of PRA methods – Critical analysis of different methods through research review- Transaction techniques
15. Application of PRA methods – Critical analysis of different methods through research review- Focus group discussion
16. Application of PRA methods – Critical analysis of different methods through research review- Problem analysis
17. Application of PRA methods – Critical analysis of different methods through research review- Institutional analysis
18. Preparation and implementation of home improvement work plans
19. Preparation and implementation of home improvement work plans
20. Critical evaluation of work plan

21. Critical evaluation of work plan
22. Application of project management techniques- PERT
23. Presentation of feedback on project management techniques- PERT
24. Application of project management techniques – CPM
25. Presentation of feedback on project management techniques – CPM
26. Application of project management techniques- SWOT
27. Presentation of feedback on project management techniques- SWOT
28. Application of project management techniques- Stake holder analysis
29. Presentation of feedback on project management techniques- stakeholder analysis
30. Application of project management techniques- Logical frame work analysis
31. Presentation of feedback on project management techniques- Logocal frame work analysis
32. End term assessment

VIII. Teaching Methods/ Activities

- Participatory lectures
- Assignment
- Simulation exercises
- Online group discussions
- Preparation of work plans
- Student's Book/Publication Review
- Students' presentation

IX. Learning Outcome

After successful completion of the curse the students will be able to:

- Understand the underlying perspectives of PPM
- Realise the importance of PPM for sustainable achievement
- Acquire skill in observation of PPM techniques applied in different situations
- Plan, apply and analyse PPM techniques and write reports

X. Suggested Reading

- Elizaphan N. 2015. *Project Monitoring and Evaluation: Tools and Techniques*. Kindle Edition, Ekon Publishers. *J. Agril. Res. Innov. & Tech.* 3(2): 72-78, December, 2013
<http://www.ijarit.webs.com>
- Koen K, Maartjede G and Louise B. 2016. *Participatory Planning, Monitoring and Evaluation of Multi-stakeholder Platforms in Integrated Landscape Initiatives*. (Working Paper).
<https://www.researchgate.net/publication/311100782>.
- Nabhi. 2005. *Handbook for NGOs: An Encyclopaedia for Non-government Organisations and Voluntary Agencies* Vol1. Nabhi Publications, New Delhi.
- Rory B. 2014. *Burke Publishing Project Mmanagement Techniques*. 2nd College Edition,
<http://www.burkepublishing.com/component/%20content/article.html?id=16>
- Uddin MN and Anjuman N. 2013. *Participatory rural appraisal approaches: an overview and an exemplary application of focus group discussion in climate change adaptation and mitigation strategies*. ISSN: 2224-0616.
- Team FME SWOT Analysis Strategy Skills ISBN 978-1-62620-951
<http://www.free-management-ebooks.com/dldebk/dlst-swot.htm>

Weekly Lecture Schedule

Duration (week)	Topic
1	Overview to PPM - Concept, Meaning and Importance.
2	Types of Participation in development.

Duration (week)	Topics
3	Advantages and disadvantages of participation by different stakeholders.
4	Role of Government and Non-Profit Organizations in promoting participation.
5	Conceptual framework of extension programme planning; objectives, principles and process.
6	Participatory planning - Concept, importance, process.
7	Techniques of participatory planning - RRA, PRA, PLA and their application in extension.
8	Approaches of participatory planning - cooperative, democratic, bottom up and down.
9	Project management techniques - Administration of the Project.
10	Concept of professional management - Stakeholder analysis.
11	Force field analysis, SWOT Analysis.
12	Logical Framework Analysis, PERT, CPM.
13	Monitoring and evaluation - Concept, Meaning and Importance of Monitoring and Evaluation.
14	Components of M&E - Physical, Financial, Staff Performance.
15	Technical aspects - Output, outcome and impact.
16	Trends in People's Participation in M & E; Contribution of Right to Information Act.

I. Course Title : Organizational Development and Human Resource Development

II. Course Code : EECM 507

III. Credit Hours : 2 (1+1)

IV. Rationale

Every organization caters to the needs of its customers. But the best corporate thinking is leading the institution towards success by means of simplified processes and models. There are many frame works and models available, towards which the students are to be exposed to critically analyse the best means. The contemporary HRD trends and process provide students professional skills in capacity building and employee motivation programme planning. Beyond this, the students as employees in any organization in future endeavours can be professionals as they acquire technical skills in identifying the required deliverables for the company.

V. Aim of the course

- To orient students with OD and provide diagnostic skills in HRD processes
- To make students capable of applying the principles and techniques as professionals for developing human resources in an organization.

VI. Theory

Unit I: Introduction to organization development

Definition; scope and importance; Relevance of organization development in community science; History of organizational development; Revolution in organizational development; Planned change - theories of planned change, models of planned change; General and specific.

Unit II: Designing interventions for organisational development

Types; Interpersonal and group process approaches - process consultation, third

party evaluation; Organisation process approaches - organization confrontation meeting, intergroup relations interventions, large group interventions; Techno-structural interventions - engineering approach, motivational approach, socio-technical systems approach; Human resource management interventions performance management - goal setting performance appraisal and rewards systems.

Unit III: Introduction to human resource development

Concept; Relationship between human resource management and human resource development; HRD mechanisms - processes and outcomes; HRD matrix; HRD interventions; Roles and competencies of HRD professionals; Challenges in HRD.

Unit IV: HRD process

Assessing need for HRD; Designing and developing effective HRD programmes; Implementing HRD programmes; Evaluating effectiveness of HRD programmes; HRD audit; HRD culture and climate; Employee development activities - approaches, leadership development, action learning, assessment and development centres; Intellectual capital and HRD.

Unit V: HRD Trends

Coaching and mentoring; Career management and development; Employee counselling; Competency mapping (CM); People capability maturity model (PCMM); Balanced score card; Appreciative inquiry; Integrating HRD with technology and Employer branding and other emerging trends.

VII. Practical

1. Visit to an organization to study the models of planned change and preparation
2. Presentation of report on models of planned change
3. Research review and presentation of organizational interventions in national context
4. Research review and presentation of organizational interventions in international context
5. Collection of data/information and preparation of case studies on organizational interventions in health
6. Collection of data/information and preparation of case studies on organizational interventions in education
7. Collection of data/information on organizational interventions in welfare and training organizations and preparation of case studies.
8. Presentation of case studies.
9. Study of existing HRD strategies of respective SAUs/Institutions
10. Analysis of existing HRD strategies of respective SAUs
11. Analysis of existing HRD strategies of respective Institutions
12. Presentation of reports with recommendations
13. Preparation of CM of the organization and planning for planned change
14. Preparation of PCM of the organization and planning for planned change
15. Presentation of reports
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignment
- Field visit

- Case study writing
- Student's Book/Publication Review
- Students' presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend and differentiate OD processes and HRD strategies
- Enlist, explain and prepare case study OD interventions in organisations
- Analyse HRD strategies of organisations
- Prepare CM and PCM plan for planned change

X. Suggested Reading

- Brown D. 2010. *Experiential Approaches to Organization Development*. (8th Ed.), Prentice Hall, New Jersey.
- Cheung-Judge M and Holbeche L. 2015. *Organization Development: A Practitioner's Guide for OD and HR*. 2nd Ed., Kogan, London.
- Cummings TG and Worley CG. 2014. *Organization Development and Change*. 10th Edition, West Publishing Company, New York.
- David M. 2009. *Human Resource Development*. Oxford University Press, Delhi.
- Haladar UK. 2010. *Human Resource Development*, Oxford University Press India.
- Harris DM and Desimoneady L. 2001. *Human Resource Development*. The Dryden Press, Orlando.
- Harvey DF and Brown DR. *An Experimental Approach to Organization Development*. Prentice-Hall, Englewood Cliffs, N.J. Mankin D. *Human Resource Development*. Oxford University Press, India.
- Pace RW, Smith Philip and Mills GE. 1991. *Human Resource Development*. The Field, Prentice Hall, New Jersey.
- Traeger J and Warwick R. 2018. *Organization Development: A Bold Explorer's Guide*. Libri Publishing, Farringdon, England.
- International Journal of Human Resources Development and Management
- IOSR Journal of Humanities And Social Science
- European journal of work and organizational psychology
- Human Resource Development Quarterly (Online)
- Human Resource Development International
- International Journal of Human Resource Studies

Weekly Lecture Schedule

Duration (week)	Topic
1	Introduction to Organization Development - Definition, scope and importance, History of Organizational Development.
2	Revolution in Organizational Development, Relevance of organization development in community science.
3	Planned Change - Theories of Planned Change, Models of Planned Change-general and specific.
4	Designing Interventions for Organisational Development – Types - Interpersonal and Group Process Approaches, Process consultation, Third party evaluation, Organisation process approaches Organization confrontation meeting, Intergroup relations interventions, Large group interventions.
5	Techno-structural interventions - Engineering approach, Motivational approach, Socio-technical systems approach, Human Resource Management Interventions Performance Management, Goal setting performance appraisal, Rewards systems.
6	Introduction to Human Resource Development – Concept, Relationship between human resource management and human resource development.

Duration (week)	Topics
7	HRD mechanisms - processes and outcomes, HRD matrix.
8	HRD interventions, Roles and competencies of HRD professionals.
9	Challenges in HRD, HRD Process - Assessing need for HRD.
10	Designing and developing effective HRD programs, Implementing HRD programs.
11	Evaluating effectiveness of HRD Programs, HRD audit.
12	HRD culture and climate, Employee development activities- Approaches, leadership development, action learning, assessment and development centres.
13	Intellectual capital and HRD, HRD Trends - Coaching and mentoring.
14	Career management and development, Employee counselling.
15	Competency mapping (CM), People Capability Maturity Model(PCMM).
16	Balanced Score Card, Appreciative inquiry, Integrating HRD with technology Employer branding and other emerging trends.

I. Course Title : Educational Technology

II. Course Code : EECM 508

III. Credit Hours : 3 (2+1)

IV. Rationale

Educational technology is a process of adopting modern technology for quality education. This primarily focuses on the educational values of the tools and applications, and later how adequate they are in acquisition of knowledge. Both theoretical and practical inputs the students are taught this course, mold them for effective learning at present and proficient instructors in future endeavors. Rational exposure to conventional and contemporary educational approaches and strategies will help the students for self learning as well promote learning.

V. Aim of the course

- To sensitize students towards the role of educational technology for effective teaching and learning
- To build competency as a teacher and public speaker
- To enable self learning among students for application of education technology.

VI. Theory

Unit I: Overview of educational technology

Meaning; Concepts and scope of educational technology; Curriculum design and development; Lesson planning; Concept and methodology; Modularised instruction - fundamentals, process, formulation of objectives, selection of media, field testing and evaluation of module.

Unit II: Teaching learning process

Meaning and characteristics of teaching and learning; Maxims of teaching - stages, forms and levels of teaching and learning; Motivation - concept, importance and techniques; Teaching styles - expert, formal authority, personal model, facilitator, delegator; Learning Styles - visual, aural, read/write, kinaesthetic (VARK).

Unit III: Teaching learning strategies

Microteaching; Programmed instruction; Simulation role-play; Team teaching; Experiential learning; Traditional media; ICT Applications in education; Multimedia based teaching and learning.

Unit IV: Current education

Genesis and trends; Management of formal and non formal education in India; Vocationalization of education; Distance education; Guidance and counselling; Innovative instructional aids - web instruction, e-learning, virtual laboratories.

Unit V: Educational technology for differently able

Visual impaired script - advances in braille; Hearing impaired - advances in Indian sign language; People with special needs - educational programmes and government policies.

Unit IV: Evaluation

Question bank; Introduction to evaluation - need and importance in education appraisal of teacher performance; Development of question bank; Evaluation of instructional effectiveness; Competency based question paper; Reliability and validity of question papers.

VII. Practical

1. Identification of key terms in educational technology and preparation of directory
2. Critical analysis of UG and PG curriculum of Community Science in relation to course objectives
3. Research review on planning and implementation of lesson planning
4. Presentation of research review report
5. Preparation of lesson plan
6. Conducting class as per lesson plan and self and peer evaluation
7. Preparation of inventory for identification of teaching styles and execution
8. Preparation and presentation of report
9. Preparation of inventory for identification of learning styles and execution
10. Preparation and presentation of report
11. Construction of Objective questions- Multiple choice, fill in the blanks
12. Construction of competency based question paper- Matching, Technical terms
13. Construction of subjective questions- Short type
14. Construction of subjective questions- Essay type
15. Analysis of questions in terms competency evaluation- knowledge, memory, application, analysis
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignment
- Student's Book/Publication Review
- Survey and analysis
- Mock sessions
- Student presentation
- Online group discussion

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend conventional and contemporary trends of educational technology for various groups of learners
- Analyse critically the course curriculum and lesson planning in terms of reaching course objectives

- Prepare and execute inventory to identify learning styles
- Construct competency based objective and subjective question papers

X. Suggested Reading

- Dahama OP and Bhatnagar OP. 2005. *Education and Communication for Development*. Oxford & IBH.
- Bhaviskar SG. 2006. *Modern Technology in Education*. Kalyani Publication, New Delhi.
- Suhaskumar and Ruprao P *Modern Trends in Curriculum Organization*. Kalyani Publication, New Delhi.
- Heidi HJ. 2010. *Curriculum Essential Education for a Changing World*.
- Kochhar SK. 1985. *Methods and Techniques of Teaching*. Sterling Publication.
- Ray GL. 2006. *Extension Communication and Management*. Kalyani Publication, New Delhi.
- Anita S *Encyclopaedia of Curriculum Reforms and New Teaching Methods (4 Vol. Set)*. Dominant Publishers and distributors, New Delhi.
- The International Journal of Educational Technology in Higher Education
- *International Journal of Educational Technology* (ISSN 2476-0730)

Weekly Lecture Schedule

Duration (week)	Topic
1	Overview of Educational Technology- Overview of educational technology, Meaning, concepts and scope of educational technology, Curriculum design and development.
2	Overview of Educational technology-Lesson planning, concept and methodology.
3	Overview of Educational technology-Modularised Instruction - fundamentals, process, formulation of objectives, Selection of media, Field Testing and Evaluation of module, Teaching learning process-Meaning and characteristics of teaching and learning.
4	Teaching learning process-Maxims of teaching, Stages, forms and levels of teaching and learning.
5	Teaching learning process-Motivation - concept, importance and techniques, Teaching styles - expert, formal authority, personal model, facilitator, delegator.
6	Teaching learning strategies-Learning styles- visual, aural, read/write, kinaesthetic, Microteaching, Team teaching.
7	Teaching learning strategies-Programmed instruction, Simulation role-play.
8	Teaching learning strategies-Experiential learning, Traditional media.
9	Teaching learning strategies-ICT applications in education, Multimedia based teaching and learning.
10	Genesis and trends in modern education-Management of formal and non formal education in India, Vocational education.
11	Genesis and trends in modern education-Distance education, Guidance and counselling.
12	Educational technology for differently able-Innovative Instructional Aids - Web Instruction, e learning, Virtual laboratories, Educational technology for differently able-Visual impaired- Advances in Braille script.
13	Educational technology for differently able-Hearing impaired- Advances in Indian sign language, People with special needs- Educational Programs and Government policies.
14	Introduction to evaluation- need and importance in education, Evaluation-Development of Question Bank.
15	Evaluation-Appraisal of Teacher Performance, Evaluation of instructional effectiveness.
16	Evaluation-Competency based question papers, Reliability and validity of question papers.

- I. Course Title** : Group Dynamics
II. Course Code : EECM 509
III. Credit Hours : 2 (2+0)

IV. Rationale

Group approach is proved to be the effective strategy as well as approach for execution of extension interventions through participation. By orienting students who are pursuing expertise in the field of extension education, towards group behavior and its dynamics they can accelerate the participatory development processes by means of team and conflict management. Further, group dynamics is a system of behaviors and psychological processes occurring within a social group or between social groups i.e intra and intergroup dynamics. Hence it will be useful in understanding decision-making behaviour, forms of social prejudice and discrimination, which are some of the major influencing factors of human development.

V. Aim of the course

- To develop understanding about group behavior and dynamics for effective communication and group management
- To acquaint students with techniques for sustainable group dynamics.

VI. Theory

Unit I: Introduction to group and group dynamics

Meaning; Characteristics; Types and functions of groups; Stages and process of group formation; Group norms and structure; Values; Ethics; and Morals.

Unit II: Understanding group behaviour

Definitions; Theories - social comparison, cognitive dissonance, self presentation, drive, social impact, self attention, social cognition theories; Individual; Interpersonal and human behaviour and dimensions.

Unit III: Group dynamics

Cooperation; Competition; Communication; Group pressure; Group cohesiveness; Group leadership; Measurement of group dynamics - tools and techniques; Group break down - causes and solutions; Strengths; Weaknesses and myths; Crowds and the mob mentality; Diversity and difference; Group dynamic skills - training and development.

Unit IV: Managing group

Team building; Conflict management; Stress management; Active listening and feedback; Achieving cooperative group structure.

Unit V: Understanding collective action in groups

Collective action meaning; Theories and applications; Incentives for collective action; Research reviews on collective action for sustainable group dynamics.

VII. Teaching Methods/ Activities

- Participatory lectures
- Field visits and interaction
- Assignment
- Demonstration
- Role play

- Presentation
- Research review

VIII. Learning Outcome

After successful completion of the course the students will be able to:

- Analyze the features and developmental stages of groups and team process
- Critically evaluate the theoretical concepts of group behaviour in real situation
- Able to measure group dynamics
- Demonstrate group dynamic skills
- Apply problem-solving skills and higher level thinking strategies

IX. Suggested Reading

- Ernest S and Sharon AR. 1985. *Effective Group Communication- How to Get Action by Working in Groups*. National Textbook Company, Lincolnwood.
- George RG. 2011. *Chapter on Theories of Group Behavior*: Commentary.
- Mary AG and Hennen. 2009. *Stages of Group Development*. Shared by Extension Center for Community Vitality, 10-21-14.
- Mary S. 2010. *Book of Conflict Resolution Games Quick, Effective Activities to Improve Communication, Trust, and Collaboration*. ISBN: 978-0-07-174366-2.
- Smith GE. 2001. *Group Development: A Review of Literature and A Commentary on Future Research Directions. Group Facilitation*.
- Susan WA. 2005. *Facilitating Group Communication*. The Handbook of Group Research and Practice, Sage Publications, Inc, Thousand Oaks.
- Vanni F. 2014. *The Role of Collective Action*. Agriculture and Public Goods, 21. DOI 10.1007/978-94-007-7457-5_2, © Springer Science +Business Media Dordrecht.
- *Managing Stress*. 2010. MTD Training and Ventus publication ApS. ISBN-978-87-7681-658-2. https://www.mindtools.com/pages/article/newTMM_79.htm

Weekly Lecture Schedule

Duration (week)	Topic
1	Introduction to group and group dynamics - Meaning and Characteristics of group and group dynamics, Types and functions of groups.
2	Stages and process of group formation, Group norms and structure.
3	Values, Ethics, and Morals, Understanding group behaviour – Definitions
4	Theories - social comparison, cognitive dissonance, self presentation, drive, social impact.
5	Self attention, social cognition theories
6	Individual, interpersonal and human behaviour and dimensions. Group dynamics- concept and indicators - Concept and indicators of Cooperation.
7	Concept and indicators of Competition, Concept and indicators of Communication.
8	Concept and indicators of Group pressure, Concept and indicators of Group cohesiveness.
9	Concept and indicators of Group leadership, Measurement of group dynamics - tools and techniques.
10	Group break down - causes and solutions, Strengths, weaknesses and myths
11	Crowds and the mob mentality, Diversity and difference.
12	Group dynamic skills - training and development. Managing group - Team building
13	Conflict management, Stress management.
14	Active listening and feedback, Achieving cooperative group structure.
15	Understanding collective action in groups - Collective action meaning, Theories and applications.
16	Incentives for collective action, Research reviews on collective action for sustainable group dynamics.



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- I. Course Title** : Community Development and Outreach
II. Course Code : EECM 510
III. Credit Hours : 3 (2+1)

IV. Rationale

This course prepares students for an interdisciplinary field working. It teaches facilitation and organize a grassroots effort, equipping with skills to empower a local, regional or international community to bring about change. A real-world experience through the programs' will benefit strong connections in and with the community and communicate effectively with local groups as well as public and private agencies. It builds skills for critical thinking in matters of social justice, sustainable development, community engagement, community asset-mapping, fundraising, team building, collaborative leadership, project management, research and project evaluation.

V. Aim of the course

- To orient students with community development and outreach perspectives
- To impart participatory research skills
- To handle a special project for analysis of community development outreach.

VI. Theory

Unit I: Community development

Definition; Issues and concepts; Historical perspective of community development in India and emerged changes since inception to current era.

Unit II: Approaches

Approaches - concept and characteristic features gandhian approach, community development approach, sectoral approach, target approach, area approach, minimum need approach, integrated or holistic approach, participatory development approach; Strategies - multipurpose strategy, growth oriented strategy and spatial planning strategy; The modernization theory; Human development model (components, HDI, ranking, gender related development index, HPI)

Unit III: Key principles of community development

Community participation - definition and scope; Inclusion; Equality; Collective action; Empowerment and community development process; Provision of information; Identification of felt needs and common issues; Consultation for Shared vision; Mobilisation for action; Reflection and evaluation.

Unit IV: Community development and governance in India

Community development policy in India; Community development perspectives in five year plans.

Unit V: Cross cutting edges of community development

Horizontal edges - education, health, women empowerment, skill development, agriculture and caste occupations; Vertical edges - adults, youth, adolescents, children, pregnant and lactating mothers, physically and mentally challenged.

Unit VI: Outreach of community development

General orientation to outreach models - preceede model, evaluation and indicator metrics; Outreach of urban; Rural and tribal community development programmes; Impact - economic and social perspectives.

Unit VII: Globalisation impact on community development

Impact on social forms - individualism, enclavism and fatalism, transition between **gemeinschaft and gesellschaft, issues of migration and mitigation.**

VII. Practical

Development of special project to study Community Development programme outreach in selected area and execution. Preparation of project report and presentation

1. Selection of Community development programme and detailed description of the programme in terms of objectives, targets, inputs, expected outputs and outcome
2. Visit to programme operating area and interaction with stakeholders- implementing agency, personnel and beneficiaries
3. Visit to programme operating area and interaction with stakeholders- implementing agency, personnel and beneficiaries
4. Framing of special project for measurement of outreach – title, objectives, study area, research review and plan of work
5. Finalisation of tools and techniques for execution of project
6. Finalisation of tools and techniques for execution of project
7. Preparation of tools for execution of project
8. Field testing and finalization of tools
- 9-12. Execution of work plan
12. Data analysis and preparation of project report
13. Data analysis and preparation of project report
14. Presentation of report
15. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignment
- Field visit
- Case study writing
- Special project
- Student's Book/Publication Review
- Students' presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend and differentiate OD processes and HRD strategies
- Critically analyse different approach of community development
- Plan and execute special project
- Analyse the results and write report
- Write research paper based on the special project

X. Suggested Reading

- Jerry WR and Gary P. 2014. *Introduction to Community Development: Theory, Practice, and Service-Learning*. 1st Edition, ISBN-13: 978-1412974622 ISBN-10: 1412974623
- Manohar P. 2014. *Social and Community Development Practice* <http://dx.doi.org/10.4135/9789351507987>
- Marianne R, Woodside and Tricia McClam. 2015. *An Introduction to Human Services*. 8th Edition, ISBN-13: 978-1285749907 ISBN-10: 1285749901
- Patil AR. 2013. *Community Organization and Development: An Indian Perspective*. PHI Learning Private Limited, Delhi 110092ISBN 978-81-203-4694-9



- Rhonda P and Robert P. 2015. *An Introduction to Community Development (Volume 1)* 2nd Edition, ISBN-13: 978-0415703550 ISBN-10: 0415703557
- *A Step by Step Guide to 'Turning Outward' in Your Community.* American Library Association. <http://www.ala.org/tools/sites/ala.org.tools/files>
- From Project to Branch Integration and Sustainability: Community-Led Work. <http://publiclibrariesonline.org/2013/04/from-project-to-branch-integration-and-sustainability-community-led-work-at-halifax-public-libraries>

Weekly Lecture Schedule

Duration (week)	Topic
1	Community development - Definition, issues and concepts, Historical perspective of community development in India and emerged changes since inception to current era.
2	Approaches- concept and characteristic features - Gandhian approach, Community Development Approach.
3	Sectoral Approach, Target Approach.
4	Area approach, Minimum Need Approach.
5	Integrated or Holistic approach, Participatory Development approach.
6	Strategies - Multipurpose strategy, Growth oriented strategy and Spatial planning strategy.
7	Key principles of Community development - Community participation- definitions and scope, Inclusion, Equality and Collective action.
8	Empowerment and community development process, Provision of information Identification of felt needs and common issues.
9	Consultation for participation Shared vision, Mobilisation for action, reflection and evaluation.
10	Community Development and Governance in India - Community development policy in India, Community development perspectives in Five year plans.
11	Community Development issues - Horizontal issues - Education, health, Empowerment, Vocational and skill development, Agriculture and caste occupations.
12	Vertical - Adults, Women ,Youth, Adolescents, Children, Pregnant and lactating mothers.
13	Physically and mentally challenged, Outreach of community development - General orientation to outreach models - precede model.
14	Evaluation and indicator metrics, Outreach of Urban, Rural and Tribal community development programmes.
15	Impact - Economic and social perspectives, Globalisation impact on community development - Impact on social forms – Individualism.
16	Enclavism and Fatalism, Transition between Gemeinschaftand Gesellschaft, Issues of migration and mitigation.

I. Course Title : Climate Change Management

II. Course Code : EECM 511

III. Credit Hours : 2 (1+1)

IV. Rationale

Geographically, every community is facing numerous challenges due to changes in the climate. This course provides students to address such challenges covering adaptation and mitigation solutions across a wide range of sectors and regions, with special reference to domestic management practices. It provides an opportunity to get exposed to climate change policies and prepares for climate change

communication. It also creates a research question, gather and analyse data, and share findings academically and in lay terms.

V. Aim of the course

- To conversant students with CCM and equip with managerial skills at home level
- To generate interest for climate communication to cope up with climate changes.

VI. Theory

Unit I: Basics of climate and climate change

Introduction to climate and climate change - Definition and meaning; Climate change classification; Method of classification; General concept of environmental Science; Natural and manmade causes of climate change; Affects for climate change; Consequences risks and uncertainty of climate change; Climate system; Major predictions.

Unit II: Greenhouse gases and global warming

Major greenhouse gases and sources; Global warming effect and causes, Responses to global warming; Different views on greenhouse gases and global warming natural resource management; Solid waste management; Biodiversity; Alternative livelihood security; Drought prone technologies.

Unit III: Climate change Impacts

Impacts on biodiversity - wetland, forest, agriculture, transportation, coastal area, water resources; Global, National and regional impacts; Vulnerability assessment; Climate modelling.

Unit IV: Climate change policy

Introduction; Various policies in India; National action plan; Sector specific policies and policies instruments; Environment impact assessment; Environment planning and management; Climate resilient technology.

Unit V: Climate change communication

Introduction - definition, perspectives and importance; Engaging climate change communication; Audiences; Frames; Values and Norms.

Unit VI: Visual communication on climate impacts and solutions

Theories of visual perception; Classification and selection of visuals.

Unit VII: Advocacy and communicating global climate action

National international advocacy groups and organisations; Strategies and programmes.

Unit VIII: Role of stake holders

Media; Scientific Experts; Policymakers; and academic institutions on climate change communication.

VII. Practical

- 1-4. Visit to Climate management organization to understand strategies and observe the impacts
5. Identification of climate management needs at home level and development of suitable technology- Apparel and textiles
6. Identification of climate management needs at home level and development of suitable technology- Food and Nutrition

7. Identification of climate management needs at home level and development of suitable technology- General health
8. Identification of climate management needs at home level and development of suitable technology- domestic appliances and arrangements
9. Identification of climate management needs and development of suitable technology- Children and senior citizens.
10. Identification of climate management needs and development of suitable technology- differently able
11. Preparation of climate communication media – print
12. Preparation of climate communication media – radio
13. Preparation of climate communication media – video
14. Preparation of climate communication media – blog/web writing
15. Exhibition on climate change management
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignment
- Field visit
- Product making
- Student's Book/Publication Review
- Students' presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend climate change affects species, societies and ecosystems, and the consequences these changes can have on natural systems
- Have advanced knowledge about national and international climate policy, and its application
- Knowledge of how the society can transform energy production and use in a more environmentally friendly direction
- Advanced knowledge of strategies, actions and tools for adapting to climate change and reducing greenhouse gas emissions, nationally and globally
- Critically assess different sources of information, and use them to structure and develop an academic argument
- Identify climate management needs and prepare communication media products on versatile issues

X. Suggested Reading

- Gopal B. 2004. *Global Warming and Climate Changes: Transparency and Accountability.* 3 ISBN-10: 8182050782 ISBN-13: 978-8182050785
- Kandarp TP and Vaishnav. 2018. *Climate Change Solutions, Global Warming Solutions and Innovative Ideas for Construction of World Development.* Notion Press; 1 edition ISBN-10: 1643241818 ISBN-13: 978-1643241814
- Lenka S and Lenka NK. 2013. *Climate Change and Natural Resources Management.* New India Publishing Agency SBN-10: 9789381450673 ISBN-13: 978-9381450673
- Mark M. 2009. *Global Warming: A Very Short Introduction.* ISBN-10: 0199548242 ISBN-13: 978-0199548248
<http://envfor.nic.in/e-books>
- *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries.*
<https://unfccc.int/resource/docs/publications/impacts.pdf>

- Mom L and Pin M. 2010. *Education Sector Responses to Climate Change Background Paper with International Examples*. UNESCO Bangkok Asia and Pacific Regional Bureau for Education, Bangkok, Thailand.
- *Journal of Climate Change* <https://www.iospress.nl/journal/journal-of-climate-change>

Weekly Lecture Schedule

Duration (week)	Topic
1	Basics of climate and climate change - Introduction to climate and climate change, Climate change classification, Method of classification.
2	General concept of environmental Science, Natural and man made causes of climate change.
3	Effects of climate change, Consequences, risks and uncertainty of climate change.
4	Climate system, Major predictions.
5	Greenhouse gases and Global Warming - Major greenhouse gases and sources. Global warming effect and causes, responses to global warming.
6	Different views on Greenhouse gases and Global warming Natural Resource Management, Solid waste management.
7	Biodiversity, Alternative livelihood security using drought prone technologies, Climate change Impacts - Impacts on Biodiversity - Wetland, Forest, Agriculture, Transportation.
8	Coastal area, water resources, Global, National and regional impacts.
9	Vulnerability assessment, Climate modeling, Climate Change Policy - Introduction, Various policies in India.
10	National action plan, Sector specific policies and policies instruments.
11	Environment impact assessment, Environment planning and management.
12	Climate resilient technology, Climate Change Communication – Introduction, definition, perspectives and importance.
13	Engaging Climate Communication, Audiences, Frames, Values and Norms.
14	Visual Communication on Climate Impacts and Solutions - Theories of visual perception, Classification and selection of visuals.
15	Advocacy and Communicating Global Climate Action -National international advocacy groups and organisations, Strategies and programmes, Role of stakeholders – Media.
16	Scientific Experts, Policymakers, Academic Institutions on climate change communication.

I. Course Title : Gender Sensitization For Empowerment

II. Course Code : EECM 512

III. Credit Hours : 2 (2+0)

IV. Rationale

This course provides sensitivity among the students towards involvement of women in decision making processes in all aspects of economic, political, social and cultural life as active administrators, decision makers, participants and beneficiaries. It also provides skill to identify lapses in gender equity and equality like sex ratio, employment and wages, literacy and education and health. With this perspective they can play an active role in issues of national interest like gender budgeting, gender accounting and gender analysis frame work.

V. Aim of the course

- To sensitize students towards gender perspectives and development, legal rights

- and using gender tools and methodologies
- To enhance students' capability for identifying and analyzing gender issues in family/home, community, agriculture and allied sector.

VI. Theory

Unit I: Overview of gender

Concept; Meaning and related terms; Gender sensitization - concept, meaning and importance of gender sensitization; Gender and empowerment - meaning, definitions and need; Gender issues in home - community and organization.

Unit II: Gender issues

Gender issues and challenges in development; Understanding gender and subordination of women; Gender as a development tool; Policy approaches for women development; Gender perspectives in development of women - roles, responsibilities, access and control over resources, constraints and opportunities.

Unit III: Gender tool kit for assessment of gender empowerment

Gender budgeting and gender analysis framework - context, activities, resources and programme action profile; Concept of GDI, GEM, GSI; National and regional indicators.

Unit IV: Gender issues and development

National policy for empowerment of women since independence; Interventions to enhance women's empowerment at individual; Community and national level; Livelihood implications of gender - health and nutrition, agriculture, violence, governance, education, media and legal issues.

VII. Practicals

1. Simulation role play to understand sex and gender, gender blind: gender aware: gender sensitive: gender equity.
2. Critical analysis of status of women in different sectors
3. Presentation of reports
4. Public speaking on Gender issues- Gender mainstreaming
5. Public speaking on Gender issues- Drudgery
6. Public speaking on Gender issues- Agriculture and allied sectors
7. Public speaking on Gender issues- Health and Nutrition
8. Public speaking on Gender issues- Business and Enterprise
9. Public speaking on Gender issues- Politics and Public administration
10. Preparation of case studies on selected issues/personalities
11. Gender sensitive interventions in SAUs and their objectives and frame work
12. Critical analysis of selected interventions and projects in operation
13. Preparation of report
14. Presentation of report
15. Critical review of Gender policy of GOI
16. End term assessment

VIII. Teaching Methods/ Activities

- Participatory lectures
- Assignment
- Mock sessions
- Student's Book/Publication Review
- Student presentation

VIII. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend gender issues and challenges for development
- Realise the need for modification of behavior by raising awareness of gender equality concerns
- Examine their personal attitudes and beliefs and questioning the ‘realities’ they thought they know
- Prepare themselves for public speaking on gender issues
- Analyse the gender sensitive interventions of SAUs

IX. Suggested Reading

- Adriana DS. 2010. *Gender Issues and International Legal Standards: Contemporary Perspectives*. Publisher, Catania, Italy.
- Grover I and Grover D. 2002. *Empowerment of Women*. Agrotech Publ. Academy.
- Sahoo RK and Tripathy SN. 2006. *SHG and Women Empowerment*. Anmol Publ.
- Sinha K. 2000. *Empowerment of Women in South Asia*. Association of Management Development Institution in South Asia, Hyderabad.
- *Gender Budgeting Handbook for Government of India Ministries and Departments* (2007) Ministry of Women and Child Development, GOI <http://wcd.nic.in/gender-budgeting>.
- *Measuring Women's Empowerment*: An assessment of the Gender-related Development Index and the Gender Empowerment Measure www.tandfonline.com
- *A Toolkit for Women's Empowerment and Leadership in Health and Welfare* http://www.who.int/kobe_centre/publications/womens_empowerment_2005.pdf
- *Indicators for Gender Equality and Women's Empowerment – An Introduction* <http://www.oecd.org/development/gender-development/43041409.pdf>
- Indian Journal of Gender Studies
- International Journal of Gender and Women's Studies

Weekly Lecture Schedule

Duration (week)	Topic
1	Overview of Gender - Concept, meaning and terminology.
2	Gender sensitization - Concept, meaning and importance of gender sensitization.
3	Gender and empowerment - meaning, definitions and need.
4	Gender issues in home, community and organization.
5	Gender issues - Gender issues and challenges in development.
6	Understanding gender and subordination of women.
7	Gender as a development tool, Policy approaches for women development.
8	Gender perspectives in development of women - roles, responsibilities, Access and control over resources, constraints and opportunities.
9	Gender toolkit for assessment of gender empowerment - Gender budgeting and gender analysis framework - context, activities, resources and programme action profile.
10	Concept of GDI, GEM, GSI, International, National and Regional indicators.
11	Gender issues and development - National Policy for empowerment of women since independence.
12	Interventions to enhance women's empowerment and leadership at the individual level.
13	Interventions to enhance women's empowerment and leadership at the community level.
14	Interventions to enhance women's empowerment and leadership at the national level.
15	Livelihood implications of gender, Health and nutrition, Agriculture, violence and governance.
16	Education, media and legal issues.



Course Title with Credit Load Ph.D. (Community Science) in Extension Education and Communication Management

Course Code	Course Title	Credit Hours
EECM 601*	Managerial Skills for Extension Professionals	3 (2+1)
EECM 602	Impact Assessment of Development programmes	3 (1+2)
EECM 603*	Scaling Techniques for Behaviour Research	3 (1+2)
EECM 604	Design and Development of e-Extension Project	3 (0+3)
EECM 605	Sustainable Livelihood Systems	2 (1+1)
EECM 606	Extension Research Project Management	3 (1+2)
EECM 607	Media application and Product Promotion	4 (2+2)
EECM 608	Advocacy and Behavior Change Management	3 (1+2)
Minor Courses**		
FN 604	Global Nutrition Problems	2(2+0)
FN 608	Energy Metabolism	2(2+0)
HDFS 608	Qualitative research methods	3(2+1)
ATS 602	Technical Textiles	3(2+1)
ATS605	Functional Clothing	3(2+1)
ATS 607	Operational Management in Textiles and Apparel	2(2+0)
RMCS 603	Globalization and Consumer Economics	3 (2+1)
RMCS 606	Environmental Issues and Challenges	2 (2+0)
RMCS 607	Family Dynamics and Women Power	3 (2+1)
Supporting Courses		
Student can choose any course relevant to the research from other faculties of the University or from Swayam portal or online courses.		
EECM 691	Doctoral Seminar I (Optional Field)	1 (1+0)
EECM 692	Doctoral Seminar II (Core Field)	1 (1+0)
EECM 699	Research	75
Total		100 Credits

*Compulsory core courses

Course Contents

Ph.D. (Community Science) in Extension Education and Communication Management

I. Course Title : Managerial Skills for Extension Professionals

II. Course Code : EECM 601

III. Credit Hours : 3 (2+1)

IV. Rationale

This course is a capsule programme for imparting competency skills among students in management process, to be professionals in delivery of extension services. The students explore the fundamental roles and processes of planning, leading, organizing and controlling that comprise the managers' role, while acquainting themselves with the basic concepts and processes of management. It focuses on the entire organization from both a short and long term perspective for strategic vision, setting objectives, crafting a strategy and then implementing it. This creates a demand for specialized extension support. This course will develop skills related to professional management practices as required in today's competitive environment.

V. Aim of the course

- To orient to professional management perspective with special reference to modern management trends
- To motivate for learning professional management practices.

VI. Theory

Unit I: Orientation to management

Concept; Process; Functions; Management problems in extension organizations; Managerial skill – definition, nature and importance; Skills for effective management of extension activities and organizations.

Unit II: Theories of management

Scientific theory; Administrative theory; Bureaucratic theory; Human relations theory; Systems theory y; X&Y theory.

Unit III: Strategic planning

Importance; Steps and techniques; Concept of management by objective (MOB) as applicable to extension organizations; Techniques of transactional analysis for improving interpersonal communication.

Unit IV: Contemporary professional management trends

Artificial intelligence (AI), Unified talent management (UTM); Self-directed micro learning (SDML); Personalisation; Design thinking; Augmented reality and virtual reality tools (AR&VR).

Unit V: Creative problem solving techniques

Stress management practices; Total quality management (TQM); Team building and management; Concept of learning organization; Time management practices; Management of information system; Self-management techniques.

Unit VI: Work motivation

Organizational climate; Resource management - concept and methods; Team building- process and strategies at organizational and village levels; Mobilization and empowerment skills; Concept and strategies in mobilization; Concretisation and empowerment of rural people.

VII. Practicals

1. Identification of professional management skills required for extension organisation through literature survey
2. Finalisation of major and specific professional management skills
3. Preparation of case studies of professional extension management professionals and visual presentation
4. Preparation of inventories for identification of professional skills
5. Finalisation and presentation of inventories for identification of professional skills
6. Execution of inventories- interviews with extension professionals in Government organisations
7. Execution of inventories- interviews with extension professionals in Non-Government organisations
8. Compilation and analysis of data
9. Report writing and presentation of data with special reference input training for professional skills
10. Hands-on-training for selected professional skills
11. End term assessment

VIII. Teaching Methods/ Activities

- Participatory lectures
- Assignment
- Simulation exercises
- Online group discussions
- Case study writing
- Student's Book/Publication Review
- Students' presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend the fundamentals of management and managerial effectiveness
- Explore the required professional skills for extension managers
- Develop and execute inventories for measurement of extension professional skills
- Analyse and interpret the data to compare and contrast professional skills between Government and Non-Government extension professionals
- Practice certain professional skills

X. Suggested Reading

- Basford TE, Offermann and Lynn R. 2012. Beyond Leadership: The Impact of Coworker Relationships on Employee Motivation and Intent to Stay. *Journal of Management and Organization* Vol. 18, No. 6.
- Chitale AK, Rajendraprasad Nishith M and Dubey R. 2012. *Organizational Behaviour: Text and Cases*. Prentice Hall India Learning Private Limited SBN-10: 8120346963 ISBN-13: 978-8120346963.

- Craig C and Pinder. 2008. *Work Motivation in Organizational Behavior*. 2nd Edition Psychology Press. ISBN-13: 978-0805856040 ISBN-10: 0805856048.
- Kumar Sanjeev and Dash MK. 2011. Management education in India: Trends, issues and implications. *Research Journal of International Studies*. Issue 18 January, 2011.
- Prasad LM. 2015. *Principles and Practice of Management*. Sultan Chand & Sons-New Delhi ISBN-10: 9351610500 ISBN-13: 978-9351610502
- Rajan G. 2007. *Marketing Management: Concepts, Cases, Challenges and Trends*. 2nd Edition, Prentice Hall India Learning Private Limited, ISBN-10: 8120332598, ISBN-13: 978-8120332591.

Weekly Lecture Schedule

Duration (week)	Topic
1	Orientation to management - Concept of management, Process of management.
2	Functions of management, Management problems in extension organizations.
3	Managerial skill - nature and importance, Skills for effective management of extension activities and organizations.
4	Theories of Management - Scientific Theory, Administrative Theory.
5	Theories of Management - Bureaucratic Theory, Human Relations Theory.
6	Theories of Management - Systems Theory, X&Y Theory.
7	Strategic planning - Importance; Steps and techniques, Concept of management by objective (MOB) as applicable to extension organizations.
8	Techniques of transactional analysis for improving interpersonal communication, Contemporary professional management trends - Artificial intelligence (AI).
9	Unified talent management (UTM), Self directed micro learning (SDML).
10	Personalisation, Design thinking.
11	Augmented reality and virtual reality tools (AR&VR), Creative problem solving techniques - Stress management practices.
12	Total quality management (TQM), Team building and management.
13	Concept of learning organization, Time management practices.
14	Management of information system, Self-management techniques.
15	Work motivation - Organizational climate, Resource management - concept and methods.
16	Team building - process and strategies at organizational and village levels, Mobilization and empowerment skills - concept and strategies in mobilizationConcretisation and empowerment of rural people.

I. Course Title : Impact Assessment of Development Programmes

II. Course Code : EECM 602

III. Credit Hours : 3 (1+2)

IV. Rationale

Impact assessment is to weigh up the relevance and effectiveness of a project, programme or public policy in bringing about a desired change in the well-being of the target population. Further, it measures improvements in pre-defined indicators in the sector concerned that can be attributed to the development intervention. Hence this course contributes a research perspective of an evaluation when undertaken during a defined period subsequent to an intervention. It facilitates the use of techniques, that measure and compare the results achieved with what would have happened, if the project/programme intervention not taken place.

V. Aim of the course

- To familiarise students with impact assessment procedures and provide skill in documentation
- To provide hands-on-experience for impact assessment of development programme.

VI. Theory

Unit I: Orientation to development programme

Development issues and goals; National and International Perspectives - goals, strategies, structure and achievements.

Unit II: Analysis of contemporary national development programmes

Public Health; Nutrition; Education; Environment; Employment; Income generation; Welfare; Marketing; Human Resource Development - objectives, clients, salient features, inputs, deliverables, outputs and outcomes.

Unit III: Orientation to impact assessment

Sustainability impact; Social impact; Health impact; Environmental and institutional impact - frame works and element; Log frame analysis.

Unit IV: Impact identification and prediction

Identification techniques - checklist, matrices, networks, overlays, expert systems, professional judgements; Prediction methods - extrapolative-trend and scenario analysis, analogies; Intuitive forecasting from group consensus(Delphi technique); Normative methods - mathematical models, statistical models, field and laboratory experiment methods, physical models and expert judgement.

VII. Practical

1. Documentation of exiting national and international development programmes and their objectives
2. Presentation and group discussion on developmental issues of each programme
3. Research review on development policy of India and developed countries
4. Presentation of comparative analysis
5. Preparation and presentation of case study on impact of Public Health programmes
6. Preparation and presentation of case study on impact of Nutrition programmes
7. Preparation and presentation of case study on impact of Education programmes
8. Preparation and presentation of case study on impact of Environment programmes
9. Preparation and presentation of case study on impact of Employment programmes
10. Preparation and presentation of case study on impact of Income generation programmes
11. Preparation and presentation of case study on impact of Welfare programmes
12. Preparation and presentation of case study on Marketing programmes
13. Consolidate report writing focusing on inputs, deliverables, outputs and outcome of every programmes and analysis of achievements and gaps.
14. Hands-on-experience on impact assessment – measurement of sustainability impact
15. Hands-on-experience on impact assessment – measurement of social impact
16. Hands-on-experience on impact assessment – Health impact
17. Hands-on-experience on impact assessment – Environment
18. Hands-on-experience on impact assessment – Long frame analysis

19. Hands-on-experience on impact assessment – Institutional impact
20. Hands-on-experience on impact identification techniques- Checklist
21. Hands-on-experience on impact identification techniques- Matrices
22. Hands-on-experience on impact identification techniques- Networks
23. Hands-on-experience on impact identification techniques- Overlays
24. Hands-on-experience on impact identification techniques- Expert systems
25. Hands-on-experience on impact identification and prediction techniques- Professional judgements
26. Hands-on-experience on impact prediction techniques- Trend and scenario analysis
27. Hands-on-experience on impact prediction techniques- Delphi technique
28. Hands-on-experience on impact prediction techniques- Statistical model
29. Hands-on-experience on impact prediction techniques-Field and laboratory experiment methods
30. Selection and planning for impact analysis development programme
31. Presentation and group discussion
32. End term assessment

VIII. Teaching Methods/Activities

- Participatory lectures
- Assignment
- Research review
- Survey
- Case study writing
- Students' presentation
- Hands-on-training

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend the national and international perspectives of assessment of development programmes
- Review on development policy of India and developed countries
- Enlist and explain impact assessment and prediction techniques
- Write case studies on the impact of development programmes
- Apply impact assessment and prediction techniques, analyse and predict the results of the selected development programmes

X. Suggested Reading

- Anjaneyulu Y. 2010. *Environmental Impact Assessment Methodologies*. BS Publication.
- Arland T. 2012. *Knowledge and Beliefs about National Development and Developmental Hierarchies: the Viewpoints of Ordinary People in Thirteen Countries*.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3462366/>
- Fateh Azzam. 2013. *The Right to Development and Implementation of the Millennium Development Goals*. <http://www.academia.edu>
- E-Book of Ministry of Rural Development. <https://www.india.gov.in/download-e-book-ministry-rural-development>
- Mc Donnell Ida An International Perspective On Communication Strategies For The Millennium Development Goals. <http://www.oecd.org/development>
- Lincoln CC *Nutrition in Developing Countries and the Role of International Agencies: In Search Of A Vision*. <https://www.ncbi.nlm.nih.gov/books/NBK231298/>
- Asian Development Bank (2018) *Health Impact Assessment*, Asian Bank Publication.



- *Impact Evaluation in Practice*. Second Edition. World Bank Group and the Inter-American Development Bank.

Weekly Lecture Schedule

Duration (week)	Topic
1	Orientation to development programme - Development issues and goals.
2	National and international perspectives – goals and strategies.
3	Structure and achievements.
4	Analysis of contemporary national development programmes - Public health, nutrition, education and environment.
5	Employment,income generation, welfare, marketing.
6	Human Resource Development - Objectives, clients, salient features, inputs, deliverables, outputs and outcomes.
7	Orientation to impact assessment - Sustainability impact assessment.
8	Social impact assessment and health impact assessment.
9	Environmental and institutional impact assessment - frame works and element.
10	Log frame analysis.
11	Impact identification and prediction of impact - Identification techniques - checklist, matrices, networks, overlays, expert systems, professional judgment.
12	Prediction methods, extrapolative- trend and scenario analysis, analogies.
13	Intuitive forecasting from group consensus (Delphi technique).
14	Normative methods - Mathematical and statistical models.
15	Field and laboratory and experiment methods.
16	Physical models and expert judgment.

I. Course Title : Scaling Techniques for Behaviour Research

II. Course Code : EECM 603

III. Credit Hours : 3 (1+2)

IV. Rationale

This course is highly essential for students undertaking social and behavioural research as it provides knowledge on developing scales for measuring attributes of objects and people. Measurement is a process of mapping empirical phenomena by using system of numbers. Basically, the events or phenomena that researchers interested can be existed as domain. Measurement links the events in domain to events in another space which called range; which is nothing but consisting of scale. This enables researchers to interpret the data with quantitative conclusion which leads to more accurate and standardized outcomes, without which systematic and accurate interpretation of data is impossible.

V. Aim of the course

- To familiarize students with scaling techniques and the development process for behaviour measurement
- To provide hands-on-experience in development of scale for behavior measurement.

VI. Theory

Unit I: Introduction

Definition - scaling techniques and behaviour research; Need and importance; Attitude, Knowledge and Practice measurement techniques and relevance to behaviour research.

Unit II: Structured techniques

Nominal; Ordinal; Interval; Ratio scales; Self rating scales- graphic rating scale; Itemized rating scales- likert scale, semantic differential scale, stapeI's scale, multi-dimensional scaling, thurston scales, guttman scales/scalogram analysis and the q sort technique.

Unit III: Non structured techniques

Projective - association, completion, construction, expressive, problems and promises; Word association; Sentence completion; Story completion and pictorial; Advantages and limitations for adoption in behaviour research.

Unit IV: Knowledge and practice tests

Knowledge - objective multiple choice questions (MCQs); True/False Assertion - reason questions; Multiple response questions (MRQs); Text/Numerical matching ranking questions; Sequencing questions; Field simulation questions; Graphical hotspot questions; and Subjective tests; Practice - worksheets, performance metrics.

Unit V: Scalability of techniques

Measurement of Reliability and Validity of scales.

VII. Practical

1. Presentation of research review on need and importance of scaling techniques in behavior research
2. Review and presentation of research articles on different scaling techniques Self rating scales- Graphic Rating Scale
3. Review and presentation of research articles on different scaling techniques Itemised rating scales-Likert Scale
4. Review and presentation of research articles on different scaling techniques- Semantic Differential Scale
5. Review and presentation of research articles on different scaling techniques- Stapel's Scale
6. Review and presentation of research articles on different scaling techniques-Multi-Dimensional Scale
7. Review and presentation of research articles on different scaling techniques- Thurston Scale
8. Review and presentation of research articles on different scaling techniques- Scalogram Analysis
9. Review and presentation of research articles on different scaling techniques-The Q Sort technique
10. Review and presentation of research articles on Projective techniques- association and sentence completion
11. Review and presentation of research articles on Projective techniques- Construction, and expressive
12. Review and presentation of research articles on Projective techniques- Problems and promises
13. Review and presentation of research articles on Projective techniques- Word association
14. Review and presentation of research articles on Projective techniques- Story completion and pictorial
15. Development of Self rating scales- Graphic Rating Scale

16. Execution and presentation of results
17. Development of Self rating scales- Likert Scale
18. Execution and presentation of results
19. Development of Self rating scales- Semantic Differential Scale
20. Execution and presentation of results
21. Development of Self rating scales- Stapel's Scale
22. Execution and presentation of results
23. Development of Self rating scales- Multi Dimensional Scale
24. Execution and presentation of results
25. Development of Self rating scales- Thurston Scale
26. Execution and presentation of results
27. Development of Self rating scales- Scalogram Analysis
28. Execution and presentation of results
29. Development of Self rating scales- Q sort technique
30. Execution and presentation of results
31. Hands-on-experience in writing research article on scale development
32. End term assessment

VIII. Teaching Methods/Activities

- Participatory lectures
- Assignment
- Research review
- Survey
- Case study writing
- Students' presentation
- Hands-on-training

IX. Learning Outcome

After completion of this course the students will be able to:

- Recognise the importance of scaling techniques in social and behavioural research
- Define the nature and characteristic feature of each scale
- Review, interpret and present the results of each scale
- Develop and apply different scales and analyse the data for presentation
- Write research article based on the selected scale

X. Suggested Reading

- Colleen K. 2012. *Measurement in Health Behavior: Methods for Research and Evaluation*. 1st Edition. Jossey-Bass Publishers; ISBN-10: 9780787970970 ISBN-13: 978-0787970970
- Donnellan MB, Lucas RE and Fleeson W. 2009. *Introduction to personality and assessment at age 40: Reflections on the legacy of the person-situation debate and the future of person-situation integration*. *Journal of Research in Personality*. 43, 117-119.
- Eid M and Diene E. 2006. *Handbook of Multi Method Measurement in Psychology*. American Psychological Association, Washington, DC.
- Gaudry E Vagg P and Spielberger CD. 1975. *Validation of the state-trait distinction in anxiety research*. *Multivariate Behavioral Research*. 10, 331-341.
- Hampson SE and Goldberg LR. 2006. *A first large cohort study of personality trait stability over the 40 years between elementary school and midlife*. *J Pers Soc Psychol*. 91(4) 763-779.
- Jagadish R Raiyani. 2012. *Research Methodology: Theory and Techniques*. New Century Publications ISBN: 9788177082944, 8177082949
- John A and Swets Signal. 2009. *Detection Theory and ROC Analysis in Psychology and Diagnostics*. Collected Papers www.questia.com/library
- Paul E, McNamara and Joyous S Tata. 2015. *Principles of Designing and Implementing*

Agricultural Extension Programs for Reducing Post-harvest Loss. Agriculture. 5, 1035-1046; doi: 10.3390/agriculture 5041035

- Peter D, Gerald A, Susan and Shuqiang Z. 2004. *Scaling Method*. 2nd Edition. Lawrence Erlbaum Associates.
- Shuchi M. 2017. Scaling techniques of attitude measurement. *International Journal of Advanced Education and Research*. ISSN: 2455-5746, Impact Factor: RJIF 5.34 www.alleducationjournal.com Volume 2 Issue 2, March 2017; Page No. 41-50.
- Chapter 3: *Levels of Measurement and Scaling* <http://www.fao.org/docrep/w3241e/w3241e04.htm>

Weekly Lecture Schedule

Duration (week)	Topic
1	Introduction - Definition - scaling techniques and behaviour research.
2	Need and importance.
3	Attitude, Knowledge and Practice measurement techniques and relevance to Behaviour research.
4	Structured techniques - Nominal, Ordinal, Interval, Ratio scales.
5	Self rating scales - Graphic Rating Scale.
6	Itemized Rating Scales- Likert Scale, Semantic Differential Scale.
7	Stapel's Scale, Multi-Dimensional Scaling, Thurston Scales.
8	Guttman Scales/Scalogram Analysis and The Q Sort technique.
9	Non structured techniques - Projective - association, completion, construction, expressive, problems and promises.
10	Word association, sentence completion, story completion and pictorial.
11	Advantages and limitations for adoption in behaviour research.
12	Knowledge and Practice tests - Knowledge - Objective multiple choice questions (MCQs).
13	True/False assertion - Reason questions multiple response questions (MRQs).
14	Text/Numerical matching ranking questions, sequencing questions, field simulation questions, graphical hotspot questions and subjective tests.
15	Practice - worksheets, performance metrics.
16	Scalability of techniques - Measurement of reliability and validity.

I. Course Title : Design and Development of E-extension Project

II. Course Code : EECM 604

III. Credit Hours : 3 (0+3)

IV. Rationale

Keeping in view the extension service system under the National Agricultural Extension Policy, this course is planned to sensitise the students towards the need for ICT mediated extension services to ensure quality life in the sectors of health, nutrition, family and human relationships, which are vital areas of community science. It is essential to gain digital communication skills to reach masses for knowledge empowerment by transferring research findings compatible to the situation and context. Hence this course guides the students in gaining comprehensive experience of Extension-Research-Education by exposing themselves to the existing e-extension projects of SAU and designing new projects.

V. Aim of the course

- To orient students with design, development and analysis of e- extension projects
- To provide hands-on-experience in executing e-extension project.

VI. Practicals

1. Orientation to e-extension projects- Knowledge projects-moocs
2. Orientation to e-extension projects -Marketing projects- e choupla
3. Orientation to e-extension projects- Bulk SMS (Text and Voice) MMS
4. Orientation to e-extension projects- Video lessons
5. Orientation to e-extension projects-Virtual class rooms
6. Orientation to e-extension projects- Off line and Online Community Radio.
7. Interaction with personnel/professionals for understanding of media tools, hardware requirements of e-Extension projects
8. Interaction with personnel/professionals for understanding of media tools software requirements of e-Extension projects
9. Report writing and presentation
10. Identification of needs for skill development and proposal for skill training to undertake e-Extension project- application of software, access to hardware, etc.
11. Orientation to existing e-Extension projects of respective SAUs
12. Hands-on-experience in e- Extension projects of SAUs - content development, management and analytics report
13. Selection of multimedia e-Extension project and submission of proposal-knowledge management, product promotion, message alerting, analytical reports, etc. (Example Digital literacy promotion, Audio/ Video streaming, Social media for product promotion)
14. Presentation of proposal
15. Content development and time lines for execution of project
16. Execution of project and measurement of analytics as per time line
- 17-23. Report writing and presentation
24. Practical examination

VII. Teaching Methods/Activities

- Assignment
- Research review
- Group discussions
- Report writing
- Students' presentation
- Hands-on-training

VIII. Learning Outcome

After completion of the course the students will be able to:

- Identify public and private e-extension projects in the discipline of community science
- Recognise essential skills for undertaking e-extension projects
- Gain first-hand experience in content writing, management and track analytical report
- Write e-extension project, execute and measure analytics as per timeline

IX. Suggested Reading

- Martin M. 2016. *Editorial – Extension education theory and research in India*. Pages 105-109 www.tandfonline.com
- Paul E McNamara and Joyous S. 2015. *Principles of Designing and Implementing Agricultural Extension Programs for Reducing Post-harvest Loss Agriculture* 2015, 5, 1035-1046; doi: 10.3390/agriculture5041035

- Richard F, Douglas A and Carolyn W. 2003 *National “e-Extension” Programs: Feasibility and Structure*, American Agricultural Economics Association Annual Meeting, Montreal, Canada.
- Ujjwal K, Abhay K and Thakur PK. 2012. *Status of Agricultural Development in Eastern India*. Chapter 7.1 Status and Constraints of Extension Services <https://www.researchgate.net>
- Volker H, Maria GB, Anja C and Mamusha L. *Handbook: Rural Extension Volume 1 Basic Issues and Concepts*. Scientific books, Margraf Publishers, GmbH, Government of India Planning Commission Report of the Working Group on Agricultural Extension for Agriculture and Allied Sectors for the Twelfth Five Year Plan(2012-17) <http://planningcommission.gov.in>
- ICT Applications in Agricultural Extension Management. Report on USAID-INDIA-Afghanistan Feed The Future India Triangular Training (FTF ITT) Programme on ‘e-Extension <http://www.manage.gov.in/ftf-itt/prgReports/afgan.pdf>

I. Course Title : Sustainable Livelihood Systems

II. Course Code : EECM 605

III. Credit Hours : 2 (1+1)

IV. Rationale

Sustainable livelihood is a systemic and adaptive approach that links issues of poverty reduction, sustainability and empowerment processes. For this, the large scale success of sustainable livelihoods will depend on our ability to design sustainable technologies, sustainable enterprise, sustainable economies and sustainable institutions of governance. The attractiveness of Sustainable livelihoods lies in its applicability to different contexts, situations of uncertainty and in its capacity as a consultative and participatory process of ideas and strategies between various stakeholders. This course imparts students the link between livelihoods and security systems and interventions to address the gap.

V. Aim of the course

- To develop understanding about resources and livelihood systems and dimensions for livelihood security
- To sensitize students towards tools and techniques for sustainable livelihood.

VI. Theory

Unit I: Orientation to livelihood system

Livelihood perspectives - definition, approaches and frame works; Livelihoods and life support systems; Designing livelihood interventions; Process; Tools and technique.

Unit II: Sustainable livelihood systems

Definition; Origin; Principles; Livelihoods - agriculture, horticulture, sericulture, forestry, animal husbandry, dairying, fisheries, non-farm activities; Urban livelihoods - linkage with food security, nutritional security, health security, livelihood security; Measuring sustainable livelihood systems.

Unit III: Critical understanding of livelihood interventions

Intervention of national and international organisations - agriculture based, forest based, non-farm based, market-led based; DFID sustainable livelihoods framework - elements, vulnerability context, policies, institutions and processes, coping and adaptive strategies.

**Unit IV: Sustainable development concepts and challenges**

Sustainable development concepts and challenges; Ecological; Social and economic dimensions of sustainable development; Peoples participation and sustainability; Indicators of environmental sustainability; Sustainable livelihoods; Quality of life.

Unit V: Livelihood analysis tool kit

Operational model - tools, process; Gaps and challenges; Institutional issues; Participatory methods for analysis.

VIII. Teaching Methods and Activities

- Participatory lectures
- Field visits and interaction
- Assignment
- Demonstration
- Role play
- Presentation
- Research review

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Understand the history and evolution of the sustainable livelihoods approach
- Exercise the sustainable livelihoods framework to analyse the complexities and dynamics of poverty
- Apply and analyse sustainable livelihoods analysis tool kit in the field
- Plan projects from a Sustainable Livelihoods perspective

X. Suggested Reading

- Alan de B and Suryanarayana MH. 2015. Linkages between poverty, food security and undernutrition: evidence from China and India. *China Agricultural Economic Review*. Vol. 7 Issue: 4, pp.655-667
- Baumgartner R and Högger R. 2004. *In Search of Sustainable Livelihood, Managing Resources and Change*, Sage publications, New Delhi.
- Bijju MR. 2008. *Panchayati Raj System: Towards Sustainable Rural Livelihood and Development*. Kanishka Publishers, Distributors ISBN-10: 9788184570557
- Harishkumar HV. 2012. *Livelihood Security of Farm Households Under Different Farming Systems In Kolar District Of Karnataka – An Economic Analysis*. University of Agricultural Sciences, Bangalore. <http://krishikosh.egranth.ac.in/bitstream/1/89107/1/Thesis.pdf>
- Scoones Ian. 2015. *Sustainable Livelihoods and Rural Development*. Practical Action Publishing
- Nadel. 2007. *Working with a Sustainable Livelihoods Approach*. NADEL, Zurich, Bern: SDC. www.povertywellbeing.net
- Premchander S and R Menon. 2006. Engendering Development: Challenges and Opportunities for Mainstreaming Gender in Development Policy. In Premchander, S. & C. Mueller 2009 *Gender and Sustainable Development: Case Studies from the NCCR North-South. Perspectives of the Swiss NCCR North-South*, University of Bern. Vol. 2. Bern: Geographica Bernensia.
- *Livelihood Manual Integrated Watershed Management Programme (IWMP)*. 2012. Commissionrate of Rural Development. www.ruraldev.gujarat.gov.in
- Food security: concepts and measurement. <http://www.fao.org/docrep/005/y4671e/y4671e06.htm>

Weekly Lecture Schedule

Duration (week)	Topic
1	Orientation to livelihood system - Livelihood perspectives –definition, approaches and frame works.
2	Livelihoods and life support systems, Designing livelihood interventions.
3	Process, Tools and technique.
4	Sustainable livelihood systems - Definition, Origin, Principles.
5	Livelihoods – Agriculture, Horticulture.
6	Sericulture, Forestry.
7	Animal husbandry, Dairying.
8	Fisheries, Non-farm activities.
9	Urban livelihoods, Linkage with food security.
10	Nutritional security, health security.
11	Livelihood security, Measuring sustainable livelihood systems.
12	Critical understanding of livelihood interventions - Intervention of National and International organisations - agriculture based, Forest based livelihood interventions.
13	Non-farm based livelihood interventions, Market-led based livelihood interventions.
14	Sustainable development - concepts and challenges - Ecological factors, Social and economic dimensions of sustainable development.
15	Peoples participation and sustainability, Indicators of environmental sustainability.
16	Sustainable livelihood - indicators, Quality of life- indicators.

I. Course Title : Extension Research Project Management

II. Course Code : EECM 606

III. Credit Hours : 3 (1+2)

IV. Rationale

Extension research projects are unique in nature as they call for interactivity with human beings to get timely feedback; thereby reconsider the gaps and restructure the strategy to cope up with the goals to be achieved. It is all together a scientific and methodical approach, where a researcher need to plan meticulously to impress upon stakeholders with a set of activities and milestones to be reached. Through this course the students would be engaged in observation of different dimensions of extension research project in terms of models, types, policy and management practices.

V. Aim of the course

- To familiarize with different dimensions of extension research project management
- To provide investigative and analytical skills for extension research.

VI. Theory

Unit I: Overview to extension research

Definition; Concepts; Models- linear, advisory, facilitation; Types - advisory services, value chains, supply chains, incubation centres, knowledge management; Market led extension; Demand driven extension; Enterprise extension; Mainstreaming extension.

Unit II: Areas of extension research

Policy analysis; Gender issues; Public and private partnership; Product extension;

Process extension; Behaviour change - health security, nutritional security, food security; Impact analysis - technology, training; Funding agencies and project proposal formats.

Unit III: Research project management practices

Project charter and mission; Project life cycle; Project network diagram; Project progress/ performance measures; Project resource loading; Project SOW (statement of work); Project WBS (work breakdown structure) – budgeting, cost benefit analysis, resource management; Risk breakdown structure; SWOT.

Unit IV: Project management approaches and tools

Approaches - result oriented approach, constructivist approach, reflexive approach; Tools - PERT, CPM, GANNT.

VII. Practical

1. Preparation and presentation of case study on linear model extension project
2. Preparation and presentation of case study on advisory model extension project
3. Preparation and presentation of case study on facilitation model extension project
4. Comparative analysis of different models of extension projects
5. Preparation and presentation of case study on advisory services
6. Preparation and presentation of case study on value chains
7. Preparation and presentation of case study on supply chains
8. Preparation and presentation of case study on incubation centers
9. Preparation and presentation of case study on knowledge management
10. Preparation and presentation of case study on market led extension
11. Preparation and presentation of case study on demand driven extension
12. Preparation and presentation of case study on enterprise extension
13. Preparation and presentation of case study on mainstreaming extension
14. Comparative analysis different extension projects
15. Identification of niche areas of extension research in Community Science discipline
16. Identification of organizations for extension research and presentation of organizational objectives
17. Critical analysis of formats for research project writing and presentation
18. Preparation of extension research project (2)
19. Revising the project as per suggestions
20. Presentation of case study on Project Life Cycle
21. Presentation of case study on Project Network Diagram
22. Presentation of case study on Performance Measures
23. Presentation of case study on Project Resource Loading
24. Presentation of case study on Project SOW (statement of work)
25. Presentation of case study on Project WBS (work breakdown structure)
26. Presentation of case study on cost benefit analysis,
27. Presentation of case study on Risk Breakdown Structure;
28. Visit to existing extension research projects of SAU for observation
29. Report writing
30. Presentation of report
31. End term assessment

VIII. Teaching Methods/Activites

- Assignment
- Research review

- Group discussions
- Report writing
- Students' presentation
- Institutional visits

IX. Learning Outcome

After completion of the course the students will be able to

- Comprehend existing extension research models and types
- Analyse and write case studies on extension research projects focusing management practices
- Identify niche areas of research in the discipline of community science
- Recognise supporting organisations for writing extension research projects and write project
- Present case study on SAUs extension research projects

X. Suggested Reading

- Anandajayasekeram P, Puskur R, Sindu W and Hoekstra D. 2008. *Concepts and Practices in Agricultural Extension in Developing Countries: A Source Book*. IFPRI, Washington, DC, USA.
- Annie SW and Merle F. 2014. *Background Paper: Research and Development and Extension Services in Agriculture and Food Security*. ADB Economics Working Paper Series, Asian Development Bank ISSN 1655-5252 Publication Stock No. WPS147021-3.
- Burton E Swanson and Riikka R. 2010. *Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems Agriculture and Rural Development*, Discussion Paper 45, The International Bank for Reconstruction and Development/The World Bank, NW Washington, DC.
- Dennis PM. 2010. *Building a Project Work Breakdown Structure: Visualizing Objectives, Deliverables, Activities, and Schedules*. ESI International Project Management Series, 1st Edition Auerbach Publications ISBN 9781420069693.
- Singh KM and Meena MS and Swanson BE. 2013. *Extension in India by Public Sector Institutions: An Overview*. ICAR-RCER, Zonal Project Directorate, Jodhpur, Patna, University of Illinois.
- Michelle JR, Jane MA, Anne-Maree S, Enly S and Helen T. 2009. *Can agricultural research and extension be used to challenge the processes of exclusion and marginalisation?* <http://iari.res.in>
- Ralf M and Jonas S. 2014. *Innovative Approaches in Project Management Research*. International Journal of Project Management. **33**(2) November 2014.
- Rodne JT, Martina H, Frank T Anbari and Christophe NB. 2010. *Perspectives on Projects*. Routledge Publishers, ISBN1135848831, 9781135848835.
- *Managing Projects with Openness Part 3*. Document No.16004, Version 1.5 <https://idpasc.lip.pt>

Weekly Lecture Schedule

Duration (week)	Topic
1	Overview to Extension research - Definition and Models - linear, advisory, facilitation.
2	Advisory services, value chains, supply chains, incubation centres and knowledge management.
3	Types -market led extension, demand driven extension, enterprise extensionMainstreaming extension.
4	Areas of extension research - Policy analysis, gender issues, public and private partnership, product extension, process extension, behaviour change-health security, nutrition security and food security.



Duration (week)	Topics
5	Impact analysis - Technology and training funding agencies and project proposal formats.
6	Research project management practices – project charter and mission.
7	Project Life Cycle, Project Network Diagram.
8	Project progress/ performance measures, project resource loading.
9	Project SOW (statement of work).
10	Project WBS (work breakdown structure)- budgeting.
11	Cost benefit analysis, resource management.
12	Risk Breakdown Structure; SWOT.
13	Project management approaches and tools - Approaches - Result oriented approach.
14	Constructivist approach.
15	Reflexive approach.
16	Tools - PERT, CPM, GANNT.

I. Course Title : Media Application and Product Promotion

II. Course Code : EECM 607

III. Credit Hours : (2+2)

IV. Rationale

Media has the capability of promoting products. Also, media as product and application has potential role in enhancing learning. But, technology alone cannot improve teaching and learning. It must be deeply integrated with subject matter content. Therefore there is a need for a technique within which the learners can meet their needs to learn how to think, their need to develop, their ideas and apply what they learn to solve problems. This calls for active participation of the students and lead to get engaged in critical thinking and problem solving skills. Beyond this, as change agents in future endeavours, they need to be convinced for timely updation of media knowledge, because, in today's world information tracking is totally media based.

V. Aim of the course

- To familiarize students with media applications and interpretation of online analytics due to dissemination
- To provide hands-on-experience in preparation of multimedia products for promotion.

VI. Theory

Unit I: Introduction to media applications

Internet media and globalization - concepts and theories; Technology and culture - debates, regulation, gatekeeping and ethics-case studies.

Unit II: Corporate online promotional strategies

Advertising and marketing; Public communication campaigns and global humanitarianism; Multiplatform journalism; Transnational citizen journalism; Grassroots activism and change.

Unit III: Media prospects of mass communication

Historical development and economic; Social and aesthetic impact on mass culture; Individual and mass consciousness.

Unit IV: Audience research

Definitions; Principles and features; Scope; BARC (Broad Cast Audience Research Council) India; Data management techniques and tools.

Unit V: Software access

Advanced new media; Design and edit software; Open and purchase sources; Application regulations; Ethics.

Unit VI: Product promotion

Search Engine Optimization; Social Media Marketing; E-mail marketing - creation, marketing campaign planning, development and execution; Research.

Unit VII: Social media platforms

Types; Optimization; Product page creation; Analytics.

Unit VIII: Social networking

SNS(Social Networking Sites) in India; Advantages and limitations; Critical analysis of role of SNS in mass communication.

Unit IX: Introduction to SEO

Targeting key words; Integrating search keywords; Search engines and directories; Page wise optimization process; Page title tags; META Description tag; META keywords Tag.

Unit X: Reports

Variables; Time line; Report access protocol; Documentation.

VII. Practical

1. Identify and suggest the suitable keywords for a product
2. Adding keywords to website and blogs
3. Preparing Search Engine Optimization (SEO) friendly content for product website
4. Demonstration to get website listed among top Search in (SEO)
5. Demonstration on off page and on page in SEO
6. Identifying best practices for Social Media Marketing, including platform level best practices
7. Connecting product objectives to appropriate Social Media tactics
8. Creating strong content to engage target audience with marketing message
9. Creating events to manage content distribution
10. Creating Social Media policies that combine business objectives with appropriate use of social media channels and content
11. Creating Fan Pages in Social media platforms
12. Hands-on-experience- learning targeting right audience
13. Hands-on-experience on process of running Facebook ads
14. Creating engaging post and creating brand for business
15. Creating channel on YouTube
16. Updating the profile on YouTube Channel
17. Understanding the Creator Studio of YouTube
18. Types of videos and different platforms of video creation
19. Creating videos- Hands-on-Experience
20. Creating videos- Hands-on-Experience
21. Uploading videos on YouTube
22. Practicing SEO of YouTube

23. Hands-on-experience on Page title tags
24. Hands-on-experience on META Description Tag
25. Hands-on-experience on META Keywords Tag
26. Promotion of videos
27. Promotion of product on YouTube
28. Online orientation to email marketing for product promotion.
29. Hands-on-experience on email marketing for product promotion.
30. Review of analytics of product promotion
31. Presentation of multimedia practice experience
32. End term assessment

VIII. Teaching Methods/ Activities

- Participatory lectures
- Assignment
- Student's Book/Publication Review
- Practice sessions
- Media development and transmission
- Students' presentation

IX. Learning Outcome

After successful completion of the course the students will be able to:

- Comprehend online and offline media applications
- Recognise effective product promotion platforms
- Write SEO friendly online content for product promotion
- Review analytics of product promotion
- Organise email marketing

X. Suggested Reading

- Dave C and Smith. 2017. *Digital Marketing Excellence*. Taylor & Francis ISBN-10: 1138494232 ISBN-13: 978-1138494237.
- Godse and Godse. 2015. *Graphics and Multimedia for ANNA University*. (V-IT-2013 course) Technical Publications, Third edition ISBN-10: 9333202099 ISBN-13: 978-9333202091.
- Klara N and Ralf S. 2012. *Multimedia Applications*. Springer-verlag GmbH ISBN: 9783642074103, 3642074103.
- Marshall S and Gohar Khan F. 2017. *Digital Analytics for Marketing*. Routledge Edition. ISBN-10: 1138190683 ISBN-13: 978-1138190689.
- Shahajan. 2010. *Strategic Marketing: Text and Cases Viva Books*. ISBN-10: 8130912694 ISBN-13: 978-8130912691.
- Simon K. 2010. *Digital Marketing Strategy: An Integrated Approach to Online Marketing*. ISBN-10: 0749484225 ISBN-13: 978-0749484224.
- *Convergence in Indian Media: a New Paradigm of ICT*
www.researchgate.net/publication

Weekly Lecture Schedule

Duration (week)	Topic
1	Introduction to media applications - Internet media and globalization - concepts and theories, Technology and culture - debates, regulation, gatekeeping and ethics-case studies.
2	Corporate online promotional strategies - Advertising and marketing, public communication campaigns and global humanitarianism, Multiplatform journalism, transnational citizen journalism, grassroots activism and change.

Duration (week)	Topics
3	Media prospects of mass communication - Historical development and economic, social and aesthetic impact on mass culture, Individual and mass consciousness.
4	Audience research - Definitions, Principles and features, Scope, BARC (Broad Cast Audience Research Council) India.
5	Data management techniques and tools, Software access - Advanced new media.
6	Design and Edit software, Open and purchase sources.
7	Application regulations and Ethics, Product promotion - Search Engine Optimization.
8	Social Media Marketing, E-mail marketing - Creation, Marketing campaign planning, development and execution.
9	Research perspectives in product promotion, Social media platforms - Types of Social media platforms.
10	Optimization of SM, Product page creation.
11	Analytics of SM, Social networking - SNS (Social Networking Sites) in India.
12	Advantages and limitations, Critical analysis of role of SNS in mass communication.
13	Introduction to SEO (Search Engine Optimization) - Targeting key words, Integrating search keywords.
14	Search engines and directories, Page wise optimization process.
15	Page title tags - META Description Tag, META Keywords Tag, Reports - Variables, Time line.
16	Report access protocol, documentation.

I. Course Title : Advocacy and Behavior Change Management

II. Course Code : EECM 608

III. Credit Hours : 3 (1+2)

IV. Rationale

The holistic objective of the discipline of extension education and communication management is sustainable behaviour change of human beings. Whether organisations or individuals working towards this end believe that social and behavior change communication is key to solving the world's most pressing health and social problems, while advocacy strategies are an important aspect of behaviour change in terms of changing the enabling environment. This course exposes students to logical thinking in planning behaviour change communication programme.

V. Aim of the course

- To familiarise students with the role of advocacy and behavior change management for human development
- To provide contrived experience in application of advocacy and BCC approaches.

VI. Theory

Unit I: Advocacy

Meaning; Purpose and types of Advocacy; Tools; Techniques and approaches of advocacy; Elements of an advocacy strategy.

Unit II: Advocacy planning cycle

Planning advocacy campaigns for different stakeholders relationship between advocacy and development; Programme communication and social mobilization;

Social marketing- models and approaches.

Unit III: Behaviour change communication

Concept; Approaches of BCC - functional approach, information processing approach, consistency approach, behaviour modification approach, health belief model and the bj fogg model of behavior change; Role of learning theories - social cognitive theory, theories of reasoned action and planned behaviour, trans theoretical model of behavior change.

Unit IV: Processes of behaviour change

Strategic issues and BCC (Health/ Environment/ Consumption); Analysis of BCC campaigns for social mobilization and policy change; BCC campaigns in core areas for stakeholders.

Unit V: Evidences of behaviour change

Global programs- evidences of WASH communication, HIV/AIDS communication, obesity communication, diabetic communication, concept of green marketing and cause marketing.

VII. Practical

1. Interaction with Advocacy personnel to comprehend the advocacy approaches- working with HIV/AIDS patients
2. Interaction with Advocacy personnel- working with drug/alcohol addicts
3. Interaction with Advocacy personnel- Family/ Marriage issues
4. Interaction with Advocacy personnel- working with mentally challenged children
5. Preparation and presentation of report
6. Review of research on BCC approaches- Functional approach
7. Review of research on BCC approaches- Information processing approach
8. Review of research on BCC approaches- Consistency approach
9. Review of research on BCC approaches- Behavior modification approach
10. Review of research on BCC approaches- Health Belief model
11. Review of research on BCC approaches-BJ Fogg model of behavior change.
12. Report writing and presentation
13. Case study on Social marketing in India
14. Identification of Niche research in BCC
15. Presentation of researchable issues in BCC
16. End term assessment

VIII. Teaching Methods/Activities

- Participatory lecture
- Online group discussions
- Blog writing
- Research review
- Case study writing and presentation
- Institutional visits

IX. Learning Outcome

After successful completion of the course the students will be able to

- Comprehend the perspectives of advocacy and behaviour change communication
- Explain the theories of BCC and their application in real world
- Review different BCC approaches and prepare case study

- Identify niche research and researchable issues in BCC
- Sensitise towards working with special groups

X. Suggested Reading

- Alan C. 2014. *An Introduction to Social Media Marketing*. Routledge Publishers, ISBN-10: 9780415856171 ISBN-13: 978-0415856171.
- Annette G and Claire B. 2013. *Advocacy and Policy Change Evaluation: Theory and Practice*. 1st Edition, ISBN-13: 978-0804792561 ISBN-10: 0804792569
- John AD. 2013. *Advocacy: Championing Ideas and Influencing Others*. 1st Edition, ISBN-13: 978-0300188134 ISBN-10: 0300188137.
- Nancy R Lee and Philip Kotler. 2011. *Social Marketing: Influencing Behaviors for Good*. Fourth Edition, ISBN-13: 978-1412981491 ISBN-10: 9781412981491.
- McKee Neill, Antje BB and Emily B. 2014. *Social and Behavior Change Communication*. <https://doi.org/10.1002/9781118505328.ch17>
- Kotler Philip. 2014. *Social Marketing –Strategies for Public Behaviour*. Routledge Publishers, ISBN-10: 9780415856171 ISBN-13: 978-0415856171.
- Sameer D and Nancy RL. 2014. *Social Marketing in India*. Sage Publications, SBN: 9788132113577.
- *Guidelines for Developing Behavioural Change Interventions in the Context of Avian Influenza Health Promotion and Education (HPE)*. Department of Non-communicable Diseases and Mental Health World Health Organization, <http://apps.searo.who.int>
- *Strategic Communication - For Behaviour and Social Change In South Asia* (2005) The United Nations Children's Fund (UNICEF) Regional Office for South Asia.

Weekly Lecture Schedule

Duration (week)	Topic
1	Advocacy - Meaning and definition of advocacy, Significance of advocacy in community sciences, Purpose and types of advocacy
2	Tools and techniques of advocacy, Approaches of advocacy
3	Elements of an advocacy strategy, Advocacy research and dimensions
4	Advocacy Planning Cycle - Planning advocacy campaigns for different Stakeholders, Relationship between advocacy and development, Critical analysis of Programme communication and social mobilization
5	Social marketing models and approaches, Critical analysis of Social marketing.
6	Research perspectives of advocacy planning cycle, Behaviour Change Communication - Concept of BCC and evolution
7	Approaches of BCC - Functional approach, Information processing approach
8	Consistency approach, Behaviour modification approach
9	Health Belief model, BJ Fogg model of behavior change
10	Role of learning Theories - social cognitive theory, Theories of reasoned action and planned behavior
11	Trans theoretical model of behavior change, Comparative analysis of different models
12	Processes of Behaviour Change - Strategic issues and BCC – Health, Environment and Consumption, Analysis of BCC campaigns for social mobilization and policy change
13	BCC campaigns in core areas for stakeholders, Stages of behavior change
14	Designing behavior change programme- Steps and outcome, Evidences of behaviour change-Global programs - Evidences of WASH communication
15	Evidences of HIV/AIDS communication, Evidences of obesity communication
16	Evidences of Diabetic communication , Concept of Green marketing and cause marketing

Restructured and Revised
Syllabi of Post-graduate Programmes

Vol. 6

Community Science
– Food and Nutrition

Preamble

(Food and Nutrition)

Nutrition is well recognized for its central role in national development. The post-graduate curriculum of Food and Nutrition is revised to enable the students to handle the continuous changing nutrition situations of the population and to imply the accurate and scientific knowledge for sustainable handling to induce better health and productivity. The important role of post-graduate students as leaders in extension and community outreach programmes is considered as a need of the hour. The courses are designed to develop a scientific temper among students. Nutrition generates lot of concerns and issues which can be tackled through interdisciplinary approach. The students will study the allied fields along with major courses of basic nutrition with an aim to develop a holistic and multidimensional understanding of the discipline. This course equips the students for skill development, academic understanding, entrepreneurship, community role and employment in various fields of food industry, hospitals, NGOs, etc. Adding the new knowledge to the previous curriculum is very much needed for students to assess the prevailing nutritional situations of a community across age, sex, physiological conditions so that they can suggest the remedial pathways. The students with a good understanding about the role of nutrition in fighting infections and preventing diseases will have better employment opportunities in ever growing health sector.

Nutrition counselling is an upcoming field globally. The major and minor courses will impart high skills in communication, subject knowledge and understanding the client's socio-eco-cultural background to offer curative/ preventive nutritional advice as counsellors. Deep knowledge of food safety and standards along with strong analytical skills in food analysis, food technology and biotechnology may improve the scope for the students for employability in food processing sector. The knowledge of advanced geriatric nutrition will further equip the students to work with elderly population for their better health care. The recent advances in energy metabolism will provide deep insight in human adiposity and the food related disease burden like Type 2 diabetes, heart diseases, cancers, etc.

The courses will include updated information that will enable the students to keep track with agriculture scenario of the country as well as of the entire world to connect with the health status to identify, evaluate and find ways to establish positive interfaces. It is important to equip students with the knowledge of global nutrition problems and prepare them with skills to address the challenges effectively. The students will acquire skills to provide support to vulnerable mother-child duo conducive to development of quality human resource through the advanced courses.

The different entities during rescue operations and how food assistance component has been addressed to meet the needs of stranded population during natural calamities that consistently occur in India such as floods, cyclones, earthquake and droughts have been dealt in the curriculum. A knowledge on the topic will enable the students to act favourably to lessen the miseries of disaster hit population in terms of health and nutrition. A new course on hormones and enzymes gives insight of hormonal and enzymatic dysfunction which may give rise to several lifestyle diseases. In depth knowledge of these two is required to reduce the disease burden. Bioenergetics and regulation of metabolism are taught



explicitly so that students are able to understand the increasing prevalence of obesity and related metabolic disorders. Courses on biotechnology, nutrigenomics and food science and technology opens a wide horizon for students to develop novel functional foods with huge potential in local and global markets.

The revision of courses is made to ensure that the students achieve high prominence and excellence in the field of nutrition to become professionals such as educators, researchers, clinical dieticians, health coaches, community health educators, holistic nutritionists rehabilitation counsellors and sports nutritionists.

Modifications Suggested in Courses in the Revised Curricula

M.Sc. (Community Science) in Food and Nutrition

Course Code	Course Title	Credit Hours	Remarks
Major Courses (20 Credits)			
FN 501*	Macro and Micro Nutrients in Human Nutrition	3(3+0)	Content Modified
FN 502*	Public Health and Nutrition	3(2+1)	Content Modified
FN 503*	Techniques in Food Analysis	3(1+2)	Content Modified
FN 504*	Diet Therapy	3(2+1)	Content Modified
FN 505	Nutrition and Physical Fitness	3(2+1)	Content Modified
FN 506	Developments in Nutrition and Immunity	2(2+0)	Content Modified
FN 507	Clinical Nutrition	3(2+1)	Content Modified
FN 508	Nutrition Counselling	2(0+2)	New
FN 509	Food Safety and Standards	3(2+1)	
FN 510	Nutritional Challenges in Life Cycle	3(2+0)	Content Modified
FN 511	Food Science	3(2+1)	Content Modified
FN 512	Food Processing Technology	3(2+1)	Content Modified
FN 513	Human Physiology	3(3+0)	Content Modified
FN 514	Institutional Food Service Management	2(1+1)	Content Modified
Minor Courses (08 Credits)			
	Food Science and Technology	3(2+1)	Course numbers will be assigned by the departments that offer the courses. Apart from these courses a student can register any other course offered by any other departments
	Food Biochemistry	3(2+1)	
	Nutritional Biochemistry	3(2+1)	
	Food Microbiology	3(2+1)	
EECM 504	Technology Transfer and Management	3 (1+2)	



Course Code	Course Title	Credit Hours	Remarks
EECM 505	Dynamic Communication Skills	3 (1+2)	
Supporting Courses (06 Credits)			
	Research Methodology	3(2+1)	
	Statistical methods and application		Course numbers will be assigned by the departments that offer the courses.
Common Courses (05 Credits)			
	Library and Information Services	1(0+1)	Common to all disciplines. The course numbers will be assigned by the departments that offer the courses
	Technical Writing and Communications Skills	1(0+1)	
	Intellectual Property and its management in Agriculture	1(0+1)	
	Basic Concepts in Laboratory Techniques	1(0+1)	
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)	
FN 591	Seminar	1(1+0)	
FN 599	Thesis/ Research	30	
	Total	70 Credits	

*Core courses/ compulsory courses

Ph.D. (Community Science) in Food and Nutrition

Course Code	Course Title	Credit Hours	Remarks
Major Courses (12 Credits)**			
FN 601*	Macronutrient Metabolism	3(3+0)	Modified
FN 602*	Micronutrient Metabolism	2(2+0)	Modified
FN 603*	Nutrition and Agricultural Interface	3(3+0)	Modified
FN 604	Global Nutritional Problems	2(2+0)	
FN 605	Nutrition in Calamities	2(2+0)	Modified
FN 606	Maternal and Child Nutrition	2(2+0)	
FN 607	Hormones and Enzymes	2(2+0)	New
FN 608	Energy Metabolism	2(2+0)	Modified
FN 609	Application of Biotechnology in Food Science and Nutrition	3(3+0)	Modified
FN 610	Recent Trends in Food Science and Technology	3(3+0)	Modified
Minor Courses (06 Credits)			
	Food Science and Technology	3(2+1)	Course numbers will be assigned
	Food Biochemistry	3(2+1)	

Course Code	Course Title	Credit Hours	Remarks
	Nutritional Biochemistry Food Microbiology	2(2+0) 3(2+1)	by the departments that offer the courses. Apart from these courses a student can register any other course offered by any other departments
EECM 603	Scaling Techniques for Behaviour Research	3 (1+2)	
EECM 605	Sustainable Livelihood Systems	2 (1+1)	
Supporting Courses (05 Credits)			
A student can opt any course related to the topic of research offered by other faculties of agriculture university or SWAYAM portal or MOOCS or other online courses up to a maximum of 5 credits.			
FN 691	Doctoral Seminar I (Major Field)	1(1+0)	
FN 692	Doctoral Seminar II (Minor Field)	1(1+0)	
FN 699	Research	75	Increased credits for Research
Total		100 Credits	

*Core courses/ compulsory courses.

**Practical sessions in Ph.D. Programme are not suggested by the experts in the field of Food and Nutrition on the grounds detailed below:

1. Sufficient hands-on exposures at UG/PG(M.Sc) level in areas of food & Nutrition covering aspects of nutrient analysis in normal and processed conditions. Such exposures ensure hand holding of related equipment/ instruments, chemicals and methods of analysis. Furthermore, nutritional assessment methods at community level provide ample opportunities to gather the expertise in survey research methods.
2. Exposure to Animal Experiments, however, is limited due to the prevailing ethical issues. If a particular field of research necessitates Animal Experiment, facilities available in established organisation could be linked through meaningful and prior arrangements.
3. In these courses, it is expected that the students take up live case studies with regard to the specificity of the course and report. Preliminary training in dealing with case studies may be imparted by a third party for which some funding may be given by ICAR. The University may offer a common training to students from all faculties through experts within the University set-up. The faculty should lead a thorough discussion of all the cases and a consolidated report may be submitted and sent for publication. In each course, the students spend one credit time during the semester for this exercise.

Course Title with Credit Load

M.Sc. (Community Science) in Food and Nutrition

Course Code	Course Title	Credit Hours
Major Courses (20 Credits)		
FN 501*	Macro and Micro Nutrients in Human Nutrition	3(3+0)
FN 502*	Public Health and Nutrition	3(2+1)
FN 503*	Techniques in Food Analysis	3(1+2)
FN 504*	Diet Therapy	3(2+1)
FN 505	Nutrition and Physical Fitness	3(2+1)
FN 506	Developments in Nutrition and Immunity	2(2+0)
FN 507	Clinical Nutrition	3(2+1)
FN 508	Nutrition Counselling	2(0+2)
FN 509	Food Safety and Standards	3(2+1)
FN 510	Nutritional Challenges in Life Cycle	3(2+0)
FN 511	Food Science	3(2+1)
FN 512	Food Processing Technology	3(2+1)
FN 513	Human Physiology	3(3+0)
FN 514	Institutional Food Service Management	2(1+1)
Minor Courses (08 Credits)		
EECM 504	Food Science and Technology	3(2+1)
EECM 505	Food Biochemistry	3(2+1)
	Nutritional Biochemistry	3(2+1)
	Food Microbiology	3(2+1)
	Technology Transfer and Management	3 (1+2)
	Dynamic Communication Skills	3 (1+2)
Supporting Courses (06 Credits)		
	Research Methodology	3(2+1)
	Statistical methods and application	
Common Courses (05 Credits)		
	Library and Information Services	1(0+1)
	Technical Writing and Communications Skills	1(0+1)
	Intellectual Property and its management in Agriculture	1(0+1)
	Basic Concepts in Laboratory Techniques	1(0+1)
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)
FN 591	Seminar	1(1+0)
FN 599	Thesis/ Research	30
	Total	70 Credits

Course Contents

M.Sc. (Community Science) in Food and Nutrition

I. Course Title : Macro and Micro Nutrients in Human Nutrition

II. Course Code : FN 501

III. Credit Hours : 3(3+0)

IV. Rationale

Proper nutrition is the crux of human health along with safe water, sanitation, immunization, etc. Adequate knowledge about this core course on macro and micronutrients in totality will enable the students to handle the nutrition situations of a population and how to imply the knowledge for sustainable handling to induce better health and productivity. Therefore, the necessity lies in this core course.

V. Aim of the course

- To provide in-depth understanding related to macro and micro nutrients
- To impart knowledge about specific requirements of these nutrients as per age, sex, physiological condition, functions, metabolism sources, deficiency parameters for meaningful handling of normal and problem stricken situations.

VI. Theory

Unit I: Carbohydrates

Body composition; Functions, sources, requirements, digestion and absorption of carbohydrates. Composition, classification and functions of dietary fibre; Role of dietary fibre, resistant starch and fructo-oligosaccharides in various physiological disorders; Glycemic response to carbohydrates.

Unit II: Proteins

Classification, functions, sources, digestion and absorption of proteins; Synthesis of non-essential amino acids in the body; Urea cycle; Protein quality; Relationship between energy and protein requirements; Regulation of food intake; Nutrient adaptation to low intake of energy and protein.

Unit III: Fats

Classification, functions, sources, digestion, absorption and deficiency disorders of lipids and essential fatty acids; Role of omega-3 and omega 6 fatty acids in physiological disorders.

Unit IV: Vitamins, minerals and water

Functions, absorption, requirement, sources, deficiency and toxicity of fat-soluble vitamins - A, D, E and K and water-soluble vitamins- thiamine, riboflavin, niacin, pyridoxine, folate, B₁₂, ascorbic acid, pantothenic acid, biotin and amygdalin; Functions, absorption, requirement, sources, deficiency and toxicity of macro minerals – calcium and phosphorus and micro minerals – iron, zinc, sodium, copper, cobalt, selenium and chromium; Water and electrolyte balance, functions and distribution of water in body, Electrolyte composition of body fluids and electrolyte balance.

VII. Teaching Methods/ Activities

- Lectures
- Assignment (Reading/Writing)
- Group discussion
- Student presentation

VIII. Learning Outcome

Completion of this course will help the students to:

- Acquire advanced knowledge in macro and micronutrients
- Understand specific nutrient related situations in population
- Apply the techniques as per the demand of the human nutritional profile.
- Utilize the learning techniques in population education/publication

IX. Suggested Reading

- Bamji MS, Rao NP and Reddy V. 2003. *Textbook of Human Nutrition*. 2nd Edition, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
- Berdanier CD and Zempleni J. 2009. *Advanced Nutrition: Macronutrients, Micronutrients and Metabolism*. CRC Press, New York.
- Eastwood MA. 1997. *Principles of Human Nutrition*. London; Chapman & Hall.
- FAO. 2004. *Human Energy Requirements - Report of a Joint FAO/WHO/UNU Expert Consultation*. Technical Report Series 1. Food and Agriculture Organization, Geneva.
- FAO. 2007. *Protein and Amino Acid Requirements - Report of a Joint FAO/WHO/UNU Expert Consultation*. Technical Report Series 1. Food and Agriculture Organization, Rome.
- Groff JL and Gropper S. 2012. *Advanced Nutrition and Human Metabolism*. 7th Edition, Yolanda Cossio, New York.
- Ross AC, Caballero B, Cousins RJ, Tucker KL and Ziegler TR. 2012. *Modern Nutrition in Health and Disease*. 11th Edition, LWW, Philadelphia.
- Summathi S. 2017. *Food Chemistry and Nutrition*. BS Publication, Hyderabad.
- Whitney EN and Rolfes CR. 2019. *Understanding Nutrition*. 15th Ed., West Publishing Company, USA.
- Wildman REC and Medeiros DM. 2000. *Advanced Human Nutrition*. CRC Press, Boca Raton, Florida.
- Stipanuk MH and Caudill MA. 2013. *Biochemical, Physiological and Molecular Aspects of Human Nutrition*. 3rd Edition, Elsevier Pub.
- <https://www.nutritionintl.org>
- <https://www.who.int>
- <https://www.hsph.harvard.edu/nutritionsource>
- <http://www.nin.res.in>

Weekly Lecture Schedule

Duration (week)	Topic
1	Body composition. Functions, sources, requirements, digestion and absorption of carbohydrates.
2	Composition, classification and functions of dietary fibre.
3	Role of dietary fibre, resistant starch and fructo-oligosaccharides in various physiological disorders. Glycemic response to carbohydrates.
4	Classification, functions, sources, digestion and absorption of proteins.
5	Synthesis of non-essential amino acids in the body. Urea cycle.
6	Protein quality.
7	Classification, functions, sources, digestion, absorption and deficiency disorders of lipids and essential fatty acids.
8	Role of omega-3 fatty acids in physiological disorders.

Duration (week)	Topics
9	Relationship between energy and protein requirements. Regulation of food intake. Nutrient adaptation to low intake of energy and protein.
10.	Functions, absorption, requirement, sources, deficiency and toxicity of fat-soluble vitamins - A, D, E and K.
11.	Functions, absorption, requirement, sources, deficiency and toxicity of water-soluble vitamins- thiamine, riboflavin, niacin.
12.	Functions, absorption, requirement, sources, deficiency and toxicity of water-soluble vitamins- pyridoxine, folate, B ₁₂ .
13.	Functions, absorption, requirement, sources, deficiency and toxicity of water-soluble vitamins- ascorbic acid, pantothenic acid and biotin.
14.	Functions, absorption, requirement, sources, deficiency and toxicity of macro minerals – calcium and phosphorus.
15.	Functions, absorption, requirement, sources, deficiency and toxicity of micro minerals – iron, zinc, sodium, copper, cobalt, selenium and chromium.
16.	Water and electrolyte balance, functions and distribution of water in body, Electrolyte composition of body fluids and electrolyte balance.

I. Course Title : Public Health and Nutrition

II. Course Code : FN 502

III. Credit Hours : 3(2+1)

IV. Rationale

This core course on public health nutrition will enable the students with the knowledge in assessment of prevailing nutritional situations of a community across age- sex- physiological conditions. Furthermore, opportunities in analysing Public Health consequences in in-situ conditions will empower the students in planning, executing and evaluating the health and nutrition related development schemes of GOs, NGOs and allied bodies to suggest remedial pathways.

V. Aim of the course

- To provide both theory and practical exposure to the students on the subject of Public Health Nutrition
- To make them skilled in management of adequate nutritional statures of the population conducive to National Development.

VI. Theory

Unit I: Nutritional status assessment

Assessment of nutritional status at individual, household and institutional level: direct and indirect methods; Ecological, socio-cultural, economic and demographic correlations of malnutrition.

Unit II: Nutritional deficiencies and life style disorders

Prevalence, aetiology, biochemical and metabolic changes in protein energy malnutrition, vitamin A deficiency, iron deficiency anaemia, iodine deficiency disorders, diabetes mellitus, cancer, hypertension and other life style disorders.

Unit III: Present scenario of nutritional problems

Major nutritional problems of the state, nation and world; Nutrition intervention-

definition, importance, methods of nutrition intervention, monitoring and evaluation; E-surveillance.

Unit IV: Nutritional programmes and polices

National nutritional programmes and policies and nutritional surveillance; National programmes and policies regarding food production and distribution.

VII. Practicals

- 1-3. Techniques of assessment of nutritional status
- 4-5. Use of Screening Tools
- 6-7. Visit to the ongoing public health nutrition programme and report writing.
- 8-9. Study of existing diet and nutrition practices
- 10-12. Planning and conducting survey
- 13-14. Analysing data and writing report
- 15-16. Development, implementation and evaluation of community nutrition and health programmes

VIII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Group activities
- On field case identification and analysis
- Project planning and report writing

IX. Learning Outcome

Completion of this course will enable the students to take responsibilities as:

- Nutrition educator
- Health educator
- Extension worker for situational analysis of prevailing public health nutritional problems for cultural adaptation strategies.
- Planner and executor of developmental schemes
- Applied researcher

X. Suggested Reading

- Bamji MS, Kamala K and Brhmam GNV. 2017. *Textbook of Human Nutrition*. 4th Edition, Oxford & IBH.
- Endres JB. 1990. *Community Nutrition Challenges and Opportunities*. Pearson Education Inc. London.
- Frank GC. 2008. *Nutrition: Applying Epidemiology to Contemporary Practice* . 2nd Edition, Jonts and Bartlett Publishers, Sudbury, MA.
- Gopaldas T and Seshadari S. 1987. *Nutrition Monitoring and Assessment*. Oxford University Press.
- Jeannette BE. 1990. *Community Nutrition: Challenges and Opportunities*. 1st Edition, Merrill.
- Jelliffe DB. 1966. *The Assessment of the Nutritional Status of the Community*. WHO, Geneva.
- Longwah T, Ananthan R, Bhaskarachary K and Venkalah K. 2017. *Indian Food Composition Tables*. National Institute of Nutrition, Hyderabad.
- Marie AB and David HH. 2012. *Community Nutrition in Action: An Entrepreneurial Approach*, Cengage Learning Inc. USA.
- McLaren DS. 1977. *Nutrition in the Community*. John Wiley & Sons.
- Park JE and Park K. 2007. *Park's Text Book of Preventive and Social Medicine*. 19th Edition, Banarsidas Bhanot Publishers, Jabalpur.

- Park JE and Park K. 2017. *Park's Textbook of Preventive and Social Medicine*. Banarsidas Bhanot Publ.
- Prabha B. 2017. *Community Nutrition in India*. 1st Edition, Star Publications, Agra.
- Rosalind S Gibson. 2005. *Principles of Nutritional Assessment*. 2nd Edition, Oxford University Press Inc.
- Salil S and Rita SR. 2007. *Textbook of Community Nutrition*. ICAR publication, New Delhi.
- Shukla PK. 1982. *Nutritional Problems of India*. Prentice Hall of India.
- Suryatapa Das. 2018. *Textbook of Community Nutrition*. 3rd Edn., Academic Publishers.
- <https://www.india.gov.in/agriculture>
- <https://mhrd.gov.in/mid-day-meal>
- <https://www.harvestplus.org>
- <https://www.icmr.nic.in/>

Weekly Lecture Schedule

Duration (week)	Topic
1	Assessment of nutritional status at individual, household and institutional level: direct and indirect methods.
2	Ecological, socio-cultural, economic and demographic correlations of malnutrition.
3	Prevalence, etiology, biochemical and metabolic changes in Vitamin A deficiency.
4	Prevalence, etiology, biochemical and metabolic changes in Protein Energy Malnutrition.
5	Prevalence, etiology, biochemical and metabolic changes in Iron Deficiency Anaemia.
6	Prevalence, etiology, biochemical and metabolic changes in Iodine Deficiency Disorders.
7	Prevalence, etiology, biochemical and metabolic changes in Diabetes Mellitus.
8	Prevalence, etiology, biochemical and metabolic changes in Hypertension.
9	Prevalence, etiology, biochemical and metabolic changes in Cancer and other life style disorders.
10	Major nutritional problems of the state, nation and world.
11	Nutrition intervention- definition, importance, methods of nutritional intervention, monitoring and evaluation.
12	Methods of nutritional intervention, monitoring and evaluation.
13	E-surveillance.
14	National nutritional programmes and policies and nutritional surveillance.
15	National programmes and policies regarding food production.
16	National programmes and policies regarding food distribution.

I. Course Title : Techniques in Food Analysis

II. Course Code : FN 503

III. Credit Hours : 3 (1+2)

IV. Rationale

Food analysis is the discipline that deals with the development, application and study of analytical procedures for characterizing the properties of foods and their constituents. It provides analytical data on the quality of a food or product.

V. Aim of the course

- To provide the students an opportunity to develop precision with the principles, techniques and application of different methods analysis for varied food and products.

- To equip the students with knowledge to ascertain quality of the tested food/products.

VI. Theory

Unit I: Sampling techniques

Preparation of various standard solutions; Sample and sampling techniques; Introduction to standard analytical methods of FSSAI.

Unit II: Analytical techniques

Principle, techniques and applications of colorimeter, spectrophotometer and atomic absorption spectrophotometer, gel filtration and ultra-centrifugation.

Unit III: Photometric methods and electrophoresis

Principle, techniques and applications of fluorimetry, flame photometry and electrophoresis.

Unit IV: Chromatography

Principle, techniques and applications of paper, thin layer, gas liquid and high-pressure liquid chromatography, introduction to animal assay.

VII. Practicals

- 1-2. Principles and operation of laboratory equipment
- 3-6. Determination of moisture content and titratable acidity
- 7-8. Determination of ash- dry and wet ash
- 9-10. Determination of reducing sugars and total sugars
- 11-14. Analysis of protein- Kjeldhal method
- 15-16. Analysis of amino acids- HPLC
- 17-20. Analysis of fat - Soxhlet method, Cold extraction method
- 21-22. Determination of peroxide value and iodine value
- 23-24. Analysis of crude fibre. Analysis of minerals- sodium and potassium
- 25-26. Analysis of iron, copper, zinc and lead. Absorption spectrophotometry
- 27-28. Analysis of phosphorus- Colorimeter method
- 29-30. Analysis of vitamin C
- 31-32. Estimation of carotene. Experiments on gel electrophoresis

VIII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Group activities
- Hands on training

IX. Learning Outcome

Successful completion of this course will enable the students to:

- Utilize the methods and tools to cater the needs of food analysis
- Guide the process of quality control
- Act as trained food analyst

X. Suggested Reading

- AOAC. 1995. *Association of Official Analytical Chemists*. Washington, DC. Gruenwedels DW and Whitakor JR. 1984. *FoodAnalysis: Principles and Techniques*. Vols. I-VIII. Marcel Dekker.
- AOAC International. 2016. *AOAC Official Methods of Analysis*. 20th Edition, Association of Official Analytical Chemists. Washington DC.

- Dennis D Miller. 1998. *Food Chemistry: A Laboratory Manual*. John Wiley and Sons Indianapolis.
- Joslyn MA. 1970. *Methods in Food Analysis: Physical, Chemical and Instrumental Methods of Analysis*. Academic Press.
- Kalia M. 2002. *Food Analysis and Quality Control*. Kalyani Publishers, New Delhi.
- Neilsen SS. 2010. *Food Analysis*. 4th Ed., ISBN 978-1-4419-1478-1 Springer Science+ Business Media, LLC, USA.
- Neilsen SS. 2002. *Introduction to Chemical Analysis of Foods*. 1st Ed., J S Offset Printers, Delhi.
- Raghuramulu N, Mahavan and Kalyanasundaram SK. 2003. *A Manual of Laboratory Techniques*. 2nd Edition, NIN Press, Hyderabad.
- Sadasivam A and Manickam A. 2004. *Biochemical Methods*. 2nd Edition, New Age International Publishers, New Delhi.
- Sawhney SK and Singh R. 2000. *Introductory Practical Biochemistry*. Narosa Publishing House, New Delhi.
- Veerakumar L. 2006. *Bio-instrumentation*. MIP Publishers. Chennai.
- Pomeranz Y and Molean CE. 1977. *Food Analysis Theory and Practice*. AVI Publ.
- Wood R, Foster L, Damand A and Key P. 2004. *Analytical Methods for Food Additives*. CRC Press, London.
- <https://www.fssai.gov.in>
- <http://www.fda.gov/food/default.htm>

Weekly Lecture Schedule

Duration (week)	Topic
1	Preparation of various standard solutions.
2	Sample and sampling techniques.
3	Sample and sampling techniques.
4	Introduction to standard analytical methods of FSSAI.
5	Principle, techniques and applications of colorimeter.
6	Principle, techniques and applications of spectrophotometer.
7	Principle, techniques and applications of atomic absorption spectrophotometer.
8	Principle, techniques and applications of gel filtration.
9	Principle, techniques and applications of ultra-centrifugation.
10	Principle, techniques and applications of fluorimetry.
11	Principle, techniques and applications of flame photometry.
12	Principle, techniques and applications of electrophoresis.
13	Principle, techniques and applications of paper and thin layer chromatography.
14	Principle, techniques and applications of gas liquid chromatography.
15	Principle, techniques and applications of high-pressure liquid chromatography.
16	Introduction to animal assay.

I. Course Title : Diet Therapy

II. Course Code : FN 504

III. Credit Hours : 3 (2+1)

IV. Rationale

Dietetics is a science and art that deals with the optimum nutrition during normal life cycles and its adaptations during ailments. In any situation of life, optimum nutrition can ensure health, endurance, cognition and productivity. As educators/advisors, the professionals need to equip themselves with the knowledge and skills of managing foods particularly during illness as people's mental condition remains at low ebb in ailment.

V. Aim of the course

- To provide both theory and practical knowledge on disease management through appropriate approaches with the most recent scientific input from researchers
- To approach the subject from a multidisciplinary perspective - technical, psycho-social-economic of client, drug diet interaction, etc, enabling the students to become effective member Health Care Team (HCT) in Medical Nutrition Therapy (MNT).

VI. Theory

Unit I: Significance of diet therapy

Importance and scope of diet therapy; Role of dietician in a health care team in hospital and community.

Unit II: Dietary management of nutritional disorders

Newer concepts in dietary management of various nutritional disorders and disease conditions; fevers and infections.

Unit III: Dietary management of diseases

Dietary management during burns, allergy, gastrointestinal disorders, liver diseases, cardiovascular diseases, hypertension, renal disorders, obesity, diabetes, cancer and HIV; Nutrition in critical care.

Unit IV: Nutrigenomics and nutraceuticals

Nutrigenomics. Nutraceuticals. Health foods and supplements; Health foods and supplements; Dietary recommendations for blood donors; Nutrients and drug interaction.

VII. Practicals

1. Formulation of food exchanges
2. Therapeutic modifications of diet in terms of nutrients, consistency and composition
3. Planning and preparation of diet for diabetes
- 4-5. Planning and preparation of diet for cardiovascular diseases
- 6-7. Planning and preparation of diet for kidney disorders
8. Planning and preparation of diet for obesity
9. Planning and preparation of diet for cancer patients
10. Planning and preparation of diet for burns patients -first, second and third-degree burns
- 11-12. Planning and preparation of diet for gastrointestinal disorders
13. Planning of diet for critical care patients
14. Visits to hospital to see preparation of tube feeding diets
- 15-16. Presentation of case studies

VIII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Group activities
- Case studies
- Hands on training

IX. Learning Outcome

After completion of this course, the students are expected to:

- Appreciate the scientific foundation of disease management through diet
- Utilize the techniques and tools for assessing the vulnerability of a disease situation towards rejection/ acceptance of the diet suggestion
- Confident responsible member of Healthcare team (HCT) as decision maker

X. Suggested Reading

- Cataldo CB, De Braya LK and Whitney EN. 2012. *Nutrition and Diet Therapy*. 6th Edn., Wadsworth/Thomson Learning Inc.
- Kathleen ML and JL Raymond. 2016. *Krause's Food and the Nutrition Care Process*. 14th Edition, Saunders, Philadelphia.
- Mazur EE and Litch NA. 2018. *Lutz's Nutrition and Diet Therapy*. 7th Edition, F.A. Davis Company, Philadelphia.
- McIntosh SN. 2016. *Williams' Basic Nutrition and Diet Therapy*. 15th Edition, Mosby, Maryland.
- Schlenker E and Gilbert JA. 2014. *Williams' Essentials of Nutrition and Diet Therapy*. 11th edition, e-book.
- Srilakshmi B. 2019. *Dietetics*. 8th Edition, New Age Internatioanal Publisher.
- Skipper A. 2008. *Advanced Medical Nutrition Therapy Practice*. 1st Edition, Jones & Bartlett Learning, Burlington, Massachusetts.
- Ross AC, Caballero B, Cousins RJ, Tucker KL and Ziegler TR. 2012. *Modern Nutrition in Health and Disease*. 11th Edition, LWW, Philadelphia.
- Whitney E, DeBruyne LK, Pinna K and Rolfe SR. 2011. *Nutrition for Health and Health Care*. 4th Edition.
- <https://www.nutritionintl.org>
- <https://www.hsppharvard.edu/nutritionsource>
- <https://www.nutrition.org.uk>
- <http://www.nutritioncare.org>

Weekly Lecture Schedule

Duration (week)	Topic
1. New concepts in dietary management of various disorders and diseases, protocols for dietary management. 2. Importance and scope of diet therapy. Role of dietitian in a health care team in hospital and community. 3. Newer concepts in dietary management of fevers and infections. 4. Dietary management during burns and allergies. 5. Dietary management during gastrointestinal disorders. 6. Dietary management during liver diseases. 7. Dietary management during obesity. 8. Dietary management during hypertension and cardiovascular diseases. 9. Dietary management during diabetes. 10. Dietary management during renal disorders. 11. Dietary management cancer and HIV. 12. Nutrition in critical care. 13. Nutrigenomics and nutraceuticals. 14. Health foods and supplements. 15. Dietary recommendations for blood donors. 16. Nutrients and drug interaction.	

-
- I. Course Title** : Nutrition and Physical Fitness
II. Course Code : FN 505
III. Credit Hours : 3 (2+1)

IV. Rationale

Physical fitness is a state of health and well-being and more particularly, the capacity to perform satisfactorily in occupations, daily chores and sports. It is generally achieved through proper nutrition, physical exercise and rest. Physical fitness is considered as a measure of body's ability to function efficiently and effectively in work and leisure activities, to be healthy and to resist diseases and to meet emergency situations.

V. Aim of the course

- To provide both theory and practical exposure to understand the concept of physical fitness
- To incorporate recent techniques of body composition and energy metabolism to ascertain the nutritional stature
- To equip the students with the knowledge and capacity to identify, evaluate and evolve ways in addressing various aspects of physical fitness.

VI. Theory

Unit I: Physical fitness and body composition

Overview of nutritional management vis-à-vis body composition and physical fitness; Techniques to assess physical fitness; Body composition in different physiological conditions and factors affecting it; Methods of measuring body composition.

Unit II: Energy balance

Energy metabolism; Factors influencing energy metabolism and physical fitness; Techniques to measure energy expenditure and energy intake.

Unit III: Sports nutrition

Requirement of nutrients for specific sports events; Exercise physiology and biochemistry; Nutrition support before, during and after sports event; Water and electrolyte requirement during exercise and their role in performance; Ergogenic aids; Definition, types and dosage; Doping: Definition, types and consequences; Muscle physiology for performance and fitness; Biomechanics; Physiological testing for fitness and performance; Strength, flexibility, anaerobic power and cardio respiratory fitness.

Unit IV: Nutrition and ageing

Role of nutraceuticals in fitness; Ageing theories; Physiology, mechanism and role of nutrients in arresting ageing process.

VII. Practicals

- 1-4. Planning diets for general fitness
- 5-12. Planning and preparation of diets for different sports categories
- 13-14. Planning nutritional requirements for sports injuries
15. Visit to a sports academy
16. Visit to established fitness centres

VIII. Teaching Methods/ Activities

- Lectures

- Assignment (Writing/Reading)
- Student presentation
- Group activities
- Case studies
- Hands on training

IX. Learning Outcome

On completion of this course, the students will be able to handle responsibilities as:

- Physical fitness educator/ Adviser
- Utilize methods and techniques for vulnerability assessment as per need of the situation
- Experts in Healthcare Team and fitness centres

X. Suggested Reading

- Benardot D. 2005. *Advanced Sports Nutrition*. 2nd Edition, Human Kinetics Publishers, Champaign, IL.
- Baumgartner R. 2006. *Body Composition in Healthy Aging*. Annals of the New York Academy of Sciences.
- FAO. 2004. *Human Energy Requirements. -Report of a Joint FAO/WHO/UNU Expert Consultation*. Technical Report Series 1. Food and Agriculture Organization, Geneva.
- Geetanjali B and Subhadra M. 2018. *Nutritional Guidelines for Sportspersons*. Jaypee Health Books Publishers.
- Geissler C and Powers H. 2009. *Fundamentals of Human Nutrition*. Churchill Livingstone, London.
- Ross AC, Caballero B, Cousins RJ, Tucker KL and Ziegler TR. 2012. *Modern Nutrition in Health and Disease*. Eleventh Edition, LWW, Philadelphia.
- Srilakshmi B, Suganthi V and Kalaivani C Ashok. 2017. *Exercise Physiology Fitness and Sports Nutrition*. New Age International Publishers.
- <https://www.who.int>
- <https://www.hsph.harvard.edu/nutritionsource>
- <http://www.nutritioncare.org>

Weekly Lecture Schedule

Duration (week)	Topic
1	Concept of physical fitness, recent techniques of body composition and energy metabolism.
2	Overview of nutritional management vis-à-vis body composition and physical fitness.
3	Methods of measuring body composition.
4	Body composition in different physiological conditions and factors affecting it.
5	Techniques to assess physical fitness.
6	Energy metabolism. Factors influencing energy metabolism and physical fitness.
7	Techniques to measure energy expenditure and energy intake.
8	Requirement of nutrients for specific sports events.
9	Exercise physiology and biochemistry.
10	Nutrition support before, during and after sports event.
11	Water and electrolyte requirement during exercise and their role in performance.
12	Ergogenic aids: Definition, types and dosage.
13	Doping: Definition, types and consequences. Muscle physiology for performance and fitness.
14	Biomechanics. Physiologic testing for fitness and performance.

Duration (week)	Topic
15	Strength, flexibility, anaerobic power and cardio respiratory fitness Role of nutraceuticals in fitness.
16	Ageing theories Physiology, mechanism and role of nutrients in arresting ageing process.

I. Course Title : Developments in Nutrition and Immunity

II. Course Code : FN 506

III. Credit Hours : 2 (2+0)

IV. Rationale

Immunity is the capability of multi-cellular organism to resist harmful microorganisms from entering it. Good nutrition is essential to build a strong immune system which offers protection from seasonal illness (flu, cold) and other health problems (arthritis, allergies, abnormal cell development, etc.) Students with a good knowledge about role of nutrition in boosting a strong immune system in population will be able to reduce risk factors arising of malnutrition and infection.

V. Aim of the course

- To impart knowledge about role of various macro and micronutrients along with prebiotics, probiotics and phytochemicals in improving immune systems in the population
- To induce understanding about nutrition and immunity in disease management in age- sex groups across all physiological stages.

VI. Theory

Unit I: Immunity and macronutrients

Immunity: definition and history; Classification of immunity and immunological responses; Role of nutrients in immune functions- Carbohydrates, fat and protein; Effect of arginine, glutamine, sulphur amino acids and omega-3 fatty acids on immune system.

Unit II: Immunity and micronutrients

Effect of deficiency and excess of vitamins and minerals on immune cell functions; Effect of malnutrition on immunity; Infections and undernutrition – causes and consequences and role of immunization.

Unit III: Nutrition during infections

Age related immune depression; Role of nutraceuticals and functional foods in immune system; Nutrition, HIV/AIDS and Tuberculosis.

Unit IV: Immunity and chronic diseases

Nutritional immunity and chronic diseases; Probiotics, prebiotics, phytochemicals and immunity; Food allergy.

VII. Teaching Methods/ Activities

- Lectures
- Assignment (Written/Reading)
- Students' presentations
- Group discussion

VIII. Learning Outcome

Completion of the course will enable the students to:

- Understand underlying causes of poor immune system
- Appreciate the scientific foundation for better management of risks associated with poor nutrition and immunity
- Act as confident members in healthcare teams
- Utilize information for publication/ education

IX. Suggested Reading

- Calder P and Yaqoob P. 2013. *Diet, Immunity and Inflammation*. Woodhead Publishing Ltd. Cambridge.
- Gershwin ME, German JB and Keen CL. 2000. *Nutrition and Immunology – Principles and Practice*. Humana Press Inc. New York.
- Gershwin ME, Nestel P and Keen CL. 2004. *Handbook of Nutrition and Immunity*. Humana Press Inc. New York.
- Ivan M Roitt and Peter J Deves. 2004. *Essential Immunology*. Blackwell Science Ltd
- Pammi M, Vallejo JG and Abrams SA. 2016. *Nutrition-Infection Interactions and Impacts on Human Health*. CRC Press, Boca Raton, Florida.
- Philip C Calder and Anil D Kulkarni. 2017. *Nutrition, Immunity, and Infection*. CRC press, London
- Shetty PS. 2010. *Nutrition, Immunity and Infection*. CABI Publishers, Oxfordshire, UK.
- <https://www.nutritionintl.org>
- <https://nutrition.org>
- <https://www.icmr.nic.in>

Weekly Lecture Schedule

Duration (week)	Topic
1	Role of nutrients in maintaining and improving the immunity of individuals.
2	Immunity: definition, history and classification of immunity and immunological responses.
3	Role of nutrients in immune functions- Carbohydrates, fats and proteins.
4	Effect of arginine, glutamine, sulphur amino acids and omega-3 fatty acids on immune system.
5	Effect of deficiency and excess of vitamins and minerals on immune cell functions.
6	Effect of malnutrition on immunity.
7	Infections and undernutrition.
8	Causes and consequences and role of immunization.
9	Age related immune depression.
10	Role of nutraceuticals and functional foods in immune system.
11	Nutrition in HIV/AIDS.
12	Nutrition in Tuberculosis.
13	Nutrition, immunity and chronic diseases.
14	Probiotics, prebiotics and immunity.
15	Phytochemicals and immunity.
16	Food allergy.

I. Course Title : Clinical Nutrition

II. Course Code : FN 507

III. Credit Hours : 3 (2+1)

IV. Rationale

Clinical nutrition is nutrition of patients in Health care and refers to the

management of patients. It incorporates primarily the scientific fields of nutrition and dietetics. Knowledge of striking a positive energy balance in patients along with providing sufficient amount of other nutrients such as proteins, vitamins, minerals is the basis of patient's Health Care Management.

V. Aim of the course

- To provide both theoretical and applied knowledge on the subject of clinical nutrition for better management of diseases
- To approach various areas of nutrition from a multidisciplinary perspective - biochemical, physiological, pathological and regulatory
- To equip the students to identify the inter-relationship, etiology and management techniques to a specific disease situation including in patients "medical nutrition therapy" understanding to induce situational improvement of health.

VI. Theory

Unit I: Macronutrients

Methods for estimating requirements and recommended allowances of energy, protein, minerals and vitamins for different age groups and physiological state; Growth studies; Depletion and repletion studies; Nutrient balance studies; Use of isotopically labelled nutrients; Nutrient turnover; Obligatory losses of nutrients; National and international recommendations on Nutrient Requirements; Recommendations for Indian by the Indian Council of Medical Research; FAO/WHO expert committee recommendations; Nutrient interrelationship; therapeutic measures of protein energy malnutrition; Adaptation and chronic energy deficiency; Regulatory processes in chronic energy deficiency; Protein and amino acid turnover; Regulation of amino acid metabolism; Disposal of dietary amino acids and roles of specific organs.

Unit II: Micronutrients

Interrelationship, etiology and preventive measures of vitamin and mineral deficiencies toxicities; Adverse effects of Vitamins and minerals; Upper tolerable levels; Principles and interpretation of clinical laboratory methods with particular emphasis on their interpretation relative to nutritional status and disease; interaction between nutrients, infections and drugs; Functional tests of malnutrition; Nutritional assessment tools in clinical decision making.

Unit III: Nutritional support during disease

Nutritional support, enteral tube feeding, parenteral nutrition, drugs and enteral feeding; Special considerations with nutritional support; Nutrition in surgery and trauma; The stress response to trauma on metabolism; Nutrition support in critically ill patient; Guidelines for use of formula feeds and calculation.

Unit IV: Therapeutic nutrition

Nutrition in GI Diseases; Celiac disease, inflammatory bowel disease, Assessment of liver function - nutritional management in liver disease, acute and chronic pancreatitis, severity scores, nutritional aspects of disease affecting the skeleton, diagnostic imaging, biochemical assessment; Acute and chronic renal failure, nephrotic syndrome, transplantation; Diet and hypertension, stroke, peripheral vascular disease, and chronic heart failure; Wasting syndrome in cancer; Impact of radiation and chemotherapies; Nutritional support on clinical outcomes.

VII. Practicals

- 1-4. Visit to critical care wards in hospitals for familiarizing with enteral and parenteral feeding methods.
5. Handling and deciphering the medical case sheets.
- 6-9. Planning enteral feeding, critical care nutritional requirements for different clinical conditions
- 10-11. Calculating energy, protein, fat and micronutrients after nutritional assessment.
- 12-13. Presenting case studies of medical cases
- 14-15. Survey of various enteral feed formulations for different clinical conditions
16. Report writing

VIII. Teaching Methods/Activities

- Lectures
- Assignment (writing/reading)
- Students' presentation
- Group activities
- Case studies in medical setup.
- Hands on training

IX. Learning Outcome

After successful completion of this course, the students will be able to

- Appreciate scientific understanding of the clinical situation of a patient and suggesting complementary nutrition therapy for its management
- Utilize methods and tools related to nutrition assessment and advocacy strategies along with Health Care Team
- Utilize knowledge for scientific Publication
- “Care Education” for target groups
- Utilize the knowledge to act as technical expert in R&D projects

X. Suggested Reading

- Connie WB and Christine SR. 2016. *Handbook of Clinical Nutrition and Ageing*. Humana Press.
- FAO. 2004. *Human Energy Requirements - Report of a Joint FAO/WHO/UNU Expert Consultation*. Technical Report Series 1. Food and Agriculture Organization, Geneva.
- Gibney MJ, Macdonald IA and Roche HM. 2011. *Nutrition and Metabolism*. Wiley-Blackwell Publishing Company, Boston.
- Gibney MJ, Elia M, Ljungqvist O and Dowsett J. 2013. *Clinical Nutrition*. Wiley-Blackwell Publishing Company, Boston.
- Heimburger DC and Ard JD (2006) *Hand Book of Clinical Nutrition*. Mosby Pub.
- Joshi YK. 2009. *Basics of Clinical Nutrition*. 2nd Edition, Jaypee Brothers Medical Publishers Private Limited, New Delhi.
- Macdonald IA and Michael J Gibney MJ. 2011. *Nutrition and Metabolism*. Wiley-Blackwell Publishing Company, Boston.
- Narasinga Rao BS and Sivakumar B. 2010. *Nutrient Requirements and Recommended Dietary Allowances*. 2nd Edition, National Institute of Nutrition, Hyderabad.
- Marian M and Susan R. 2009. *Clinical/Nutrition for Oncology Patients*. Jones and Bartlett Pub.
- Scott AS and George LB. 1997. *Nutrition Support-Theory and Therapeutics*. Chapman and Hall Series, International Thomson Publications.
- Sharon RR , Kathryn P and Whitney E. 2017. *Understanding Normal and Clinical Nutrition*. Cengage Learning.
- Width M and Reinhard T. 2017. *The Essential Pocket Guide for Clinical Nutrition*. LWW Pub.

- Wayne EB. 2005. *Clinical Nutrition Case Studies*. Cengage Learning.
- Vishwanath S. 2017. *Introduction to Clinical Nutrition*. CRC Press.
- <http://www.nutritioncare.org>
- <https://nutrition.org>
- <http://www.nutritionlink.org/>

Weekly Lecture Schedule

Duration (weeks)	Topic
16	<ol style="list-style-type: none">1. Methods for estimating requirements and recommended allowances of energy, protein, minerals and vitamins for different age groups and physiological state.2. Growth studies. Depletion and repletion studies. Nutrient balance studies.3. Use of isotopically labelled nutrients: Nutrient turnover. Obligatory losses of nutrients.4. National and international recommendations on nutrient requirements. Recommendations for Indian by the Indian Council of Medical Research. FAO/WHO expert committee recommendations.5. Nutrient interrelationship; therapeutic measures of protein energy malnutrition. Adaptation and chronic energy deficiency. Regulatory processes in chronic energy deficiency.6. Protein and amino acid turnover. Regulation of amino acid metabolism. Disposal of dietary amino acids and roles of specific organs.7. Interrelationship, etiology and preventive measures of vitamin and mineral deficiencies toxicities. Adverse effects of vitamins and minerals. Upper tolerable levels.8. Principles and interpretation of clinical laboratory methods with particular emphasis on their interpretation relative to nutritional status and disease; interaction between nutrients, infections and drugs.9. Functional tests of malnutrition. Nutritional assessment tools in clinical decision making.10. Nutritional Support, Enteral tube feeding, Parenteral nutrition, drugs and enteral feeding.11. Special considerations with nutritional support, Nutrition in surgery and trauma. The stress response to trauma on metabolism.12. Nutrition support in critically ill patient. Guidelines for use of Formula feeds and calculation.13. Nutrition in GI Diseases, celiac disease and inflammatory bowel disease. Assessment of liver function-nutritional management in liver disease, acute and chronic pancreatitis, Severity scores.14. Nutritional aspects of disease affecting the skeleton. Diagnostic imaging, biochemical assessment. The Kidney- Acute, chronic renal failure, Nephrotic syndrome, transplantation.15. Diet and hypertension, stroke, peripheral vascular disease and chronic heart failure.16. Wasting syndrome in cancer. Impact of radiation and chemotherapies. Nutritional support on clinical outcomes.

I. Course Title	: Nutrition Counselling
II. Course Code	: FN 508
III. Credit Hours	: 2 (0+2)

IV. Rationale

Nutrition counselling is an ongoing process in which nutrition professional works with an individual to assess his/her usual dietary intake to support growth, development and maintenance conducive to good health in normal and ailing conditions. As counsellor, it requires high skill in communication, subject knowledge and understanding the client's socio-eco-cultural background to offer curative/preventive nutritional advice.

V. Aim of the course

- To provide ample hands on training to develop skills in communication, application of subject knowledge and understanding client's need and offer curative/preventing dietary plan in medical or non-medical set-ups
- To approach the counselling techniques from a multidimensional perspective i.e. personal, medical, socio-eco cultural good habits and causative factors that contribute to the development of situations affecting normal health of population
- To create effective nutrition counsellors for addressing health and nutritional challenges of population.

VI. Practicals

- 1-2. Development of resources and dietary guidelines for counselling
- 3-4. Procedures of nutritional counselling in clinical practice
- 5-12. Preparing nutritional and dietary care plans for individuals and groups
- 13-16. Records required for follow up study, group discussion and motivation as tools to bring attitudinal changes in food selection and preparation
- 17-18. Exercises on writing scientific facts in simple manner for the people
- 19-22. Diet campaigns, exhibitions, demonstrations and workshops
- 23-28. Setting up counselling unit. Counselling in outpatient wards in local hospitals
- 29-30. Simulation techniques for counselling in selected settings
- 31-32. Use of dietary apps for counselling and assessing food intake

VII. Teaching Methods/ Assignments

- Hands on training
- Group activities
- Project planning and report writing
- Case studies

VIII. Learning Outcome

After successful completion of this practical course, students will be able to:

- Act as confident nutrition counsellor in given setup
- Utilize methods and techniques to correct nutrition related health problems and suggest adaptive strategies in the context of social milieu
- Utilize the scientific knowledge for benefit of the community through population education/publication
- Act as resource person in handling R&D projects

IX. Suggested Reading

- Aronson V. 1989. *The Dietetic Technician-Effective Nutrition Counselling*. John Wiley and Sons Florida.

- Betsy H and Judith BA. 2014. *Nutrition Counselling and Education Skills for Dietetics Professional*. 6th Edition, LWW, Philadelphia.
- Devito JA. 2015. *Human Communication: The Basic Course*. Pearson, New York.
- Gable J. 2016. *Counselling Skills for Dietitians*. John Wiley and Sons Florida.
- Kathleen DB, Doreen Land Carol AS. 2001. *Basic Nutrition Counselling Skill Development*. Brooks Cole Pub.
- Kathleen DB, Doreen L and Carol AS. 2014. *Nutrition Counselling and Education Skill Development*. CENGAGE Learning Custom Pub, USA.
- King K and Klawitter B. 2007. *Nutrition Therapy. Advanced Counselling Skills*. 3rd Edition, LWW, Philadelphia.
- Mahan LK and Escott S. 2016. *Krause's Food & Nutrition Therapy*. 14th Edition, Saunders, Philadelphia.
- Midwinter R and Dickson J. 2015. *Embedding Counselling and Communication Skills - A Relational Skills Model*. Routledge.
- Snetselaar L. 2009. *Nutrition Counselling Skills for the Nutrition Care Process*. 4th Edition Jones Bartlett Publishers, Sudbury, Massachusetts.
- <https://nutrition.org>
- <http://www.nutritionlink.org>
- <http://www.fao.org/docrep/X2550E/X2550e04.htm>

I. Course Title : Food Safety And Standards

II. Course Code : FN 509

III. Credit Hours : 3 (2+1)

IV. Rationale

Food safety involves the prevention of the adverse effects of chemical substances of food on human beings and means to overcome toxic effect through appropriate processing techniques. It is important to derive maximum benefits of consumed food as far as practicable toxin free.

V. Aim of the course

- To provide both theoretical and practical exposure to the students on the subject of food safety including types of toxin and methods of removal of these in terms of human health
- To approach the related topics ranging from types, causative factors, signs and symptoms of food toxicity, removal and potential containments
- To induce sufficient knowledge regarding national and international food safety standards.

VI. Theory

Unit I: Xenobiotics

Toxicologically relevant principles of the cell and molecular biology; Dynamics and kinetics of xenobiotics; Environmental pollutants entering the food chain.

Unit II: Food poisoning

Introduction and significance of food toxicology; Food poisoning – types, causative factors, signs and symptoms and preventive measures; Naturally occurring food toxins, their harmful effects and methods of removal.

Unit III: Microbial and chemical toxins

Microbial toxins and food intoxication – source of contamination, effects on health, preventive measures and methods of inactivation and destruction; Chemical toxins –

pesticides, insecticides, metallic and others and their residual effects, preventive measures and methods of removal.

Unit IV: Food safety laws and standards

Food packaging material – Potential contaminants from food packaging material; Food safety laws and standards: FSSAI, FPO, ISI, Agmark, Codex Alimentarius, ISO mark for vegetarian and non-vegetarian foods, eco-friendly products and others in operation.

VII. Practicals

- 1-2. Basic chemical diagnostics of poisonings based on the samples from dead animal's organs and feed
- 3-7. Methods of identification and quantification of poisons isolation from biological materials
- 8-9. Principles of sampling and sending biological materials for toxicological analysis
10. Basis of intravital laboratory diagnostics of acute and chronic poisonings
11. Evaluation of toxic effects concerning the degree and the time of exposure to a xenobiotic
- 12-13. The determination of cholinesterase activity in the whole blood, in blood plasma and in red blood cells after the exposure to organophosphate and carbamate insecticides
14. Evaluation of the effect of an antidote
15. Identification of nitrite and nitrate in water and in vegetables
16. Evaluation of nitrite and nitrate effect on haemoglobin.

VIII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Group activities
- On field case identification and analysis
- Hands on training

IX. Learning Outcome

Successful completion of this course will enable the students to:

- Be an expert on the subject relating key learnings as food safety officer/ extension worker/ food inspector
- Utilize learning in scientific Publications/ population education

X. Suggested Reading

- Concon JM. 2000. *Food Toxicology- Principles and Concepts - Part A and B*. Marcel-Dekker Inc. New York.
- Helferich W and Winter CK. 2001. *Food Toxicology*. CRC Press, Boca Raton, Florida.
- Pussa T. 2013. *Principles of Food Toxicology*. CRC Press, Boca Raton, Florida.
- Timbrell J. 2001. *Introduction to Toxicology*. 3rd Edition, Informa, London.
- Vought JB and Henderson MK. 2000. *Principles of Sampling and Sending Biological Materials for Toxicological Analysis - Unit II Biomarkers Practical Aspects*. IARC publication, WHO, Geneva.
- <https://www.fssai.gov.in>
- <http://www.fda.gov/food/default.htm>

Weekly Lecture Schedule

Duration (weeks)	Topic
1	Toxicologically relevant principles of the cell and molecular biology.
2	Dynamics and kinetics of xenobiotics.
3	Environmental pollutants entering the food chain.
4	Introduction and significance of food toxicology.
5	Food poisoning – types and causative factors.
6	Food poisoning- signs and symptoms and preventive measures.
7	Naturally occurring food toxins, their harmful effects.
8	Naturally occurring food toxins- methods of removal.
9	Microbial toxins and food intoxication – source of contamination and effects on health.
10	Microbial toxins and food intoxication- preventive measures and methods of inactivation and destruction.
11	Chemical toxins – pesticides, insecticides, metallic and others and their residual effects.
12	Chemical toxins – Preventive measures and methods of removal.
13	Food packaging material- Potential contaminants from food packaging material.
14	Food laws and standards: FPO and ISI.
15	Agmark, Codex Alimentarius and ISO.
16	Mark for vegetarian and non-vegetarian foods, eco-friendly products and others in operation.

I. Course Title : Nutritional Challenges in Life Cycle

II. Course Code : FN 510

III. Credit Hours : 3 (3+0)

IV. Rationale

Nutrition is crucial for the fulfilment of human rights especially those of the most vulnerable groups i.e. infants, children less than 5 years of age, girls and women who constitute the foundation of human development and national prosperity. Knowing the nutritional challenges during various stages of life cycle can reduce susceptibility to infection, morbidity, disability and mortality, thereby, enhancing cumulative lifelong learning capacities and adult productivity.

V. Aim of the course

- To give an exposure to the students with an in-depth basic knowledge regarding nutritional challenges of vulnerable groups during various stages of life cycle
- To approach the areas from various angles like nutritional needs of fetus, mothers (expectant and lactating), adolescents, adults and geriatrics in terms of cognitive learning abilities and to remain healthy and productive
- To equip students to identify, evaluate and evolve management techniques to address nutritional challenge.

VI. Theory

Unit I: Importance of maternal nutrition

Nutritional needs during first 1000 days; Influence of maternal nutritional status on outcome of pregnancy: birth weight of infant and lactation performance.

Unit II: Human milk

Psycho-physiology of lactation; Milk synthesis and secretion; Maternal needs during lactation; Composition of colostrum and mature human milk; Milk of mothers of preterm babies; Milk of animal and formula feeds; Non-nutritional factors of human milk - immunological factors, enzymes and hormones; Human milk banking.

Unit III: Nutrition during childhood, adolescence and adulthood

Nutritional needs of the children and adolescents; Common childhood ailments and dietary considerations; Growth spurt and nutrition; Adolescent fads influencing nutrition, food preferences and nutritional problems; Nutritional requirements in adulthood; Malnutrition, mental development, learning abilities and behavior.

Unit IV: Geriatric nutrition

Overview of ageing process; Nutritional variables related to the ageing process; Physiology of aging; Biological markers of aging; Sociology of aging; Nutritional requirements and deficiencies in elderly; Medications and psychiatric problems in elderly; Immunopathological diseases and aging; Parkinson and Alzheimer syndrome; Care of the elderly; Care-givers and community services.

VII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Student presentation
- Group activities

VIII. Learning Outcome

Successful completion of this course will enable the students to

- Appreciate the scientific understanding of mitigating nutritional challenges and relating key learning as professional expert in the area
- Utilize methods and hand tools for vulnerability assessment and designing adaptation strategies
- Utilize knowledge in scientific publication/ population education
- Be an expert in community health and R&D projects

IX. Suggested Reading

- Bales CW, Ritchie CS. 2013. *Handbook of Clinical Nutrition and Aging*. 2nd Edition, Springer Science & Business Media, Humana Press Inc. New York.
- Cataldo CB, De Braya LK and Whitney EN. 2012. *Nutrition and Diet Therapy*. 6th Edn., Wadsworth/Thomson Learning Inc.
- Chernoff R. 2003. *Geriatric Nutrition: The Health Professional's Handbook*. 2nd Edition, Jones & Bartlett Learning, Burlington, Massachusetts.
- Kleinman RE. 2008. *Paediatric Nutrition Handbook*. 6th Edition, American Academy of Paediatrics Committee on Nutrition.
- Sachdev HPS and Choudhury P. 2004. *Nutrition in Children - Developing Country Concerns*. B I Publications.
- Schlenker E and Gilbert JA. 2014. Williams' *Essentials of Nutrition and Diet Therapy*. 11th Edition, e-book.
- Sharbaugh C and Brown JE. 2013. *Nutrition Through the Life Cycle*. 5th Edition, Wadsworth Co Inc. Belmont, CA.
- Srilakshmi B. 2019. *Dietetics*. 8th Edition, New Age Internatioanal Publisher.
- Whitney E, DeBruyne LK, Pinna K and Rolfe SR. 2011. *Nutrition for Health and Health Care*. 4th Edition.

- World Health Organization. 2005. *WHO Library Cataloguing-in-Publication Data. Nutrition in Adolescence –Issues and Challenges for the Health Sector.* WHO, Geneva.
- <https://www.who.int>
- <http://www.nutritionlink.org>
- <https://www.icmr.nic.in>

Weekly Schedule

Duration (week)	Topic
1	Nutritional needs of the foetus during different stages of fetal cell growth
2	Maternal nutritional needs
3	Influence of maternal nutritional status on outcome of pregnancy: birth weight of infant and lactation performance.
4	Psycho-physiology of lactation. Milk synthesis and secretion.
5	Maternal needs during lactation.
6	Composition of colostrum and mature human milk. Milk of mothers of preterm babies. Milk of animal and formula feeds.
7	Non-nutritional factors of human milk -immunological factors, enzymes and hormones.
8	Human milk banking.
9	Nutritional needs of the children and adolescents.
10	Common childhood ailments and dietary considerations.
11	Growth spurt and nutrition. Adolescent fads influencing nutrition, food preferences and nutritional problems.
12	Nutritional requirements in adulthood. Malnutrition, mental development, learning abilities and behaviour.
13	Overview of ageing process. Nutritional variables related to the ageing process. Physiology of aging. Biological markers of aging. Sociology of aging.
14	Nutritional requirements and deficiencies in elderly. Medications and psychiatric problems in elderly.
15	Immuno-pathological diseases and aging. Parkinson and Alzheimer syndrome.
16	Care of the elderly. Care-givers and community services.

I. Course Title : Food Science

II. Course Code : FN 511

III. Credit Hours : 3 (2+1)

IV. Rationale

Food is an integral part of everyone's life. This course will empower the students to understand the science factors of food, effects of different processing methods on its nutritional qualities and how to conserve nutrients to the best benefits of the consumers.

V. Aim of the course

- To expose the students in understanding the changes in foods during various processing methods in laboratory setups
- To equip the students in understanding the desirable and undesirable effects of food treatments and identify the best ones for the benefit of consumers as food or trade.

VI. Theory

Unit I: Evaluation of food

Colloidal chemistry as related to foods; Evaluation of food by subjective and objective methods.

Unit II: Characteristics of sugars and starches

Carbohydrates in foods sources; Characteristics of sugar; Starches - types, sources, uses and chemical characteristics; Factors effecting viscosity of starch paste; Characteristics of cellulose and pectin; Gums in foods; Effect of cooking and processing techniques on carbohydrates; Batters and dough- types, properties.

Unit III: Processing of cereals, legumes and animal foods

Preparation of gluten structure; Dough changes in baking; Protein in foods: Plant and animal protein; Chemical and physical properties related to protein foods; Effect of cooking and processing techniques on animal foods – meat, fish, poultry, eggs, milk and milk products; Effect of cooking and processing of plant foods – cereals, millets, legumes, nuts and oilseeds;

Unit IV: Processing of fruits and vegetables

Classification and importance of fruits and vegetables; Composition of fruits and vegetables. Effect of cooking and other processing methods on the nutritive value of fruits and vegetables; Food pigments; Browning reactions in fruits and vegetables; Classification and importance of beverages; Definition, classification, uses and legal aspects of food additives; Classification, nature and uses of leavening agents.

VII. Practicals

1. Microscopic structure of different starch granules
2. Evaluation of food by subjective and objective methods
- 3-4. Changes in colour, texture and flavour of foods due to processing
5. Product preparation using leavening agents
6. Physicochemical evaluation of grains like length, breadth, L/B ratio, bulk density, cooking properties, 1000 grains weight
7. functional properties of grains - gelatinization, water absorption capacity, oil retention capacity and water retention capacity
- 8-9. Sugar cookery
10. Smoking temperature of fats and oils
11. Factors effecting absorption of fats
12. Deep fat fried food preparation
13. Changes in cookery- meat, fish, poultry
14. Coagulation of egg, poached egg, omelette, custard, cake
15. Emulsion - mayonnaise preparation
16. Soaking, germination and fermentation of pulses

VIII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Group activities
- Hand on experience

IX. Learning Outcome

After completion of this course, the students are expected to:

- Appreciate the scientific foundation of food and its application to the benefits of human health
- Perform as Food Analyst
- Become Food Entrepreneurs
- Act as Health/ Nutrition advisor

X. Suggested Reading

- Belle Lowe. 2019. *Experimental Cookery from the Chemical and Physical Standpoint*. Facsimile Pub.
- Potter NN and Hotchkiss JH. 2007. *Food Science*. 5th Edition, CBS, New Delhi.
- Roday S. 2018. *Food Science and Nutrition*. 3rd Edition, Oxford University Press, UK.
- Sharma A. 2005. *Textbook of Food Science and Technology*. 3rd Edition, CBS, New Delhi.
- Stone H. 2004. *Sensory Evaluation Practices (Food Science and Technology)*. 3rd Edition, Academic Press, Cambridge.
- Subbalakshmi G and Udupi SA. 2006. *Food Processing and Preservation*. New Age International, New Delhi.
- Sofia Jan. 2013. *Elements of Food Science*. New India Publishing Agency, New Delhi ISBN: 979-93-81450-24-6.
- Vaclavik VA and Christian EW. 2014. *Essentials of Food Science*. 4th Edition, Springer-Verlag, New York.
- <https://www.ift.org>
- <https://www.foodsciencematters>
- <https://www.ifst.org>

Weekly Lecture Schedule

Duration (week)	Topic
1	Colloidal chemistry as related to foods.
2	Evaluation of food by subjective and objective methods.
3	Carbohydrates in foods sources.
4	Characteristics of sugar.
5	Starches-types, sources, uses and chemical characteristics.
6	Factors effecting viscosity of starch paste.
7	Characteristics of cellulose and pectin. Gums in foods.
8	Effect of cooking and processing techniques on carbohydrates. Batters and dough-types, properties.
9	Preparation of gluten structure. Dough changes in baking.
10	Protein in foods: Plant and animal protein. Chemical and physical properties related to protein foods.
11	Effect of cooking and processing techniques in Animal foods – meat, fish, poultry, eggs, milk and milk products.
12	Effect of cooking and processing of plant foods – cereals, legumes, nuts and oilseeds.
13	Classification and importance of fruits and vegetables. Composition of fruits and vegetables.
14	Effect of cooking and other processing methods on the nutritive value of fruits and vegetables. Food pigments. Browning reactions in fruits and vegetables.
15	Classification and importance of beverages. Definition, classification, uses and legal aspects of food additive.
16	Classification, nature and uses of leavening agents.

I. Course Title	: Food Processing Technology
II. Course Code	: FN 512
III. Credit Hours	: 3(2+1)

IV. Rationale

Almost all foods consumed need processing from field to plate. While some processing is applicable to day-to-day life to consume safe and healthy foods, most of the perishable foods require special techniques to conserve nutrients alongside increasing shelf life. Knowledge of the subject is an integral part for food entrepreneurs.

V. Aim of the course

- To give exposure of the subject, with the newer techniques in food processing procedures ranging from preliminary steps to the packaging aspects of different foodstuff for safe consumption and business
- To equip students to identify and application of processing methods suitable to meet the purpose of the consumer.

VI. Theory

Unit I: Food processing techniques

Principles underlying food processing operations including thermal, radiation, refrigeration freezing and dehydration; Effect of processing on physicochemical characteristics; Principles underlying pressure modified processing (high hydrostatic pressure, hyperbaric processing, vacuum cooling, hypobaric storage).

Unit II: Processing technologies for plant foods

Processing technology for preservation and production of variety food products during storage, handling and processing of cereals/millets and legumes, oilseeds, fruits and vegetables; Food preservation by Hurdle technology and canning technology.

Unit III: Processing technologies for animal foods

Processing technology for milk and milk products, egg, meat, poultry and fish, convenience foods and processed foods; Technologies underlying mutual supplementation, enrichment and fortification, fermentation, malting and germination; Food additives commonly used in food industries for colour, flavour and as preservatives; Nanomaterials as food additives.

Unit IV: Quality control in food processing

Quality control in food industry - raw materials and finished products; Waste management and sanitation in food industries; Packaging - self-cooling self-heating packaging, micro packaging, antimicrobial packaging and water-soluble packaging.

VII. Practicals

1. Effect of blanching on enzymatic activity and volume occupation
2. Effect of refrigeration and freezing on quality of fruits and vegetables
3. Dehydration of fruits and vegetables
4. Canning of fruits and vegetables
- 5-6. Preparation of fruit candy, squash, nectar, malt beverages and quality evaluation with respect to FPO
7. Clarification of juice using various methods (chemical, enzyme and fining agents)
- 8-9. Malting of green gram, moth bean- enzymatic activity determination

10. Preparation of *Paneer* and curd and its quality evaluation
11. Quality evaluation of egg and fish
12. Effect of chemical preservation on storage quality of food (bread, cake).
13. Storage of nuts and oil seeds under vacuum packaging
14. Packaging of fruits and vegetables for transportation distance market using corrugated fibre boxes
15. Transportation of fresh fruits and vegetables using cushioning system and fibre board
16. Visit to food processing unit

VIII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Group activities
- Hands on training

IX. Learning Outcome

This course will help students to

- Utilize the scientific knowledge to become food processing entrepreneur
- Utilize the acquired knowledge for being an expert in any Processing Unit
- Assist in ascertaining quality control of a consumed food in any given situation

X. Suggested Reading

- Brennan JG. 2006. *Food Processing Handbook*. Wiley-VCH
- Clark S, Jung S and Lamsal B. 2014. *Food Processing - Principles and Applications*. 2nd Edition, Wiley-Blackwell Publishing Company, Boston.
- Fellows PJ. 2000. *Food Processing Technology*. Woodhead Publishing Ltd.
- Fellows PJ. 2017. *Food Processing Technology, Principles and Practice*. 4th Edition, Woodhead Publishing Ltd. Cambridge.
- Hartel R W and Heldman D. 2012. *Principles of Food Processing*. Aspen Publishers Inc. New York.
- Owens G. 2001. *Cereals Processing Technology*. Woodhead Publishing Ltd.
- Sivshankar B. 2002. *Food Processing and Preservation*. Prentice-Hall of India Pvt. Ltd. Delhi.
- Subbalakshmi. 2001. *Food Processing and Preservation*. New Age International Publishers, New Delhi.
- Vaclavik V. 2018. *Dimensions of Food*. CRC Press.
- <https://www.ift.org>
- <https://www.foodsciencematters>
- <https://www.ifst.org>

Weekly Lecture Schedule

Duration (week)	Topic
1.	Principle underlying food processing operations including thermal, radiation, refrigeration, freezing and dehydration.
2.	Effect of processing on physicochemical characteristics.
3.	Principles underlying pressure modified processing (high hydrostatic pressure, hyperbaric processing, vacuum cooling, hypobaric storage).
4.	Processing technology for preservation and production of variety food products during storage, handling and processing of cereals, legumes and oilseeds.
5.	Processing technology for preservation and production of fruits and vegetables.
6.	Food preservation by Hurdle technology.
7.	Food preservation by canning technology.

Duration (week)	Topic
8.	Processing technology for milk and milk products, egg, meat, poultry and fish.
9.	Processing technology for convenience foods and processed foods.
10.	Technologies underlying in mutual supplementation, enrichment and fortification.
11.	Technologies underlying fermentation, malting and germination.
12.	Food additives commonly used in food industries for colour, flavour and as preservatives.
13.	Nanomaterials as food additives.
14.	Quality control in food industry - raw materials and finished products.
15.	Waste management and sanitation in food industries.
16.	Packaging - self-cooling self-heating packaging, micro packaging, antimicrobial packaging and water-soluble packaging.

I. Course Title : Human Physiology

II. Course Code : FN 513

III. Credit Hours : 3 (3+0)

IV. Rationale

Physiology is the scientific study of the function and mechanism which work within a living system. Human Physiology seeks to understand the mechanisms that work to keep the human body alive and functioning through scientific enquiry to keep humans healthy and productive. Changes in Physiology in human can impact vital body functions.

V. Aim of the course

- To give theoretical concepts to complex physiological systems of the human body through scientific enquiry into the nature of mechanical, physical and biochemical function of humans, their organs and cells of which they are composed
- To approach the subject area from variegated angles to equip the students with the knowledge of importance of normal and altered picture of biological markers and suggest remedies.

VI. Theory

Unit I: Circulatory system

Overview of anatomy and functions of human body; Reticuloendothelial system-functions, classification; Lymphatic system- functions, circulation; Circulatory system- blood and composition blood cells, development and function of blood cells, blood clotting, blood grouping and haemoglobin, Heart - anatomy, cardiac cycle, blood pressure and factors affecting blood pressure.

Unit II: Respiratory system

Respiratory system- anatomy, physiology and mechanism of respiration, regulation of respiration; Digestive system- anatomy of gastrointestinal tract and accessory organs, digestion and absorption of food, regulation of appetite.

Unit III: Excretory system

Excretory system- anatomy and functions of kidney, formation, composition and excretion of urine; Endocrine glands, mode of action of hormones.

Unit IV: Reproductive system

Reproductive system- structure and functions of male and female reproductive organs; Anatomy and functions of nervous and musculoskeletal system.

VII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Group activities

VIII. Learning Outcome

This course will help students to:

- Apply knowledge in understanding interrelationship between physiology and nutrition.
- Enable to act as a reliable team member in Healthcare team in medical and non-medical setups.
- Apply the acquired techniques for population education

IX. Suggested Reading

- Chaterjee CC. 2012. *Human Physiology Vol. I and Vol. II*. CBS Publications.
- David F, Stacia BM and Charles LS. 1993. *Human Physiology- Foundations and Frontiers*. 2nd Edn., Mosby Pub.
- Donnersberger AB and Scott AL. 2005. *Laboratory Textbook of Anatomy and Physiology*. 8th Edition, Jones and Bartlett Learning, Burlington, Massachusetts.
- Jain AK. 2009. *Human Physiology for BD*. 3rd Edition, Avichal Publishing Company, New Delhi.
- Hall JE. 2016. *Gayton and Hall Text Book of Medical Physiology*. 13th Edition, Elsevier India.
- Marieb EN. 2004. *Human Anatomy and Physiology 6th Edition*. Pearson Education, Inc. London.
- Waugh A and Grant A. 2014. *Ross and Wilson Anatomy and Physiology in Health and Illness*. 6th Edition, Elsevier Ltd. Churchill Livinstone, London.
- http://novella.mhhe.com/sites/0073525707/information_center_view0/custom_publishing_primis.html
- <https://jsums.instructure.com/courses/2144344/pages/welcome-to-holes-human-anatomy-and-physiology-11-slash-e>

Weekly Lecture Schedule

Duration (week)	Topic
1	Overview of anatomy and functions of human body.
2	Reticuloendothelial system- functions, classification.
3	Lymphatic system- functions, circulation.
4	Circulatory System- blood and composition blood cells, development and function of blood cells.
5	Blood clotting, blood grouping and haemoglobin.
6	Heart – anatomy and cardiac cycle.
7	Blood pressure and factors affecting it.
8	Respiratory system- anatomy and physiology.
9	Mechanism of respiration and its regulation.
10	Digestive system- anatomy of gastrointestinal tract and accessory organs.
11	Digestion and absorption of food, regulation of appetite.
12	Excretory system- anatomy and functions of kidney.

Duration (week)	Topics
13	Formation, composition and excretion of urine.
14	Endocrine glands, mode of action of hormones.
15	Reproductive system- structure and functions of male and female reproductive organs.
16	Anatomy and functions of nervous and musculoskeletal system.

I. Course Title : Institutional Food Service Management

II. Course Code : FN 514

III. Credit Hours : 2 (1+1)

IV. Rationale

Institutional food Service Management denotes the entities that provides meals at educational institutes, hospitals, care homes, hotels, public and private cafeteria, etc. Students equipped with updated knowledge in this area will help them to act as an expert to suggest quality food to the customer as per their needs.

V. Aim of the course

- To equip the students with the multi-dimensional knowledge associated with institutional food service in a given setup
- To enable them in planning, execution and control of the management of institutes with ease and profit.

VI. Theory

Unit I: Food service management

Types of food services - organization and management. Tools of management; FSSAI and CODEX guidelines.

Unit II: Record keeping

Personnel management; Books, records and record keeping; Cost control in food services; Menu planning; HACCP.

Unit III: Quantity food production

Meal services management; Types of services; Quantity food production; Principles involved in development of recipes in large scale cooking; Standardization of recipes; Utilization of left-over foods.

Unit IV: Planning of food service unit

Types of kitchens; Planning of layout and equipment for food services; Sanitation and hygiene in handling foods; Personnel hygiene and its importance; Organisation of spaces.

VII. Practicals

- 1-2. Standardization of basic recipes: planning and preparation
3. Modification in basic recipes
4. Use of left-over foods
- 5-6. Visit to different types of food service institutions and study the organization, physical plan and layout, food service equipment, sanitation and hygiene.
- 7-10. Practical experience in organization and management of a college cafeteria/ hotels
- 11-12. Setting of canteens with formal and informal table setting

13. Scale production of standardised recipes
- 14-15. Menu planning for snack bars, canteens, residential hostels and hospitals
16. Cost analysis

VIII. Teaching Methods/ Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Group activities
- Hands on training

IX. Learning Outcome

This course will help students to:

- Act as front office managers
- Skilled in centralized/ decentralized service providers in medical/ care homes
- Skilled chef and service providers

X. Suggested Reading

- Arora RS. 2012. *Banquet and Catering Management*. Abhijeet Publications.
- Beckley JH, Herzog LJ and Foley MM. 2017. *Accelerating New Food Product Design and Development*. 2nd Edition, John Wiley and Sons Inc. Hoboken, New Jersey.
- Carpenter RP, Lyon DH and Hasdell TA. 2002. *Guidelines for Sensory Analysis in Food Product Development and Quality Control*. 2nd Edition, Aspen Publishers Inc. New York.
- Earle M and Earle RL. 2008. *Case Studies in Food Product Development*. Woodhead Publishing Limited and CRC Press, New York.
- Harish Bhat. 2008. *Hotel Management*. Crescent Publishing Corporation.
- Moskowitz HR, Straus T and Saguy S. 2009. *An Integrated Approach to New Food Product Development*. CRC Press, Boca Raton, Florida.
- Mudit Bhajwani. 2007. *Food Service Management: Principles and Practice*. Rajat publications, New Delhi.
- Nancy LS. 2007. *Catering Management*. John Wiley & Sons.
- Puckett RP. 2012. *Food Service Manual for Health Care Institutions*. 4th Edition, John Wiley and Sons Inc. Hoboken, New Jersey.
- Sethi M. 2018. *Catering Management- An Integral Approach*. 3rd Edition, New Age International, New Delhi.
- <https://www.ferrerofoodservice.com>
- <https://www.foodservicedirector.com>
- Vaclavik V (2018) *Dimensions of Food*. CRC Press.

Course Title with Credit Load Ph.D. (Community Science) in Food and Nutrition

Course Code	Course Title	Credit Hours
Major Courses (12 Credits)		
FN 601*	Macronutrient Metabolism	3(3+0)
FN 602*	Micronutrient Metabolism	2(2+0)
FN 603*	Nutrition and Agricultural Interface	3(3+0)
FN 604	Global Nutritional Problems	2(2+0)
FN 605	Nutrition in Calamities	2(2+0)
FN 606	Maternal and Child Nutrition	2(2+0)
FN 607	Hormones and Enzymes	2(2+0)
FN 608	Energy Metabolism	2(2+0)
FN 609	Application of Biotechnology in Food Science and Nutrition	3(3+0)
FN 610	Recent Trends in Food Science and Technology	3(3+0)
Minor Courses (06 Credits)		
	Food Science and Technology	3(2+1)
	Food Biochemistry	3(2+1)
	Nutritional Biochemistry	2(2+0)
	Food Microbiology	3(2+1)
EECM 603	Scaling Techniques for Behaviour Research	3 (1+2)
EECM 605	Sustainable Livelihood Systems	2 (1+1)
Supporting Courses (05 Credits)		
A student can opt any course related to the topic of research offered by other faculties of agriculture university or SWAYAM portal or MOOCS or other online courses up to a maximum of 5 credits.		
FN 691	Doctoral Seminar I (Major Field)	1(1+0)
FN 692	Doctoral Seminar II (Minor Field)	1(1+0)
FN 699	Research	75
	Total	100 Credits

*Core courses/ compulsory courses

Course Contents

Ph.D. (Community Science) in Food and Nutrition

I. Course Title : **Macronutrient Metabolism**

II. Course Code : **FN 601**

III. Credit Hours : **3(3+0)**

IV. Rationale

Food intake is sporadic: for most people it occurs in three major boluses each day. Energy expenditure, however, is continuous, with variations during the day that bears no resemblance to the energy intake pattern. Macronutrients are the three sources of energy which are variably stored and assimilated from food each day. A basic understanding of this fact will help the students to address the need of efficient energy metabolism in people to maintain energy balance for health. Furthermore, it will help to guide people how to lessen the food related disease burden like obesity, Type 2 diabetes, heart disease, etc.

V. Aim of the course

- To give a strong theoretical base to the students with reference to metabolism of macronutrients
- To approach the related areas from a multidimensional perspective—digestion, absorption, assimilation and metabolism in relation to normal health maintenance and preventing disease onsets
- To equip the students to identify, stratify and manage the risks associated with energy metabolism.

VI. Theory

Unit I: Macronutrients

Digestion, absorption and metabolism of carbohydrates, proteins and lipids; Inborn errors of metabolism; Degenerative diseases - diabetes, obesity, atherosclerosis, hyperlipidaemia and hypertension; Glucose homeostasis determined by insulin/glycogen ratio; low carbohydrates diet and its metabolic consequences.

Unit II: Dietary fibre

Glycaemic Index and load; Dietary fibre and its impact in various physiological disorders; Hypoglycaemic action of foods.

Unit III: Proteins

Classification of protein, new discoveries in protein and their functions (protein in immune system, biological buffers and carriers); Evaluation of protein quality- *in vitro* and *in vivo* methods, animal and human bioassays; Amino acid pool, protein turnover in man with special reference to body size, age and various nutrition and pathological conditions; Novel food sources of protein; Role of hormones in protein metabolism; Effect of dietary protein on cardiovascular disease and cholesterol metabolism; Adaptation of body to low intake of energy and protein.

Unit IV: Lipids

Hypolipidemic action of MUFA, PUFA and oxidation products of cholesterol; Effect of saturated fatty acids and trans fatty acids in lipid metabolism, role of reversal diet in cardiovascular disorders; Causes, prevention and treatment of hyperlipidaemia.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Student presentation
- Online Group Discussion

VIII. Learning Outcome

After successful completion of this course, the students will be able to

- Appreciate the scientific knowledge in the process of energy metabolism
- Utilize the methods and tools for the management of hypo/hyper metabolic stages
- Utilize knowledge for scientific deliberations
- Act as Clinical Nutritionist in medical set-ups
- Expert Member of Health Care Team (HCT)
- Researcher in related R&D Projects

IX. Suggested Reading

- Akoh CC and Min DB. 2002. *Food Lipids - Chemistry, Nutrition and Biotechnology*. Marcel Dekker Inc. New York.
- Dickens F. 1981. *Carbohydrate Metabolism and its Disorders Vol. III*. Academic Press, Cambridge.
- FAO WHO/UNU (2004) *Human Energy Requirements: Report of a Joint FAO/WHO/UNU Expert Consultation*. Geneva: World Health Organization. FAO Food and Nutrition Technical Report Series 1.
- FAO WHO/UNU. (2007). *Protein and Amino Acid Requirements in Human Nutrition: Report of a Joint FAO/WHO/UNU Expert Consultation, Geneva*. Word Health Organization. Technical Report Series 935. <http://www.who.int/iris/handle/10665/43411>.
- Nelson D L and Cox MM. 2017. *Lehninger Principles of Biochemistry*. 7th Edition. WH Freeman, New York.
- Stipanuk MH and Caudill MA. 2013. *Biochemical, Physiological and Molecular Aspects of Human Nutrition*. 3rd Edition. Elsevier Pub.
- <https://www.who.int>
- <http://www.fao.org/home/en>
- <https://www.nutrition.org.uk>

Weekly Lecture Schedule

Duration (week)	Topic
1	Carbohydrates -digestion, absorption and metabolism. Proteins - digestion, absorption and metabolism. Lipids- digestion, absorption and metabolism.
2	Inborn errors of metabolism. Diabetes.
3	Obesity.
4	Atherosclerosis.
5	Hyperlipidaemia.
6	Hypertension.
7	Glucose homeostasis determined by insulin/glycogen ratio. Low carbohydrates diet and its metabolic consequences.
8	Glycaemic Index and load. Dietary fiber and its impact in various physiological disorders



Duration (week)	Topic
9	Hypoglycemic action of foods. Classification of protein
10	New discoveries in protein and their functions in immune system, biological buffers and carriers.
11	Evaluation of protein quality- <i>in vitro</i> and <i>in vivo</i> methods, animal and human bioassays. Amino acid pool.
12.	Protein turnover in man with special reference to body size, age and various nutrition and pathological conditions. Novel food sources of protein.
13.	Role of hormones in protein metabolism. Effect of dietary protein on cardiovascular disease and cholesterol metabolism. Adaptation of body to low intake of energy and protein.
14.	Hypolipidemic action of MUFA, PUFA and oxidation products of cholesterol.
15.	Effect of Saturated fatty acids and trans fatty acids in lipid metabolism. Role of reversal diet in cardiovascular disorders.
16.	Causes, Prevention and treatment of hyperlipidemia.

I. Course Title : Micronutrient Metabolism

II. Course Code : FN 602

III. Credit Hours : 2(2+0)

IV. Rationale

Micronutrients are required by human and other organisms all over life in small quantities to coordinate a wide range of physiological functions. While vitamins are chiefly necessary for energy production, immune functions, blood clotting, etc. the minerals play important role in growth, bone health, fluid balance, etc. An advanced understanding of the metabolism aspects of these nutrients will enable the students to guide the population in encouraging proficient metabolic stages in humans to address the public health nutritional problems.

V. Aim of the course

- To give a strong theoretical understanding of the essentiality of micronutrient sufficiency to aid metabolic processes in relation to health and disease onset
- To enhance the knowledge of recent advances in micronutrient nutrition that will help the students to plan and execute policies in micronutrient malnutrition in population.

VI. Theory

Unit I: Vitamins

History, chemistry, distribution and functions of vitamins; Absorption, transportation, metabolism of vitamins; Nutritional requirements of vitamins; Deficiency manifestations of water soluble vitamins; Deficiency manifestations of fat soluble vitamins; Causes of vitamin deficiencies in India; Hypervitaminosis of water-soluble vitamins; Hypervitaminosis of fat-soluble vitamins; Vitamin fortification and supplementation; Methods of assay of vitamins; Interaction with other nutrients, antagonists and analogues of vitamins; Assessment of vitamin status of population.

Unit II: Minerals

Causes of macro and micro mineral deficiencies in India; Chronology, chemistry and distribution of minerals; Functions, absorption, transport and metabolism of minerals; Deficiency manifestations of minerals; Nutritional requirements of minerals; Methods of assay of minerals; Interactions of minerals with other nutrients, antagonists and analogues of minerals; Assessment of mineral status of population; Mineral fortification and supplementation; Metalloenzymes. Antioxidants and their relationship with aging, cancer and various non-communicable diseases.

Unit III: Heavy metal toxicity

Harmful effects of major mineral pollutants on health - mutagenicity, carcinogenicity and heavy metal toxicity; Heavy metal toxicity;

Unit IV: Trace elements

Trace minerals - their chronology, chemistry, distribution. Functions of trace minerals. Absorption and metabolism of trace minerals. Requirements of trace minerals. Deficiency manifestation and interaction of trace minerals. Use of mineral isotopes/ tracers in nutritional studies.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Online Group Discussion

VIII. Learning Outcome

After successful completion of this course, the students will be able to

- Appreciate the scientific knowledge in the process of various physiological functions of human body
- Utilize the methods and tools for the management of hypo/hyper metabolic stage
- Utilize knowledge for scientific deliberations
- Act as Clinical Nutritionist in medical setups
- Expert Member of Health Care Team (HCT)
- Researcher in related R&D Projects

IX. Suggested Reading

- FAO/WHO. 2004. *Vitamins and Minerals in Human Nutrition. A report of joint FAO/WHO Expert Consultation.* 2nd Edition, World Health Organization and Food and Agriculture Organization of the United Nations.
- Garland CF, Garland FC, Gorham ED, Lipkin M, Newmark H, Mohr SB and Holick MF. 2006. *The Role of Vitamin D in Cancer Prevention.* *American Journal of Public Health.* 96(2), 252–261.
- Groff JL and Gropper S. 2012. *Advanced Nutrition and Human Metabolism.* 7th Edition, Yolanda Cossio, New York.
- Guardia M and Garrigues S. 2015. *Hand Book of Mineral Elements in Foods.* John Wiley & Sons Inc. Hoboken, New Jersey.
- Rizvi S, Raza, ST, Ahmed F, Ahmad A, Abbas S and Mahdi F. 2014. *The Role of Vitamin E in Human Health and Some Diseases.* *Sultan Qaboos University Medical Journal,* 14(2), 157–165.
- Schwalfenberg GK. 2017. *Vitamins K1 and K2: the emerging group of vitamins required for human health.* *Journal of Nutrition and Metabolism.*
<https://doi.org/10.1155/2017/6254836>.
- <https://www.who.int>



- <https://nutrition.org>
- <https://www.gainhealth.org>

Weekly Lecture Schedule

Duration(Week)	Topic
1	History, chemistry, distribution and functions of vitamins.
2	Absorption, transport, metabolism of vitamins.
3	Nutritional requirements of vitamins.
4	Deficiency and manifestations of water soluble and fat soluble vitamins.
5	Causes of vitamin deficiencies in India. Hypervitaminosis of water-soluble and fat-soluble vitamins.
6	Vitamin fortification and supplementation.
7	Methods of assay of vitamins. Interaction with other nutrients, antagonists and analogues of vitamins. Assessments of vitamin status of population.
8	Causes of macro and micro mineral deficiencies in India. Chronology, chemistry and distribution of minerals.
9	Deficiency manifestations of minerals. Nutritional requirements of minerals.
10	Methods of assay of minerals. Interactions of minerals with other nutrients, antagonists and analogues of minerals.
11	Assessment of mineral status of population. Mineral fortification and supplementation.
12	Metalloenzymes. Harmful effects of major mineral pollutants on health – mutagenicity, carcinogenicity. Heavy metal toxicity.
13	Heavy metal toxicity.
14	Antioxidants and their relationship with ageing and cancer. Antioxidants and their relationship with various non – communicable diseases.
	Trace minerals - their chronology, chemistry, distribution and functions. Absorption and metabolism of trace minerals.
15	Functions and Requirements of trace minerals. Absorption and metabolism of trace minerals.
16	Deficiency manifestation and interaction of trace minerals. Use of mineral isotopes/ tracers in nutritional studies.

I. Course Title : Nutrition and Agricultural Interface

II. Course Code : FN 603

III. Credit Hours : 3(3+0)

IV. Rationale

There is a clear potential for the agriculture sector to play a critical role in enhancing food and nutrition security and health of population. Agriculture and nutrition are closely linked. Producing foods that are acceptable, accessible and affordable can make population healthy and productive, thus making a virtuous cycle. If this cycle becomes vicious, the turn-over will become negative. This course will enable the students to keep tract with agriculture scenario of a place and connect with the health status to identify, evaluate and find ways to establish positive interfaces.

V. Aim of the course

- To give a clear understanding of interlinking agricultural production and nutritional status of the population
- To assist the students to identify and evaluate the agriculture in terms of nutrition nexus and its effective management.

VI. Theory

Unit I: Food production and consumption

Food situation in India and in the world; Food production and consumption trends; Food balance sheets; Role of nutrition in agricultural planning and national development.

Unit II: Food distribution

Linkages between agricultural practices and food production, distribution and nutritional status; Factors affecting food distribution at macro and micro level; Per capita food availability and consumption; Food and Nutrition security at national and household level; Role of agriculture in enhancing food security; Food crop failure and malnutrition.

Unit III: Farming systems

Poverty and vicious cycle of low food production; Effect of food production and economic policies on food availability; Impact of physical resources, farming systems, cropping system, inputs and manipulation, agricultural marketing system, post-harvest processing of foods on food and nutrition situation; Implementation of nutrition policy.

Unit IV: Agricultural programmes

Sustainable food systems, nutritional impact of agricultural programmes, food price control and consumer subsidy; Contribution of National and International organization in agricultural development.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Online Group Discussion

VIII. Learning Outcome

After successful completion of this course, the students will be able to

- Understand linkage between agriculture and nutrition
- Apply the knowledge in planning and implementation of agriculture and nutrition related policies
- Act as expert in developmental programmed of GOs and NGOs

IX. Suggested Reading

- FAO. 2017. *The State of Food and Agriculture - Leveraging Food Systems for Inclusive Rural Transformation*. Food and Agriculture Organization, Rome.
- FAO. 2017. *The State of Food Security and Nutrition in the World*. Food and Agriculture Organization, Rome.
- GOI. 2016. *Agricultural Statistics at a Glance*. Ministry of Agriculture & Farmers Welfare Department of Agriculture, Cooperation and Farmers Welfare Directorate of Economics and Statistics, Government of India.
- GOI. 2017. *Agriculture - Statistical Year Book India*. Ministry of Statistics and Programme Implementation, Government of India.
- GOI. 2011. *Census of India*. Government of India.
- GOI. 2018. *A Reference Manual by Publication Division*. Ministry of Information about Broadcasting, Govt. of India.
- <https://www.who.int>

- <http://www.fao.org/home/en>
- <https://www.india.gov.in/> agriculture
- <https://mhrd.gov.in/mid-day-meal>

Weekly Lecture Schedule

Duration(Week)	Topic
1	Food situation in India and in the world
2	Food production and consumption trends. Food balance sheets.
3	Role of nutrition in agricultural planning and national development
4	Linkages between agricultural practices and food production, distribution and nutritional status
5	Factors affecting food distribution at macro and micro level. Per capita food availability and consumption
6	Per capita food availability and consumption
7	Food and Nutrition security at national and household level
8	Role of agriculture in enhancing food security. Food crop failure and malnutrition
9	Poverty and vicious cycle of low food production. Effect of food production and economic policies on food availability
10	Impact of physical resources, farming systems, cropping system and inputs and manipulation on food and nutrition situation
11	Impact of agricultural marketing system, post-harvest processing of foods on food and nutrition situation
12	Nutrition policy implementation
13	Sustainable food systems
14	Nutritional impact of agricultural programmes
15	Food price control and consumer subsidy
16	Contribution of National and International organization for agricultural development

I. Course Title : Global Nutritional Problems

II. Course Code : FN 604

III. Credit Hours : 2(2+0)

IV. Rationale

Global Nutrition Report of 2018 by WHO states that malnutrition is still rampant affecting most of world's population at some point in their life cycle from infancy to old age. No country is untouched. Malnutrition is a universal issue holding back development with unacceptable human consequences. Yet the opportunity to end malnutrition has never been better. Malnutrition is responsible for more ill-health than any other cause. It deems necessary for the students to equip them with the knowledge of the nutrition related global problems and prepare them with skills to address the challenges effectively.

V. Aim of the course

- To make the students knowledgeable about the world scenario of prevailing malnutrition in variegated forms and measures being adopted at international/national levels
- To give opportunity to the students to identify, analyse and suggest coping strategies at global, national, regional and community levels.

VI. Theory

Unit I: Food consumption

Food consumption pattern of underdeveloped, developing and developed countries.

Unit II: Nutritional deficiency diseases

An overview of world nutrition situation and assessment of problems of developing and developed countries in light of prevalence, aetiology, indicators and preventive measures.

Unit III: Health programmes

Nutrition and health programmes to alleviate malnutrition, role of national and international organizations.

Unit IV: Health care polices

Impact of health care polices and delivery systems; Micronutrients, food fortification and supplementation.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Group work/ group discussion

VIII. Learning Outcome

A successful scholar with this knowledge will be able to

- Appreciate the scientific foundation of risk management associated with malnutrition and relate the key learning to the job of a professional
- Utilize methods and tools to assess the nutritional scenario and plan out suitable interventions

IX. Suggested Reading

- Babu SC, Gajanan SN and Hallam JA. 2017. *Nutrition Economics-Principles and Policy Applications*. Science Direct. Elsevier.
- FAO. 2017. *Regional Overview of Food Security and Nutrition in Asia and the Pacific*. Food and Agriculture Organization, Rome.
- Park JE and Park K. 2007. *Text Book of Preventive and Social Medicine*. Barnasi Das Bhanot Publishers, Jabalpur.
- Semba RD and Bloem MW. 2008. *Nutrition and Health in Developing Countries*. 2nd Edition. Humana Press Inc. New York.
- Temple NJ and Steyn N. 2016. *Community Nutrition for Developing Countries*. AU Press, Athabasca University, Canada and UNISA Press, University of South Africa.
- <https://www.who.int>
- <http://www.fao.org/home/en>
- <https://www.harvestplus.org>
- <https://www.hsppharvard.edu/nutritionsource>

Weekly Lecture Schedule

Duration(Week)	Topic
1	An overview of world nutrition situation.
2	Overview of global nutritional problems.
3	Global nutrition intervention programmes.
4	Food consumption pattern of underdeveloped countries.

Duration (week)	Topic
5	Food consumption pattern of developing countries.
6	Food consumption pattern of developed countries.
7	Prevalence and etiology of nutritional problems of developing countries.
8	Indicators of nutritional problems of developing countries.
9	Preventive measures of nutritional problems of developing countries.
10	Prevalence and etiology of nutritional problems of developed countries.
11	Indicators and preventive measures of nutritional problems of developed countries.
12	Nutrition and health programmes to alleviate malnutrition.
13	Role of national organizations in combating nutritional problems.
14	Role of international organizations in combating nutritional problems.
15	Impact of health care policies and delivery systems.
16	Micronutrients food fortification and supplementation.

I. Course Title : Nutrition in Calamities**II. Course Code : FN 605****III. Credit Hours : 2(2+0)****IV. Rationale**

Calamities, natural, viz., flood, earthquake, draught) or man-made, viz., riots, war, wrong policies always affect nutritional status of population which may be short-termed or long-termed depending upon the severity of the disaster. A knowledge on the topic will enable the students to act favourably for the favours of the victims to lessen the miseries in terms of health and nutrition.

V. Aim of the course

- To give theoretical base to the scholars in the management of food and nutritional security during a disaster. This course will cover areas of food and water supply, precautions against food shortage, adequate feeding especially of vulnerable groups, control of communicable diseases, health and hygiene, etc. during a calamity
- To equip the students with the knowledge of providing effective support systems according to the need of calamity.

VI. Theory**Unit I: Calamities and undernutrition**

Starvation in emergencies arising out of drought, floods, earth quakes, locust, war, wrong policies and poverty and climatic changes, conflict and global economic volatility, historical perspectives.

Unit II: Food needs during emergencies

Effect of inanition, short, medium and long- term emergencies on food and nutrient intake, precautions against food shortage; Population groups most vulnerable to under nutrition; Food needs at national level during normal emergencies.

Unit III: Nutritional deficiency diseases

Major nutritional deficiency diseases in emergencies, mobilization of local resources, general fund distribution, mass and supplementary feeding, therapeutic feeding, social funds; Nutritional Indices and reference standards; Preventing and handling donations in emergencies.

Unit IV: Hygiene and sanitation

Control of communicable diseases, public health and hygiene problems during emergencies.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Online Group Discussion

VIII. Learning Outcome

After successful completion of the course, the students will be able to:

- Assist in preparedness and disaster risk management
- Assist in taking care of vulnerable population
- Assist in nutrition risk assessment as extension professional

IX. Suggested Reading

- FAO. 2018. *Climate Change Challenge Badge*. 2nd edition. Food and Agriculture Organization of United Nations, Rome.
- Gibney MJ. 2004. *Public Health Nutrition*. Blackwell Science, Oxford.
- Park K. 2007. *Text book of preventive and Social Medicine* 19th Edition. Banarsidas Bhanot Publishers, Jabalpur, India.
- Spark A. 2007. *Nutrition in Public Health: Principles, Policies and Practice*. CRC Press, New York.
- WHO. 2000. *The Management of Nutrition in Major Emergencies*. World Health Organization, Geneva.
- <https://www.who.int>
- <http://www.fao.org/home/en>
- <https://ndma.gov.in>

Weekly Lecture Schedule

Duration (week)	Topic
1	Latest advances in management of food and nutrition in emergent situation.
2	Starvation in emergencies- historical perspectives.
3	Starvation in emergencies arising out of war, wrong policies, poverty and climatic changes.
4	Starvation in emergencies arising out of conflict and global economic volatility.
5	Starvation in emergencies arising out of drought, floods, earthquakes and locust.
6	Population groups most vulnerable to under nutrition.
7	Food needs at national level during normal emergencies.
8	Effect of inanition, short, medium and long- term emergencies on food and nutrients intake.
9	Precautions against food shortage.
10	Major nutritional deficiency diseases in emergencies.
11	Mobilization of local resources, general fund distribution, social funds.
12	Mass and supplementary feeding programmes during emergencies.
13	Therapeutic feeding programmes during emergencies.
14	Nutritional Indices and reference standards.
15	Communicable diseases and their control during emergencies.
16	Public health and hygiene problems during emergencies.

-
- I. Course Title** : Maternal and Child Nutrition
II. Course Code : FN 606
III. Credit Hours : 2(2+0)

IV. Rationale

Inadequate maternal and child nutrition is the underlying cause of considerable deaths in the third world countries. The one who survives does not grow to its full potential, remains unproductive and a burden to the society. As professionals, the students need to develop skills to provide support to this most vulnerable mother-child duo conducive to development of quality human resource.

V. Aim of the course

- To impart in-depth knowledge about why this vulnerable group needs special attention in terms of nutrition and other health care areas. This course will emphasize topics like nutritional challenges, physiological changes, IYCF guidelines, feeding of children with special needs, interventions, etc.
- To make students knowledgeable to identify risks and stratify coping strategies.

VI. Theory

Unit I: Nutrition and reproduction

Nutrition challenges, physiological changes, teenage pregnancy and gestational diabetes, nutrient needs, factors affecting nutrition of the women and children.

Unit II: Nutritional deficiencies

Needs and problems of lactating women, fetal malnutrition and low birth weight, nutrition and parasites, children with special needs, Protein energy malnutrition, vitamin A, iron, vitamin D, calcium and other common deficiencies, significance of stem cell and cord blood.

Unit III: Feeding practices

Formula feeding and supplements, lactation and breast feeding in the community, HIV and breast feeding; drug abuse and breast feeding. Human milk banks, IYCF guidelines, WHO breast feeding recommendations

Unit IV: Overnutrition and undernutrition

International programs regarding child and maternal health initiative to prevent overnutrition and undernutrition.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Group Work/ Group Discussion

VIII. Learning Outcome

Successful completion of this course will enable the students to:

- Appreciate the scientific knowledge and relate them to actual work situation to evade long term health crisis of the concerned
- Utilize the methods and tools to assess nutritional demands and suggest coping strategies
- Utilize the knowledge for scientific publication/ population education.
- Act as scientist in related R&D projects

IX. Suggested Reading

- Brown JE. 2016. *Nutrition through the Life Cycle*. 6th Edition. Cengage Learning, Boston.
- Ehiri J. 2009. *Maternal and Child Health - Global Challenges, Programs and Policies*. Springer Nature, Switzerland.
- Gluckman P, Hanson M, Seng CY and Bardsley A. 2015. *Nutrition and Lifestyle for Pregnancy and Breastfeeding*. Oxford University Press, UK.
- Morgan JB and Dickeson JWT. 2003. *Nutrition in Early Life*. John Wiley and Sons Ltd. Chichester.
- <https://www.unicef.org>
- <https://www.india.gov.in/agriculture>
- <https://mhrd.gov.in/mid-day-meal>

Weekly Lecture Schedule

Duration (week)	Topic
1	Nutrition and reproduction.
2	Nutrition challenges, physiological changes.
3	Teenage pregnancy and gestational diabetes.
4	Nutrient needs, factors affecting nutrition of the women and children.
5	Needs and problems of lactating women.
6	Foetal malnutrition and low birth weight.
7	Nutrition and parasites.
8	Children with special needs.
9	Protein energy malnutrition, vitamin A, iron, vitamin D, calcium and other common.
10	Significance of stem cell and cord blood.
11	Formula feeding and supplements.
12	Lactation and breast feeding in the community.
13	HIV and breast feeding; drug abuse and breast feeding.
14	Human milk banks, IYCF guidelines.
15	WHO breast feeding recommendations.
16	International programs regarding child and maternal health initiative to prevent over weight human nutrition.

I. Course Title : Hormones and Enzymes

II. Course Code : FN 607

III. Credit Hours : 2(2+0)

IV. Rationale

Hormones are chemical messengers providing signals to the cells for performing various functions while enzymes as catalysts enhance the rate of reaction in the body. There are few chances of occurring disease due to enzyme dysfunction however, hormonal dysfunction may give rise to lifelong diseases. Both are important biochemical materials for all living beings. Knowledge on the topic will help the students in ascertaining an effective diet counselling to address health problems linked with hormones and enzymes.

V. Aim of the course

- To learn in detail about the role of hormones and enzymes in human physiology and relate this information to the context of normal health and diseased state like diabetes, hypertension, renal and gastro intestinal disorders, etc. and suggesting relevant dietary managements

- To equip the students with relevant knowledge of effective dietary management of a given disease condition due to hormonal and enzymatic imbalance.

VI. Theory

Unit I: Hormones

History, chemistry, endocrine and exocrine secretion of hormones, organs of secretion, metabolism, mechanism of action, regulation and sites of action, biological effects and interaction.

Unit II: Enzymes

Enzyme pathways in normal functions of the heart, pancreas, gastrointestinal and hepatic functions and kidneys.

Unit III: Metabolic disorders

Altered hormone and enzymatic pathways in obesity, reproductive functions, renal disorders, gastrointestinal disorders.

Unit IV: Degenerative diseases

Altered hormone and enzymatic pathways in hypertension, cardiovascular diseases, diabetes and cancer.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Online group work/ group discussion

VIII. Learning Outcome

After successful completion of this course, a scholar will be able to:

- Utilize the scientific foundation to act as an expert of Health Care Team in medical set-ups
- Act as Clinical Nutritionists
- Act as expert in related R&D projects

IX. Suggested Reading

- Berg JM. 2007. *Biochemistry*. 6th Edition. W. H. Freeman and Company, New York.
- Henry HL and Norman AW. 2014. *Hormones*. 3rd Edition. Academic Press, Cambridge.
- Kleine B and Rossmanith WG. 2016. *Hormones and the Endocrine System*. Springer Nature, Switzerland.
- Palmer T and Bonner PL. 2007. *Enzymes*. 2nd Edition. Woodhead Publishing, Cambridge.
- Nelson DL and Cox MM. 2017. *Lehninger Principles of Biochemistry*. 7th Edition. W.H. Freeman Company, New York.
- <https://www.nutrition.org.uk>
- <http://www.nutritioncare.org>
- <https://nutrition.org>

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Histor and chemistry of hormones.
2	Endocrine and exocrine secretion of hormones, organs of secretion.
3	Metabolism, mechanism of action, regulation and sites of action of hormones.
4	Biological effects and interaction of hormones.
5	Enzyme pathways in normal functions of the heart and pancreas.
6	Enzyme pathways in normal functions of the gastrointestinal and hepatic functions.

Duration (weeks)	Topics
7	Enzyme pathways in normal functions of the kidneys.
8	Altered hormone and enzymatic pathways in diseases-hypertension.
9	Altered hormone and enzymatic pathways in cardiovascular diseases.
10	Altered hormone and enzymatic pathways in diabetes.
11	Altered hormone and enzymatic pathways in obesity.
12	Altered hormone and enzymatic pathways in metabolic disorders.
13	Altered hormone and enzymatic pathways in reproductive functions.
14	Altered hormone and enzymatic pathways in renal disorders.
15	Altered hormone and enzymatic pathways in gastrointestinal diseases.
16	Altered hormone and enzymatic pathways in cancer.

I. Course Title : Energy Metabolism

II. Course Code : FN 608

III. Credit Hours : 2(2+0)

IV. Rationale

Energy metabolism is complex process of deriving energy from the nutrients. Imbalance in energy metabolism may be devastating for human health. It is important to understand bioenergetics to overcome the issued related to these imbalances. The understanding of the role of energy metabolism in regulation of hunger to manage body weight and other non-communicable disease by the students will help them to manage obesity related diseases.

V. Aim of the course

- To impart in depth knowledge to the students with new developments in the area of energy metabolism and its relation to human health
- To learn the concept of bioenergetics, thermogenesis, metabolic regulation and hunger for its application in preventing adiposity.

VI. Theory

Unit I: Bioenergetics

Scope and application of bioenergetics for human nutrition; Energy stores in man; Components of energy; Basal metabolism, energy cost of various activities; Factors affecting energy expenditure.

Unit II: Energy expenditure

Direct and indirect methods of assessing energy expenditure; Factors affecting energy requirements; Assessment of energy requirements.

Unit III: Regulation of metabolism

Thermogenesis, metabolic regulation; Weight control and obesity-role of adipose tissues; Effect of hormones on energy metabolism.

Unit IV: Hunger

Mechanism of hunger; Psychological and physiological factors associated with adiposity.

VII. Teaching Methods/Activities

- Lectures

- Assignment (Writing/Reading)
- Students' presentation
- Online Group Discussion

VIII. Learning Outcome

Successful completion of this course will enable the students to:

- Apply the knowledge of bioenergetics in weight management
- Use methods and tools of measuring energy expenditure
- Correlate eating behaviours of people for planning appropriate meals/diets to prevent adiposity

IX. Suggested Reading

- Donohoue PA. 2010. *Energy Metabolism and Obesity*. Humana Press Inc. New York.
- Driskell JA and Wolinsky I. 2007. *Sports Nutrition: Energy Metabolism and Exercise*. 2nd Edition. CRC Press, New York.
- Korbonits M. 2008. *Obesity and Metabolism*. Karger Publishers, London.
- Rathore AK. 2015. *Bioenergetics, Physiology and Biostatistics*. Discovery Publishing House, New Delhi.
- Scott B. 2008. *A Primer for the Exercise and Nutrition Sciences: Thermodynamics, Bioenergetics, Metabolism*. Humana Press Inc. New York.
- <http://www.nutritionlink.org>
- <https://www.icmr.nic.in>
- <http://www.nin.res.in>

Weekly Lecture Schedule

Duration (week)	Topic
1	Scope and application of bioenergetics for human nutrition.
2	Energy stores in man. Components of energy.
3	Basal metabolism.
4	Energy cost of various activities.
5	Factors affecting energy expenditure.
6	Direct methods of assessing energy expenditure.
7	Indirect methods of assessing energy expenditure.
8	Factors affecting energy requirements.
9	Assessment of energy requirements.
10	Thermogenesic.
11	Metabolic regulation.
12	Weight control.
13	Role of adipose tissues in obesity.
14	Effect of hormones on energy metabolism.
15	Mechanism of hunger.
16	Psychological and physiological factors associated with adiposity.

I. Course Title : Application of Biotechnology in Food Science and Nutrition

II. Course Code : FN 609

III. Credit Hours : 3 (3+0)

IV. Rationale

The role of food biotechnology is important in product development. Knowledge of biotechnology will help to develop foods with enhanced taste, shelf life, nutrition

and quality. Novel food products with desirable characteristics that are safe, nutritious and suitable in different physiological conditions can be developed by the application of biotechnology. Biotechnology can be an important area of application to manage hunger from population.

V. Aim of the course

- To understand the role of food biotechnology in quality food production for mass feeding
- To equip the students with knowledge of application of biotechnology in the process of food product development.

VI. Theory

Unit I: Food science and biotechnology

History, processes and products of biotechnology, application of biotechnology in production of nutritious foods.

Unit II: Product development

Role of biotechnology in enzymology and product development, fermentation process, fruit juice extraction, genetic improvement of food grade microorganisms.

Unit III: Nutraceuticals

Nutritional significance of food products developed by biotechnological techniques.

Unit IV: Constraints in food biotechnology

Scientific, technological and resource constraints in biotechnology; important factors affecting development in biotechnology.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Online Group Discussion

VIII. Learning Outcome

Successful completion of this course will enable the students to:

- Utilize the knowledge in modifying foods for therapeutic purpose
- Serve as investigative dietitian in developing novel food products in food industry

IX. Suggested Reading

- Nestle M. 2003. *Safe Food: Bacteria, Biotechnology and Bioterrorism*. University of California Press Ltd., London.
- Panesar PS and Marwaha. 2014. *Biotechnology in Agriculture and Food Processing: Opportunities and Challenges*. CRC Press, Boca Raton, Florida.
- Shetty K, Paliyath G, Pometto A and Levin RE. 2011. *Food Biotechnology*. 2nd Edition, CRC Press, New York.
- Ravishankar Rai V. 2015. *Advances in Food Biotechnology*. Wiley-Blackwell Publishing Company, Boston.
- <https://www.bio.org>

Weekly Lecture Schedule

Duration (weeks)	Topic
1	History of biotechnology.
2	Processes and products of biotechnology.



Duration (weeks)	Topic
4	Application of biotechnology in production of nutritious foods.
6	Role of biotechnology in enzymology.
7	Product development.
8	Fermentation process.
9	Fruit juice extraction.
10	Genetic improvement of food grade microorganisms.
12	Nutritional significance of food products developed by biotechnological techniques.
14	Resource constraints on biotechnology.
15	Technological constraints on biotechnology.
16	Important factors affecting development in biotechnology.

I. Course Title : Recent Trends in Food Science and Technology

II. Course Code : FN 610

III. Credit Hours : 3(3+0)

IV. Rationale

Environment and food can influence individual's health due to interaction between genes and food components that can cast positive or negative impact on human health. Nutrigenomics relates human genome with response of body to the food. In depth study of recent advances in the field of food analysis and food fortification is imperative to reduce double burden of malnutrition. With the use of application of food science and technology, the novel foods can be formulated which are safe, wholesome and nutritious.

V. Aim of the course

- To acquaint the students with latest advances in food science and technology to meet nutritional challenges
- To understand the integration of genomic science with nutrition
- To understand the physical, chemical and biological makeup of food and ways of food processing and packaging.

VI. Theory

Unit I: Macro and micronutrients

Recent advances in the field of carbohydrates, lipids, proteins, vitamins and minerals in relation to food science; Nutrigenomics, incorporating genetics into dietary guidance.

Unit II: Food analysis

Recent advances in the field of food analysis and food fortification.

Unit III: Advanced techniques

Membrane technology: micro-filtration, ultra-filtration, nano-filtration, reverse osmosis and their applications in food industry; Supercritical fluid extraction- concept and extraction methods; Microwave and radio frequency processing- mechanism and application in food processing; Hurdle technology- concept and its applications.

Unit IV: Foods of future

Food processing and product development; regulating; food processing and preservation through Total Quality Management (TQM) and Hazard Analysis and

Critical Control Points (HACCP); Genetically Modified Foods (GM) foods and their health implications, functional foods and organic foods.

VII. Teaching Methods/Activities

- Lectures
- Assignment (Writing/Reading)
- Students' presentation
- Online Group Discussion

VIII. Learning Outcome

Successful completion of this course will enable the students to:

- Understand the recent advances in technologies used in food industry
- Gain in knowledge of genetically modified, safe and nutritious food products to maintain and improve human health
- Serve as novel therapeutic food designer in pharmaceutical/nutraceutical companies

IX. Suggested Reading

- Clark S, Jung S and Lamsal B. 2014. *Food Processing - Principles and Applications*. 2nd Edition, Wiley-Blackwell Publishing Company, Boston.
- deMan JM, Finley JW, Hurst WJ and Lee CY. 2018. *Principles of Food Chemistry*. 4th Edition, Springer International Publishing, New York.
- Fellows PJ. 2017. *Food Processing Technology*. 4th Edition, Woodhead Publishing Ltd. Cambridge.
- Hartel RW and Heldman D. 2012. *Principles of Food Processing*. Aspen Publishers Inc. New York.
- Ward JD and Ward LT. 2012. *Principles of Food Science*. Goodheart-Willcox Publisher, Illinois.
- <https://www.gainhealth.org>
- <https://foodprocessingindia.co.in>
- <http://agronfoodprocessing.com>

Weekly Lecture Schedule

Duration (week)	Topic
1. 16	1. Recent advances in the field of carbohydrates, lipids and proteins in relation to human nutrition. 2. Recent advances in the field of vitamins and minerals in relation to human nutrition. 3. Nutrigenomics. 4. Incorporating genetics into dietary guidance 5. Recent advances in the field of food analysis 6. Recent advances in the field of food fortification. 7. Membrane technology: micro-filtration, ultra-filtration. 8. Reverse osmosis and their applications in food industry. 9. Supercritical fluid extraction- concept and extraction methods. 10. Microwave and radio frequency processing- mechanism and application in food processing. 11. Hurdle technology- concept and its applications. 12. Foods of future; special nutrients. 13. Food processing and product development. 14. Regulating food processing and preservation through Total Quality Management (TQM). 15. Hazard Analysis and Critical Control Points (HACCP). 16. Genetically Modified Foods (GM) foods and their health implications, functional foods and organic foods.

Restructured and Revised
Syllabi of Post-graduate Programmes

Vol. 6

Community Science
– Human Development and Family Studies

Preamble

Human Development and Family Studies (HDFS) students acquire knowledge to explore the ways in which people develop physically, emotionally, socially and intellectually within the framework of family and society and learn strategies for promoting growth and development in family systems. The face and pace of systematic investigation has accelerated markedly, in all disciplines and the product of research has changed in both quality and quantity. Owing to wide-ranging transition in psychological structures, social systems and family relations, a more specific radical transformation has occurred over the past decade in how we view human development and family studies in the changing ecological settings and complexities of life. Accordingly, research in Human Development is moving away from research focused on development at particular stages (early childhood, adolescence, middle age, older adulthood) and from separate fields of inquiry to a more inclusive, integrative, and interdisciplinary approach to the study of human development across the entire life span. Some problems considered to be of major importance a decade ago receive less attention today, rather other areas of HDFS that had previously been only minor foci of study have become central today.

With this backdrop, Post Graduate curriculum of HDFS has been extensively updated, reshaping previous course contents and developing some new ones after giving due consideration to the needs and requirements of stakeholders thus rendering it suitable for students to pursue for optimal placements. The basic objectives of this updated/ revamped curriculum are the same as they were earlier, but effort has been made to offer the students a broader and deeper understanding and more extended knowledge of the scientific basis of various developmental processes in various ecological settings across cultures. The redesigned courses will help in understanding and critically analyzing the adopted practices in trend to know what is best and what is obsolete for human development. It can prove panacea for many developmental delays, irregularities as well as ills and evils faced by society. The increased number of courses and research credits give massive support to this aspect.

The PG courses are not only meant to give freedom to choose the courses of their interest to enhance their knowledge and abilities in various domains of human development and family studies but also enhance their professionalism, entrepreneurship skills, creativity, innovation, employability, job avenues and develop their confidence to become job providers than job seekers. These courses support and are in line with the objectives of this new educational policy and Skill India. The courses will help in capacity building of the students to develop their managerial and entrepreneurial skills so that they can organize and manage various types of institutions for children, adolescents and elderly which are the need of the day. The courses on HDFS equip the students to engage themselves as child, school and family counsellors, personality development trainers, parent coaches and motivational speakers for public sector and private corporate houses, make them entitled to work with various national and international organizations or to undertake their own enterprise. The main purpose of this new curriculum is to focus on the overall development and performance of students, as it is believed that if their performance over takes their ambitions, it gets lot of success to them.



Modifications Suggested in Courses in the Revised Curricula

M.Sc. (Community Science) in Human Development and Family Studies

Course Code	Course Title	Credit Hours	Remarks
Major Courses (20 Credits)			
*HDFS 501	Theories of Human Development	3 (3+0)	Course content modified
*HDFS 502	Dynamics of Human Development	3 (3+0)	Contents modified and change in title
*HDFS 503	Methods and Techniques of Assessment in Human Development	3 (2+1)	Contents modified and change in title
*HDFS 504	Innovative Programmes in Early Childhood Development and Education	3 (2+1)	Contents modified
HDFS 505	Gender Issues in Human Development and Relationships	3 (2+1)	Contents modified and change in title
HDFS 506	Adult Development	2 (2+0)	New Course added
HDFS 507	Management of Differently Abled	3 (2+1)	Contents modified and change in title
HDFS 508	Adolescent Development and Challenges	3 (2+1)	Contents modified and change in title
HDFS 509	Guidance and Counselling	3 (2+1)	Contents modified
HDFS 510	Interventions for Differently Abled Children	2(1+1)	New course added
HDFS 511	Family Ecology	2 (2+0)	New Course added
HDFS 512	Family and Cultural Diversities	2(2+0)	New course added
HDFS 513	Family Therapy	3 (2+1)	Contents modified

Course Code	Course Title	Credit Hours	Remarks
Minor Courses (08 Credits)			
FN 502	Public Health and Nutrition	3(2+1)	Proposed minor courses from subjects closely related to a student's major subject.
FN 505	Nutrition and Physical Fitness	3(2+1)	
FN 510	Nutritional Challenges in Life Cycle	3(2+0)	Apart from these courses a student can register any other course offered by any other departments
FN 513	Human Physiology	3(3+0)	
EECM 501	Global Extension Systems	2 (2+0)	
EECM 502	Development Communication	3 (2+1)	
EECM 508	Educational Technology	3 (2+1)	
EECM 509	Group Dynamics	2 (2+0)	
EECM 512	Gender Sensitization for Empowerment	2 (2+0)	
Supporting Courses (06 Credits)			
	Research Methodology	3 (2+1)	Course numbers will be assigned by the departments that offer these courses
	Statistical Methods and Application	3 (2+1)	
Common Courses (05 Credits)			
	Library and Information Services	1(0+1)	Common to all disciplines. The course numbers will be assigned by the departments that offer these courses
	Technical Writing and Communications Skills	1(0+1)	
	Intellectual Property and its management in Agriculture	1(0+1)	
	Basic Concepts in Laboratory Techniques	1(0+1)	
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)	
HDFS 591	Master's Seminar	1 (0+1)	
HDFS 599	Research	30	Increased credits for research
Total		70 Credits	

*Core courses/ compulsory courses

Ph.D. (Community Science) in Human Development and Family Studies

Course Code	Course Title	Credit Hours	Remarks	
Major Courses (12 Credits)				
*HDFS 601	Advanced Human Development	3(3+0)	Contents and title modified	
*HDFS 602	Ecology and Human Development	3(3+0)	Contents and title modified	
*HDFS 603	Programme Development for Vulnerable Families	3(2+1)	Contents modified	
HDFS 604	Strategic Developmental Intervention	3(2+1)	Contents modified	
*HDFS 605	Family Studies	3(3+0)	Contents and title modified	
HDFS 606	Adulthood and ageing	3(3+0)	Contents and title modified	
HDFS 607	Mental Health	3(3+0)	New course	
HDFS 608	Qualitative Research Methods	2(1+1)	Contents modified	
Minor Courses (06 Credits)				
CS/PGS 601	Research and Publication Ethics	2(1+1)	Proposed minor courses from subjects closely related to a student's major subject. Apart from these courses a student can register any other course offered by any other departments	
EECM 602	Impact Assessment of Development Programmes	3(1+2)		
EECM 603	Scaling Techniques for Behavioural Research	3(1+2)		
EECM 608	Advocacy and Behavior Change Management	3 (1+2)		
FN 606	Maternal and Child Nutrition	2(2+0)		
FN 604	Global Nutritional Problems	2(2+0)		
FN 605	Nutrition in Calamities	2(2+0)		
Supporting Courses (05 Credits)				
A student can opt any course related to the topic of research offered by other faculties of agriculture university or SWAYAM portal or other online courses up to a maximum of 5 credits.				
HDFS 691	Doctoral Seminar I	1 (0+1)		
HDFS 692	Doctoral Seminar II	1 (0+1)		
HDFS 699	Doctoral Research	75	Increased credits for Research	
Total		100 Credits		

*Core courses/ compulsory courses

Course Title with Credit Load

M.Sc. in Human Development and Family Studies

Course Code	Course Title	Credit Hours
Major Courses (20 Credits)		
*HDFS 501	Theories of Human Development	3 (3+0)
*HDFS 502	Dynamics of Human Development	3 (3+0)
*HDFS 503	Methods and Techniques of Assessment in Human Development	3 (2+1)
*HDFS 504	Innovative Programmes in Early Childhood Development and Education	3 (2+1)
HDFS 505	Gender Issues in Human Development and Relationships	3 (2+1)
HDFS 506	Adult Development	2 (2+0)
HDFS 507	Management of Differently Abled	3 (2+1)
HDFS 508	Adolescent Development and Challenges	3 (2+1)
HDFS 509	Guidance and Counselling	3 (2+1)
HDFS 510	Interventions for Differently Abled Children	2(1+1)
HDFS 511	Family Ecology	2 (2+0)
HDFS 512	Family and Cultural Diversities	2(2+0)
HDFS 513	Family Therapy	3 (2+1)
Minor Courses (08 Credits)		
FN 502	Public Health and Nutrition	3(2+1)
FN 505	Nutrition and Physical Fitness	3(2+1)
FN 510	Nutritional Challenges in Life Cycle	3(2+0)
FN 513	Human Physiology	3(3+0)
EECM 501	Global Extension Systems	2 (2+0)
EECM 502	Development Communication	3 (2+1)
EECM 508	Educational Technology	3 (2+1)
EECM 509	Group Dynamics	2 (2+0)
EECM 512	Gender Sensitization for Empowerment	2 (2+0)
Supporting Courses (06 Credits)		
	Research Methodology	3 (2+1)
	Statistical Methods and Application	3 (2+1)
Common Courses (05 Credits)		
	Library and Information Services	1(0+1)
	Technical Writing and Communications Skills	1(0+1)
	Intellectual Property and its management in Agriculture	1(0+1)



Course Code	Course Title	Credit Hours
	Basic Concepts in Laboratory Techniques	1(0+1)
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)
HDFS 591	Master's Seminar	1 (0+1)
HDFS 599	Research	30
	Total	70 Credits

*Core courses/ compulsory courses

Course Contents

M.Sc. in Human Development and Family Studies

I. Course Title : Theories of Human Development

II. Course Code : HDFS 501

III. Credit Hours : 3 (3+0)

IV. Rationale

Theories act as vital tools in the study of human development and provide orderly, meaningful direction to research and out-reach programmes. Children are complex beings and to understand them, it is significant to be familiar with the basis of their development in all aspects i.e. biological, psychological, social and cognitive. No single theory has been able to explain all these aspects. The study of multiple theories helps advance knowledge, since researchers are continuously trying to explore, support and integrate the different points of view.

V. Aim of the course

- To equip the students with the concepts, theoretical framework and critical review of different theories of human development .
- To give orientation towards comparative analysis of theories and their educational implications.

VI. Theory

Unit I: Psycho-dynamic theories

Meaning, types and functions of developmental theories. Theoretical perspectives and approaches- Psycho-dynamic theories- Psycho-analytic theory of Sigmund Freud – life history of Sigmund Freud, key concepts of psycho analytic theory, laws of psychological energy, three components of personality and their operational principles. Structural model of personality. Psycho-sexual stages and their impact on process of personality development. Contribution and criticism of Freudian theory. Neo-Freudians. Psycho-social theory of Erik Erikson – concept of development and basis of development, psycho-social stages of life.

Unit II: Maturation and cognitive theories

Maturational and biological approach- Arnold Gessell's theory of maturation. Cognitive Development theory of Jean Piaget – concepts, cognitive mechanism, cognitive structure, different stages of cognitive development, thought process and implications of the theory. Piaget's contribution to field of education. Neo-Piagetians- Fischer, Robert Case, Robert Siegler and Bruner. Socio-cultural theory of Lev Vygotsky. Information processing theories.

Unit III: Behavioural and ecological systems theories

Behavioural approach of Watson. Stimulus Response theory by Sears, Skinner and Pavlov. Social- Learning and Social Cognition theory by Albert Bandura and its application in human development. Ecological Systems theory of Urie Bronfenbrenner - concepts, systems and implications in understanding human

development. Contribution of ecological systems theory in guiding families and teachers. Language development theory of Naom Chomsky.

Unit IV: Attachment, self and moral theories

Attachment theories by John Bowlby and Ainsworth. Maslow's Need Hierarchy model. Self Theories- Models of Morris Rosenberg and Coopersmith. Moral development theories of Lawrence Kohlberg and Jean Piaget. Comparative analysis of theories and their application. Integrated approach to theory building.

VII. Teaching Methods/ Activities

- Lecture cum discussion
- Assignments
- Student presentation
- Content analysis of the seminal work of different theorists
- Classroom discussion
- Video clips/ films
- Quiz and debate
- Incentives

VIII. Learning Outcome

After completion of the course, the students will

- have an overview of theories of human development, learn to critically evaluate these theories and recognize their merits.
- understand the scientific process of human development and learn to know the application of different theories in this process.

IX. Suggested Reading

- Baldwin AL. 1980. *Theories of Child Development*. John Wiley & Sons, New Jersey.
- Craig. 1985. *Theories of Human Development*. 2nd Ed., John Wiley & Sons, New Jersey.
- Grains WC. 1980. *Theories of Development: Concepts and Application*. Englewood Cliffs, Bergen, New Jersey.
- Hall CS. 1998. *Theories of Personality*. 4th Ed., John Wiley, New Jersey.
- Miller PH. 2016. *Theories of Developmental Psychology*. Worth Publishers, New York.
- Newman B and Newman R. 2007. *Theories of Human Development*. Rutledge, New Jersey.
- Sailkind NJ. 2004. *An Introduction to Theories of Human Development*. Sage Publications, New Delhi.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Introduction to the course. Meaning, types and functions of developmental theories. Theoretical perspectives and approaches.
2	Psycho-dynamic theories- Psychoanalytic theory of Sigmund Freud – Life history of Sigmund Freud. Key concepts of Freud's theory of Psychoanalysis, personality components, operational principles of different components and structural model of personality.
3	Freudian theory- Stage approach to nature and process of personality development, implications and criticism of Freudian theory. Neo-Freudians.
4	Psycho-social theory of Erik Erikson – his life history, key concepts, stages of life span development, Erikson's model of Psycho-social development.
5	Maturational and biological approach. Arnold Gessell's theory of maturation.
6	Cognitive Development theory of Jean Piaget – Key concepts, cognitive mechanism.
7	Cognitive Development theory of Jean Piaget – stages and implications. Piaget's contribution to education.

Duration (weeks)	Topics
8	Neo-Piagetians- Fischer, Case and Bruner. Socio-cultural theory of Lev Vygotsky. Information Processing theories.
9	Behavioural approach of J.B. Watson, Stimulus Response theory by Thorndike, Sears, Skinner and Pavlov.
10	Social Learning theory by Albert Bandura. Application of behaviourism, learning and social cognition in human development.
11	Ecological Systems theory of Uri Bronfenbrenner - concepts, systems and implications in understanding human development and guiding families and teachers
12	Language development theory of Naom Chomsky. Attachment theories by John Bowlby and Ainsworth.
13	Moral development theories of Lawrence Kohlberg and Jean Piaget.
14	Maslow's Need Hierarchy Model.
15	Self Theories- Models of Morris Rosenberg and Coopersmith.
16	Comparative analysis of theories and their application. Integrated approach to theory building.

I. Course Title : Dynamics of Human Development

II. Course Code : HDFS 502

III. Credit Hours : 3 (3+0)

IV. Rationale

Nature and nurture play key role in human development. It is necessary for the students to understand the role of genetic endowment and environmental experiences of an individual in the course of human development. The knowledge of latest trends in the dynamic process of human development and the issues that emerge in it due to ever changing socio-cultural and economic environments becomes important .

V. Aim of the course

- To impart information to students regarding advanced concepts of human development, current trends and issues of development.
- To provide indepth understanding of the developmental concepts and processes in human life span.

VI. Theory

Unit I: Nature vs. Nurture

Human development – basic concepts and issues. Genetic foundation, genetic code, chromosomal abnormalities. Role of epigenesis and canalization in growth and development. Interface between heredity and environment. Genetic research and its influence on child's development. Current research findings on pre-natal development and neo-natal stages – developmental sequence, prenatal environmental influences, developmental threats and DNA methylation.

Unit II: Cognitive development

Brain development- key concepts and process of development. Models of intelligence. Cognitive development during early years - perceptual capacities, attention, memory, imitation, early learning, conditioning and assessment. Role of early deprivation and enrichment in cognition. Information processing. Social cognition, emotional

intelligence, metacognition and self regulation and their contribution to human mind and behavior. Gardner's Model of Multiple Intelligence.

Unit III: Psycho-social Issues

Language development and its components - pre-linguistic development, phonology, semantics and bilingualism. Socialization practices and influencing factors. Cultural influence on child outcomes. Exposure to media and technology and role of parents and institutions. Impact of socio-emotional deprivation on different stages of development. Vulnerability and resilience, risk and protective factors. Personality changes and self perceptions through different stages of development. Integrated view of human development.

Unit IV: Current and classic research trends in human development

Seminal work of Sigmund Freud, Erikson, Piaget, Uri Bronfenbrenner and Margaret Mead. Design and field work of "Six cultures project". Current research trends in physical, intellectual, psycho- social and moral development of children from birth to adolescence.

VII. Teaching Methods/ Activities

- Lecture cum discussion
- Assignments
- Students' presentation
- Content analysis of the seminal work of Developmental psychologists
- Video clips/ films
- Quiz and debate
- Incentives

VIII. Learning Outcome

After completion of the course, the students will

- Understand the role of heredity and environmental influence in human development.
- Appreciate and recognize the interdependence of various aspects of human development across lifespan.
- Get oriented to the current researchable issues in human development.

IX. Suggested Reading

- Berk EL. 2017. *Development Through the Life Span*. 7th Ed., Pearson Education, Atlantic.
- Bronfenbrenner V. 1979. *The Ecology of Human Development*. Cambridge, Harvard.
- Feldman RS. 2017. *Development Across the Life Span*. Pearson, London, England.
- Garbarino J. 1982. *Children and Families in the Social Environment*. Aldine, New York.
- Kail R and Cavaraugh JC. 2016. *Human Development - A Life Span View*. Cengage Learning, Boston.
- Papalia DE and Olds SW. 2008. *Human development*. 11th Ed., McGraw Hill, New York
- Santrock JW. 2006. *Life Span Development*. Mc Graw Hill, New York.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Human development perspective- basic concepts and issues. Introduction to genes and environment. Genetic foundation, genetic code, chromosomal abnormalities.
2	Role of epigenesis and canalization in growth and development. Interface between heredity and environment. Genetic research and its influence on child's development.

Duration (week)	Topics
3	Current research findings on pre-natal development and neo-natal stages – developmental sequence, prenatal environmental influences, developmental threats and DNA methylation.
4	Brain development across life span- key concepts and process of development. Structure of cognition. Models of intelligence. Cognitive abilities and development during early years - perceptual capacities, attention, memory, imitation, early learning, conditioning, and assessment.
5	Role of early deprivation and enrichment in cognition. Information processing.
6	Social cognition, emotional intelligence, metacognition and self regulation and their contribution to human mind and behavior.
7	Gardner's Model of Multiple Intelligence.
8	Language development and its components - pre-linguistic development, phonology, semantics and bilingualism.
9	Socialization practices and influencing factors. Influence of cultural factors on child outcomes.
10	Exposure to media and technology and role of parents and institutions.Impact of socio-emotional deprivation on different stages of development. Vulnerability and resilience, risk and protective factors.
11	Personality changes in self perceptions through different stages of development. Integrated view of human development.
12	Current research trends in physical, motor and intellectual development in early childhood.
13	Presentation and group discussion on Seminal work of Sigmund Freud
14	Presentation and group discussion on Seminal work of Erik Erikson
15	Presentation and group discussion on Seminal work of Jean Piaget and Margaret Mead
16	Presentation and discussion on Seminal work of Uri Bronfenbrenner.

I. Course Title : Methods and Techniques of Assessment in Human Development

II. Course Code : HDFS 503

III. Credit Hours : 3(2+1)

IV. Rationale

It is imperative to have knowledge of various methods and techniques of assessment in human development for scientific understanding and analysis of developmental status of individuals for their need based guidance and education. In order to gather required information about the individuals, it makes pertinent to have an insight into the strengths, weaknesses of various research tools and hands-on training in application of these, so as to make assessments in a dependable manner.

V. Aim of the course

- To apprise the students with different methods and techniques of assessment in human development.
- To develop skills in psychological test administration, scoring, analysis, interpretation and report writing.

VI. Theory

Unit I: Developmental assessment, methods and techniques.

Assessment –Concept, functions, characteristics, steps and rationale of assessment.



History of tests and measurements. Different methods of child study/ developmental assessment. Techniques of measurement and their significance in measuring different aspects of human development. Role of assessment in intervention.

Unit II: Types of measures & methods

Scientific methods-definition, importance, goals and steps. Essential criteria of Scientific methods -reliability, validity control, item analysis. Use of objective measures and methods. Types of tests – individual and group tests. Projective techniques. Psychometrics, Sociometry. Types of scales –nominal, ordinal, interval and ratio scale

Unit III: Development of tests/ scales

Developmental Assessment from birth to early childhood. Tests for infants and children. APGAR scoring of new borns. Physical growth assessment. Anthropometric evaluation of nutritional status. Measurement of intelligence. Assessment of personality, aptitude, attitude and environment. Development of test/scale, steps, guidelines and standardization procedure – various methods of calculation of validity and reliability. Variables- extraneous, confounding, researcher variables and participant variables affecting internal validity. Threats to internal validity.

Unit IV: Ethical issues and barriers

Ethical issues in the assessment of human development. Special consideration in assessing young children. Ethical issues and barriers in assessment of infants and young children. Assessment of children with special needs. Interpretation and use of assessment information. Trends and challenges in assessment of human behavior.

VII. Practical

1. Visit to neonatal unit to observe the neonates and to observe their assessment of APGAR score by pediatricians.
2. Physical Growth assessment and nutritional status of children of different age groups.
3. Review of available developmental screening and diagnostic tests for infants, toddlers and pre-school children.
4. Review of available screening and diagnostic tests for school age children and adolescents.
5. Developmental assessment of infants by using Bayley's Scale of Infant Development (BSID)
6. Interpretation of results and report writing
7. Administration of psychological tests for measuring cognitive abilities and intelligence.
8. Administration of psychological tests for assessment of socio-emotional development of children and adolescents.
9. Administration of psychological tests for personality assessment.
10. Administration of psychological tests for assessment of language development of children.
11. Assessment of home environment using HOME (Home Observation and Measurement of Environment) inventory for different age groups of children/ Indian Home Inventory/ Family Environment Scale.
12. Interpretation of results and report writing on home environment
13. Development of scale or check lists on selected areas of development.
14. Standardization of the developed test, scoring and interpretation of results.
15. End term assessment

VIII. Teaching Methods/ Activities

- Lectures cum discussion
- Demonstrations on various methods and techniques of developmental assessment
- Case studies and discussion
- Demonstrations and hands on experience on various psychological tests, administration, scoring, interpretation of results and effective counselling
- Organizing Child Development Assessment Camps (CDAC) for giving hands on training

IX. Learning Outcome

After completion of the course, the students will

- Learn different methods and techniques of assessment of various aspects of human development.
- Gain practical experience of handling various psychological tests – administration, scoring, interpretation of results and report writing.
- Learn basics of developing testing material/ tools.

X. Suggested Reading

- Anastasi A. 1988. *Psychological Testing*. 6th Ed., McMillan Publishing Company, New York.
- Bailey DB and Worley M. 2003. *Assessing Infants and Preschoolers with Handicaps*. Merrill Publishing Company, Delhi.
- Gregory RJ. 2004. *Psychological Testing - History, Principles and Applications*. 4th Ed., Pearson Education, Atlantic.
- Gumbiner J. 2003. *Adolescent Assessment*. John Wiley & Sons, New Jersey.
- Kumar R. 2014. *Research Methodology - A Step by Step Guide for Beginners*, 4th Ed., Sage Publications, New Delhi.
- Miller LA, Macintire SA and Lovler RL. 2012. *Foundations of Psychological Testing - A Practical Approach*. 4th Ed., Sage Publications, New Delhi.
- Shaughnessy JJ and Zechmeister EB. 2014. *Research Methods in Psychology*. 10th Ed., McGraw - Hill Publishing Company, New York.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Concept, functions, characteristics, steps and rationale of assessment.
2	History of tests and measurements. Importance of assessment for intervention.
3	Different methods of developmental assessment/ child study.
4	Different Techniques of measurement and their significance in measuring different aspects of human development.
5	Scientific Methods-definition, importance, goals and steps. Essential criteria of Scientific methods. Concept of reliability, validity, item analysis. Different methods of calculating reliability.
6	Types of validity - face, content, concurrent & predictive and construct validity . Difference between test validity & test reliability. Validity & reliability in qualitative research
7	Item analysis – Item difficulty, item discrimination, item response theory, item analysis of speed tests, cross validation and assessment of item bias.
8	Methods of test classification. Types of tests – individual and group tests. Performance tests. Projective techniques. Psychometrics, Sociometry. Types of scales –nominal, ordinal, interval & ratio scale.
9	Developmental assessment from birth to early childhood. APGAR scoring of new borns. Neuro-behavioral assessment of new born infant. Physical growth assessment. Anthropometric evaluation of nutritional status. Early childhood assessment. Tests for infants and children

Duration (week)	Topics
10	Measurement of intelligence. Assessment of aptitude, attitude and personality. Environmental assessment.
11	Development of test/scale- need, significance, steps, guidelines for composing test items, writing effective items, writing administration instructions, instructions for test take, scoring instructions.
12	Standardization - establishing validity & reliability of the instrument. Variables-extraneous, confounding, researcher variables & participant variables affecting internal validity. Threats to internal validity.
13	Ethical issues in the assessment of human development. Special considerations in assessing infants and preschoolers. Special consideration in assessing young children.
14	Principles of assessment for young children. Ethical issues and barriers in child assessment. Assessment of children with special needs.
15	Interpretation of assessment information and use of assessment information for planning instructional programme.
16	Trends and challenges in assessment of human behavior - current changes in assessment, issues and trends in assessment, computerized testing. Web based assessment, implications for future.

I. Course Title : Innovative Programmes in Early Childhood Development and Education

II. Course Code : HDFS 504

III. Credit Hours : 3 (2+1)

IV. Rationale

Early childhood care and educational experiences play a pivotal role in human development. As change agents, early childhood educators and professionals need to enrich themselves with the advances and innovations that are taking place in the domain of early childhood development and education for strategic planning and execution of child care, development and educational programmes for fostering child development.

V. Aim of the course

- To orient students about the need and scope of innovative programmes in early childhood development and education.
- To develop the abilities in students for planning and executing innovative early childhood development and education programmes for enhancing wholesome development of young children

VI. Theory

Unit I: Innovative programmes in early childhood development and education

Need and scope for innovative programmes for early childhood development and education (ECDE). Innovative pedagogical approaches in early childhood development and education. Developmental patterns of children in early years. Current innovative programmes at State, National and International level. Innovative learning settings in classrooms of early child development and education centres. Usage of virtual and digital classrooms in Child Development and Education Centres

Unit II: Innovative programmes for child development

Methods and principles of designing, execution, monitoring and evaluation of programmes and activities in early childhood care and education centres. Innovative programmes for fostering physical, motor, cognitive, speech and language, creativity, socio- emotional and moral development of children.

Unit III: Stimulatory learning environment

Stimulatory learning environments at home and early childhood child care and education centres and at centres for children with special needs. Current and conventional practices of stimulatory learning. Innovative ideas for planning and execution of customized programmes/ activities for gifted children and differently able children.

Unit IV: Social support network systems

Innovative programmes for involving families in early childhood development and education centres. Challenges of family involvement. Development of social support network systems for inclusion of differently able children

VII. Practical

1. Visits to observe early childhood care, education and development centers using varied pedagogical approaches in urban/ rural settings and study their programme and activities.
 - i. Creche/ day care centre and Urban Nursery school
 - ii. Visit to Aanganwadi centre and rural nursery school
2. Critical analysis and report presentation
3. Class room discussions on different types of virtual and digital classrooms
4. Designing innovative activities for young children - Physical and motor development
5. Designing innovative activities for young children - Cognitive and language development
6. Designing innovative activities for young children - Social, emotional and moral development
7. Execution of designed innovative activities.
8. Evaluation of the designed innovative activities as per their effectiveness and implementation potential
9. Conducting survey to assess parental needs on knowledge of innovative activities.
10. Designing need based parent education programmes
11. Organization of parent education programme
12. Conducting need assessment study to find out the training needs of ECCE staff
13. Planning of workshop/training for ECCE personnel
14. Conducting workshop/training for ECCE personnel
15. End term assessment

VIII. Teaching Methods/ Activities

- Lectures and discussions
- Showing educational video films.
- Field visits to early childhood care and education centers
- Demonstrations of innovative programmes
- Designing innovative programmes, their implementation and analysis of developmental outcome of children.
- Market survey of available educational play material

- Visit to child libraries.
- Web/ Internet surfing & report presentations

IX. Learning Outcome

After successful completion of this course, students are enabled to:

- Design innovative child development and education programmes.
- Evaluate early childhood programmes, understand and differentiate the mundane and innovative programmes being run early childhood development and education centers.
- Utilize the knowledge and skills acquired in it for establishing innovative child care & education institutions as a worthy enterprise with win-win principle (employment for self and others too).

X. Suggested Reading

- Deiner PL. 2006. *Inclusive Early Childhood Education*. Cengage Learning Press.
- Jaipaul I Roopnarian and James EJ. 2008. *Approaches to Early Childhood Education*. Pearson Education, Atlantic.
- Kaul V. 1997. *Early Childhood Education Programmes*. NCERT, Delhi.
- Saraswathi TS. 1988. *Issues in Child Development - Curriculum and Other Training and Employment*. Spmaya.
- Shiradhonkar K and Patnam V. 2019. *Understanding and Developing Creativity*. New Academic Publications, New Delhi.
- Sinclair H. 2004. *Standards for Early Childhood Programmes in Centre based Child Care*. Govt. of New Found Land and Labrador. Dept. of Health and Community Services.
- Soni R. 2015. Theme Based Early Childhood Care And Education Programme - A Resource Book. NCERT, New Delhi.
- Wiltshire M. 2010. *Understanding the High Scope Approach, Early Years Education in Practice*. Taylor and Francis.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Need and scope for innovative programmes for early child care, development and education centers. Principles of pedagogy in early child care, development and education centers. Innovative pedagogical approaches in early child care, development and education centers.
2	Physical and motor development patterns during early childhood. Cognitive development pattern during early childhood. Speech and language development patterns of early childhood. Socio-emotional and moral development patterns during early childhood.
3	Current innovative programmes of State and National level for early child care, development and education.
4	Innovative learning settings in classrooms of early child development and education centers. Usage of virtual and digital classrooms in Child Development and Education centers
5	Methods and principles of designing, executing, monitoring and evaluation of early child care, development and education centers.
6	Innovative integrated programmes with special focus on enhancing physical and motor development of children. Innovative integrated programmes with special focus on fostering intellectual development of children.
7	Innovative integrated programmes with special focus on fostering speech & language development of children. Innovative integrated programmes with special focus on promoting socio- emotional and moral development of children.

Duration (week)	Topics
8	Innovative integrated programmes with special focus on inculcating moral values in children. Need and benefits of inclusive early childhood education.
9	Stimulatory learning environments at home and early childhood child care and education centers. Creating Stimulatory learning environments at centers for children with special needs.
10	Current and conventional practices of stimulatory learning. Innovative ideas for planning and execution of customized programmes/ activities for gifted children and differently able children.
11	Significance of customized programmes for differently able children and challenges in it. Precautions to be taken while customizing programmes for differently able children and challenges in it.
12	Innovative programmes for differently able children at State and National level and their effectiveness.
13	Innovative programmes for differently able children at international level. Innovative ideas for planning and execution of customized programmes for gifted children and their effectiveness.
14	Innovative ideas for planning and execution of customized programmes for differently able children and challenges in it.
15	Innovative programmes for involving families in early childhood development and education centers and challenges in it. Innovative programmes for involving families in early childhood development and education centers.
16	Social support network systems for execution of innovative early childhood care development and education centers. Social support network for planning and execution of innovative programmes for developmentally differently able children in ECDE centers.

I. Course Title : Gender Issues In Human Development and Relationships

II. Course Code : HDFS 505

III. Credit Hours : 3 (2+1)

IV. Rationale

Gender stereotypes have been existing in different cultures, though, at various degrees. In rapidly changing socio-cultural and economic scenario, gender issues in human development and relationships have become a very sensitive and vital issue for protection of human rights and dignity. It is important to enlighten students about the various aspects of gender studies and its repercussion on human development, behaviour, relationships, family functioning and societal values.

V. Aim of the course

- To orient the students regarding the gender issues in human development and family relationships.
- To impart experiences regarding gender issues, family practices and biases prevalent in Indian Society.

VI. Theory

Unit I: Gender perspectives and theories

Concept of gender- biological and socio-cultural connotations. Historical perspectives. Gender differences in human development. Gender theories- Gender Orientation

theory of Sandra Bem. Gender Schema theory, theory of Ego Development and Gender. Gender Stratification theory by Blumberg. Gender Identity Formation theory.

Unit II: Gender discrimination, gap and parity

Gender equality and development. Gender inequalities in human development-dimensions, causes and consequences. Gender discrimination indicators- global gender gaps. Gender Development Index, Global Gender Gap Index and Gender Parity Index. Demographic challenges to family ecology- gender role socialization.

Unit III: Gender violence and empowerment

Gender violence- dowry harassment and deaths, suicides, prostitution, sexual harassment and exploitation and prevention. Family violence, amniocentesis, female feticide, infanticide, eve teasing. Gender empowerment strategies- working towards family solidarity and social well-being. Gender main streaming- concept, policy of United Nations, objectives, requirements and principles. Empowering lives of women by controlling – patriarchy system, women's sexuality, fertility, labour, lack of visibility. Gender budgeting.

Unit IV: Changing trends in status of women

Status of women in India. Various plans and policies designed for achieving gender equality. Changing trends in gender role orientation- early civilization, pre-independence, post independent India, contemporary times, socio economic impact on the family and society, cultural impact on the family. Gender role portrayal in mass media. Gender stereotyping in schools. Gender issues at workplace.

VII. Practical

1. Gender analysis of mass media: Print media and E-media
2. Report writing
3. Study of adopted socialization practices for children of both genders
4. Report writing
5. Case studies of three generations on dynamics of gender orientation
6. Report presentation and discussion
7. Case studies of three generations on dynamics of Gender roles and responsibilities.
8. Report presentation and discussion
9. Views of adolescents on their gender role orientation- designing questions .
10. Survey through questionnaire
11. Report presentation and discussion
12. Case studies on changing trends of roles and responsibilities of women and men
13. Report writing
14. Visits to women welfare Govt. organizations/ agencies/ NGOs
15. Presentation of report and class discussion.
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures.
- Viewing of educational video films.
- Case studies on women and men in different occupations- issues & challenges.
- Intergenerational case studies of families.
- Interviews with lawyers of women welfare courts.

- Field visits to Govt and Non- Govt institutions.
- Analysis of mass media narratives.

IX. Learning Outcome

After successful finishing of this course,

- Students become capable of recognizing gender related issues, problems and challenges in society, its influencing factors and solutions.
- Students are able to design and organize effective programmes for protection of rights and dignity of women in families, society and workplace.

X. Suggested Reading

- Bandarage A. 1997. *Women Population and Global Crisis - A Political and Economical Analysis*. Zed books, London.
- Barnett RC, Biner L and Baruch GK. 1987. *Gender Stress*. The Free Press, New York.
- Chanana K. 1989. *Gender and the Household Domain*. Sage Publications, New Delhi.
- Kapadia S and Gala J. 2015. *Gender Across Cultures: Sex and Socialization in Childhood*. Sage Publications, New Delhi.
- Kumar CS. 2017. *Gender Socialization and The Making of Gender in The Indian Context*. Sage Publications. New Delhi.
- Menon L. 1997. *Gender Issues and Social Dynamics*. Kanishka Publishers and Distributors, New Delhi.
- Sudha DK. 2000. *Gender Roles*. A.P.H. Publishing Corporation, New Delhi.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Concept of gender- biological and socio-cultural connotations. Historical perspectives.
2	Gender differences in human development.
3	Gender theories- Gender Orientation theory of Sandra Bem. Gender Schema Theory, theory of Ego Development and Gender.
4	Gender Stratification theory by Blumberg. Gender Identity Formation theory.
5	Gender equality and development. Gender inequalities in human development-dimensions, causes and consequences.
6	Gender discrimination indicators- global gender gaps. Gender Development Index, Global Gender Gap Index and Gender Parity Index.
7	Demographic challenges to family ecology- gender role socialization.
8	Gender violence- dowry harassment and deaths, suicides, prostitution, sexual harassment and exploitation and prevention.
9	Family violence, amniocentesis, female feticide, infanticide, eve teasing.
10	Gender empowerment strategies- working towards family solidarity and social well-being.
11	Gender mainstreaming- concept, policy of United Nations, objectives, requirements and principles.
12	Empowering lives of women by controlling – patriarchy system, women's sexuality, fertility, labour, lack of visibility. Gender budgeting.
13	Status of women in India and various plans and policies designed for achieving gender equality.
14	Changing trends in gender role orientation- early civilization, pre-independence, post independent India, contemporary times, socio economic impact on the family and society, cultural impact on the family.
15	Gender stereotyping in schools and gender issues at workplace. Gender role portrayal in mass media
16	Wrap up

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- I. Course Title : Adult Development**
II. Course Code : HDFS 506
III. Credit Hours : 2 (2+0)

IV. Rationale

Adulthood is a critical period in the life course involving vibrant transitions in roles and responsibilities in biological, psychological, social, carrier and economic spheres. If adults make needed adjustments and alterations in life, there will be sustainable, happy and healthy society. Students get oriented to adulthood concerns, issues, challenges and different ways to cope up with them.

V. Aim of the course

- To acquaint the students with developmental perspectives in relation to adult life stages and theoretical perspectives of the ageing process.
- To develop an understanding of the changes and adjustments at various stages of adulthood aging.

VI. Theory

Unit I: Theoretical and ecological perspectives of adult development

Adulthood- transition to adulthood, stages of adulthood. Psychosocial theories of ageing - Erikson's Psychosocial theory, Identity Process Theory, Activity Theory, Socio-emotional Selectivity Theory. Theoretical perspectives in adult development - Bio-psychosocial perspective, Ecological perspective, Life Course perspective. Klaus Riegel's Dimensions of Development Theory. Four principles of adult development and aging.

Unit II: Models and stereotypes in adulthood

Models of development- biological model of aging, psychological models of adulthood development, socio-cultural models of development, nature and nurture in adulthood- individual and environment interactions. Reciprocity in development. Themes and issues in adult development and aging. Ageism and stereotyping the elderly.

Unit III: Developmental changes during adulthood

Developmental changes in adulthood – biological changes, cognitive changes, sensory changes, psychological and social interactional changes associated with aging. ageing and health. Factors affecting health. Lifestyle and health. Key concepts in health and prevention of chronic diseases, physical and neuro-cognitive disorders and others. Risk factors and preventive measures, supportive services.

Unit IV: Adulthood Adjustment

Demographics of an ageing population. Gender differences in aging. Menopause and its effects on women. Cessation of sexual prowess and its effect on men. Issues and adjustments related to occupation, self and family. Retirement, leisure and adjustment. Causes of morbidity and mortality across the life cycle. Human longevity - the influence of genetic and environmental factors. Death, dying and bereavement. Attitude towards death, grief and bereavement.

VII. Teaching Methods/ Activities

- Lecture cum discussion
- Interviews with individuals in different phases of adulthood.
- Adult case study analysis- report presentation.

- Related video clips and films.
- Assignments and class reports on current research trends.

VIII. Learning Outcome

After successful completion of this course, students are able to

- Realize age related transitions and challenges in life of adults and measures to cope up with them.
- Understand gender related developmental perspectives in adulthood and build up empathy to guide them well.

IX. Suggested Reading

- Dacey JS and Travers JF. 2002. *Human Development - Across the Lifespan*. McGraw Hill, Boston.
- Dandekar K. 1996. *The Elderly in India*. Sage Publications, New Delhi.
- Hayslip B and Panek P. 1989. *Adult Development and Aging*. Harper & Row.
- Hurlock EB. 2003. *Developmental Psychology - A Life Span Approach*. Tata McGraw Hill, New Delhi.
- Kail RV and Cavanaugh JC. 2004. *Human Development - A Life-Span View*. Thomson Wadsworth, United States.
- Kimmel DC. 1990. *Adulthood and Aging*. John Wiley & Sons, New York.
- Leme BH. 1995. *Development in Adulthood*. Allyn & Bacon.
- Newman BM and Newman PR. 2003. *Development Through Life: A Psycho Social Approach*. Cengage Learning, Boston.
- Sigelman CK. 1999. *Life Span Human Development*. 3rd Ed., Brooks/Cole Publishing Company, London.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Adulthood – Definition, phases/ stages of Adulthood, related concepts of biological, psychological, social, legal, and functional age, characteristics of emerging adulthood, physical and social indicators of adulthood.
2	Psychosocial theories of ageing - Erikson's Psychosocial Theory. Identity Process theory, Activity theory, Socio- emotional Selectivity theory.
3	Theoretical perspectives in adult development - Bio-psychosocial perspective. Ecological Perspective, Havighurst's Developmental Tasks Theory, Jane Loevinger's theory of Ego Development.
4	Theories of Aging, theories of successful Aging, biological theories of ageing - programmed theories, evolutionary theories and random damage theories.
5	Life-Course Theories - Erik Erikson's Eight Stages of Life, Klaus Riegel's Dimensions of Development Theory. Four Principles of Adult Development and Aging.
6	Models of development- biological model of ageing in adulthood, psychological models of development in adulthood. Socio-cultural models of development.
7	Nature and nurture in adulthood. Individual–environment interactions, reciprocity in development.
8	Themes and issues in adult development and aging. Ageism & Stereotyping the elderly.
9	Theoretical perspectives on developmental changes in adulthood. Changes at different stages of adulthood – biological changes, cognitive changes- ageing and memory, ageing and intelligence, sensory changes, psychological and social interactional changes associated with aging.
10	Aging and health. Factors affecting health.

Duration (weeks)	Topics
11	Lifestyle changes needed for secure health, Key concepts in health and prevention–cardiovascular diseases, cancer, disorders of the musculoskeletal system, diabetes, neuro-cognitive disorders and others.
12	Risk factors and preventive measures, supportive services.
13	Demographics of an ageing population. Gender differences in aging. Menopause and its effects on women. Cessation of sexual prowess among men and its effects.
14	Issues and adjustments related to occupation, self and family. Retirement, leisure and adjustment.
15	Causes of morbidity & mortality across the life cycle.
16	Human longevity -the influence of genetic & environmental factors. Death, dying and bereavement. Attitude towards death, grief and bereavement.

I. Course Title : Management of Differently Abled

II. Course Code : HDFS 507

III. Credit Hours : 3 (2+1)

IV. Rationale

Despite advanced scientific technologies in health and education domains, the number and types of differently abled persons is still alarming. It is necessary for students to learn about persons with various different abilities, their causes, characteristics, needs, management, assistive technologies and rights. This input is required for the effective guidance and counseling of such individuals, their families and teachers. This course is useful for making efforts for prevention, management and rehabilitation of differently able.

V. Aim of the course

- To orient the students to the etiology and developmental characters of differently abled individuals and develop empathy for working with differently abled persons.
- To develop knowledge and skills in students about how to conduct case studies and surveys of differently abled individuals, analyzing and report writing about it.

VI. Theory

Unit I: Classification and statistics of differently abled

Concept and classification of differently abled individuals. Their current statistics. It's implications on the quality of life. Social, emotional, and economic aspects of exceptionality for both children and families. Multi disciplinary view of differently abled individuals.

Unit II: Characteristics, etiology and issues of differently abled

Different abilities- mental deficiency, learning disabilities, visual impairment, hearing impairment, communication disorders, neurological disorders - definition, types, characteristics, etiology, prevalence in India for all above different abilities. Associated psychological and behavioural problems, educational provisions, management considerations and remedial programmes for different types of special needs.

Unit III: Educational & vocational interventions for differently abled

Physical impairment or loco-motor disabilities (Orthopedic and neurological impairment)- definition, classification, assessment and etiology. Psychological and

behavioural characteristics of physically challenged children. Educational and vocational interventions. Remedial programmes for physically challenged. Psycho-social disturbances and social maladjustment - definition, classification, types, characteristics and etiology of emotionally disturbed and socially maladjusted. Management considerations and remedial programmes for psycho-socially disturbed and socially maladjusted. Gifted children - definition, types, characteristics, assessment and prevalence in India. Inclusive education and special programmes for the gifted.

Unit IV: Government support services

Preventive measures. Assistive technologies for different developmental challenges. Inclusive education policies and programmes for differently abled persons. Government provisions, concessions, facilities, rights and legislations for differently abled. Community based rehabilitation. Rehabilitation Council of India. National and International agencies for differently abled individuals.

VII. Practical

- Case studies of differently abled persons- etiology, characteristics, assessment of their different Abilities
 - Mentally subnormal children
 - Visually impaired children
 - Hearing impaired children
 - Speech impaired children
 - Orthopedically handicapped
 - Learning disabled children
 - Gifted children
- 2. Collaborative work with professionals in development of intervention packages for differently abled children (for any one category)
- 3. Conducting home based interventions
- 4. Conducting center based interventions at schools/ child clinics/ pediatric wards/ special schools and so on.
- 5. Report writing and presentation
- 6. Collaborative work with professionals in development of intervention packages for differently abled children (for any second category)
- 7. Conducting home based interventions
- 8. Conducting center based interventions at schools/ clinics/ pediatric wards/ special schools, etc.
- 9. Report writing and class presentation
- 10. End term assessment

VIII. Teaching Methods/ Activities

- Lectures.
- Field visits to various institutions of differently abled.
- Viewing of related educational video films-report writing and discussion.
- Case studies –Analysis & discussion.
- Demonstrations of special accessories & materials.
- Study and analysis of reports.
- Demonstrations on planning, execution and evaluation of intervention packages.

IX. Learning Outcome

After successful completion of this course, students become



- Sensitive and empathetic to the needs, conditions and circumstances of differently abled.
- Capable of conducting case studies and planning and executing activities for differently abled.

X. Suggested Reading

- Achenbach TM. 1982. *Developmental Psychopathology*. 2nd Ed., John Wiley, New York.
- Berdine WH and Blackhurst AE. 1985. *An Introduction to Special Education*. 2nd Ed., Harper Collins, Lexington.
- Hallahan DP and Kauffman JM. 1991. *Introduction to Exceptional Children*. Allyn and Bacon, Boston.
- Hegarty S. 2002. *Education and Children with Special Needs*. Sage Publications, New Delhi.
- Kar C. 1996. *Exceptional Children - Their Psychology and Education*. Sterling Publication, New York.
- Kirk SA. 1972. *Educating Exceptional Children*. Houghton Mifflin Company, Boston.
- NIMH. 1999. *School Readiness for Children with Special Needs*. National Institute for the Mentally Challenged Children, Secunderabad.
- Prasad J and Prakash R (1996). *Eduaction of Handicapped Children, Problems and Solution*. Kanishka Publications. New Delhi.
- Saini S and Vig D (2008). *Special Children - Behaviour, Needs and Management*. Swami Printers, Ludhiana.

Weekly Lecture Schedule

Duration(Weeks) Topics

- 1 Classification of differently abled individuals. Their current statistics. Implications of special needs on quality of life.
- 2 Social, emotional, and economic aspects of exceptionality for both children and families. Preventive measures.
- 3 Multi disciplinary view of differently abled individuals in their care and coping with them. Screening and early identification. Methods and benefits
- 4 Mental deficiency (low intelligence or *mental retardation*), etiology, characteristics, associated psychiatric problems, special education and welfare services for their management. Managing child in school.
- 5 Learning disabilities (LD) – definition, causes, types and characteristics. Educational considerations, remedial programmes and managing LD students in schools.
- 6 Visual impairments - development of visual skills, common visual defects among partially blind. Causes and characteristics. Vision tests. Educational provisions and management considerations.
- 7 Special education and welfare services for their management. Remedial programmes for visually impaired.
- 8 Hearing impairment- etiology, early identification and characteristics of hearing impaired. Psychological and behavioural characteristics, special education and welfare services for their management.
- 9 Communication (speech & language) disorders – speech production, language & communication development. Classification of speech defects, identification and causes.
- 10 Psychological and behavioural characteristics associated with communication disorders. Educational provisions and management considerations. Remedial programmes for speech problems.
- 11 Physical impairment or loco-motor disabilities (Orthopedic and neurological impairment)- definition, classification, assessment and etiology. Psychological and behavioural characteristics of physically challenged children. Educational and vocational interventions. Remedial programmes for physically challenged.

Duration (weeks)	Topics
12	Psychosocially disturbed (emotionally disturbed and socially maladjusted) - definition, classification, types, characteristics and etiology of emotionally disturbed and socially maladjusted. Management considerations and remedial programmes for psychosocially disturbed and socially maladjusted.
13	Gifted children - definition, types, characteristics, assessment, prevalence in India. Inclusive education and special programmes for the gifted.
14	Preventive measures. Assistive technologies for different types of challenges. Inclusive education. Community based rehabilitation.
15	Government policies and provisions for differently abled. Concessions, facilities, rights and legislations.
16	Rehabilitation Council of India. National and International agencies for differently abled individuals.

I. Course Title : Adolescent Development and Challenges

II. Course Code : HDFS 508

III. Credit Hours : 3 (2+1)

IV. Rationale

India has more than half of its population below the age of 25 yrs. Adolescence is an age of opportunity. Due to rapid physical, psycho-social changes, adolescents are inclined to be at risk to storm and stress, peer pressure and encounter various challenges. If their development, education, economic empowerment and stability are well taken care, it becomes easy to maintain peace and prosperity in the country. The adolescents need to be studied intensely for proper understanding of the development and challenges of this phase of life, so that they can be guided well.

V. Aim of the course

- To acquaint the students with the important developmental issues and challenges.
- To educate about the contemporary issues in adolescent development and challenges.

VI. Theory

Unit I: Theoretical perspectives of adolescents

Adolescence – definition, significance of the stage. Theoretical perspectives on adolescence – biological, psycho-analytical, psycho-social, social-cognitive and cultural. Physical and sexual development in adolescence - physical transition from child to adult, adolescent growth spurt, puberty causes and changes, psychological impact of puberty, early and late maturation and its psychological implications, adolescent sexuality, causes and correlates of physical development.

Unit II: Cognitive and communication development during adolescence

Cognitive and intellectual development during adolescence- the formal-operational stage, hypothetico-deductive reasoning, thinking like a scientist, complexities of adolescent thoughts, information-processing view of adolescent cognitive development, gender differences in mental abilities. Language development during adolescence- later syntactic development, semantics and meta-linguistic awareness, development of communication skills, learning in school and vocational development.

Unit III: Psycho-social and personality development

Psychosocial development during adolescence- emotional changes, problems, emotional regulation and stability, self-understanding. Role of family, peers, school in psychosocial development. Work, career, heterosexual relationships in adolescence. Personality development- Erikson's theory, identity crisis, identity diffusion, identity foreclosure, identity moratorium, self-concept, gender-role stereotyping. Moral development during adolescence and value orientation. Environmental learning, interactional and cultural context in moral development.

Unit IV: Different challenges of adolescence

Vocational preferences. Transition to adulthood- conflicts with special reference to contemporary socio-cultural changes. Challenges of adolescence- sexuality, aggression, delinquency, AIDS, substance abuse, alcoholism, personality disorders, depression, suicide, eating disorders, health problems, psychological problems, social problems- dating and relationships. Integration of self and psycho-sexual resolution. Resolving identity crisis- reorganization of social life relationship with peers and parents, heterosexual relationships. Risk and resilience during adolescence. Risk and protective factors. Challenges in adolescent's life in the 21st century. Challenges and opportunities for adolescent research. Programs and policies.

VII. Practicals

1. Case studies- interviewing early and late adolescents on issues, problems, pubertal changes, friendships, career aspirations, self and social awareness, mass media references
 - Development of case study format
 - Conducting case study of early adolescent girl and early adolescent boy
 - Conducting case study of late adolescent girl and late adolescent boy
2. Report writing and presentation of case studies
3. Assessment of intellectual abilities of adolescents and class room discussion.
4. Assessment of psycho-social development patterns of adolescents and class room discussion.
5. Depiction of adolescents in mass media: Content analysis of media-
 - Feature films
 - Television serials
 - Literature-magazines, newspapers, advertisements.
6. Report writing and presentation
7. Survey in rural/ semi-urban/ urban communities on challenges faced by adolescents and their Parents.
8. Survey in rural/ semi-urban/ urban communities on challenges faced by teachers of Adolescents
9. Analysis of survey results for adolescent challenges and their need assessment.
10. Planning intervention education programmes for adolescents.
11. Organising intervention education programmes for adolescents about their developmental changes, needs and coping up strategies.
12. End term assessment

VIII. Teaching Methods/ Activities

- Lecture-cum-discussion.
- Adolescent interviews: concerns and challenges.
- Viewing related amazing video clips.
- Class reports on interesting case studies reported in mass media.

- Survey- educational & vocational interests, values and aspirations of adolescents.
- Demonstrations of tests- IQ, EQ,GQ and personality.

IX. Learning Outcome

After successful finishing of this course, students are able to

- Appreciate the scientific foundation of adolescent development and challenges.
- Utilize their knowledge and available services for planning and executing programmes for raising awareness of adolescents about their self care and development.

X. Suggested Reading

- Berk LE and Meyers AB. 2010. *Infants, Children, and Adolescents*. 7th Ed., Prentice Hall, PTR.
- Conger JJ. 1977. *Adolescence and Youth: Psychological Development in a Changing World*. Harper & Row, New York.
- Hazen EP, Goldstein MA and Goldstein MC. 2011. *Mental Health Disorders in Adolescents: A Guide for Parents, Teachers, and Professionals*. Rutgers University Press: New Brunswick, NJ.
- Hurrelmann K and Hamilton SF. 1996. *Social Problems and Social Contexts in Adolescence*. Aldine De Gruyter: New York.
- Seifert KL, Hoffnung RJ and Zack IZ. 1999. *Child and Adolescent Development*. Cengage Learning, Belmont, CA, USA.
- Shaffer DR and Kipp K. 2010. *Developmental Psychology: Childhood and Adolescence*. Wadsworth, Cengage Learning, Belmont, CA, USA.
- Spielhagen FR and Schwartz PD. 2013. *Adolescence in the 21st Century: Constants and Challenges*. Information Age Publishing, Amazon Kindle.

Weekly Lecture Schedule

Duration (weeks)	Topics
	<ol style="list-style-type: none"> 1. Adolescence – definition, importance of the stage, adolescence in perspectives, adolescents today. 2. Theoretical perspectives on adolescence- biological, psychoanalytical, social-cognitive and cultural. 3. Physical, motor and sexual development- motor development in adolescence, physical transition from child to adult, adolescent growth spurt, sexual maturation, adolescent sexuality. 4. Causes and correlates of physical development. Psychological impact of puberty, psycho-social implications of early and late maturation. 5. Cognitive and intellectual development during adolescence- the formal-operational stage, hypothetico-deductive reasoning, thinking like a scientist, complexities of adolescent thoughts, information-processing view of adolescent cognitive development, sex differences in mental abilities. 6. Language development during adolescence- later syntactic development, semantics and meta-linguistic awareness, development of communication skills. 7. Learning in school, vocational and career development 8. Psychosocial development -emotional changes, problems and emotional regulation, self-understanding. Role of family, peers, school, work and career, heterosexual relationships in psychosocial development. Environmental learning, interactional and cultural context in psychosocial development 9. Personality development- Erikson's theory, identity crisis, identity diffusion, identity foreclosure, identity moratorium, self-concept, gender-role stereotyping

10. Moral development during adolescence and value orientation. Environmental learning, interactional and cultural context in moral development. Vocational preferences, training and work, transition to adulthood- conflicts with special reference to contemporary socio – cultural changes.
11. Challenges of Adolescence- sexuality, aggression, delinquency, AIDS, substance abuse, alcoholism, personality disorders, depression, suicide, eating disorders, health problems, psychological problems
12. Social problems- dating and relationships. Integration of self and psycho-sexual resolution and resolving identity crisis- reorganization of social life relationship with peers and parents, heterosexual relationships.
13. Risk and resilience in adolescence. Risk and protective factors. Transition to adulthood- conflicts with special reference to contemporary socio-cultural changes
14. Challenges in adolescent's life in the 21st century
15. Challenges and opportunities for adolescent research. Programs and policies
16. Researchable and current issues in adolescent development

I. Course Title : Guidance and Counselling

II. Course Code : HDFS 509

III. Credit Hours : 3 (2+1)

IV. Rationale

Family systems, roles and responsibilities are under great transformation, which has lead the society towards various problems and challenges. Rapidly changing socio-cultural & economic scenario has affected family systems. As a result, families are encountering for its sustainability and in discharging its role and responsibilities. Child guidance and family counseling is a big boon in uprooting/ solving problems and empowering families to encounter their challenges through professional services for leading quality and successful life.

V. Aim of the course

- To acquaint the students about guidance and counselling.
- To orient the students about different techniques of guidance and counselling for different problems.

VI. Theory

Unit I: Areas and types of guidance and counselling

Guidance and Counselling – Meaning, history, goals, levels and techniques. Areas of guidance and Counselling. Types of guidance and counseling services - educational, vocational, personal, marriage and family, leisure time. Assessment and diagnostics in counselling.

Unit II: Contemporary trends and ethical issues

Counselling and therapy relationships. Counselling children - goals, child-counsellor relationships. History about counselling children. Contemporary issues. Play therapy. Integrated counselling for children. Guidance and counselling in schools and colleges. Group guidance. Couple, pre-marital, marriage and family counselling. Current trends in counselling, computerized therapy programs. Research trends in guidance and counseling in India and abroad.

Unit III: Essentials of conducting guidance and counselling sessions

Competencies and role of guidance and counselling professionals. Modes and methods of counselling. Essentials of conducting guidance and counselling session. Understanding the process of guidance and counseling. Ethical issues in guidance and counselling. Knowledge and skills to handle assessment tools. Effective communication and documentation skills. Networking with allied professionals and institutions. Counselling with special concerns, Children with developmental challenges, ambivalent and oppositional type, crisis counselling, guidance in adolescence, counselling elderly.

Unit IV: Approaches and theories of counselling

Approaches and theories of counselling: Affective Counselling theory- concept, key principles. Humanistic approaches- Roger's Client centered approach, Gestalt approach. Psychoanalytic -Psychodynamic approaches by Sigmund Freud, Carl Jung, Alfred Adler and Melanie Klein. Skinner's Behaviouristic approach, Bandura's Behaviour Modification approach. Rational emotive behaviour therapy. Reality therapy. Beck's Cognitive –Behaviour approach.

VII. Practicals

1. Compiling research reviews on various aspects of guidance and counselling.
2. Preparing a checklist to observe and analyze guidance and counselling centers – their organizational structure, objectives, types of services provided, available facilities, staff competencies and problems experienced by them, etc.
3. Survey of guidance and counselling centers by using prepared observation check list.
4. Visit to observe and conduct interviews to get information about the counselling services provided by these institutions such as-Women welfare & child development
5. Family court
6. Women cell, etc.
7. Preparation and presentation of report
8. Visit to observe career guidance centers
9. Feed back of the clients towards the services, financial management/budget, support of other professionals/agencies to different types of centers.
10. Simulation exercises of guidance and counselling children and parents.
11. Content analysis of problems addressed by the leading counselling centers.
12. Content analysis of prevailing psychosocial problems reported in print and electronic media.
13. Identification of characteristics and skills of the counsellors by watching recorded videos on child and adolescent counselling.
14. Understanding techniques used by counsellors by watching recorded videos on child and parent guidance, child counselling, adolescent counselling, couple counselling.
15. Writing reports on films and videos related to the course and its presentation.
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures.
- Case studies of guidance & counselling institutions/ clinics–analysis & discussion.
- Viewing related video clips-report writing and discussion.



- Field visits to different guidance and counselling centers/ institutions.
- Interviews with clients of such centers and counselors.
- Observations and analysis of profile & issues of clients.

IX. Learning Outcome

After successful completion of this course, students

- Learn about essentials and skills of child guidance and family counselling.
- Appreciate different approaches to child guidance and family counselling.
- Understand the various needs of families and children for giving appropriate guidance and counselling services.

X. Suggested Reading

- Anthony DJ. 2006. *Mental Disorders Encountered in Counselling*. Anuragha Publications, Chennai.
- Barker M, Vossler A and Langdridge D. 2010. *Understanding Counselling and Psychotherapy*. Sage Publications, New Delhi.
- Cooper S. 2005. *Counselling, Inception, Implementation & Evaluation*. Infinity Books, New Delhi.
- Gunner J. 1984. *Counselling and Therapy for Children*. The Free Press, New York.
- Hough M. 2014. *Counselling Skills and Theory*. Hodder Education, Oxon, UK.
- Ivey AE, Ivey MB and Downing LS. 1987. *Counseling and Psychotherapy - Interpreting, Skills Theory and Practice*. Prentice Hall.
- Timulak L (2011). *Developing your Counselling and Psychotherapy Skills and Practice*, 1st Ed., Sage publications, New Delhi.
- Welfel E R and Patterson L E (2004). *The Counseling Process - A Multitheoretical Integrative Approach*. Thomson Brooks/Cole, Australia.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Counselling- definitions, difference between guidance and counselling. Goals, stages and conditions for guidance and counselling, levels of counselling, types of counselling. History of Counselling, evolution of guidance and counselling movement in India.
2	Counselling strategies and techniques. Role of Assessment and diagnosis in counselling.
3	Areas of counselling- school counselling, college counselling, career counselling, vocational counselling, social guidance and counselling, mental health. Counselling and therapy relationships.
4	Current trends in counseling, computerized therapy programs. Counselling children – history, goals for counselling children, child counsellor relationship.
5	Types of guidance and counselling services - educational, vocational, personal, marriage and family, leisure time. Couple counselling, premarital and marital counselling, family counselling.
6	Research trends in guidance and counselling in India and abroad. Counselling children – goals of child counselling. Child- counsellor relationships. History of child counselling.
7	Contemporary issues in counselling children. Play therapy - Goals, theories and Working with children and their parents. Child Counselling skills, play therapy, use of media, strategies and activities. Child counselling. Counselling process, general model for counselling. Integrated counselling for children – child counselling, observation, active listening, dealing with resistance & transference, self destructive behavior patterns.

Duration (weeks)	Topics
8	Guidance and counselling in schools and colleges. Group guidance. Student counselling – counselling and psychotherapy, objectives of student Counselling.
9	Group guidance – definition, importance, objectives and advantages of group guidance. Tools and techniques, career conferences, vocational, recreational, educational, occupational information.
10	Competencies and role of guidance and counselling professionals. Modes and methods of counselling. Essentials of conducting guidance and counselling session. Understanding the process of guidance and counselling.
11	Ethical issues in counselling. Knowledge and skills to handle assessment tools.
12	Effective communication and documentation skills. Networking with allied professionals and institutions.
13	Counselling special groups. Counselling children with developmental challenges. Counselling ambivalent, different and oppositional type children. Crisis counselling - death, financial, suicidal, academic failure, illness, etc. Guidance for adolescence. Counselling elderly.
14	Approaches and theories of counselling: Affective Counselling theory- concept, key principles. Humanistic approaches- Roger's Client centred approach, Gestalt approach.
15	Psychoanalytic -Psychodynamic approaches by Sigmund Freud, Carl Jung, Alfred Adler and Melanie Klein. Skinner's Behaviouristic approach, Bandura's Behaviour Modification approach.
16	Rational emotive behaviour therapy. Reality therapy. Beck's Cognitive-Behaviour approach.

I. Course Title : Interventions for Differently Abled Children

II. Course Code : HDFS 510

III. Credit Hours : 2 (1+1)

IV. Rationale

Differently able children and their families encounter various physical, psychological, educational and career problems. They are in need of expertise support and guidance to develop right attitudes towards their differently abled children and skills for their effective care and management of. Timely and early interventions for differently abled children yield analyzing results. This course is useful for the students specializing in human development as they need to have knowledge and skills for planning & executing interventions for the rehabilitation and mainstreaming differently abled children.

V. Aim of the course

- To make the students aware about significance and strategies of imparting intervention for differently abled children.

VI. Theory

Unit I: Significance and types of intervention services

Intervention services- concept, need and significance. Prevention of avoidable health problems. Early intervention –concept, need and significance. Therapies and services- types and contents. Family centred, Child focused intervention, supportive and structured intervention. Speech therapy, occupational therapy, play based intervention.

Unit II: Intervention Strategies and steps

Guidelines for intervention programmes for differently abled. Problems and strategies. Process and steps of intervention- identification, assessment and diagnosis of differently abled and at-risk children, planning and designing intervention, implementation and evaluation. Curriculum planning for differently abled children.

Unit III: Development of intervention programme

Developing need based intervention programmes and strategies for different categories of developmentally challenged children and their parents. Understanding key elements for successful interventions- tailoring for individual needs, providing normality and integration, provision of optimal environment for developmental progress, environmental compatibility and remedial services.

Unit IV: Executing intervention and multi disciplinary approach

Executing child and parent focused interventions and evaluating its effectiveness. Multi disciplinary approach-significance, strategies to include parents and community and overcoming barriers. Planning interventions for inclusion. Involving parents and community.

VII. Practicals

1. Identification of families having children with specific disability
2. Based on selected families, developing need assessment checklist of differently abled children and their families.
3. Need assessment of differently abled children and their families, report presentation and enlisting the needs of family and differently abled child care & development.
4. Designing and developing intervention modules/ programme based on needs of differently abled children and their families.
5. Presentation of intervention modules/ programme, its evaluation and enhancement.
6. Intervention programme: Material selection from department and market survey of required Material/ toys/ tools/ books, etc.
7. Presentation of student's ideas for development of educational and development oriented material/ tools for intervention, discussion on it and finalizing the intervention material and tools.
8. Understanding and experiencing purchase procedure for required material- Seeking permissions of the authorities for purchases, drawing advances (Money indent), submission of vouchers and entry of material in registers.
9. Preparation and up gradation of intervention activities, material and tools.
10. Part-1: Implementation and monitoring of intervention programme in families of differently abled child
11. Part-II: Implementation and monitoring of intervention programme in families of differently abled child.
12. Part-III: Implementation and monitoring of intervention programme in families of differently abled child.
13. Part-IV: Implementation and monitoring of intervention programme in families of differently abled child.
14. Evaluation of effectiveness of intervention programme in catering the identified needs of families and their differently abled children.

15. Conducting parents/ community workshops for publicity of benefits of need based intervention programmes for creating awareness and motivation in families for the welfare of differently abled children.
16. End term assessment.

VIII. Teaching Methods/Activities

- Lectures.
- Case studies –success stories .
- Viewing of amazing intervention video clips.
- Review reports on different types of interventions.
- Field visits to Govt. and Non- Govt. institutions implementing various intervention programmes.
- Demonstrations on preparation & use of innovative learning & teaching materials.

IX. Learning Outcome

After successful completion of this course, students are well equipped to

- Understand the dos & don'ts in designing & executing interventions for the welfare and enhancing of differently abled children.
- Analyze the government programmes and home environments differently abled children and suggest concrete measures for improvement in it.

X. Suggested Reading

- Chadha A. 2001. *A Guide to Educating Children with Learning Disabilities*. Vikas Publishing House, New Delhi.
- Chadha A. 2005. *Teaching Visually Impaired Children – Module 1*. Unistar Books, Chandigarh.
- Gutpa R K. 2005. *Disability In Indian Context - A Teacher's Role*. Unistar Books, Chandigarh.
- Khatib J and Khadi P. 2011. *Emotional Behaviour of Mentally Challenged Children Attending Special Schools: Parental Educational Intervention*. UAS, Dharwad.
- Manga SK. 2009. *Educating Exceptional Children - An Introduction to Special Education*. PHI Learning, New Delhi.
- Panda KC. 1997. *Education of Exceptional Children*. Vikas Publishing House. New Delhi.
- Sahu BK. 2002. *Education of the Exceptional Children*. Kalyani Publishers, New Delhi.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Concept, need and significance of intervention services. Prevention of avoidable health problems.
2	Early intervention –concept, benefits, eligibility criteria for early intervention. Role of early intervention specialist
3	Therapies and services- types and contents. Family centred, Child focused intervention, Supportive and structured. Play based intervention.
4	Speech and language therapy, physical or occupational therapy, psychological services, home visits, medical, nursing or nutrition services, hearing (audiology) or vision services, social work services.
5	Guidelines for planning and implementation of intervention programmes for differently abled. Problems and strategies for planning and implementation of intervention programmes for differently abled
6	Process and steps of intervention. Screening, assessment and diagnosis of differently abled and at-risk children.
7	Curriculum planning for differently abled children.

Duration (weeks)	Topics
8	Understanding key elements for successful interventions- tailoring for individual needs, providing normality and integration, environmental compatibility and remedial services.
9	Developing need based intervention programmes and strategies for different categories of developmentally challenged children (continued)....
10	Developing need based intervention programmes and strategies for different categories of developmentally challenged children.
11	Implementation of need based intervention programmes for different categories of developmentally challenged children.
12	Provision of optimal environment for developmental progress. Environmental compatibility and remedial services.
13	Multi disciplinary approach-significance, strategies to include parents and community and overcoming barriers.
14	Need, significance and strategies to counsel parents of differently abled
15	Planning interventions for inclusive education.
16	Guidelines for involving parents and community in interventions and evaluating its effectiveness.

I. Course Title : Family Ecology

II. Course Code : HDFS 511

III. Credit Hours : 2 (2+0)

IV. Rationale

Family is a child's first context and as a social system plays a vital role in human development. From ecological perspective, children cannot be understood properly outside the context of their families, as interactions within the family and other social settings outside family play a vital role in individual's development. Families' roles, relationships and functioning have undergone dramatic transition. It is essential to the students to get exposed to different aspects of family ecology.

V. Aim of the course

- To orient the students regarding family as an institution.
- To impart knowledge about family transitions and impact of social change and development

VI. Theory

Unit I: Family relationships

Family as a social system. Socialization within the family. Models of parenting. Parent child relationships- functional and dysfunctional dyads. Family cohesion, conflict and family disorganization –impact on parenting. Children as family agents. Children and marital life. Child abuse. Bidirectionality in parent child relations. Family interactions and delinquency. Improving family communication and interpersonal relations.

Unit II: Family under transition

Family transitions. Change and continuity over life cycle. Needs and problems of families at different developmental stages. Impact of social change on family and changing family patterns in India. Religion and family. Family social class and ethnic variations in child rearing.

Unit III: Family stressors and resilience

Family as an institution under stress. Family crisis. Poverty and children. Stressors and family relations - with special reference to family disruption, sickness, divorce, substance abuse and disability. Stress Process Model. Family's adaptation to stress. Family resilience and protective factors for promotion of family resilience. Family environment and social support as a source of risk and resilience for vulnerable children/youth. Intergenerational family dynamics in management of family conflicts and negative patterns.

Unit IV: Impact of consumerism, emigration and multiculturalism on families

Impact of consumerism on rural and urban families. Impact of emigration and multiculturalism on families. Two culture children and their psycho-social dilemmas. Contemporary issues related to family.

VII. Teaching Methods/ Activities

- Lecture cum discussion.
- Observations and interviews with different types of families.
- Case study of families in crisis.
- Class reports- based on mass media narratives.
- Seminars- Review of research studies .

VIII. Learning Outcome

After successful completion of this course, students are able to

- Students develop deep insight into role of family in individuals' development and different issues of family systems.

IX. Suggested Reading

- Carson DK, Carson CK, Chowdhury A. 2007. *Indian Families at the Crossroads*. Gyan Publishing House, New Delhi.
- Daly KJ. 2007. *Qualitative Methods for Family Studies & Human Development*. Sage Publications, New Delhi.
- Falcov CJ. 1991. *Family Transitions*. Guilford Press, California.
- Garbarino J, Eckernrode J and Barry F D. 1997. *Understanding Abusive Families: An Ecological Approach to Theory and Practice*. Jossey-Bass, New York.
- Grigorenko EL and Stenberg RJ. 2001. *Family Environment and Intellectual Functioning: A Life-Span Perspective*. Lawrence Erlbaum Associates Publishers, London.
- Karim AB. 2014. *Family Interactions: Concepts, Mechanism & Methods to Improve the Family Communication & Interpersonal Relationships*. Successful Family Upbringing Series, Refman.
- Kuczynski L. 2003. *Handbook of Dynamics in Parent-Child Relations*. Sage Publications, New Delhi.
- McCubbin H and Figley CR. 1991. *Stress And The Family: Coping with Normative Transitions*. Routledge. Taylor and Francis Group, New York.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Family as a social system, ecological perspective of family. Family as an agent of Socialization.
2	Models of parenting. Parent child relationships- functional and dysfunctional dyads.

Duration (weeks)	Topics
3	Family cohesion and adaptability. Family cohesion, conflict and family disorganization –impact on parenting.
4	Children as family agents. Children and marital relations.
5	Child abuse- understanding abusive families. Bi-directionality in parent child relations.
6	Family interactions and delinquency. Improving family communication and interpersonal relations.
7	Family transitions- continuity and change over life cycle. Needs and problems of families at different developmental stages.
8	Religion and family. Impact of social change on family and changing family patterns in India.
9	Family disorganization. Family Social class and ethnic variations in child rearing.
10	Family as an institution under stress. Family crisis. Stress Process Model.
11	Poverty and children. Stressors and family relations - with special reference to family disruption, sickness, divorce, substance abuse and disability. Stress Process Model.
12	Family resilience and protective factors for promotion of family resilience. Family and social support as a source of resilience for vulnerable children/youth.
13	Intergenerational family dynamics in management of family conflicts and negative patterns.
14	Impact of consumerism on rural and urban families.
15	Impact of emigration and multiculturalism on families. Two culture children and their psycho-social dilemmas.
16	Contemporary –researchable issues related to family.

I. Course Title : Family and Cultural Diversities

II. Course Code : HDFS 512

III. Credit Hours : 2(2+0)

IV. Rationale

Family values and functions are determined by its cultural milieu. Families must be studied in diverse cultures to understand variations in its members' status, development, interactions, relationships, concerns and their challenges in cross-cultural context. It helps to dispel negative stereotypes and personal biases about different groups. As this course deals with different elements of families in western and eastern cultures cutting across different communities, the students get an intellectual perspective of families with cultural diversities.

V. Aim of the course

- To sensitize the students, regarding the theories and issues pertaining to cultural difference in family studies.
- To orient students about families across India in diversified cultural context with special reference to the farming community and their quality of living and concerning issues

VI. Theory

Unit I: Culture and family

Culture- definition, components and characteristics of culture. Agents of cultural influences- school, family, community and other social groups. Cultural factors and

impact on families. Western versus Eastern family culture. Cultural diversities in India. Elements of India's diverse culture – religion, philosophy, cuisine, language, fine arts, dance, music.

Unit II: Families in India and abroad

Families in India and abroad - communal, nuclear, joint, extended, polyamorous, polyandrous, polygynous, single parent families, unrelated families. Indian family culture-values and issues concerning families and its stability. Factors determining social status of families. Families in rural and tribal agrarian community – status of women, children, elderly and men in the families.

Unit III: Cross-cultural variations in family functioning

Cross-cultural variations in different aspects of family functioning across different West and East countries/ cultures *vis-à-vis* – marriage, parenthood, relationships, care of elderly and status of women. Cross cultural variations in family functioning, roles and responsibilities, cohesion, interpersonal communication patterns, conflict resolution. Parenting across cultures – child rearing, socialization and socialization practices. Family crisis and adaptations across cultures. Unique family experiences across cultures, some classic examples like Kibbutz in Israel.

Unit IV: Diversities in family life and challenges

Diversities in family life – ethnic, linguistic, regional, etc. Effect of urbanization, secularization, westernization, technological advancement, globalization and other such developments on families in general and agrarian in particular. Challenges before families across cultures. Legal provisions – emerging cultural trends. Research trends in cross-cultural family studies, methodological issues.

VII. Teaching Methods/ Activities

- Lectures.
- Viewing video films on national & international families.
- Case studies of families in diverse cultures.
- Book review
- Class reports & seminars.

VIII. Learning Outcome

After successful completion of this course, students are enable to

- Understand different elements of families in international perspective.
- Comprehend individual's development and issues differently in families of various cultural settings.
- Recognize and respect "Ways of being" that are not be our own.

IX. Suggested Reading

- Ballard SM and Taylor AC. 2012. *Family Life Education with Diverse Populations*. Sage Publications, Los Angeles.
- Brislin RW. 1990. *Applied Cross Cultural Psychology*. Sage Publications, New Delhi.
- Carson DK, Carson CK and Chowdhury A. 2007. *Indian Families at the Crossroads*. Gyan Publishing House, New Delhi.
- Ratra A, Kaur P, Chhikara S, Varma T and Chawla P. 2006. *Marriage and Family- In Diverse and Changing Scenario*. Deep & Deep Publications Pvt. Ltd, New Delhi.
- Saraswathi TS. 2003. *Cross Cultural Perspectives In Human Development*, Sage Publications, New Delhi.
- Selin H. 2014. *Parenting Across Cultures: Childrearing, Motherhood and Fatherhood in Non-Western Cultures*. Springer, Dordrecht.



- Trask BS and Hamon RR. 2013. *Cultural Diversity and Families: Expanding Perspectives*. Sage Publications, New Delhi.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Culture- definition, components and characteristics of culture.
2	Agents of cultural influences- school, family, community and other social groups.
3	Cultural diversities in India and abroad. Elements of India's diverse culture – religion, philosophy, cuisine, language, fine arts, dance, music.
4	Cultural factors and impact on families. Western versus Eastern family culture.
5	Families in India and abroad - communal, nuclear, joint, extended, polyamorous, polyandrous, polygynous, single parent families, unrelated families.
6	Indian family culture-values and issues concerning families and its stability.
7	Factors determining social status of families. Families in rural and tribal agrarian community – status of Women, children, elderly and men in the families.
8	Male headed and female headed families in agrarian community – causes and concerns.
9	Cross cultural variations in different aspects of family across different West and East countries/ cultures viz marriage, parenthood, care of elderly and status of women and other functions of family, roles and responsibilities.
10	Parenting across cultures – child rearing, socialization and socialization practices. Some classic examples like Kibbutz in Israel.
11	Cross cultural variations in family cohesion, interpersonal communication patterns, conflict resolution. Family crisis and adaptations.
12	Diversities in family life – ethnic, linguistic, regional, etc. Unique family experiences across groups.
13	Effect of urbanization, secularization, westernization, technological advancement, globalization and other such developments on families in general and agrarian in particular.
14	Challenges before families across cultures.
15	Interventions on ideals and practice of families
16	Legal provisions – emerging cultural trends in different societies/ countries. Research trends in cross-cultural family studies, methodological issues.

I. Course Title : Family Therapy

II. Course Code : HDFS 513

III. Credit Hours : 3 (2+1)

IV. Rationale

The family as an institution is envisaging ever increasing stress, disruption and dysfunction. Family therapy is useful for resolving various vertical and horizontal issues of individuals. Family therapy helps in better functioning of individuals and creates happy home environments. In the current scenario of increasing number of nuclear type families, single parent families, atypical families, the course is very beneficial for social well being.

V. Aim of the course

- To orient the students regarding various methods and techniques of family therapy.
- To help students know their abilities as counselors and equip them with family therapies.
- To enable application of therapies in different case studies.

VI. Theory

Unit I: Family therapy - orientation and theoretical perspectives

Family Therapy – concept, need, significance, areas, scope, goals and application of marriage and family therapies. Evolution of family therapy. Early models and basic techniques of family therapy- group process and communications analysis. Theoretical developments in marital and family therapy. Approaches in family therapy - Social Learning approach, Psychoanalytic, Behavioural, Systems approach. Social Constructionism theory. Attachment theory.

Unit II: Types of family therapy

Classic schools of family therapy- Bowenian Family Systems therapy, Strategic, Structured, Communication and Experiential therapies, Psychodynamic Therapy, Cognitive- Behaviour family therapy and integrated family therapy. Contemporary marital therapies. Family therapy in the 21st century and its application to multicultural, single parent and disorganized families, solution focused therapy, narrative therapy and integrative models. Application of family therapy in depression, substance abuse, schizophrenia and eating disorders.

Unit III: Concerns for family therapy

Signs and symptoms of family in need of therapies- psychosomatic symptoms, psychiatric disorders, marital distress, alcoholism, drug dependence, juvenile offences, problems of adolescence, conduct problems, work and school phobias.

Unit IV: Prospects of family therapy

Qualities of marriage and family therapists. Techniques of marriage and family therapy. Advances in clinical assessment, preventive and enrichment programmes. Future direction for marriage and family therapy- bridging research, theory and practices.

VII. Practical

1. Observational visits and screening families in need of therapy (in various settings) and preparation of format for it. Visiting and screening of urban families in need of therapy
2. Visiting and screening of slum families in need of therapy
3. Visiting and screening of rural families in need of therapy
4. Report presentation and discussion
5. Case studies of different areas of marriage and family therapy (alcoholism, drug, dependence, juvenile offences, problems of adolescence).
6. Preparation of format. Case study of alcoholic de-addiction.
7. Case study of drug dependence and de-addiction.
8. Case study of juvenile offences and rehabilitation.
9. Case study of socio-emotional problems of adolescents.
10. Report presentation and discussion.
11. Case studies of different methods and techniques of marriage and family Therapy (one from each).
12. Visit to marriage and family therapy centre
13. Observation of sessions for knowing the methods and techniques used in marriage and family therapy (actual).
14. Observation of sessions for knowing the methods and techniques used in marriage and family therapy (recorded ones).

15. Report presentation and discussion.
16. End term assessment.

VIII. Teaching Methods/ Activities

- Lectures.
- Survey of families with different issues.
- Viewing of related films/ video clips.
- Field visits to family therapy/ family counselling clinics.
- Technical interactions with family therapists
- Class reports on current issues of families therapy impact.
- Case studies of beneficiaries of family therapy.

IX. Learning Outcome

After successful completion of this course, students are enlightened to

- Deal with family issues more scientifically in light of acquired knowledge and skills.
- Develop confidence to deal with a range of family issues under the professional guidance experts.

X. Suggested Reading

- Carr A. 2008. *Family Therapy – Concepts, Process and Practice*. 2nd Ed., John Wiley & Sons Ltd, Chichester.
- Carson DK, Carson CK, Chowdhury A. 2007. *Indian Families at The Crossroads*. Gyan Publishing House, New Delhi.
- Doherty W, Boss P, Larossa R, Schumm W and Steinmets S. 1993. *Family Theories and Methods: A Contextual Approach*. Mac Millan & Company.
- Lowe R. 2004. *Family Therapy a Constructive Framework*. Sage Publications, New Delhi.
- Mark R. 2003. *Family Therapy in Focus*. Sage Publications, London.
- Roger L. 2004. *Family Therapy - A Constructive Framework*. Sage Publications London.

Weekly Lecture Schedule

Duration (weeks)	Topics
1	Concept. Need and significance of family therapy. Areas, scope and goals of family therapy.
2	Application of marriage and family therapy. Evolution of family therapy. Early models and basic techniques of family therapy- group process and communications analysis.
3	Theoretical developments in marital and family therapy. Approaches in family therapy - Social Learning approach and Psychoanalytic approach.
4	Behavioural approach, Systems approach. Social Constructionism and Attachment theory approach.
5	Classic schools of family therapy- Bowenian Family Systems therapy, Strategic therapy, Structured therapy.
6	Psychodynamic therapy, Communication therapy and Experiential therapy.
7	Cognitive- Behaviour family therapy and Integrated family therapy. Contemporary marital therapies.
8	Family therapy in the 21st century and its application to multicultural, single parent and disorganized families, solution focused therapy, narrative therapy and integrative models.
9	Application of family therapy in depression, substance abuse, schizophrenia and eating disorders.
10	Signs and symptoms of family in need of therapies- psychosomatic symptoms, psychiatric disorders, marital distress.

Duration (weeks)	Topics
11	Role of family therapy in alcoholism, drug dependence, juvenile offences, problems of adolescence,
12	Role of family therapy in conduct problems, work and school phobias.
13	Qualities of marriage and family therapists. Techniques of marriage and family therapy.
14	Advances in clinical assessment, preventive and enrichment programmes.
15	Future direction for marriage and family therapy- bridging research, theory and practices
16	Wrap up



Course Title with Credit Load Ph.D. in Human Development and Family Studies

Course Code	Course Title	Credit Hours
Major Courses (12 Credits)		
*HDFS 601	Advanced Human Development	3(3+0)
*HDFS 602	Ecology and Human Development	3(3+0)
*HDFS 603	Programme Development for Vulnerable Families	3(2+1)
HDFS 604	Strategic Developmental Intervention	3(2+1)
HDFS 605	Family Studies	3(3+0)
HDFS 606	Adulthood and ageing	3(3+0)
HDFS 607	Mental Health	3(3+0)
HDFS 608	Qualitative Research Methods	2(1+1)
Minor Courses (06 Credits)		
CS/PGS 601	Research and Publication Ethics	2(1+1)
EECM 602	Impact Assessment of Development Programmes	3(1+2)
EECM 603	Scaling Techniques for Behavioural Research	3(1+2)
EECM 608	Advocacy and Behavior Change Management	3(1+2)
FN 606	Maternal and Child Nutrition	2(2+0)
FN 604	Global Nutritional Problems	2(2+0)
FN 605	Nutrition in Calamities	2(2+0)
Supporting Courses (05 Credits) **		
HDFS 691	Doctoral Seminar I	1+0
HDFS 692	Doctoral Seminar II	1+0
HDFS 699	Research	75
Total		100 Credits

*Core courses/ compulsory courses

Course Contents

Ph.D. in Human Development and Family Studies

I. Course Title : Advanced Human Development

II. Course Code : HDFS 601

III. Credit Hours : 3(3+0)

IV. Rationale

Development as a dynamic phenomenon in life course of all human beings is an integrated, multifaceted and interdependent process. Human development as a subject has also undergone a lot of revolution. There is a great need to understand the recent orientation and advances in nature, developmental perspective, processes and the latest trends in human development throughout the life span.

V. Aim of the course

- To create awareness among students regarding the model of human development as a science and as a process, its orientation and nature.
- To impart knowledge regarding theoretical foundations, issues and research trends in human development

VI. Theory

Unit I: Human development – a science and a process

Classical and contemporary theoretical orientation to human development. Relational developmental systems and developmental science. Developmental psychology to developmental science from deficit to diversity in development. Regulation of development and differentiation. Constructing general model for development – developmental behaviour genetics. Multilevel nature and analysis of developmental processes.

Unit II: Developmental diversity and regularity

Concept of Consistency vs. change in development. Developmental diversity and regularity. Developmental diversity and consequences for Human Development. Dynamics of stability and variability in development – role of experience in development, Optimal Experience theory. Human action perspective to developmental diversity and regularity. Abnormal behaviour vs. individual differences. Intentional personal development and personal control over development.

Unit III: Development through life span

Life span theory in development, five levels of analysis – Life cause theory, basic concepts, life transitions and historical change. Continuity vs. discontinuity in different developments across stages of life. Cognitive and emotional development-development of children's thinking and emotions. Dynamic development of thinking, feeling and acting- infancy through adulthood. Emotional development and consciousness. Dynamic structure in cognitive and emotional development - growth cycle and brain activity. Unravelling the processes underlying social, emotional and personality development.



Unit IV: Psycho-social perspective

Dialectical models of socialization. Development of self-regulation and morality. Pro-social behaviour development-development across lifespan and correlates. Religious and spiritual development through life span – positive and negative correlates. Issues concerning children in difficult circumstances. Multilevel perspective on child maltreatment. Resilience in the face of adversities. Socio-emotional development in diverse family contexts. Gendered development. Future directions for life course and behaviour genetics.

Weekly Teaching Schedule

Duration (weeks)	Topics
1	Classical and contemporary theoretical orientation to human development. Relational developmental systems and developmental science.
2	Developmental psychology to developmental science from deficit to diversity in development. Regulation of development and differentiation.
3	Constructing general model for development – developmental behaviour genetics. Capability_approach in studying human development.
4	Multilevel nature of developmental processes
5	Consistency vs. change in human development. Consistency of concepts and phenomenon.
6	Developmental diversity and regularity. Developmental diversity and Consequences for Human Development
7	Dynamics of stability and variability in development – role of experience in development, Optimal Experience theory.
8	Human action perspective to developmental diversity and regularity. Abnormal behaviour vs. individual differences Intentional personal development and personal control over development.
9	Life span theory in development, five levels of analysis – life cause theory, basic concepts, life transitions and historical change. Continuity vs. discontinuity in different developments across stages of life.
10	Cognitive development across life span. Development of children's thinking and emotions. Dynamic development of thinking, feeling and acting- infancy through adulthood.
11	Emotional development across life span. Emotional development and consciousness.
12	Dynamic structure, growth cycle and brain activity in cognitive and emotional development.
13	Dialectical Models of Socialization. Development of self-regulation and morality across life span. Pro-social behaviour development across lifespan and its correlates.
14	Unravelling the processes underlying social, emotional and personality development. Religious and spiritual development through life span – positive and negative correlates.
15	Issues concerning children in difficult circumstances. Socio-emotional development in changing family contexts. Multilevel perspective on child maltreatment.
16	Resilience in the face of adversities. Socio-emotional development in changing family contexts. Gendered development. Future directions for life course and behaviour genetics

VII. Teaching Methods/ Activities

- Lecture and classroom discussion
- Group discussion
- Case specific discussions

- Assignment (Reading/Writing), Book/Publication Review
- Student presentation
- Case studies and analysis
- Guest Lectures

VIII. Learning Outcome

After this course, the students will be able to

- Understand the concepts, complex system, process and sequence of human development.
- Comprehend the nature of development by getting oriented to phenomenon of diversity, regularity, continuity and stability in development.
- Recognize the current trends and issues of human development.

IX. Suggested Reading

- Ausubel D and Sullivan EV. 1980. *Theory and Problems of Child Development*. 3rd Ed., Grune & Stratton, New York.
- Berk LE. 2013. *Child Development*. Pearson, New Delhi.
- Damon W and Lerner R. 1998 & 2006. *Handbooks of Child Psychology*. Vol. I to Vol. IV. John Wiley & Sons.
- Lerner RM and Newell KM. 2014. *Handbook of Developmental Systems Theory and Methodology*. Pp. 19-65. The Guilford Press, New York.
- Rogoff B. 2005. *The Cultural Nature of Human Development*. Oxford University Press, New York.
- Saraswathi TS and Kaur B. 1993. *Human Development and Family Studies in India*. Sage Publications, New Delhi.
- Sharma N and Chaudhary N. 2009. Human development: Context and Processes. In G. Misra (Ed.), *Psychology in India (Vol.I) Basic Psychological Processes and Human Development*. Pp. 69-109. Pearson, New Delhi.
- https://en.wikipedia.org/wiki/Capability_approach
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5830131/>

I. Course Title : Ecology and Human Development

II. Course Code : HDFS 602

III. Credit Hours : Credits: 3(3+0)

IV. Rationale

Each human being is like others in some ways and also remains unique in others. The uniqueness rests upon the ecological settings of the individual one experiences in varied forms in biological, psychological sociological and cultural contexts. The students getting expertise in Human Development need to understand the diverse array of ecological modelling and the environmental complexities that influence human developmental processes.

V. Aim of the course

- To help students understand the process of interaction between human development and ecological systems.
- To provide in-depth knowledge about physical, economic, socio-cultural and socio-political role of ecology in life course development.
- To make the students realise research and assessment of human development based on ecological perspective.

VI. Theory

Unit I: Ecological modelling in human development

Human ecology – concept and relevance in understanding human development. Ecological modelling, ecology of developmental processes, bio-ecological model of Bronfenbrenner. Developmental ecology through space and time. The Process-Person-Context-Time (PPCT) Model . An Integrated model of individual development based on PPCT Model. Life course development through ecological perspective.

Unit II: Physical ecology and human development

Developmental tasks through lifespan – role of ecology, social roles and structural role of ecology. Behavioural development – role of physical ecological factors, terrain, climatic changes, demographics and their effect on human development. Children's physical environment, housing, overcrowding, neighborhood and development. Economic factors and their impact on human development.

Unit III: Socio-cultural ecology and human development

Building blocks in the environment. Interpersonal structures as context of human development. Dyads- types, nature and function of joint and molar activities, affective relations, balance of power. Race, class, ethnicity and development. Socio-cultural and sub-cultural context of human ecology and development- differences in child's ecological systems and their impact on parenting and development. Socio-cultural imbalances and their impact on human development. Contemporary child rearing and implications for human development. Impact of time factor and cultural history on development.

Unit IV: Role of systems and policies

Children's institutions, day care and preschools as context of human development. Children in war and disaster. Socio-political, legal systems and policies and human development. Religion, caste, minority and deprived states and their effects. Community support and its value for human development. Impact of media, technology and social networking. Policies, programmes based on ecological factors impacting human development. Research and assessment of human development based on ecological perspective.

Weekly Teaching Schedule

Duration (weeks)	Topics
1	Human ecology – its concept and relevance in understanding human development. Life course development through the ecological perspective.
2	Ecology of developmental processes. Bio-ecological model of Bronfenbrenner
3	Developmental ecology through space and time: referred to as process-person-context-time (PPCT) model.
4	An Integrated model of Individual Development based on PPCT Model.
5	Developmental tasks through lifespan –role of ecology, social roles and structure role of ecology.
6	Physical ecological factors, Terrain, climatic changes, demographics and their effect on human development.
7	Behavioural development –role of ecology, physical, environmental impact on behaviour. Environmental aspects - Children's physical environment, housing, overcrowding, neighbourhood and development. Economic factors and their impact on human development.

Duration (weeks)	Topics
8	Interpersonal structures as context of human development. Building blocks in the environment. Dyads, nature and function of joint and molar activities Impact of affective relations, balance of power.
9	Race and ethnicity and human development. Socio-cultural and sub-cultural differences in child's environment and their impact on childrearing practices and development. Socio-cultural imbalances and their impact on development.
10	Impact of time factor and cultural history on development. Contemporary child rearing practices and their implications for human development.
11	Children's institutions, day care and preschools as context of human development.
12	Children in war and disaster. Socio-political, legal systems and policies impact on human development.
13	Religion and caste systems, minority and deprived states and their effects on human development.
14	Community support and its value for human development. Impact of media, technology and social networking.
15	Policies, programmes based on ecological factors impacting human development.
16	Research and assessment of human development based on ecological perspective.

VII. Teaching Methods/ Activities

- Lecture and class room discussions
- Group discussion
- Case specific discussions
- Assignment (Reading/Writing)
- Book/publication Review
- Student presentation
- Case studies and analysis
- Guest Lectures

VIII. Learning Outcome

After studying this course, the students would be able to

- Have gained the knowledge of both the various ecological structural factors that can impact upon developmental pattern and the processes that underlie it.
- Acquire information about how complex combinations of biological and socio-cultural events produce development.
- Appreciate the impact of context and culture on children's development.
- Describe, explain, and optimize the course of human life for diverse individuals living within diverse contexts.

IX. Suggested Reading

- Begon M, Harper JL and Townsend CR. 1990. *Ecology: Individuals, Populations and Communities*. Blackwell, Cambridge.
- Bronfenbrenner U. 1977. *Toward An Experimental Ecology of Human Development*. American Psychologist. 2, pp. 513-531.
- Bronfenbrenner U. 1979. *The Ecology of Human Development: Experiments by Nature and Design*. Harvard University Press, Cambridge.
- Hames R. 2001. *Human Behavioral Ecology*. International Encyclopedia of the Social and Behavioral Sciences. Elsevier Science Ltd.
- Ingold T. 1986. *Evolution and Social Life*. Cambridge University Press, Cambridge.
- Klein RG. 1989. *The Human Career: Human Biological and Cultural Origins*. University of Chicago Press, Chicago.

- Lerner RM. 2015. *Handbook of Child Psychology* (Ed.), Vol. 1 to 7. John Wiley & Sons, Harvard.
- Smith EA and Winterhalter B. 1992. *Evolutionary Ecology and Human Behavior*. Aldine, New York.
- https://en.wikipedia.org/wiki/Human_behavioral_ecology

I. Course Title : Programme Development for Vulnerable Families

II. Course Code : HDFS 603

III. Credit Hours : 3(2+1)

IV. Rationale

A family that is suffering from its own disadvantages, vulnerabilities and problems is likely to produce problem children. It is conceptualised that families have the ability to bounce back from difficult circumstances or stressful experiences to make a good adaptation to life if they participate in supportive programmes and thus diminish the chances of causing damage to its incumbents. The students seeking expertise in human development need to understand and gain skills in designing intervention programmes for vulnerable families, to step in when appropriate, to help people live happier and have more fulfilled lives.

V. Aim of the course

- To make the students learn to identify vulnerable population in rural and urban areas.
- To develop an understanding regarding techniques of planning, implementing and evaluating development and programmes and projects for vulnerable families.

VI. Theory

Unit I: Family Vulnerabilities

Vulnerable families- meaning, categories, forms of vulnerability, characteristics. Family vulnerability factors - poverty, alcohol and drug abuse, AIDS, prostitution, delinquency, social disadvantages, mental disorders, chronic serious health issues, destitute women and children, street children, abused children, women and senior citizens. Impact of family vulnerabilities on children and families.

Unit II: Programmes for vulnerable families

Developmental programmes for vulnerable families – concept, history and five year plans. Types of programmes and projects for vulnerable families. Different approaches to develop programmes for families. Inter disciplinary approach to research project management. National and international research projects for vulnerable families. National and International programmes and policies for vulnerable children and families. UNICEF framework for protection, care and support of orphans and vulnerable children. National Plan of Action for protection and care of children.

Unit III: Programme development – elements and process

Need assessment of vulnerable families. Developing need based multiple programmes for vulnerable families and children - project proposal, principles of project design, steps, guidelines, process involved, aspects of appraisal, basic considerations, risks and returns in project proposal development. Elements of effective programmes for families. Project sustainability- factors, components and action plan. Scientific values

and professional ethics in development of programmes for vulnerable population. Donors and funding agencies- types, National and International donors funding projects. Role of public and private donors in funding projects.

Unit IV: Working with vulnerable families

Working with vulnerable families- need, goals and significance. Developing strategies to support vulnerable children and their families. Strategies for increasing participation and retention. Ethics in working with vulnerable families. Working with children in vulnerable families- need, goals, strategies. Family resilience in the face of adversities- concept, risk and protective factors. Strengthening family relations. Including fathers in work with vulnerable families. Implementing the stimulating management techniques- Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Line of Balance (LOB), Gantt Chart and SWOT analysis.

VII. Practicals

1. Review of the national international projects and programmes for vulnerable families.
2. Discussion on programmes and research projects
3. Developing need assessment performa
4. Learning to use selected PRA techniques –
 - Focus group discussions/ interviews
 - Transit walk, social mapping and time line
5. Interviewing families with need assessment
6. Developing need based programme for vulnerable families
7. Class discussion on developed programme and enhancement
8. Programme implementation – Working with families and execution of developed programmes- home based approach
9. Working with families and execution of developed programmes- child centred approach
10. Programme Evaluation by using- Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM)
11. SWOT analysis
12. Developing concept note for research project on vulnerable families
13. Developing Multiple Programs for promoting family health with vulnerable Children
14. Dissemination/ publishing of success stories, popular articles.
15. End term assessment

Weekly Teaching Schedule (Theory)

Duration (Weeks) Topics

- | | |
|---|--|
| 1 | Vulnerable families- meaning, categories, forms of vulnerability and characteristics. |
| 2 | Family vulnerability factors and family vulnerability processes - poverty, alcohol and drug abuse, AIDS, prostitution, delinquency. Impact of family vulnerabilities on children and families. |
| 3 | Other vulnerability factors and their impact- social disadvantages, mental disorders, chronic serious health issues. |
| 4 | Vulnerable groups - destitute women and children, street children, abused children, women and senior citizens. |
| 5 | Developmental programmes for vulnerable families – concept, history and five year plans. Types of programmes and projects for vulnerable families. |



Duration (Weeks)Topics

- 6 Different approaches to develop programmes for families. Inter disciplinary approach to research project management.
 - 7 National and international research projects for vulnerable families. National and international programmes and policies for vulnerable children and families.
 - 8 UNICEF framework for the protection, care and support of orphans and vulnerable children. National Plan of Action for protection and care of children.
 - 9 Need assessment of vulnerable families. Developing need based multiple programmes for vulnerable families and children - project proposal, principles of project design, steps, guidelines.
 - 10 Process involved, aspects of appraisal, basic considerations, risks and returns in project proposal development. Elements of effective programmes for families.
 - 11 Project sustainability, factors, components and action plan. Scientific values and professional ethics in development of programmes for vulnerable population.
 - 12 Donors and funding agencies- types, National and International donors funding projects. Role of public and private donors in funding projects.
 - 13 Working with vulnerable families- need, goals and significance. Developing strategies to support vulnerable children and their families.
 - 14 Strategies for increasing participation and retention. Ethics in working with vulnerable families. Working with children in vulnerable families- need, goals, strategies. Social context of children in difficult circumstances and developmental vulnerabilities.
 - 15 Family resilience in the face of adversities- concept, risk and protective factors. Strengthening family relations. Including fathers in work with vulnerable families.
 - 16 Implementation/ stimulating management techniques- Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM) Line of Balance (LOB) Gantt Chart and SWOT analysis
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VIII. Teaching Methods/ Activities

- Lecture and class room discussions
- Group discussion
- Assignment (Reading/Writing)
- Surveys and community work
- Classroom and field practicals
- Case specific discussions
- Student presentation
- Case Analysis and case studies
- Guest Lectures

IX. Learning Outcome

After completion of this course, the students will be able to

- Develop a knowledge base into family vulnerabilities and will learn to identify vulnerable population in different settings. .
- Gain hands-on training in planning, designing, management and monitoring need based programmes and projects to make a positive impact on families in difficult circumstances

X. Suggested Reading

- Chandra P. 1995. *Project Planning, Analysis, Selection, Implementation and Review*. Tata McGraw, New Delhi.
- Chaudhary DP. 1992. *Women Welfare and Development*. NIPPCD, New Delhi.

- Dunst C, Trivette C and Angela D. 1998. *Enabling and Empowering Families: Principles and guidelines for families*. Brookline Books, Inc. Newton.
- Golden O, Lopres P and Mills G. 2012. *Economic Security for Extremely Vulnerable Families: Themes and Options for Work-force Development and Asset Strategies*. Urban Institute, University of New Hampshire, New Hampshire.
- Resource and Development Unit. 2012. *Supporting Vulnerable Families: Self-guided learning package*. Community Child Care Unit, Victoria.
- Mynarska M, Riederer B and Jaschinski I. 2015. *Vulnerability of families with children: Major risks, future challenges and policy recommendations*. Wittgenstein Centre for Demography and Global Human Capital, stockhom.
- [https://www.dcyd.gov.ie/documents/publications/A_Guide_to_what_Works_in_Family_Serviecs_for_Vunerable_Families.pdf](https://www.dcyd.gov.ie/documents/publications/A_Guide_to_what_Works_in_Family_Support_Serviecs_for_Vunerable_Families.pdf)
- https://www.who.int/maternal_child_adolescent/documents/pdfs/lancet_child_dev_series_paper3.pdf
- https://www.unicef.org/aids/files/Framework_English.pdf
- <https://www.cambridge.org/working-with-vulnerable-families/children-in-the-midst-of-family-and-domestic-violence>

I. Course Title : Strategic Developmental Intervention

II. Course Code : HDFS 604

III. Credit Hours : 3(2+1)

IV. Rationale

The dysfunctional families and their children who have unmet needs deviate from the normal development pattern and are in need of intervention during different phases of life. Early intervention services can change their developmental path and improve outcomes for families and communities. The human development specialists need to be professionally equipped with competencies and hands-on skills to design and implement macro and micro level situation specific customized interventions. Further, their resourcefulness in utilizing available expertise in allied areas and networking with them needs to be strengthened.

V. Aim of the course

- To make the students aware about the significance, scope, issues and current trends in interventions.
- To develop insight into different strategies and approaches of developmental intervention.
- To provide hands-on learning in designing, implementing, and evaluating developmental intervention package in various settings.

VI. Theory

Unit I: Developmental intervention – concept and significance

Intervention – definition, need and importance. Early intervention for promoting children's development - principles, assumptions, eligibility and success criteria, theory and practice, biosocial developmental contextualism. Current orientation towards developmental intervention for children from birth to early school years. Children with developmental vulnerabilities and their characteristics. Sources of developmental vulnerabilities and resources. Risk - biological, other personal and contextual risks, impact of social inequality. Protective factors - influences on children's development. Neurological basis for developmental intervention needs- importance of early years, sensitive periods and factors influencing brain development.

Unit II: Intervention approaches and framework

Need assessment for intervention, Contemporary issues and current trends in intervention. Intervention principles strategies and process. Theoretical frameworks in early intervention. Intervention models. Multi-disciplinary approaches to early intervention and programmes for motor, cognitive, language and social development. Characteristics of effective Intervention strategies. Framework for developing and implementing programs for children with developmental delays.

Unit III: Intervention procedural guidelines

Early intervention therapy program- guidelines, purpose, program goals and objectives, program description, service delivery and role of other supportive team members. Types of early intervention therapies. Service delivery models in early intervention- child centred, parent centred, family centred, home based, center/ school based. Role of personnel in intervention – role of physiotherapist, speech pathologist, audiologist, occupational therapist, behaviour therapist and developmental therapist. Developing network with other agencies. Resource Generation. Role of family and community in implementation of intervention programmes. Family as developmental context.

Unit IV: Strategic planning and implementation

Planning and implementation of intervention programme. Utilisation of other local level services offered to children and families – screening, referral, assessment, family education and support. Arranging services and family support, collaboration and teamwork with families and professionals. Collaboration and interdisciplinary practices. Professional and ethical behavior. Early intervention - operational standards, accountability and quality assurance, accreditation, program resources and service delivery. Evaluation of developmental intervention programmes – basic concepts, effectiveness, efficiency and economics. Government policies and provisions. Early intervention policies – an international perspective.

VII. Practical

Week	Topics
1	Compilation of research reviews on various developmental Interventions for young children.
2	Observational visits to intervention unit to understand the organizational structure, objective, types of services provided, facilities available, frequency, duration & cost of the Intervention, etc.
3	Observational visit to Paediatric Intervention unit to understand the process/ steps followed in Intervention programme
4	Observational visits to any National Institute offering Intervention programmes for children with developmental delays
5	Observational visits to any NGO offering intervention programmes for children with developmental delays
6	Identification of groups for intervention and Developmental assessment
7	Conducting need based assessment to identify target groups in need of intervention using Developmental Screening test/ appropriate psychological tests
8	Preparing developmentally appropriate intervention package for the selected group
9	Involving parents in the intervention programme, offering home based parent education programmes for managing children with developmental delays.
10	Field testing the developed intervention package at– – Day care centers/ pediatric wards – Clinics/ special schools
11	

Week	Topics
12	Conducting home based intervention programme for children with developmental delays
13	Conducting center-based interventions at – Day care centers/ pediatric wards/ Clinics/ special schools
14	Developing a checklist for assessing the quality & effectiveness of the intervention packages.
15	Evaluation of developed intervention programmes
16	End term assessment

Weekly Teaching Schedule (Theory)

Duration (weeks)	Topics
1	Introduction to early childhood intervention – definition, need and importance. Early intervention for promoting children's development – aims, principles, assumptions, eligibility and success criteria, theory and practice, biosocial developmental contextualism.
2	Current orientation towards developmental intervention for children from birth to early school years. Children with developmental and their characteristics. Sources of developmental vulnerabilities and resources.
3	Risk factors for developmental vulnerabilities among children- biological, other personal and contextual risks, impact of social inequality. Protective factors - influences on children's development.
4	Neurological basis for developmental intervention needs- importance of early years, sensitive periods and factors influencing brain development.
5	Need assessment for intervention, Contemporary issues and current trends in intervention, cultural considerations in children's wellbeing and development. Intervention principles strategies and process.
6	Theoretical frameworks in early intervention. Types of early childhood interventions. Ecological framework, transactional theory, developmental systems model, psychoanalytic perspective, behavioural and educational approaches to early intervention; behavioural perspective.
7	Intervention models – Guralnick's early developmental and risk factors model, Dunst & Trivette's resource based approach. Early Intervention approaches and programmes- relationship based approach, early intervention therapy team approach, multidisciplinary, interdisciplinary and trans-disciplinary approaches for promoting development of children.
8	Characteristics of effective Intervention strategies. Framework for developing and implementing programs for children with developmental delays.
9	Early intervention therapy program- guidelines, purpose, program description, program goals and objectives, service delivery, other supportive team member roles. Types of early Intervention therapies - play therapy, behavior modification, speech & auditory therapy, hydro therapy, physio-therapy, cognitive therapy.
10	Service delivery models in early intervention- child centred, parent centred, family centred, home based, school/ center based, home-cum-centre based programmes. Developing network with agencies.
11	Role of personnel in intervention – role of physiotherapist, speech pathologist, audiologist, occupational therapist, behaviour therapist, developmental therapist.
12	Developing network with agencies and generating resources. Role of family and community in implementation of early intervention programme. Families as developmental contexts. Generating resources.
13	Planning and implementation of intervention programme. Utilisation of other local level services offered to children and families – screening, referral, assessment,



Duration (weeks)	Topics
14	family education and support. Arranging services and family support, collaboration and teamwork with families and professionals.
15	Professional and ethical behavior. Early intervention - operational standards, accountability and quality assurance, accreditation, program resources, service delivery.
15	Evaluation of developmental intervention programmes – basic concepts. Economics of developmental intervention– cost - benefit analysis in early intervention, programme effectiveness.
16	Government policies and provisions.Early intervention policies – an international perspective.

VIII. Teaching Methods/ Activities

- Lecture and class room discussions
- Group discussion, Case specific discussions
- Assignment (Reading/Writing)
- Surveys
- Classroom and field practicals
- Community work
- Student presentation
- Case studies and analysis

IX. Learning Outcome

After studying this course, the students will

- Gain an understanding of the concept, significance, strategies and approaches of developmental intervention.
- Be able to design, implement, and evaluate need based developmental intervention package for assisting children and families in various settings.

X. Suggested Reading

- Berk LE. 1996. *Child Development*. Prentice Hall.
- Chandra P. 1995. *Project Planning, Analysis, Selection, Implementation and Review*. Tata McGraw, New Delhi.
- Choudhary DP. 1992. *Women Welfare and Development*. NIPCCD, New Delhi.
- Guralnick MJ. 2017. Early intervention for young children with developmental delays. In H Sukkar CJ, Dunst & J Kirkby (Eds.), *Early Childhood Intervention* (pp. 17-35). Oxon, UK: Routledge.
- Hetherington EM and Parke RD. 1993. *Child Psychology: A Contemporary View Point*. Mc Graw Hill.
- Saraswathi TS and Kaur P. 1999. *Human development and Family Studies in India*. Sage Publications, New Delhi.
- Sukkar H, Dunst CJ and Kirkby. 1999. *Early Childhood Intervention*. Routledge, Oxon.

I. Course Title : Family Studies

II. Course Code : HDFS 605

III. Credit Hours : 3 (3+0)

IV. Rationale

Numerous frame-works and perspectives about families have been developed by several theorists and researchers which have contributed towards the knowledge

building of families. It is very pertinent to understand the family as a social system and its transformed patterns, structure, roles, and ecological phenomenon that lay foundation for human development.

V. Aim of the course

- To develop an in-depth understanding among students regarding various approaches and frameworks for understanding families.
- To give them exposure to the various family issues in the current scenario and to orient them to psycho-social analysis of the changing family roles, responsibilities and relations in the context of human development.

VI. Theory

Unit I: Theoretical frameworks and perspectives

Different frameworks to understand families-conceptual framework, institutional, developmental and interactional framework. Family theories- Family Systems theory, human ecology theory, life course perspectives, social-cognitive-behavioral theory, biosocial theory and family communication theories. Family perspectives- Parson's sociological perspective, Marxist perspective, feminist perspectives, modern perspective.

Unit II: Family assessment

Different approaches to Family research- demographic, psychological, psychiatric, ethnographic and inter disciplinary approach. Measurement of family roles and relationships. Ethics in family research. Current issues for research in Indian families in different communities- rural and urban.

Unit III: Family under transition

Indian family system and changing patterns. Fatherhood- changing role of parents. Global migration- demographics, nature, contemporary migration patterns and effects. Cultural identity, family change and transnational mothering. Influence of globalization on children, youth, aged and families. Work and family interface - changing nature of work, feminization of the labour force and changing nature of family life and family roles. Diverse families -single parent families, female headed households, dual career families, one child family, adoptive families. Marital distress, family disorganisation.

Unit IV: Family therapy

Evolution of family therapy. Early models and basic techniques of family therapy-group process and communications analysis. Classic schools of family therapy-Bowenian family systems therapy, strategic, structured and experiential therapies, solution focused therapy, narrative therapy, psychodynamic therapy and integrative models. Cognitive behaviour family therapy. Application of family therapy in mental disorders. Family resilience- concept, developmental systems perspective, advances and challenges in family resilience research.

Weekly Teaching Schedule

Duration (weeks)	Topics
1	Different frameworks to understand families-conceptual framework, institutional, developmental and interactional.
2	Family theories- Family Systems theory, human ecology theory, life course perspectives, social-cognitive-behavioral theory.

Duration (weeks)	Topics
3	Biosocial theory and family communication theories.
4	Family perspectives- Parson's sociological perspective, Marxist perspective, feminist perspectives, modern perspective.
5	Different approaches to Family research- demographic approach, psychological approach and psychiatric approach.
6	Ethnographic and inter disciplinary approach. Measurement of family roles and relationships.
7	Ethics in family research. Current issues for research in Indian families in different communities- rural and urban.
8	Indian family system and changing patterns. Fatherhood and changing role of parents. Global migration- demographics, nature, contemporary migration patterns and effects- cultural identity, family change and transnational mothering.
9	Influences of globalization on children, youth, aged and families. Vulnerability of young people in a globalizing environment. Work and family interface - changing nature of work, feminization of the labour force and changing nature of family life and family roles.
10	Diverse families -single parent families, female headed households, dual career families, one child family, adoptive families. Marital distress, family disorganisation.
11	Evolution of family therapy-Palo Alto, Murray Bowen, Carl Whittaker and Minuchin
12	Early models and basic techniques of family therapy- group process and communications analysis, fundamental concepts such as systems theory, social constructionism and attachment theory.
13	Classic schools of family therapy- Bowenian family systems therapy, strategic, structured and experiential therapies. Psychodynamic therapy and cognitive behaviour family therapy.
14	Solution focused therapy, narrative therapy and integrative models
15	Family therapy in the 21st century and its application. Application of family therapy in mental disorders like depression, substance abuse, schizophrenia and eating disorders.
16	Family resilience- concept, developmental systems perspective, advances and challenges in family resilience research. Ecology of the family and healthy functioning.

VII. Teaching Methods/ Activities

- Lecture and class room discussions
- Group discussion
- Assignment (Reading/Writing)
- Case specific discussions
- Student presentation
- Case Analysis
- Guest Lectures

VIII. Learning Outcome

After successful completion of this course students will gain

- Comprehensive knowledge of different approaches to study families including explanations of major family theories, and their applications.
- Ability to reflect significant advances in the field of family studies and researchable issues including reconceptions of theories and cultural concerns.

- Reflects the paradigm shift that involves families, process of family transition and impact of its changing patterns on human development.

IX. Suggested Reading

- Bernardes J. 1997. *Family Studies: An Introduction*. Routledge, New York.
- Bharat S. 1996. *Family Measurement in India*. Sage Publications, New Delhi.
- Boss P, Doherty WJ, LaRossa R, Schumm WR and Steinmetz SK. 1993. *Sourcebook of Family Theories and Methods: A Contextual Approach*. Plenum Press, New York.
- Le Poire and Beth A. 2005. *Family Communication: Nurturing and Control in a Changing World*. Sage Publications, New Delhi.
- Nichols P and Schwartz R. 2006. *Family Therapy - Concepts and Methods* (7th Ed.). Pearson Education, Inc. USA.
- Roger L. 2004. *Family Therapy - A Constructive Framework*. Sage Publications, New Delhi.
- Trask B. 2010. Globalization and Families: Accelerated Systemic Social Change.
- White JM and Klein DM. 2007. *Family Theories*. Sage Publications, New Delhi.
- <http://www.Springer.com>.

I. Course Title : Adulthood and Aging

II. Course Code : HDFS 606

III. Credit Hours : 3 (3+0)

IV. Rationale

Population ageing phenomenon is widely observed across the world. The scholars need to have a wide understanding of the implications of this for the society at large and families in particular. Resonant, theoretical and empirical, understanding of adulthood and ageing from various biological, social and psychological perspectives with a specific focus on development in family context can empower students to develop a vision and contribute to the society in creating an environment for optimizing the quality of life of seniors in the prevailing socio-cultural circumstances.

V. Aim of the course

- To orient the students about the theoretical perspectives and current issues of aging.
- To inculcate knowledge regarding the methods and techniques in conducting researches in gerontology among students.

VI. Theory

Unit I: Ageing perspectives and developmental changes

Socio demographic profile of the aged in Indian context. Biological theories of aging, programmed ageing theories, random damage theories. Stochastic theories, evolutionary theories. The Ageing body - physical, sensory, cardiovascular, brain and central nervous system changes. Changes in bodily systems - muscular and skeletal system, respiratory system, immune system. Cognition during adulthood - fluid and crystallized intelligence, decline/ stability in intelligence, dialectic operations, memory, multidimensional changes. Cognitive neuroscience and aging. Healthy aging.

Unit II: Ageing personality

Personality changes during late adulthood. Personality types among the elderly. The Five-factor Model of dispositional traits by Tupes and Christal. Neugarten's Personality Styles. Levinson's theory of Social development, Carl Jung's theories-

personality, psyche & dreams. Peck's theory of personality adjustment in late adulthood. Erikson's theory. Disengagement theory. Information-processing in old age- attention, memory, pathological changes in memory. Cognitive disorders-dementia, Parkinson's disease and Alzheimer's disease. Ageing and sexuality, illness and sexuality.

Unit III: Ageing in the family context

Aged in the family milieu- family relationships, problems, prospects and support systems. Attachment and relationships in late adulthood. Ageing and mental health, Mental health risks and disorders. Loneliness, depression and sociability in old age. Indicators of successful and positive aging. Ageing and financial status. Elderly abuse. Stress among the aged and coping strategies. Grief and bereavement- patterns of bereavement and stages of grief. Dying with dignity.

Unit IV: Ageing in the current scenario

Contemporary socio-cultural changes and aging. Ageing in the current scenario- impact of urbanisation, globalisation and migration. Dual career families and aging, stress among caretakers and sandwich generation. International scenario of the aged. Critical issues around global aging. Reconceptualising aging. Researchable issues related on aging. Welfare of the aged- policies and programmes. Research trends in gerontology and methodological issues.

Weekly Teaching Schedule

Duration (weeks)	Topics
1	Socio demographic profile of the aged in Indian context. Theories of aging-Stochastic theories, programmed theories, evolutionary theories and random damage theories.
2	Biological theories of ageing - programmed ageing theories, random damage theories. Stochastic theories, evolutionary theories . Changes in bodily systems - muscular and skeletal system, respiratory system, immune system.
3	The Ageing body - physical, sensory, cardiovascular, brain and central nervous system changes. Changes in bodily systems - muscular and skeletal system, respiratory system, immune system. Cognition during adulthood- fluid and crystallized intelligence, decline/ stability in intelligence, dialectic operations, multidimensionality and multi-directionality. Cognitive neuroscience and aging.
4	Cognitive changes - the selection, optimization, and compensation theory (SOC theory), wisdom. Information-processing - attention, memory, pathological changes in memory.
5	Personality changes during late adulthood. Personality types among the elderly. The Five-factor Model of dispositional traits by Tuples and Christal.
6	Neugarten's Personality Styles. Levinson's stages of adult development theory. Disengagement theory.
7	Carl Jung's theories- personality, psyche and dreams, Peck's Views of Personality Adjustments. Erikson's theory.
8	Neuro -Cognitive disorders-dementia, Parkinson's disease and Alzheimer's disease.
9	The aged in the family context- family relationships, problems, prospects and support systems. Loneliness, depression and sociability in old age. Attachment & relationships in late adulthood.
10	Ageing and mental health, Mental health risks, indicators of successful and positive aging. Ageing and financial status. Elderly abuse.
11	Stress among the aged and coping strategies. Grief and bereavement- patterns of bereavement and stages of grief. Dying with dignity.

Duration (weeks)	Topics
12	Contemporary socio-cultural changes and aging. Ageing in the current scenario- impact of urbanisation, globalisation and migration.
13	Dual career families and aging, stress among sandwich generation and caretakers. International scenario of the aged.
14	Critical issues around global aging- reconceptualising aging. Researchable issues related on aging.
15	Welfare of the aged- policies and programmes.
16	Class discussions on Research trends in gerontology and methodological issues.

VII. Teaching Methods/ Activities

- Lecture and class room discussions
- Group discussion, - Case specific discussions
- Assignment (Reading/Writing)
- Student's Book/Publication Review
- Student presentation
- Case studies and analysis
- Guest Lectures

VIII. Learning Outcome

After this course, the students will be able to

- Develop an insight into the individual, interpersonal and broader social contexts that influence adult development and changes from young adulthood through mid life and old age impacting quality of life.
- Gain understanding of the social and psychological issues and challenges of ageing for individuals and families and further for society in a broader context.

IX. Suggested Reading

- Baron RA. 2008. *Psychology*. Pearson, Prentice Hall, New Delhi.
- Bigner JJ. 1994. *Individual and Family Development. A Life-Span Interdisciplinary Approach*. Prentice Hall, Englewood Cliffs, New Jersey.
- Brophy JE and Willis SL. 1981. *Human Development and Behaviour*. St. Martin's Press, New York.
- Dandekar K. 1996. *The Elderly in India*. Sage Publications, New Delhi.
- Hayslip B and Panek P. 1989. *Adult Development and Aging*. Harper & Row.
- Leme BH. 1995. *Development in Adulthood*. Pearson, Chicago.
- Richardson B and Barusch A. 2005. *Gerontological Practice for the 21st Century*. Columbia University Press.
- Sheets D, Bradley DB and Hendricks J. 2005. *Enduring Questions in Gerontology*. Springer Publishing Co., New York.

I. Course Title : Mental Health

II. Course Code : HDFS 607

III. Credit Hours : 3(3+0)

IV. Rationale

Although the general perception of mental illness has improved over the past decades, studies show that stigma against mental illness is still persistent, due to stereotypes and unawareness. Untreated, mental illness can contribute to higher medical issues, expenses, under-performance at school, college and at work, fewer employment opportunities and also to increased risk of suicide. Hence, the



professionals dealing with human beings need to have basic understanding about the types, symptoms and diagnostic measures of various mental health issues and the therapies for behavior modification.

V. Aim of the course

- To develop an insight into the issues related to mental health in varied contexts, theoretical perspectives and its relevance to individual functioning.
- To make them aware about various mental health disorders, their etiology, contemporary intervention techniques, therapies and programmes and policies for promotion of mental health.

VI. Theory

Unit I: Mental health - Issues and theories

Mental health – concept, biological and psychological basis, historical perspectives. Concept, criteria and measurement of normality and abnormality. Cognitive functions - normal and pathological. Theories of mental health - behavioural, biological, humanistic, existential, psychoanalytical and related theories. Family and mental health. Gender and mental health. Sociology of mental health. Culture and mental health.

Unit II: Mental health disorders

Types, etiology and behavioural symptoms of various mental health disorders and maladjustments- psychosomatic problems, anxiety disorders, mood disorders, schizophrenia and multiple-personality disorders. Clinical manifestation and effects/consequences of mental disorders- cognitive disturbances, affective disturbances, functional impairments, addictions, alcoholism, substance abuse, gambling, other addictions and social networking.

Unit III: Behaviour assessment and modification

Identification and assessment of mental disorders – approaches to diagnosis of mental disorders, techniques, steps in mental health assessment. Diagnostic and Statistical Manual of Mental Disorders (DSM) IV and DSM V. Psychological assessment - Role of mental health professionals. Strategies for behaviour modification - behaviour therapy, cognitive therapy, psychotherapy and family therapy.

Unit IV: Mental health programme and policy

Status of mental health in vulnerable population – children, adolescents, women and senior citizens in India and abroad. Contemporary intervention techniques. Mental Health Policy – legislations, programmes and policies for the promotion of mental health in India.

Weekly Teaching Schedule

Duration (weeks)	Topic
1	Mental Health – Concept, definitions, Biological basis, Psychological basis. Historical perspectives of mental health.
2	Definition of normality and abnormality- criteria and measurement. Cognitive functions-normal and pathological
3	Theories of Mental Health- Behavioural theories, Biological theories, Humanistic and existential theories, Psychoanalytical and related theories

Duration (weeks)	Topic
4	Family and mental health, Gender and Mental Health, Sociology of mental health, Culture and mental health.
5-6	Types, etiology and behavioural symptoms of various behavioural disorders and maladjustments- psychosomatic problems, anxiety disorders, mood disorders, schizophrenia and multiple-personality disorders.
7-9	Clinical Manifestations, effects/consequences of mental disorders- cognitive disturbances, affective disturbances, functional impairments, addictions- alcoholism, substance abuse, tobacco addiction, Gambling, other addictions and social networking.
10	Identification and assessment of mental disorders – Approaches to diagnosis of mental disorders. Techniques, steps in mental health assessment - psychological assessment
11	Diagnostic and Statistical Manual of Mental Disorders (DSM) IV and DSM V
12	Role of mental health professionals. Strategies of behaviour modification
13	Psycho therapy, behaviour therapy, cognitive behaviour therapy and family therapy.
14	Status of Mental Health in vulnerable population – Children, adolescents, women and senior citizens in India and abroad. Contemporary intervention techniques.
15	Mental Health Policy- legislations on Mental Health. Programmes and policies for the promotion of mental health in India.
16	Wrap up

VII. Teaching Methods/ Activities

- Lecture and class room discussions
- Group discussion
- Case specific discussions
- Assignment (reading/writing)
- Book/publication Review
- Student presentation
- Case studies and analysis
- Guest Lectures

VIII. Learning Outcome

After successful completion of this course, the students will

- Be aware of the issues related to mental health, theoretical perspectives on mental health its significance in life and trends of mental health in varied contexts.
- Develop an insight into various mental health disorders, their etiology, symptoms, assessment and diagnostics, contemporary intervention techniques and therapies and the ongoing mental Health programmes and policies.

IX. Suggested Reading

- Herrman H, Saxena S and Moodie R (Eds). 2005. *Promoting Mental Health*. World Health Organization.
- Kapur M. 1995. *Mental Health of Indian children*. Sage Publications, New Delhi.
- Paul S A. 2011. *Reference guide on Mental Health Evidence*. The National Academic Press, New York.
- Sreevani R. 2016. *A Guide to Mental Health and Psychiatric Nursing*. 4th Ed., Jaypee Publishers, New Delhi.
- Witte R and Howard GS. 2016. *Mental Health Practices in Today's Schools- Issues and Interventions*. Springer Publishing Company.
- https://www.who.int/mental_health/media/investing_mnh.pdf

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- I. Course Title** : Qualitative Research Methods
II. Course Code : HDFS 608
III. Credit Hours : 2 (1+1)

IV. Rationale

Qualitative research opens avenues for giving in-depth understanding of impact of socio-historical factors and life course variables on human beings. It also helps in developing competency for utilizing multiple research methods, simultaneously. This can guide in generating intensive data and critical analysis of human development and behaviour and action to be taken in various natural settings. Such research can provide a base for developing new theoretical inputs and for developing interactions for fruitful outcomes.

V. Aim of the course

- To orient the students regarding the need and scope of qualitative research.
- To impart knowledge and training in methods and techniques of qualitative research.

VI. Theory

Unit I: Introduction to qualitative research

Qualitative research design- concept, need and scope of qualitative research methods. Types, contribution, overview and practical applications of qualitative research methods.

Unit II: Qualitative research methods

Case studies, naturalistic design, historical methods, content analysis, ethnography, single cases experimental design, grounded theory, phenomenology.

Unit III: Qualitative data analysis and interpretation

Coding procedures, analysis and interpretation of qualitative data. Report writing. Evaluation of qualitative research.

Unit IV: Issues in qualitative research

Trends, challenges, limitations and constraints of various qualitative research methods. Ethical issues in conduct of research.

VII. Practical

Week Topics

- | | |
|----|---|
| 1 | Critical review of research papers using qualitative methods |
| 2 | Critical analysis of research papers using qualitative methods |
| 3 | Extensive review of the empirical research works using qualitative method |
| 4 | Preparing any one review paper using qualitative methods |
| 5 | Identifying researchable issues that can be researched for qualitative methods |
| 6 | Designing qualitative research, site selection, sampling. Data collection by using qualitative methods-
i) Conducting in-depth interviews
ii) Focused group interviews
iii) Naturalistic design
iv) Historical method
v) Ethnography
vi) Single cases experimental design
vii) Grounded theory |
| 13 | Coding procedures, data analysis |

Week Topics

- 14 Report writing and presentation
 - 15 Ethical issues in qualitative methods
 - 16 End term assessment
-

Weekly Teaching Schedule (Theory)

Duration (weeks)	Topics
1	Qualitative research design- concept, need and significance of qualitative research methods.
2	Scope of qualitative research.
3	Types of qualitative research and its contribution.
4	Overview and practical applications of qualitative research methods.
5	Case studies.
6	Naturalistic design, Historical methods, content analysis
7	Ethnography, single cases experimental design
8	Grounded theory, Phenomenology.
9	Coding procedures and analysis of data.
10	Interpretation of qualitative data
11	Report writing
12	Evaluation of qualitative research
13-14	Trends, challenges, limitations and constraints of various qualitative research methods
15	Ethical issues in conduct of research
16	Wrap up

VIII. Learning Outcome

After studying this course, the students will

- Gain deep understanding of the qualitative *research, various methods* and its practical applications.
- Will develop competency for utilizing *Qualitative* research methods by designing, . data generation, interpretation and writing report using qualitative analysis.

IX. Suggested Reading

- Barbour R. 2008. *Introducing Qualitative Research*. Sage Publications, New Delhi.
- Corbin J and Strauss A. 2008. *Basics of Qualitative Research*. Sage Publications, New Delhi.
- Denzin N and Lincoln Y. 2008. *Collecting and Interpreting Qualitative Materials*. Sage Publications, New Delhi.
- Hennink M, Hatter I and Bailay A. 2003. *Qualitative Research Methods*. Sage Publications, New Delhi.
- Ritchie J and Lewis J. 2003. *Qualitative Research Practices*. Sage Publications, New Delhi.
- Sharan BM. 2002. *Qualitative Research in Practice for Discussion and Analysis*. Jossey-Bass, Georgia.

Restructured and Revised
Syllabi of Post-graduate Programmes

Vol. 6

Community Science
– Resource Management and Consumer Science

Preamble

(Resource Management and Consumer Science)

Professionals in the field of Resource Management and Consumer Sciences are required to understand the interactions among humans and other elements of a system and allocate resources to maximize efficiency. The courses in the discipline should promote proficiency among students to apply theory, principles, and methods to optimize human well-being and overall system performance. Resource management is the efficient and effective development of consumer resources when they are needed. Thus the discipline of resource management and consumer science is linked with ergonomics, a major component of the human resources management and space planning which is an important factor in determining the productivity and safety in workplace. Management education provides knowledge on features and methods of contemporary management practices

The new education policy of India envisages systemic and structural changes in higher education system to enhance essential learning and critical thinking among students with a focus on experiential learning. By engaging students in hands-on experiences they are better able to connect theories and knowledge learned in the classroom to real-world situations.

Therefore, the courses are designed to give intense training to students in the field of ergonomics, space planning and management. Some of the exiting courses were modified to suit to the needs of present society. In the area of ergonomics focus was laid on understanding interactions among humans and other elements of system Upgraded the content integrating the human factor into workplace design. A new course on product design was introduced with a focus on generating and developing new product ideas. The concept of outsourced product development was introduced to establish linkages with industry. In the area of space planning and interior enrichment, upgraded the content of some of the existing courses as per the requirements of contemporary interior design profession and added new courses to enhance the architectural drawing skills of students.

The courses are upgraded to provide on hand skill training to student. Innovative methodologies were suggested to improve the understanding and vision of the students. Orientation towards research was given to enhance the aptitude for research among students. New initiatives like professional practice and industrial attachment give scope for developing professionalism among students.



Modifications Suggested in Courses in the Revised Curricula

M.Sc. (Community Science) in Resource Management and Consumer Science

Course Code	Course Title	Credit Hours	Remarks
Major Courses			
RMCS 501*	Resource Management: Principles and Practices	3 (3+0)	Changed the title and modified the content to provide knowledge on features and methods of contemporary management practices.
RMCS 502*	Human Factors and Ergonomics	3 (2+1)	Changed the title and included content on human physiology and interactions among humans and other elements of system.
RMCS 503*	Interior Space Planning	3(1+2)	Changed the title and upgraded the content as per the requirements of contemporary interior design profession.
RMCS 504*	Consumer Economics	3 (2+1)	Upgraded the content in light of changing consumer behaviours.
RMCS 505	Work and Work Station Design	3(1+2)	Upgraded the content integrating the human factor into workplace design.

Course Code	Course Title	Credit Hours	Remarks
RMCS 506	Colour and Lighting in Interiors	3 (2+1)	Modified the content taking onto consideration the changing trends in interior colour and lighting developments.
RMCS 507	Consumer Issues and Legislations	2 (2+0)	Three existing consumer courses are merged and modified the content in light of modifications in consumer legislations.
RMCS 508	Product Design	3(1+2)	New course is added with a focus on generating and developing new product ideas. The concept of outsourced product development was introduced.
RMCS 509	Ergonomic Research Techniques	3(1+2)	New course is added to expose students to the developments in ergonomic research methodologies.
RMCS 510	Housing and Energy Efficient Building Design	3 (2+1)	Two courses are merged and modified the content.
RMCS 511	Technical Drawings	3(1+2)	New course is added to enhance the architectural drawing skills of students.
RMCS 512	Interior Design Business Management	3(1+2)	Increased the practical credits and decreased the theory credits.



Course Code	Course Title	Credit Hours	Remarks
RMCS 513	Environmental Resource Management	2(1+1)	New course is added to expose students to emerging scientific and policy issues.
RMCS 514	Special Project	2(0+2)	
	Minor Courses		
FN 505	Nutrition and Physical fitness	3(2+1)	
FN 509	Food Safety and Standards	3(2+1)	
FN 513	Human Physiology	3(3+0)	
EECM 502	Development communication	3(2+1)	
EECM 505	Dynamic communication skills	2(0+2)	
EECM 507	Organisational development and HRD	2(1+1)	
EECM511	Climate Change Management	2(1+1)	
HDFS 503	Methods and Techniques of Assessment in Human Development	3(2+1)	
HDFS 506	Management of differently abled	3(2+1)	
ATS 512	Apparel and Textile Product Development	2(1+1)	
ATS 513	Laboratory Techniques in Textiles Research	2(0+2)	
	Supporting Courses		
	Research methodology	3(2+1)	
	Statistics	3(2+1)	
			Course numbers will be assigned by the departments that offer these courses.
	Common Courses		
	Library and Information Services	1(0+1)	
	Technical Writing and Communication Skills	1(0+1)	
	Intellectual Property and its management in Agriculture	1(0+1)	
	Basic Concepts in Laboratory Techniques	1(0+1)	
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)	
	Total	5(0+5)	
RMCS 591	Seminar	1(0+1)	
RMCS 599	Thesis/ Reseach	30	
	Total	70 credits	

*Core courses/ compulsory courses

Ph.D. (Community Science) in Resource Management and Consumer Science

Course Code	Course Title	Credit Hours	Remarks
Major Courses			
RMCS 601*	Trends in Resource Management	3 (3+0)	Changed the title and added content on skills and tools for better resource management.
RMCS 602*	Occupational Biomechanics	3 (2+1)	Modified the content focusing on biomechanical analysis for designing work environment that minimizes load on worker's body
RMCS 603	Globalization and Consumer Economics	3 (2+1)	Content modified to focus on changes in consumer pattern.
RMCS 604	Space Designing and Managerial Dimensions for Special needs	3(1+2)	Changed the title and included recent developments and transitions in space designing for special needs.
RMCS 605	Physical Ergonomics	3(1+2)	New course is added to make the students understand the potential effects of physical load on human body.
RMCS 606	Environmental Issues and Challenges	2 (2+0)	Added challenges due to recent environmental issues.
RMCS 607	Family Dynamics and Women Power	3 (2+1)	No major changes made.
RMCS 608	Special Project	2(0+2)	



Course Code	Course Title	Credit Hours	Remarks
Minor Courses			
FN 604	Global Nutrition Problems	2(2+0)	Proposed minor courses from subjects closely related to a student's major subject. Apart from these courses a student can register any other course offered by any other departments.
FN 608	Energy Metabolism	2(2+0)	
EECM 602	Impact Assessment of Development Programmes	3(1+2)	
EECM 603	Scaling Techniques for Behavioural Research	3(1+2)	
EECM 607	Media application and product promotion	4(2+2)	
HDFS 608	Qualitative research methods	3(2+1)	
ATS 602	Technical Textiles	3(2+1)	
ATS 605	Functional Clothing	3(2+1)	
ATS 607	Operational Management in Textiles and Apparel	2(2+0)	

Supporting Courses

A student can opt any course related to the topic of research offered by other faculties of agriculture university or SWAYAM/ MOOCS or other online courses up to a maximum of 5 credits.

RMCS 691	Doctoral Seminar I (Core Field)	1 (1+0)
RMCS 692	Doctoral Seminar II (Optional Field)	1 (1+0)
RMCS 699	Research	75
	Total	100 Credits

*Compulsory core courses

Course Title with Credit Load

M.Sc. in Resource Management and Consumer Science

Course No	Course Title	Credit Hours
Major Courses		
RMCS 501*	Resource Management: Principles and Practices	3 (3+0)
RMCS 502*	Human Factors and Ergonomics	3 (2+1)
RMCS 503*	Interior Space Planning	3 (1+2)
RMCS 504*	Consumer Economics	3 (2+1)
RMCS 505	Work and Work Station Design	3 (1+2)
RMCS 506	Colour and Lighting in Interiors	3 (2+1)
RMCS 507	Consumer Issues and Legislations	2 (2+0)
RMCS 508	Product Design	3 (1+2)
RMCS 509	Ergonomic Research Techniques	3 (1+2)
RMCS 510	Housing and Energy Efficient Building Design	3 (2+1)
RMCS 511	Technical Drawings	3 (1+2)
RMCS 512	Interior Design Business Management	3 (1+2)
RMCS 513	Environmental Resource Management	2 (1+1)
RMCS 514	Special Project	2 (0+2)
Minor Courses**		
FN 505	Nutrition and Physical fitness	3 (2+1)
FN 509	Food Safety and Standards	3 (2+1)
FN 513	Human Physiology	3 (3+0)
EECM 502	Development communication	3 (2+1)
EECM 505	Dynamic communication skills	2 (0+2)
EECM 507	Organisational development and HRD	2 (1+1)
EECM 511	Climate Change Management	2 (1+1)
HDFS 503	Methods and Techniques of Assessment in Human Development	3 (2+1)
HDFS 506	Management of differently abled	3 (2+1)
ATS 512	Apparel and Textile Product Development	2 (1+1)
ATS 513	Laboratory Techniques in Textiles Research	2 (0+2)
Supporting Courses		
	Research methodology	3 (2+1)
	Statistics	3 (2+1)



Course No	Course Title	Credit Hours
Common Courses		
	Library and Information Services	1(0+1)
	Technical Writing and Communication Skills	1(0+1)
	Intellectual Property and its management in Agriculture	1(0+1)
	Basic Concepts in Laboratory Techniques	1(0+1)
	Agricultural Research, Research Ethics and Rural Development Programmes	1(0+1)
RMCS 591	Seminar	1(0+1)
RMCS 599	Thesis/ Reseach	30
	Total	70 credits

*Core courses/ compulsory courses. **A student can also choose a course from other fields related to the student's research

Course Contents

M.Sc. in Resource Management and Consumer Science

I. Course Title	: Resource Management: Principles and Practices
II. Course Code	: RMCS 501
III. Credit Hours	: 3(3+0)

IV. Rationale

Global scenario presents tremendous challenges at the forefront of upcoming managers. Management education provides a potential productive ground to develop entrepreneurial skills and abilities. There is a need to facilitate students in developing competencies related to the role of managers as required in today's competitive environment. This course will nurture the students in a way that their abilities can be sharpened to take up managerial responsibilities in future.

V. Aim of the course

- To impart knowledge on the multifarious concepts, principles and processes of management
- To enable students to develop skills in the application of managerial skills in an organizational setup.

VI. Theory

Unit I: Nature and functions of management

Importance of management; Management functions; Management principles; Management levels; Functional areas of management; Managerial skills; Managerial roles.

Unit II: Evolution of management thought

Early classic approaches- Scientific management, administrative management and bureaucracy; Neo-classic approaches- human relation approach and behavioral approach; Modern approach; Quantitative approach; Systems approach; Contingency approach.

Unit III: Managerial competencies

Planning and administrative competencies; Decision making- Introduction, nature of managerial decision making, approaches to decision making; Types of decisions; Process of decision making; Tools and techniques of decision making; Creativity and rationality in decision making; Models of decision making behaviour; Risk and certainty in decision making; Authority and responsibility in decision making; Communication- Functions, factors and features, process, barriers and principles, types and channels; Leadership-Meaning, importance, characteristics and styles.

Unit IV: Management process

Steps in management process; Planning- types and dimensions, planning in systems perspective, factors affecting planning; Organizing- Departmentalization, line and staff relationship; Coordinating – need, types, principles, techniques and problems of coordination; Directing; Controlling.



Unit V: Human behaviour and organization

Introduction to organizational behaviour; Values; Attitudes and performance; Motivation-Importance, contemporary theories of motivation, approaches, elements of sound motivation; Stress management- concepts, causes, consequences, stress managing techniques.

VII. Teaching Methods/ Activities

- Lectures
- Assignments
- Publication review
- Students' presentations
- Case studies
- Guest lectures
- Online learning

VIII. Learning Outcome

After successful completion of the course, the students will be able to:

- Identify managerial activities that contribute to managerial effectiveness
- Observe and evaluate the influence of historical forces on the current practice of management
- Explain how organizations adapt to an uncertain environment and identify techniques that managers apply to influence and control the internal environment

IX. Suggested Reading

- Gaurav A. 2010. *Management Functions and Process, Management Thought* <https://kalyan-city.blogspot.com/2010/06/management-functions-process-management.html>
- Hellregel. 2002. *Management*. Thomason Learning, Bombay.
- Henry John. 2019. Functions of Management Process: Planning, Organizing, Leading, Controlling <https://iedunote.com/function-of-management-process>
- Koontz H and Wechrich H. 2008. *Management*. Tata McGraw Hill Inc., N.Y.
- Draft Richard L. 2015. *Management*. Thomson South-Western.
- Robbins SP and Decenzo DA. 2010. *Fundamentals of Management*. Pearson Education Asia, New Delhi.
- SatyaRaju R and Parthasarathi A. 2009. *Management- Text & Cases*. PHI, New Delhi.
- Stephen PR and Mary AC. 2015. *Management*. 13th Edition. Prentice Hall of India. New Delhi.
- Subba Rao P. 2017. *Management and Organizational Behaviour (Text and Cases)*. Himalaya Publishing House, New Delhi.
- Tripathi PC and Reddy PN. 2013. *Principles of Management*. Tata McGraw Hill Education Pvt Ltd, ND.

Weekly Lecture Schedule

Duration (week)	Topic
1	Nature and functions of management-definition and importance of management, management and administration; Management functions- Planning, organizing, staffing, directing, motivating, controlling and coordinating; Management principles- Importance, Fayol's principles of management.
2	Management levels-administrative level, executor level, supervisory level; Functional areas of management; Human resource management; Production management; Office management; Financial management and marketing management; Managerial skill- Roles and effectiveness.

Duration (week)	Topics
3	Evolution of management thought- Early classic approaches, scientific management, and Taylor's contribution, contributions of Gantt and Gilbreth, criticism of scientific management; Administrative management- Fayol's contribution, Principles of administration.
4	Limitations of administrative management; Bureaucracy- Important features, limitations; Classic approaches- Human relation approach, Hawthorne study.
5	Contributions and limitations of human relations approach; Behavioral approach- Emergence, key ideas, contributions and weaknesses; Modern approach- Contributions and limitations.
6	Quantitative approach-Contributions and limitations; Systems approach – Introduction, system's vocabulary, features of system, system's framework; Contingency approach-contributions and limitations.
7	Managerial competencies; Planning and administrative competencies; Decision making-Introduction, nature of managerial decision making; Approaches to decision making; Types of decisions; Process of decision making.
8	Tools and techniques of decision making; Creativity and rationality in decision making; Models of decision making behaviour; Risk and certainty in decision making; Authority and responsibility in decision making.
9	Communication-Functions, factors and features; Communication Process; Barriers of communication; Principles of communication; Types and channels.
10	Leadership- Meaning and importance, characteristics and styles of leadership; Management process; Steps in management process; Planning- Nature, types, importance and dimensions.
11	Strategic planning process; Planning in systems perspective; Factors affecting planning, limitations of planning.
12	Organizing-Process, departmentalization, organization structure, line and staff relationship; Coordinating-Need, types, principles.
13	Techniques and problems of coordination; Difference between coordination and cooperation; Directing- Elements of directing; Controlling- Need, steps, benefits and problems of controlling, controlling techniques.
14	Human behaviour and organization; Introduction to organizational behaviour; Values; Attitudes and performance; Motivation- definition, process, nature and importance of motivation.
15	Contemporary theories of motivation; Approaches and elements of sound motivation; Stress management- concepts and causes.
16	Signs and symptoms of stress; Sources and consequences of stress; Stress managing techniques.

I. Course Title : Human Factors and Ergonomics

II. Course Code : RMCS 502

III. Credit Hours : 3(2+1)

IV. Rationale

Ergonomics is an applied science that coordinates the design of devices and physical working conditions with the capacities and requirements of the worker. Human factors and ergonomics is the application of physiological and psychological principles to design of products, processes, and systems. The course is intended to train the students to reduce human error, increase productivity, and enhance safety and comfort with a specific focus on the interaction between the human and the thing of interest.

V. Aim of the course

- To acquaint students with basic principles of human anatomy, physiology, human anthropometry and its relation to ergonomics
- To enable the students, understand the human factors and its relation to ergonomic design.

VI. Theory

Unit I: Introduction to ergonomics

Definition, aim, objectives and scope of ergonomics; Domains of ergonomics; Historical development of ergonomics and human factor; Interface between man machine and environment; Ergonomics in design.

Unit II: Human body systems

Structure and functions of major body systems- parts and basic functions of skeletal system; Properties and functions of muscular system; Components of circulatory system; Parts and functions of respiratory system; Structure and functions of digestive system and nervous system.

Unit III: Human anthropometry

Human anthropometry; Static and dynamic anthropometry; Anthropometric measurements; Normal distribution and percentiles; Anthropometry in ergonomics and design.

Unit IV: Body movement and postures

The functions and movements of skeletal system - functional classification of bones, joints, ligaments and tendons; Neuromuscular aspects of movement; Joints and movements; Classification of joints on the basis of function; Movement at synovial joints; Skeletal muscle as levers; Posture- Work posture, postural discomfort and its impact on work and human health, posture analysis tools.

Unit V: Work physiology

Fundamentals of work physiology; Muscular efforts; Energy consumption; Physical fitness-Measuring physical fitness using different techniques; Physical work capacity and its measurement; Determination of cardiac cost of work; Factors influencing energy requirements and energy costs for various activities.

VII. Practical

1. Collection of anthropometric measurements of school children
2. Analysis of data on school children anthropometry
3. Presentation of report on school children anthropometry
4. Designing study table based on the anthropometric data
5. Measuring the work posture of a worker involved in manual work using RULA/REBA/OWASA
6. Analysis of work posture data
7. Presentation of report on work posture of person involved in manual work
8. Determination of physical fitness using any one of the technique
9. Analysis of data and presentation of report on physical fitness
10. Measurement of cardiac cost of selected activity
11. Analysis of data on cardiac cost of selected activity
12. Presentation of report on cardiac cost of selected activity
13. Assessment of ergonomic cost of work in terms of physiological indices

14. Analysis of data on ergonomic cost of work
15. Presentation of report on ergonomic cost of work
16. End of Term Assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Student presentations
- Group and individual research work
- Field visits
- Guest lectures

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Appreciate the role of ergonomics in reducing human error in designing and increase productivity
- Understand the importance of people in work systems, their abilities and limitations for designing tasks and work for effectiveness, efficiency, health and safety
- Contribute to new thinking and innovation processes within human factors and ergonomics

X. Suggested Reading

- Benchmark Research and Safety Inc. 2008. *A Brief History of Human Factors and Ergonomics* <http://www.benchmarkrs.com/main/human-factors/what.aspx>
- Dalela S and Saurabh. 1999. *Text book of Work Study and Ergonomics*. Standard Publishers and Distributors, Delhi.
- Galer IAR. 1982. *Applied Ergonomics Handbook*. Butterworth-Heinemann.
- Grandjean E. 1978. *Ergonomics of the Home*. Taylor & Francis, London.
- Grandjean E. 1980. *Fitting the Task to the Man*. Taylor & Francis, London.
- Jain AK. 2017. *Human Anatomy and Physiology*. Arya Publications, Udaipur.
- Panero J and Zelnik M. 1979. *Human Dimension and Interior Space*. Whitney Library of Design.
- Roebuck John A. 2016. *Anthropometric Methods: Designing to Fit the Human Body*. <http://www.hfes.org/Publications>.
- Rodahl AK, Hans A Dahl and Sigmund B Stromme. 2005. *Text Book of Work Physiology*. CRC Press, London.
- Salvendy (Ed). 2006. *Handbook of Human Factors and Ergonomics*. Third edition, John Wiley and Sons, Hoboken, NJ.

Weekly Lecture Schedule

Duration (week)	Topic
1	Introduction to ergonomics- Definition, aim, objectives and scope of ergonomics; Physical, cognitive and organizational domains of ergonomics; History and status of ergonomics; Developments in the field of ergonomics; Approaches, characteristics, classification and interface between man, machine and environment system.
2	Ergonomics in designing for human comfort and safety; Human body systems; Components of human skeleton -bones, cartilage, joints.
3	Parts of human skeleton-Skull, vertebral column, rib cage, shoulder girdle, skeleton of upper limb, pelvic girdle, skeleton of lower limb; Functions of human skeletal system- Strength, support and shape, protection of delicate organs, leverage for movements, production of red blood cells.

Duration (week)	Topics
4	Introduction to muscular system; Properties of muscles- irritable, contractible, extensible, elastic and adaptability; Types of muscles-Skeletal muscles, cardiac muscles, smooth muscles.
5	Functions of the muscular system- Mobility, stability, posture, circulation, respiration, digestion, urination, childbirth, vision, organ protection, temperature regulation; Components of the human circulatory system- Heart, blood, red and white blood cells, platelets, and the lymphatic system.
6	Respiratory system-Upper respiratory tract, nose, mouth, and the beginning of the trachea; Lower respiratory tract-The trachea, the bronchi, bronchiole and the lungs.
7	The act of breathing- inhalation and exhalation and involvement of muscles; Measurements of lung function.
8	Structure and functions of digestive system and nervous system; Human anthropometry- Static and dynamic anthropometry.
9	Anthropometric measuring techniques; Normal distribution and percentiles; Anthropometry in ergonomics and design-designing for extremes, designing for adjustability, designing work heights.
10	The skeletal system- Functions and movements; Functional classification of bones, joints, ligaments, tendons.
11	Neuromuscular aspects of movement; Joints and skeletal movement; Classification of joints on the basis of structure-Fibrous joints, cartilaginous joints, synovial joints.
12	Classification of joints on the basis of function- synarthrosis, amphiarthroses, diarthroses; Movement at synovial joints- Gliding movement, angular movement, rotational movement, special movements.
13	Skeletal muscles as levers and their role in body movement; Posture- Workplace posture, posture and muscle activity, postural discomfort and its impact on work and human health.
14	Posture analysis tools- Rapid Upper Limb Analysis (RULA); Rapid Entire Body Analysis (REBA); Ovako Working Posture Analysis (OWASA); Fundamentals of work physiology- Muscular efforts, energy consumption, body size and movements.
15	Physical fitness- Techniques to measure physical fitness; Physical work capacity and its measurement.
16	Determination of cardiac cost of work; Factors influencing energy requirements and energy costs for various activities.

I. Course Title : Interior Space Planning

II. Course Code : RMCS 503

III. Credit Hours : 3(1+2)

IV. Rationale

Space planning either in residential or commercial buildings is the most imperative aspect of interior design profession. The interior designer is expected to develop a space plan for either residential or commercial buildings with its space allocations and divisions, arrangements and organizations to accommodate the functional, special and occupancy requirements in the form of space layout and final planning. The course is designed to expose students to advances in interior space designing process.

V. Aim of the course

- To gain insight into the process of interior design and the various aspects and considerations involved in practice of both residential and commercial design
- To expose the students to advanced space planning techniques of residential and commercial buildings.

VI. Theory

Unit I: Interior design and user comfort

Residential buildings- Types and its characteristics; Commercial buildings- Types and its characteristics; Effect of interior design on user comfort- residential, commercial, special needs.

Unit II: Building planning principle

Functional and aesthetic considerations in the use of elements of design; Functional and aesthetic considerations in the use of principles of design; Housing principles for designing public private and circulation spaces; Advances in design process of residential interiors-Personal space, public space, utility space; Advances in design process of commercial interiors- Service institutions, marketing institutions; Recent trends in interior space management.

Unit III: Space standards

Space standards for various rooms in residential and commercial buildings; Building materials and their standards; Space saving furniture.

Unit IV: Building services

Electrical and safety fittings; House wiring; Plumbing systems for residential and commercial buildings; Sanitary fittings and fixtures for residential and commercial buildings.

VII. Practical

1. Preparation of a schedule to collect information regarding the characteristics of residential and commercial buildings
2. Visits to identify the characteristics of residential buildings
3. Visits to identify the characteristics of commercial buildings
4. Presentation of report on characteristics of residential and commercial buildings
5. Designing a residential house as per space standards –development of conceptual drawings
6. Designing a residential house as per space standards –development of design details and working drawings
7. Designing a residential house as per space standards –portfolio preparation
8. Designing a residential house as per space standards –presentation and group discussion
9. Designing any commercial building as per space standards- development of conceptual drawings
10. Designing any commercial building as per space standards- development of design details and working drawings
11. Designing any commercial building as per space standards- portfolio preparation
12. Designing any commercial building as per space standards- presentation and group discussion
13. Market survey on electrical and sanitary fittings and fixtures



14. Market survey on space saving furniture suitable
15. Presentation of report on sanitary fittings, fixtures and space saving furniture for residential and commercial buildings available in market
16. Cost estimation of residential building (apartment/condominium/row house)
17. Cost estimation of commercial building (Ice cream parlor/Tiffin centre/beauty salon/ restaurant, etc.)
18. Designing space saving furniture for residential buildings
19. Portfolio preparation on space saving furniture for residential buildings
20. Presentation of report on space saving furniture for residential buildings
21. Design and development of space saving furniture for commercial buildings
22. Portfolio preparation on space saving furniture for commercial buildings
23. Presentation of report on space saving furniture for commercial buildings
24. Project on renovation of a residential building with cost estimation
25. Portfolio preparation on renovation of a residential building with cost estimation
26. Presentation of report and group discussion on renovation of a residential building with cost estimation
27. Project on renovation of a commercial building with cost estimation
28. Portfolio preparation on renovation of a commercial building with cost estimation
29. Presentation of report and group discussion on renovation of a commercial building with cost estimation
30. Preparation of material board and presentation for a residential project
31. Preparation of material board and presentation for a commercial project
32. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Field visits
- Assignments
- Preparation of manuals
- Market survey
- Students' presentation
- Group and individual research work
- Guest lectures

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Understand the effect of interior design on user comfort and plan interiors for residential, commercial and special needs
- Get acquainted with recent trends in interior space management
- Develop plans as per space and building materials standards
- Update knowledge on building services

X. Suggested Reading

- Allen PS, Stimpson MF and Jones LM. 2000. *Beginnings of Interior Environments*. Prentice Hall.
- Choudhari SN. 2006. *Interior Design*. Avishkar Publ.
- Gilliatt M. 1981. *The Decorating Book*. Pantheon Books.
- Hamstech Interior Design. 2017. *Importance of Space Planning in Interior Designing* <http://www.hamstech.com/blog/importance-of-space-planning-in-interior-designing/>
- Panero J and Zelnik M. 1979. *Human Dimension and Interior Space*. Whitney Library of Design.

- Parikh A, Robertson D, Lane T, Hilliard E and Paine M. 2000. *The Ultimate Home Design Source Book*. Conran Octopus.
- Pears A, Lawrence M, Hymers P and Howell J. 2000. *Working with the Professionals*. Marshall Publ.
- Philip S. 2017. *Concept Design and Space Planning*.<https://www.designblendz.com/solutions/concept-design-space-planning>
- Seetharaman P and Pannu P. 2005. *Interior Design and Decoration*. CBS.
- Zimmerman N. 2003. *Home Workspace Idea Book*. The Taunton Press.

Weekly Lecture Schedule

Duration (week)	Topic
1	Types and characteristics of residential buildings; Types and characteristics of commercial buildings-Public and private educational institutions, health related buildings, recreational buildings, market buildings, etc.
2	Effect of interior design on user comfort in residential, commercial and buildings for people with special needs in terms of colour, space, texture, and light.
3	Functional and aesthetic considerations in the use of elements of design- Line, form, texture, colour, pattern and space.
4	Functional and aesthetic considerations in the use of principles of design – Proportion, balance, emphasis, harmony and rhythm.
5	Housing principles for designing public spaces and private spaces like living room, dining room, porticos, drawing room, media room, bedrooms, pooja room, bathrooms, bar area, etc.
6	Housing principles for designing circulation and utility spaces – kitchen, laundry, stair cases, path ways and corridors.
7	Advances in design process of residential interiors- Personal space, public space, utility space.
8	Advances in design process of commercial interiors- Service institutions, marketing institutions.
9	Recent trends in interior space management with reference to colour, architectural features, building materials, etc.
10	Space standards for public, private, utility and circulation spaces in residential and commercial buildings.
11	Building materials and their standards.
12	Space saving and multipurpose furniture suitable for residential and commercial interiors and their standards.
13	Electrical and safety fittings; Wiring system in residential and commercial buildings.
14	Plumbing systems for residential buildings in terms of fittings and fixtures.
15	Plumbing systems for commercial buildings in terms of fittings and fixtures.
16	Sanitary fittings and fixtures for residential and commercial buildings.

I. Course Title : Consumer Economics

II. Course Code : RMCS 504

III. Credit Hours : 3(2+1)

IV. Rationale

Consumer economics is a broad field, principally concerned with microeconomic analysis behaviour in units of consumers, families, or individuals. Students need to develop in-depth understanding of the functioning of domestic and global economies and to develop the necessary and portable skills to perform economic analysis. The



course will provide an insight to understand the role of consumption in shaping India's economy

V. Aim of the course

- To provide a comprehensive study of the basic institutions, concepts, principles, and practices of economics
- To impart knowledge about consumer behaviour with reference to micro and macroeconomic systems and its impact on consumption behavior.

VI. Theory

Unit I: Consumer behaviour

Consumer behavior; Environmental influences on consumer behaviour; Individual determinants of consumer behavior; Models of consumer behavior - Micro economic model, Nicosia model, Howard-Sheth model, Engel- Block well-Miniard model; Application of consumer behaviour knowledge in marketing; Consumer decision process- Problem recognition, search and evaluation, purchasing process, post purchasing behavior; Researching consumer behaviour.

Unit II: National income

Definition and significance; Concepts of national income; Methods of measurements of national income - value added method, income method, expenditure method, reconciliation of the three measures of national income; Difficulties in measurement of national income- Conceptual difficulties and practical difficulties; National income and Economic welfare.

Unit III: Consumption economics

Concept of consumption economics; Theories of consumption- Engels law of consumption, relative income theory of consumption, life cycle theory of consumption, permanent income theory of consumption; Budget and economy; Fiscal policy; Annual financial statement of the government and budget; Revenue receipts and revenue expenditure; Capital receipts and capital expenditure; Overall budget; Concepts of deficits in government budget; Revenue deficits and fiscal deficit; Taxation- India's tax structure; Tax as a source of public revenue; Direct and indirect taxes; Merits and demerits of taxes; Role of indirect tax in a developing economy; Incidence and effects of taxes; Inflation- Meaning of inflation, types of inflation, causes, effects, measures to check inflation; Deflation- Meaning, deflation and disinflation, causes, effects, measures to control deflation.

Unit IV: Financial systems of India

Introduction to financial system of India; Financial institutions; Financial services; Financial markets; Structure of Indian financial system; Importance of financial system for the economic development; Banking-Types of banking institutes; Functions; Types of loans and advances; Indian money market; Indian capital market; Financial intermediaries and services; Insurance and its regulations.

VII. Practical

1. Project work: Study of consumer buying behaviour while buying a selected commodity –Collection of review
2. Formulation of objectives of the study
3. Selection of sample, and study location
4. Designing the data collection tool

5. Pre testing and finalization of data collection tool
6. Collection of data
7. Data analysis
8. Report writing
9. Finalization of report
10. Presentation of the report on “Consumer buying behaviour while buying a selected commodity”
11. Discussion on the findings of the research
12. Visit to any one financial institute
13. Preparation of documents required for applying for a loan
14. Study the trends of stock market index given in magazines or news papers
15. Critical analysis of National Budgets through panel discussion.
16. End of Term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Students' presentation
- Group work
- Student's interview of key policy makers
- Case analysis and case studies
- Guest lecture
- Review of policy documents

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Understand how markets organize core economic activities, such as production, distribution, consumption, and the growth of productive resources
- Appreciate the role of factors that influence consumer decisions in consumer buying behaviour
- Gain knowledge on the determinants of macroeconomic conditions , causes of business cycles, and interactions of monetary and fiscal policy

X. Suggested Reading

- Ahuja HL. 2012. *Modern Micro Economics: Theory & applications*. Chand Company Ltd., New Delhi.
- Chadha R. 1995. *The Emerging Concepts and Strategies*. New Age International & Wiley Eastern.
- Deepashree. 2016. *Introductory Macroeconomics*. Saraswati House Pvt Ltd.
- Dewett KK and Varma JD. 2017. *Elementary Economic Theory*. S. Chand & Company Ltd., New Delhi.
- Dhingra IC and Garg VK. 2002. *Basic Economics & Business Environment*. Sultan Chand & Sons, New Delhi.
- Dhingra IC and Garg VK. 2004. *Economics Fundamentals*. Sultan Chand & Sons, New Delhi.
- Kaur S, Lekhi RK and Joginder S. 1997. *Consumer Economics*. Kalyani Publishers.
- Loudon David L and Albert JDB. 1993. *Consumer Behaviour*. 4th edition. Tata McGrawHill Publishing company Limited, New Delhi.
- Marguerite B. 2000. *Consumer Economics: A Multidisciplinary Approach*. John Wiley & Sons.
- Schiffman LG and Kaunuk LL. 2004. *Consumer Behaviour*. Prentice Hall of India.



Weekly Lecture Schedule

Duration (week)	Topic
1	Introduction to consumer behaviour, consumer and customer, buyers and users, organization of buyers, development of marketing concept. Environmental influences on consumer behaviour- Culture, social class, family, personal influences; Diffusion of innovations.
2	Individual determinants of consumer behaviour- personality and social concept, motivation and involvement, information processing, learning and memory, attitudes; Models of consumer behaviour-Micro economic model, Nicosia model.
3	Models of consumer behaviour- Howard-Sheth model, Engel- Block well-Miniard model; Application of consumer behaviour knowledge in marketing; Consumer behaviour and marketing management; Consumer behaviour and non-profit and social marketing; Consumer behaviour and government decision making; Consumer behaviour and consumer research process.
4	Consumer decision process-Problem recognition, search and evaluation, purchasing process, post purchasing behaviour; Researching consumer behaviour-Consumer research strategies, methods of gathering information, measuring consumer characteristic.
5	National income-definition and significance; Concepts of national income- Gross Domestic Product (GDP), Gross National Product (GNP), Net Domestic Product (NDP), Net National Product (NNP).
6	Concepts of national income- Net national product at market price, net domestic product at factor cost, income from domestic product occurring to private sector, private income, personal income, personal disposable income, inter-relationship between different concepts of national income; Methods of measurements of national income-value added method, income method.
7	Methods of measurements of national income- Expenditure method, reconciliation of the three measures of national income; Difficulties in measurement of national income-Conceptual difficulties and practical difficulties.
8	National income and economic welfare- Changes in the composition of national income and economic welfare, changes in the distribution of national income and economic welfare; Consumption economics-Definition, terms and concepts.
9	Theories of consumption- Engels law of consumption, relative income theory of consumption, life cycle theory of consumption, permanent income theory of consumption.
10	Budget and economy- Fiscal policy, objectives, annual financial statement of the government and budget; The Budget-revenue receipts and revenue expenditure, capital receipts and capital expenditure, overall budget, concepts of deficits in government budget, revenue deficits and fiscal deficit.
11	Taxation; India's tax structure; Tax as a source of public revenue, direct and indirect taxes, merits and demerits of taxes, role of indirect tax in a developing economy, incidence and effects of taxes; Inflation- Introduction, meaning of inflation, types of inflation, causes, effects, measures to check inflation.
12	Deflation- Meaning, deflation and disinflation, causes, effects, measures to control deflation; Introduction to financial system of India- Financial institutions, financial services, financial markets.
13	Meaning of financial services, structure of Indian financial system, importance of financial system for the economic development; Definition of Bank, Functions of Reserve Bank of India, Commercial Banks, Regional Rural Banks, Cooperative Banks, Micro Finance, Priority Sector Lending, NABARD, Development Financial Institutions SFC, SIDBI.
14	Types of loans and advances, principles of sound lending policies, credit appraisals of various forms of loans and advances; Modes of creating charges-lien, pledge,

Duration (week)	Topics
15	mortgage and hypothecation; Indian money market- Characteristics, structure, composition; Problems and reforms in Indian money markets.
16.	Indian capital market- Composition and growth of primary and secondary markets, difference between primary and secondary markets, capital market reforms and NBFC in capital markets, stock exchange, NSE, OTCEL, Online trading and role of SEBI; Financial intermediaries and services- Merchant banker, mutual funds, leasing companies, venture capital funds, forfeiting, loan syndication, factoring, custodial services, depository services and depository by participants.
	Meaning of insurance and reinsurance; Principles and advantages of insurance; Globalization of insurance and insurance sector reforms in India; Types of insurances; Regulations of insurance in India; Insurance act 1938.

I. Course Title : Work and Workstation Design

II. Course Code : RMCS 505

III. Credit Hours : 3(1+2)

IV. Rationale

Workplace design has a profound impact on the productivity of workers. Making the best use of space through optimum placement of equipment, integrating the human factor into workplace design, and effectively aligning the workplace into the surrounding environment are important aspects of ergonomics. This course prepares students to develop work stations as per the requirements of the organizations and its technologies that satisfy the workers individual requirements.

V. Aim of the course

- To acquaint students with the interrelatedness of work, worker and workstation environments
- To infuse an interdisciplinary approach to workstation engineering and techniques to reduce human cost of work.

VI. Theory

Unit I: Work, worker and workplace

Work, worker and workplace-definition, types and interrelationship; Classification of work based on energy consumption and nature of work; Time and energy requirements of work; Introduction to components of worker input- affective, cognitive, temporal and physical.

Unit II: Work measurement techniques

Work measurement techniques- Subjective judgment, Record of past performance, Scientific methods; Tools for work analysis-charts, diagrams, models and photographic aids.

Unit III: Workplace layout and equipment design

Principles of workstation and system design; Design and arrangement of different work centers; Work reaches; Working heights; Visual design parameters- Work surface, space allowance and storage; Design considerations for different workstation designs-Seated work, Standing work, Sit stand work; Controls, displays and information; Visual, auditory and other displays; Quantitative and qualitative



information; Methodologies for studying workplace design; Hazards of ill designed workstation.

Unit IV: Physical factors of the work environment

Environmental factors in workplace and their measurement-Heat, light, sound and noise, vibration, radiation, humidity; Effect of environmental parameters on worker and work performance.

VII. Practical

1. Selection of workplace unit for taking the anthropometric measurements of worker and dimensions of equipment and furniture used in a selected workplace units
2. Measuring and recording the anthropometric measurements of worker in the selected workplace unit
3. Measuring and recording the dimensions of equipment and furniture used in the selected workplace unit
4. Working on developing design for a workplace unit as per data collected in previous exercise
5. Determining the space relationships as per workers anthropometry
6. Determining the space relationships as per workers posture and movement at selected workstations
7. Developing the 2D design of selected workplace unit
8. Developing the 3D design of selected workplace unit
9. Work measurement in the selected workstation using two hand process charts
10. Analysis of data collected
11. Presentation of report on work done in the selected workstation using two hand process charts
12. Work measurement in the selected workstation using photographic aid
13. Analysis of data on work measurement collected in the selected workstation using photographic aid
14. Presentation of report on work done in the selected workstation using photographic aid
15. Measuring environmental factors in the workplace: Heat
16. Measuring environmental factors in the workplace: Light
17. Measuring environmental factors in the workplace: Noise
18. Measuring environmental factors in the workplace: Vibration
19. Measuring environmental factors in the workplace: Radiation
20. Measuring environmental factors in the workplace: Humidity
21. Analysis of data collected on environmental parameters
22. Presentation of report on environmental parameters
23. Developing a design layout of a selected commercial workplace: Preparation of check list
24. Collection of data on design features, space relationships, dimensions of equipment and furniture, and environment control parameters in the workplace
25. Analyzing the data
26. Finalizing the dimensions of selected commercial workplace
27. Developing a design layout of the selected commercial workplace based on the DATA.
28. Presentation and group discussion on the design layout of the selected commercial workplace
29. Finalization of design layout of the selected commercial workplace

30. Developing 2D plan of the selected commercial workplace
31. Developing 3D workplace design of the selected commercial workplace
32. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Reading assignment
- Photographic technique for recording posture at workplace
- Hands on experience on measuring ergonomic parameters
- Students' presentation
- Group discussions
- Guest lectures
- Visits to industries

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Asses the workers requirements in a workplace
- Determine the space relationships as per workers anthropometry, posture and movement at any workstations
- Develop workplace design for various occupations

X. Suggested Reading

- Barnes RM. 1980. *Motion and Time Study*. John Wiley & Sons.
- Bridger JD. 1995. *Introduction to Ergonomics*. McGraw-Hill Book Co., Singapore.
- Dalela S and Saurabh. 1999. *Textbook of Work Study and Ergonomics*. Standard Publishers Distributors, Delhi.
- GalerIAR. 1982. *Applied Ergonomics Handbook*. Butterworth-Heinemann.
- Grandjean E. 1978. *Ergonomics of the Home*. London: Taylor & Francis.
- Grandjean E. 1980. *Fitting the Task to the Man*. Taylor & Francis, London.
<https://workdesign.com/2012/08/ergonomics-and-workplace-design/>
- Mundel M. 1978. *Motion and Time Study*. Prentice Hall.
- Panero J and Zelnik M. 1979. *Human Dimension and Interior Space*. Whitney Library of Design.
- Singh S. 2007. *Ergonomics Interventions for Health and Productivity*. Himanshu Publications.
- Thomas Jiji. 2012. *Ergonomics and Workplace Design*

Weekly Lecture Schedule

Duration (week)	Topic
1	1. Definition, types and interrelationship of work, worker and workplace.
2	2. Classification of work-Based on the amount of physical exertion that the work requires as sedentary, light, medium, heavy, and very heavy; Based on the nature of work as manual repetitive, cognitive repetitive, manual non repetitive and cognitive non repetitive work; Time and energy requirements of work.
3	3. Introduction to components of worker input- affective, cognitive, temporal and physical.
4	4. Affective component- job satisfaction, task performance and goal of work; Cognitive component- Knowledge, thinking and mental skill.
5	5. Temporal component- Techniques of organizing work; Physical Component- Productivity.
6	6. Work measurement techniques- Subjective judgment, record of past performance, scientific methods.

7. Tools for work analysis (i) Charts indicating sequence of events, flow process chart, two hand process chart; (ii) Charts indicating sequence of events happening in the order in which they occur on a time scale-Multiple activity chart, man-machine chart, simo chart; (iii) Diagrams indicating movements along the events happening in the order in which they occur- Flow diagram, string diagram, cycle graph, chrono-cycle graph, travel chart.
8. Tools for work analysis- (i) Models indicating the actual layout on a dimensional scale, two dimensional models, three dimensional model; (ii) Photographic aids.
9. Principles of workstation and system design.
10. Design and arrangement of different work centres, work reaches, working heights.
11. Design considerations for different workstation designs- Seated work, standing work, sit stand work.
12. Controls and displays- Visual, auditory and other displays, quantitative and qualitative information.
13. Methodologies for studying workplace design- Formal and informal techniques.
14. Hazards of ill designed workstation.
15. Environmental factors in workplace and their measurement- Heat, light, sound and noise, vibration, radiation, humidity.
16. Effect of environmental parameters on worker and work performance.

I. Course Title : Colour and Lighting in Interiors

II. Course Code : RMCS 506

III. Credit Hours : 3(2+1)

IV. Rationale

Colour and lighting influence and manipulate space through strategic lighting designs. The study of the relationship between light, colour and spaces is an essential element of the whole interior design process. The course provides an opportunity for students to learn principles of lighting and investigate lighting for contemporary lifestyle and luxury interiors and correctly interpret the 'light' atmosphere of a space and translate this into creative and technical lighting solutions.

V. Aim of the course

- To gain insight into the use of colour and lighting in various buildings and its significance
- To assess the technical aspects and interrelationship of colour and light and their effect on interior spaces.

VI. Theory

Unit I: Colour as an interior design element

Historical perspective of colour as an interior design element; Properties of colour - Hue, value and intensity; Approaches and theories of colour.

Unit II: Applications of colour in various elements of interiors

Cultural and psychological effects of colour; Types of colour schemes-Related colour schemes, contrast colour schemes; Factors to consider while choosing colour schemes for buildings; Suitable colour schemes for residential, commercial, public, educational and religious building interiors.

Unit III: Introduction to lighting in interior

Importance and sources of lighting; Cultural and social aspects of lighting; Physiology of vision; Properties of lighting - Reflection, absorption, transmission and diffusion; Types of lighting; Safety and emergency lighting; Lighting requirements for household activities; Lighting requirements in commercial buildings.

Unit IV: Quantity and quality of lighting

Measurement of light and its units; Types of lamps from animal fat lamps to LEDs, their characteristics and suitability to various rooms; Types of lighting based on direction of use, place of use, purpose and portability; Lighting controls- Type, selection, care, maintenance and economic use; Lamp holders; Lighting switches; Motion sensors; Factors affecting the quantity of illumination in a room- Room proportion, colour, texture and cleanliness of room surface, lamp lumen, lamp lumen depreciation; Method of calculating lighting requirements for various rooms; Lighting for outdoor living and gardens.

Unit V: Effect of colour on lighting

Colour rendition; Use of colour and lighting in architecture, materials and finishes from 16th century to the date; Use of colour and lighting in problematic areas to disguise and camouflage.

VII. Practical

1. Study of types of colour schemes in residential interiors
2. Study of types of lamps and lighting used in residential interiors
3. Group discussion on use of colour and lighting in interiors
4. Study of types of colour schemes in commercial interiors
5. Study of types of lamps and lighting used in commercial interiors
6. Presentation on use of colour and lighting in commercial interiors
7. Suggesting suitable colour schemes for residential buildings and its cost estimation
8. Suggesting suitable colour schemes for commercial buildings and its cost estimation
9. Group discussion on suitable colour schemes for residential and commercial buildings
10. Suggesting suitable lighting fixtures for residential buildings and its cost estimation
11. Suggesting suitable lighting fixtures for commercial buildings and its cost estimation
12. Group discussion on suitable lighting fixtures for residential and commercial buildings
13. Prepare a colour and lighting plan for problematic areas like space below stair case and estimate the cost
14. Prepare a colour and lighting plan for problematic areas like, irregular shape rooms or narrow areas and estimate the cost
15. Market survey to understand the available safety and emergency lighting systems and presentation of report
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Preparation of manuals

- Students' presentation
- Visits to institutes
- Group research work
- Guest lectures

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Develop a detailed lighting plan for different context
- Successfully create a project outline on lighting installation for residential and commercial interiors, events and exhibition
- Design suitable colour scheme for residential and commercial building interiors

X. Suggested Reading

- Cullision PW. 1981. *New Decorating Book*. Meredith Corporation, Iowa.
- James D. 1997. *Lighting*. Cassell Publ, U.K.
- Mark K and James Benya. 2004. *Lighting Design Basics*. John Wiley & Sons, Inc, U.S.A.
- Michael W. 2002. *Advances in Colour Harmony & Contrast for the Home Decorator*. School of Colour Publ.
- Parikh A et al. 2000. *The Ultimate Home Design Source Book*. Conran Octopus, London.
- Sarao M and Laurie Z. 1995. *The Power of Colour*. John Wiley & Son.
- Stepat Dorothy. 1971. *Introduction to Home Furnishings*. MacMilan.
- Tim Anderson. 2018. *Importance of Lighting in Interior Design*
<https://homeguides.sfgate.com/importance-lighting-interior-design-56751.html>

Weekly Lecture Schedule

Duration (Week)	Topic
1	Historical perspective of colour as an interior design element- Definition, origin, old theories of colour; Properties of colour -Hue, value and intensity and their effect on space and texture in different rooms.
2	Approaches to the concept of colour- Physicist, physiologist, chemist, artist, and psychologist; Theories of colour –Prang and Munsell colour theories.
3	Theories of colour – Ostwald colour theory; Cultural and psychological effects of primary, secondary and tertiary colours.
4	Related colour schemes- Monochromatic, analogous, neutral colour schemes; Characteristics and applicability of related colour schemes in interiors; Contrast colour schemes- Single, double and split complementary, triad and tetrad colour schemes; Characteristics and applicability of contrast colour schemes in interiors.
5	Factors to consider while choosing colour schemes for buildings -Age, gender, orientation of the room, climate, personal preferences, mood, occasion, etc.; Suitable colour schemes for residential, commercial, public, educational and religious building interiors.
6	Importance and sources of lighting - Natural and manmade; Cultural and social aspects of lighting -Usage for different occasions.
7	Physiology of vision with reference to the perception of colour; Properties of lighting- Reflection, absorption, transmission and diffusion.
8	Types of lamps for household and commercial interiors- Low intensity and high intensity discharge lamps; Safety and emergency lighting needs in residential and commercial buildings.
9	Lighting requirements in residential buildings for cooking, reading, washing, sewing, cleaning, watching, grooming, etc.; Lighting requirements in commercial buildings like banks, bus stations, air ports, stadiums, theatres, restaurants, etc.
10	Measurement of light and its units- Lumen, candle power, lux, foot candle; Types of lamps from past to present, their characteristics and suitability to various rooms.

Duration(Week)	Topic
11	Types of lighting based on direction of use, place of use, purpose and portability; Types of architectural lighting - . Luminous, recessed, valance, cove, cornice, etc.
12	Lighting Controls- Type, selection, care, maintenance and economic use- lamp holders, lighting switches, motion sensors; Factors affecting the quantity of illumination in a room-Room proportion, colour, texture and cleanliness of room surface, lamp lumen, lamp lumen depreciation.
13	Method of calculating lighting requirements for various rooms by lamp lumen method; Lighting for outdoor living like terraces, balconies, patios, decks, etc. and gardens in residential and commercial buildings.
14	Meaning of colour rendering, types of glare and visual illusions; Use of colour and lighting in Roman, English, French and Indian architecture from 16 th century to the date.
15	Use of colour and lighting in materials (wall, floor, ceiling, furnishings) and in finishes (wall, floor, ceiling) from 16 th century to the date.
16	Use of colour and lighting in problematic areas to disguise - Low height rooms, high ceiling rooms, narrow rooms, tiny rooms, projections and recesses, spaces below stair cases, awkward shape windows, irregular shaped rooms.

I. Course Title : Consumer Issues and Legislations

II. Course Code : RMCS 507

III. Credit Hours : 2(2+0)

IV. Rationale

Globalization of trade, market-dominated economy, information revolution and emergence of e-commerce has contributed towards development of consumer protection measures. The subject has received tremendous importance among the contemporary legal fraternity in India. The legal experts are emphasizing on the need for teaching consumer law to present generation for making them equipped to handle issues relating to this branch of law. In this background the present course will introduce the students to the existing law and practice relating to consumer protection.

V. Aim of the course

- To acquaint the students with various consumer issues and legislative framework available for consumer protection
- To make students approach the subject from a multifaceted perspectives such as changing trends in consumerism, legal and non-legal consumer protection measures, consumer and communication tools.

VI. Theory

Unit I: Consumer issues

Changing trends in consumerism; Profile of consumers in India and abroad; Consumer issues and challenges; Social media management; Consumer finance; Multiple tax structure: Gender issues in consumerism; Gender division of labour; Access to decision making; Marketing and gender consumerism; Wealth and gender consumerism; Green consumerism- Definition, objectives and necessity of green consumerism; Agriculture credit in India; Agriculture marketing in India.



Unit II: Consumer legislations

Significance of consumer guidance and counseling; Consumer protection measures- Legal and non-legal consumer legislations; The Contract Act 1982; The Sale of Goods Act 1930; The Essential Commodities Act 1955; The Agricultural Produce (Grading and Marking) Act 1937; The Standard of Weights and Measures Act 1976; The Trade Mark Act 1999; The Competition Act 2002; The Bureau of Indian Standard Act 1986; Consumer Protection Act 1986; Consumer protection Bill 2018; Right to Information Act 2005; Information Technology Act 2000; Food Safety and Standards Act, 2016.

Unit III: Consumer and communication tools

Consumer communication- Significance, history and types; Communication media and social change; Trends in consumer communication; Media and consumer demand; Advertising as a mode of communication; Trends and impact of advertising on consumers; Social media- chats, Blogs, Face book, LinkedIn, Twitter, Instagram, Pinterest, YouTube.

Unit III: On line marketing

E-marketing in India- Evolution; Growth and challenges; Legislative frame work.

VII. Teaching Methods/ Activities

- Lectures
- Assignments
- Book/Publication Review
- Students' presentation
- Group work
- Guest lectures
- Review of policy documents

VIII. Learning Outcome

After successful completion of the course, the students will be able to

- Understand challenges faced by consumers in the economy because of changing trends in consumerism
- Conversant with major national and international instruments on consumer protection.
- Recognize common problems involving consumer transactions; identify relevant statutes and regulations; and apply them to specific problems

IX. Suggested Reading

- Bhatt R. 2010. *Consumer Behaviour*. Common Wealth Publishers Pvt. Ltd.
- Clarke J, Janet N, Smith EV and Westmarland L. 2007. *Creating Citizen Consumers*. Sage Publ.
- Jones RN. 2007. *Basic Counseling Skills*. Sage Publ.
- *Nations Guidelines on Consumer Protection*. 2008. <https://unctad.org/en/Pages/DITC/CompetitionLaw/UN-Guidelines-on-Consumer-Protection.aspx>
- Pant H. 2007. *Advertising & Media*. ABD Publishing.
- Potter WJ. 2008. *Media Literacy*. Sage Publ.
- Seetharaman P and Sethi M. 2001. *Consumerism: Strategies and Tactics*. CBS.
- Sharma S and Kumar D. 2001. *Advertising, Planning, Implementation and Control*. Mangal Deep Publ.
- Shukul M and Gandotra V. 2006. *Home Management & Family Finance*, Dominant Publishers & Distributors New Delhi.
- Sparks C. 2008. *Globalization, Development and Mass Media*. Sage Publ.

Weekly Lecture Schedule

Duration (week)	Topic
1	Changing trends in Consumerism; Changing economy, rapid urbanization, increasing income levels, digital marketing, shift in approach towards family systems; Profile of consumers in India and abroad- socially connected, environmentally aware, style –conscious, low brand loyalty, informed purchases, spends on leisure, health conscious; Consumer issues and challenges- on line marketing, social media management, consumer finance, multiple tax structure.
2	Gender issues in consumerism- gender division of labour, access to decision making, marketing and gender consumerism, wealth and gender consumerism; Green consumerism-definition, objectives and necessity of green consumerism.
3	Consumer guidance and counseling: Significance, aims and objectives, major areas of guidance and counseling; Agriculture credit in India ,Agriculture marketing in India.
4	Unfair trade practices in India- Introduction, types of unfair trade practices, false representation, false offer of bargain price, free gifts offers and prize scheme, non-compliance of prescribed standards, hoarding, destruction, etc.; Provisions and remedies for unfair trade practices in legal system- Removal of defects, replacement of goods, refund of price, removal of deficiency in service, discontinuance of unfair trade practice, stopping of sale and withdrawal of hazardous goods, payment of adequate cost.
5	Consumer protection against unfair trade practices- The monopolistic and restrictive trade practices Act, 1969 and The Competition Act, 2002; Authorities and agencies for settling unfair trade practices in India- District Forum, State Commission, National Commission, Supreme Court, Competition Commission of India
6	Non-legal Consumer Protection Measures; Types of alternate dispute resolution techniques- mediation, arbitration, ombudsman, peer review, early neutral evaluation, settlement conference, facilitation, adjudication; Provisions for consumer protection and welfare under The Contract Act 1982 and The Sale of Goods Act 1930.
7	Provisions for consumer protection and welfare under The Essential Commodities Act 1955; The Agricultural Produce (Grading and Marking) Act 1937; The Standard of Weights and Measures Act 1976 and The Trademark Act 1999.
8	Provisions for consumer protection and welfare under The Competition Act 2002 The Bureau of Indian Standard Act 1986; and Consumer Protection Act 1986 and Consumer protection Bill 2018.
9	Provisions for consumer protection and welfare under Right to Information Act 2005; Information technology Act 2000 and Food Safety and Standards Act, 2016.
10	Consumer communication media- significance, history and types; Communication media and social change.
11	Trends in consumer communication and their role in creating consumer demand; Advertising as an effective mode of consumer communication- History, target audience, impact of advertising on consumers.
12	Legal and ethical aspects of advertising in India; Social media and new trends in consumer communication.
13	Types of social media; Chats, Blogs, Face book, Link din, Twitter, Instagram, Pinterest, Youtube; Communication through blog- Origin, types, communication through personal blogs, collaborative blogs, corporate and organizational blogs.
14	Effective methods of communication through face book and link din; Communication through Twitter, Instagram, Pinterest, YouTube.
15	Online marketing- Definition, evolution and benefits; Online marketing tools- Types, merits and demerits.
16	Challenges of On line marketing; On line marketing and legislative frame work.

- I. Course Title : Product Design**
II. Course Code : RMCS 508
III. Credit Hours : 3(1+2)

IV. Rationale

Product design is highly customized and user centered. The purpose of every product is to increase safety, comfort and performance. An integrated approach to management of product design and development is required to create better quality products with enhanced capabilities. This course is designed with focus on theory and practical applications in the product design and development for all purposes not undermining the environment in which it will be used.

V. Aim of the course

- To present an overview of the product designing and development process.
- To facilitate for gaining hands on experience in design and development of consumer product.

VI. Theory

Unit I: Introduction to product design

Product Design- Definition, significance and essentials of product design and consumer demand; Product attributes-usability, contextual needs, compatibility, product aesthetics.

Unit II: Approaches to product designing

Concepts in product designing; User-centered design; Universal design; Accessible design; Usable design; Anthropometry in product design; Design consideration in product for geriatrics; Design consideration in product for people with special needs.

Unit III: Outsourced product development (OPD)

Introduction; Importance; Concept and need; Major differentiating factors- technology related, people related, process related; Emerging models of product development.

Unit IV: Product development process

Stages of product development process; Market analysis; Product analysis; Identification and innovation; User-Product relationship and ergonomics; Cognitive and social engineering issues; User interface designing.

Unit V: Product testing

Product testing- definition, purpose, role of government, Industry and consumer organizations; Product testing techniques and devices-product evaluation, quality control and standardization.

VII. Practical

1. Checklist for evaluation of a selected consumer product against the manufacturer's guidelines-Literature survey
2. Designing a checklist for evaluation of a selected consumer product against the manufacturer's guidelines
3. Evaluation of the selected consumer product against the manufacturer's guidelines
4. Presentation and group discussion
- 5-9. Exposure to Outsourced product development (OPD)
10. Conceptualization and development of consumer products with functional alternatives

11. Product Idea generation through brainstorming
12. Evaluation of the product idea generated; Group participation
13. Finalization of product
- 14-18. Working on design criteria
19. Collection of feedback from market
20. Analyzing the user's option on the design of the consumer product
- 21-26 Developing the prototype of the product
27. Evaluation of the product developed for identifying the problems through brain storming
28. Proposing design solutions to rectify identified lacunas in the product design
- 29-31. Finalization of product design
32. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Students' presentation
- Exposure to outsourced product development
- Guest lectures
- Visits to industries

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Understand the technical and business aspects of the product development
- Analyze and apply methodologies for product design and development
- Undertake a meticulous approach to the management of product development to satisfy consumer needs

X. Suggested Reading

- Boothroyd G, Dewhurst P and Knight W. 2002. *Product Design for Manufacture and Assembly*. CRC Press.
- Cross N. 2000. *Engineering Design Methods: Strategies for Product Design*. Reiters Publications.
- Dumas JF and Redish JC. 1993. *A Practical Guide to Usability Testing*. Greenwood Publications.
- Meilgaard M, Civille GV and Carr BT. 2006. *Sensory Evaluation Techniques*. CRC Press.
- Otto KN and Wood KL. 2001. *Product Design: Techniques in Reverse Engineering*. New Age International.
- Parker G and Alstyne MV. 2005. *Management Science: The Theory of Information Product Design*. INFORMS Publications.
- Roodenburg NFM and Eekels J. 1995. *Product Design: Fundamentals and Methods*. Wiley.
- Sharma DD. 2000. *Total Quality Management*. Sultan Chand and Sons.
- Stone H and Sidel JL. 2004. *Sensory Evaluation Practices*. Academic Press.
- Ulrich KT and Eppinger SD. 1995. *Product Design and Development*. Irwin McGraw Hill.

Weekly Lecture Schedule

Duration (week)	Topic
1	Product Design- definition, significance and essentials of product design.
2	Consumer behaviour considerations in product design.
3	Product attributes- Usability, contextual needs, compatibility, product aesthetics.
4	Design considerations and product design process.
5	User-centered design- need, models, elements and process.

Duration (week)	Topic
6	Universal design, Accessible design, Usable design- concept, design for improving product accessibility, need identification and process.
7	Definition and application of anthropometry in product design- design diversity, Design for extreme individuals, design for adjustable range, design for average.
8	Functional limitations and design consideration in designing product for geriatrics.
9	Disabilities, specific barriers and design consideration in designing products for people with special need.
10	Outsourced product development (OPD) - introduction, importance, concept and need. Major differentiating factors-Technology related, people related, process related; Emerging models of product development.
11	Stages of product development process- market analysis, product analysis, identification and innovation.
12	User-Product relationship and ergonomics; Cognitive and social engineering issues in product development.
13	User Interface designing- definition, requirements and process.
14	Product testing- definition, purpose, role of government, industry and consumer organizations.
15	Product testing techniques and devices.
16	Product evaluation, quality control and standardization.

I. Course Title : Ergonomic Research Techniques

II. Course Code : RMCS 509

III. Credit Hours : 3(1+2)

IV. Rationale

The use of established, documented research tools, techniques and methods is important when conducting any research as it ensures that investigations are conducted in a standardized, repeatable way. This course will introduce a number of constructive tools, techniques and methods to conduct research in the area of ergonomics which enable the student to analyze and evaluate humans while they are carrying out work tasks.

V. Aim of the course

- To equip students with the ergonomic research methods
- To provide hands on experience in the application of ergonomic research methods.

VI. Theory

Unit I: Approaches to research methods in ergonomics

Measurement and information gathering; Ergonomic standards; Observational techniques; Rating scales; Questionnaires and checklist; Digital models and simulation.

Unit II: Subjective assessment tools

NIOSH discomfort survey; The Dutch Musculoskeletal Nordic Questionnaire (DMQ); Nordic Musculoskeletal Questionnaire (NMQ); Cornell Musculoskeletal Discomfort Questionnaire; University of Michigan Upper Extremity Questionnaire (UMUEQ); Job stress Questionnaire; Work Style Questionnaire; NIOSH Generic Job Stress Questionnaire.

Unit III: Postural evaluation tools

Ovako Working Posture Analyzing System(OWAS); Quick Exposure Checklist(QEC); Concise Back Screening Instrument(CBSI); Rapid Upper Limb Assessment (RULA); Plan for Identifying av Belastnings faktorer (PLIBEL); Rapid Entire Body Assessment (REBA); Model for Comprehensive Evaluation of Risks of Musculoskeletal Disorders (MODSI).

Unit IV: Measurement of work effort and fatigue

Borg Rating of Perceived Exertion Scale; Muscle Fatigue Assessment Method; Hand Activity Level (HAL); The Occupational Repetitive Action (OCRA); NIOSH Lifting Equation; The Strain Index.

VII. Practical

1. Collection of literature on occupational disorders in any one occupation such as Construction Industry/ Manufacturing industry
2. Review of collected literature to understand the type of disorders prevailing in the selected industry
3. Elicit information on musculoskeletal disorders experienced by workers from a selected field using Nordic Musculoskeletal Questionnaire -Data collection
4. Discuss the merits and demerits of the tool
5. Propose modifications in light of demerits of the tool
6. Gain hands on experience on the use of a selected postural evaluation tool
7. Evaluation of posture adopted by sweepers using a selected postural evaluation tool
8. Identify the level of risk
9. Group discussion on the use of postural evaluation tool
10. Gain hands on experience on the use of a selected muscle fatigue assessment tool
11. Measure the muscle fatigue experienced by workers involved in manual work using the selected muscle fatigue assessment tool
12. Group discussion on the use of muscle fatigue assessment tool
13. Gaining hands on experience on the use of OCRA checklist
14. Identify the risk of upper extremity work related musculoskeletal disorders among workers involved in repetitive work using OCRA checklist
15. Develop a measuring scale to measure work stress: Collection of literature
16. Identifying the parameters to be included in the scale
17. Item collection
18. Identifying the items to be included in the scale
19. Validation of the tool
20. Collection of expert remarks on the items included in the scale
21. Modifying the scale as per the remarks of experts
22. Testing reliability of the tool- test retest method
23. First phase data collection.
24. Second phase data collection
25. Testing the reliability
26. Finalization of scale
27. Pre testing of scale
28. Modifications as per the identified lacunas
29. Data collection in the field
30. Data analysis

31. Critical evaluation and finalization of the scale
32. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Hands on experience on different assessment tools
- Preparation of manuals
- Students' presentations
- Group research work
- Guest lectures

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Get acquaint with the subjective assessment tools
- Gain confidence in conducting ergonomic research and identifying risk factors
- Develop measuring instruments for conducting research

X. Suggested Reading

- *Ergonomic Workplace Analysis Course Manual* compiled by RECOUP Neuromusculoskeletal Rehabilitation Centre, Bangalore.
- Helmut Strasser. 2009. *Principles, Methods and Examples of Ergonomics Research and Work Design* https://link.springer.com/chapter/10.1007/978-3-642-01293-8_28
- Hendrick, HW and Kleiner BM. 2001. *Macroergonomics. An Introduction to Work System Design*. Human Factors and Ergonomics Society, Santa Monica, CA.
- McCabe Paul T. 2003. *Contemporary Ergonomics*. Taylors And Francis.
- Neville AS and Alan Hedge. 2004. *Hand Book of Human Factors and Ergonomics Methods*. CRC Press.
- Soares Mand Rebalo F (Ed.). 2016. *Ergonomics in Design Methods & Techniques*. Balkema: CRC Press.
- Suzanne H Rodgers. 1986. *Ergonomic Design for People at Work*. John Wiley & Sons, New York.
- Taylor JC and Felton DF. 1993. *Performance by Design*. Prentice-Hall, Englewood Cliffs, NJ.

Weekly Lecture Schedule

Duration (week)	Topic
1	Measurement and information gathering; Literature search, strategies for gathering data on physical work-related strain, qualitative and quantitative data, methods of quantification of data.
2	Ergonomic standards, OSHA's ergonomic standards, legal provisions and guidelines.
3	Observational techniques-Rating scales, questionnaires and checklist.
4	Digital human models and simulation in ergonomic research.
5	Subjective assessment tools- NIOSH discomfort survey, The Dutch Musculoskeletal Questionnaire (DMQ), Nordic Musculoskeletal Questionnaire (NMQ).
6	Subjective assessment tools- Cornell Musculoskeletal Discomfort Questionnaire, University of Michigan Upper Extremity Questionnaire (UMUEQ).
7	Subjective assessment tools- Job stress Questionnaire, Work Style Questionnaire, NIOSH Generic Job Stress Questionnaire.
8	Postural evaluation tools- Ovako Working Posture Analysing System (OWAS), Quick Exposure Checklist (QEC).

Duration (week)	Topic
9	Postural evaluation tools- concise Back Screening Instrument (CBSI), Rapid Upper Limb Assessment (RULA), Rapid Entire Body Assessment(REBA).
10	Postural evaluation tools- Plan for Identifying av. Belastnings faktorer (PLIBEL).
11	Postural evaluation tools- Model for Comprehensive Evaluation of Risks of Musculoskeletal Disorders (MODSI).
12	Measurement of work effort and fatigue-Borg Rating of Perceived Exertion Scale.
13	Muscle Fatigue Assessment Method.
14	Measurement of work effort and fatigue, Hand Activity Level (HAL), The Occupational Repetitive Action (OCRA).
15	Measurement of work effort and fatigue, NIOSH Lifting Equation.
16	Measurement of work effort and fatigue, The Strain Index.

I. Course Title : Housing and Energy Efficient Building Design

II. Course Code : RMCS 510

III. Credit Hours : 3(2+1)

IV. Rationale

There is an immense need in the field of interior design to be aware of the environmental impacts of the built environment on the natural environment and to reduce the negative environmental impacts by designing buildings based on the concept of energy efficiency and sustainability. As interior design professionals, students need to develop skills to plan energy efficient buildings. This course train students to develop skills in planning eco friendly buildings

V. Aim of the course

- To provide an understanding of the concept of reduction in energy consumption through low energy building design
- To impart knowledge on strategies to integrate day lighting and low energy heating/ cooling in building.

VI. Theory

Unit I: Socio cultural and economic issues in housing

Historical perspective of the architectural features of buildings; Ancient science of house design; Role of housing in developing economies; Economic impact of housing; Housing markets and housing policies in India; Housing finance; Role of Government and non-government organizations in providing and regulating housing needs.

Unit II: Recent trends in building design

Emerging techniques in the house construction; Building design- need and scope for energy use and conservation; Design parameters for visual comfort; Day lighting and artificial lighting; Recent developments in building bye-laws; Low-cost building materials and fabrication technologies; Estimation of construction cost and housing finance; Housing research in energy efficient building design.

Unit III: Energy and climate

Structural features of residential buildings in different geo-climatic conditions; Environmental and architectural characteristics and energy consumption; Design parameters for climate and energy control; Eco and Ergo friendly house design; Low and zero carbon buildings and energy infrastructure.

Unit IV: Energy efficient building design

Green building design- Concept; Need and scope for energy use and conservation in building design; Energy efficient design principles and guidelines; Techniques for improving energy efficiency in residential and commercial buildings; Energy efficient building materials and construction technology; Energy flow audit and economy; Energy economy in residential and commercial buildings; Energy efficiency building regulations; Housing and energy models-Residential and commercial.

VII. Practical

1. Collection of information on building forms in different geo-climatic regions
2. Presentation and group discussion on building forms in different geo-climatic regions
3. Visits to organizations promoting green building technology
4. Collection of information on green building technology through literature search
5. Presentation and group discussion on green building technology
6. Analysis of research trends in energy efficient building design
7. Panel discussion on energy efficient building design
8. Assessment of existing house plan in terms of energy efficiency
9. Suggesting suitable renovations to improve energy efficiency
10. Evolving Eco friendly housing plan for selected geo-climatic region - development of conceptual drawings
11. Evolving Eco friendly housing plan for selected geo-climatic region- development of design details
12. Presentation and group discussion
13. Housing research in energy efficient building design-review of literature
14. Estimation of cost of construction
15. Energy audit of a residential building
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Institutional visits
- Students' presentation
- Group research work
- Guest lectures

IX. Learning Outcome

After successful completion of the course the student will be able to:

- Apply design parameters for climate and energy control in buildings
- Develop eco and ergo friendly building designs
- Plan energy efficient buildings

X. Suggested Reading

- Ambadker SN. 2000. *Rural Housing: Agro-socio-economic Impact*. Special Indian Ed. Agrobios.
- Hawkes D and Forster W. 2002. *Energy Efficient Buildings: Architecture, Engineering and Environment*. WW Norton & Co.
- Jefferis A and Madsen DA. 2004. *Architectural Drafting and Design*. Thomas Delmar Co.
- Lal AK. 1999. *Handbook of Low Cost Housing*. New Age International.
- Mahadeva M. 2002. *Housing in India: The Situation, Development and Challenges*. Orient Longman Publ.

- Morris EW. 1979. *Housing Family and Society*. John Wiley & Sons.
- RajaRao YN and Subrahmanyam Y. 2002. *Planning and Designing of Residential Buildings*. Standard Publ.
- Steffy GR. 2002. *Architectural Lighting Design*. John Wiley & Sons.
- Stitt FA. 1999. *Ecological Design handbook: Sustainable Strategies for Architecture*. McGraw Hill.
- University of Calgary. 2007. *Energy Efficient Building Design*
https://energyeducation.ca/encyclopedia/Energy_efficient_building_design

Weekly Lecture Schedule

Duration (week)	Topics
1	Historical perspective of the architectural features of buildings; Ancient science of house design.
2	Role of housing in developing economies; Economic impact of housing.
3	Housing markets and housing policies in India; Housing finance- Sources, types and financial institutions.
4	Role of Government and non-government organizations in providing and regulating housing needs; Emerging techniques in the house construction.
5	Building design- need and scope for energy use and conservation; Design parameters for visual comfort- day lighting.
6	Design parameters for visual comfort-artificial lighting; Recent developments in building bye-laws.
7	Low-cost building materials; Low-cost building fabrication technologies.
8	Estimation of construction cost and housing finance; Housing research in energy efficient building design.
9	Structural features of residential buildings in different geo-climatic conditions in India; Structural features of residential buildings in different geo-climatic conditions in western countries.
10	Environmental and architectural characteristics and energy consumption; Design parameters for climate and energy control.
11	Eco friendly house design; Low carbon buildings and energy infrastructure.
12	Zero carbon buildings and energy infrastructure; Green building design- concept, need and scope for energy use and conservation in building design.
13	Energy efficient design principles and guidelines- Site analysis, building orientation and layout, fenestration and shading, insulation, thermal mass and building material, ventilation, landscape; Techniques for improving energy efficiency in residential and commercial buildings.
14	Energy efficient building materials and construction technology; Energy flow audit and economy.
15	Energy economy in residential and commercial buildings; Energy efficient building regulations.
16	Housing and energy models – residential and commercial.

I. Course Title : Technical Drawings

II. Course Code : RMCS 511

III. Credit Hours : 3(1+2)

IV. Rationale

Technical drawings are tools for communication in the interior design field. There is a great demand from the client for clarity on the output of the interior design project. The designers need to provide with virtual interiors before the actual project is executed. The course will enable students mastering in interior design

to equip with design skills and presentation techniques to communicate effectively with clients.

V. Aim of the course

- To acquaint students with architectural drafting and their application in developing interior design plans
- To gain hands on experience in using computer programmes for drawing architectural plans and 3D representation of spaces for interior design.

VI. Theory

Unit I: Drafting fundamentals

Measurement and scaling; Lines-Types, quality and weights; Lettering styles; Sheet format and layout; Blocks and layout; Legend and dimension; Conventions and preliminary drawings.

Unit II: Presentation techniques

Orthographic plans- Plan, elevations and sections; Design drawings; Projection drawings; Isometric drawings; Perspective drawings; Rendering and hatching techniques; Presentation boards.

Unit III: Introduction to AutoCAD

Introduction to AutoCAD as 2D drafting tool; Digital drawings tools; Drawing lines and shapes; Modifying lines and shapes; Drawing with accuracy and speed; Organizing plans; Sections and elevations; Drawing and printing to scale; Text styles and sizes; Hatches and dashed lines; Stencils and blocks; Advanced editing tools and Dimensioning drawings.

Unit IV: 3D Modelling using AutoCAD

Introduction to 3D-modelling technique using AutoCAD; 3D basics- axes, Planes and Faces; 3D Object Modification- Rotate, Mirror, Array and Scale; 3D Boolean operations-Union, Subtract, Intersect; 3D Primitive objects- Box, Wedge, Cone, Sphere, Cylinder, Torus and Pyramids; Solid modeling – Revolve, Shell, Taper, Loft, Path extrusion and Sweep.

Unit V: Introduction to 3D Modelling and Rendering

Introduction to 3D Modelling and Rendering; Building Modelling and basic rendering techniques; Using 3DSMax or equivalent; Advanced 3D Modelling-Advanced modeling; Ray rendering engine.

Unit VI: Auto CAD and its application in interior design

Orientation to AutoCAD Main screen and menus; Coordinate systems; Use of Draw and edit menus; Hatching inquiry tools; Layers; 3D Modelling; Co-ordinate system; Primitive tools: Boolean operation; Editing 3D objects; Rendering; Printing; Introduction to ADT- creation of plans, sections, elevations, title marks and dimensioning, schedule table of doors and windows; Create still camera views; Creating a movie file; Walk through; Introduction to 3D Max -standard tool bar command panel; Concept of import and export of objects from ADT and Auto CAD to 3D Studio MAX; Creating objects in 3D Max using standard primitives; Using transforms; Introduction of material; Light; Colour; Render the images and save; Camera animation of walk through.

VII. Practical

1. Drawing a detailed floor plan showing the use of different lines, lettering styles, sheet format and layout, blocks and layout, legend and dimension, section drawing
2. Drawing a detailed floor plan showing the use of blocks and layout, legend and dimension, section drawing
3. Scale drawing of building components in plan and elevation
4. Preparation of electrical layout for a small building
5. Preparation of plumbing layouts for a small building
6. Working on presentation details for the above plans
7. Evolving floor plans for an existing residential building
8. Drawing views of brick arrangement to scale in two dimensions (Plan, elevation) and three dimension (isometric, oblique and axonometric)
9. Study of buildings and interiors in two and three dimensions
10. Drawing one/single perspectives of interiors
11. Drawing two point perspectives of interiors
12. Creation of texture effects in interior objects
13. Pencil rendering of interiors
14. Colour rendering of interiors
15. Developing a private project and presenting with views
16. Use of Presentation techniques
- 17-31 Project work: Application of CAD in developing plans and presentation details of any one residential and commercial building
32. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Site visits
- Hands on experience
- Students' presentation
- Guest lectures

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Create orthographic plans and projection drawings
- Apply AUTOCAD in developing interior design plan
- Solve design problems using sketching and remodeling software
- Read and understand/pictorial drawings and advanced orthographic projections

X. Suggested Reading

- Chiavaroli J. 1999. *AEC Drafting Fundamentals*. Delmar Publishers, London.
- Frey D. 2000. *AutoCAD 2000*. BPB Publications, New Delhi.
- Gill RW. 1975. *The Thames and Hudson Manual of Rendering with Pen and Ink*. Thames and Hudson, London.
- George O. 2007. *Just Enough Auto CAD*. Wiley Publishing Inc.
- Hepler DE and Wallach PI. 1965. *Architecture – Drafting and Design*. McGraw-Hill Book Company, New York.
- Kalee S, Zaidi A and Siddique S. 2004. *Designing and Design of Residential and Commercial Buildings*. Standard Publ.
- Kasu AA. 1995. *An Introduction to Art, Craft, Technique, Science of Profession of Interior Design*. Iqura Publishing Pvt. Ltd., Bombay.



- Kilmer WO and Kilmer R. 2004. *Construction Drawings and Details for Interiors*. Wiley.
- Mitton M. 1999. *Interior Design Visual Presentation*. John Wiley & Sons, New York.
- Shah MG, Kale CM and Patkki SY. 1995. *Building Drawing*. 3rd Edition, Tata McGraw Hill.

Weekly Lecture Schedule

Duration (week)	Topic
1	Drafting fundamentals-Measurement and scaling; Lines; types, quality and weights; Lettering styles; Sheet format and layout; Blocks and Layout- Legend and Dimension; Conventions and Preliminary Drawings.
2	Orthographic plans- plan, elevations and sections; Design drawings.
3	Projection drawings- Isometric drawings; Perspective drawings; Rendering and Hatching techniques; Presentation boards.
4	Introduction to AutoCAD as 2D drafting tool; Digital drawings tools; Drawing lines and shapes; Modifying lines and shapes; Drawing with accuracy and speed.
5	Organizing plans; Sections and elevations; Drawing and printing to scale; Text styles and sizes; Hatches and dashed lines; Stencils and blocks.
6	Advanced editing tools and dimensioning drawings.
7	Introduction to 3D-modelling technique using AutoCAD; 3D basics- Axes, Planes and Faces.
8	3D Object Modification-Rotate, Mirror, Array and Scale; 3D Boolean operations- Union, subtract, intersect.
9	3D primitive objects- Box, Wedge, Cone, Sphere, Cylinder, Torus and Pyramids.
10	Solid modelling- Revolve, Shell, Taper, Loft, Path extrusion and Sweep.
11	Introduction to 3D Modelling and Rendering; Building modelling and basic rendering techniques, using 3DSMax.
12	Advanced 3D Modelling- Advanced modelling, V-Ray rendering engine, or equivalent.
13	Orientation to AutoCAD main screen and menus; Coordinate systems; Use of Draw and edit menus; Hatching inquiry tools; Layers; 3D Modelling; Co-ordinate system; Primitive tools; Boolean operation; Editing 3D objects; Rendering; Printing.
14	Introduction to ADT- Creation of plans, sections, elevations, title marks and dimensioning, schedule table of doors and windows; Create still camera views.
15	Creating a movie file; Walk through-Introduction to 3D Max -standard tool bar command panel, Concept of import and export of objects from ADT and Auto CAD to 3D Studio MAX, Creating objects in 3D Max using standard primitives, Using transforms.
16	Introduction of material, light, colour; Render the images and save; Camera animation of walk through.

I. Course Title : Interior Design Business Management

II. Course Code : RMCS 512

III. Credit Hours : 3(1+2)

IV. Rationale

Interior designing business is one of the upcoming professions and has lot of potential for business opportunities. This course justifies the natural affinity to style, fashion, glamour, painting, creativity, etc. and will enhance great imagination skills for interior designer. This is also a flourishing industry wherein a career and start-up in India and abroad can be taken up

V. Aim of the course

- To impart knowledge about profession and principles of interior design business management
- To build confidence among students for establishing a interior design firm.

VI. Theory

Unit I: Introduction to professional management

Definition of a profession; Principles of interior design business management; Ethics and professional conduct; Establishing interior design practice.

Unit II: Professional components of managing interior work

Legal issues of business; Business management applications; Marketing; Scale of professional fee and charges; Duties of employer under labour welfare provisions; Structure of interior designers office; Conditions of engagement; Risk management.

Unit III: Estimating and costing for interior work

Definition; Importance and types of estimation; Units and mode of measurement; Rate analysis; Bills of quantities; Contract design.

Unit IV: Professional practice

Professional portfolios; Resumes and business cards; Web page and e-service; Professional associations and support systems.

VII. Practical

1. Case study of an established interior design firm
2. Cost estimation for projects
3. Contracting and sub-contracting procedure for the estimated projects
4. Strategic plan for presentation of project for a tender call
5. Working on modalities for establishing an interior design firm
6. Preparation of financial plan for a design firm
7. Working on portfolio and resume design for job in professional firm
- 8-31. Working with an interior designer for work experience
32. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Students' presentation
- Work experience
- Group work
- Guest lectures

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Take up interior designing as a profession
- Launch an Interior Design firm and run successfully

XI. Suggested Reading

- Christine MP. 2001. *Interior Design Management: A Handbook for Owners and Managers*. ASID, IIDA.
- Christine MP. 2002. *Professional Practice for Interior Designer*. John Wiley & Sons.
- Cindy C. 2002. *Interior Design Handbook of Professional Practice*. McGraw Hill.

- Kailee Helget May. 2019. *How to start an Interior Business* <https://www.2020spaces.com/blog-start-an-interior-design-business/>
- Terry LP (2002) *Architects Studio Handbook*. McGraw Hill.

Weekly Lecture Schedule

Duration (week)	Topic
1	Definition and meaning of a profession; History of interior design as a profession.
2	Principles, ethics and professional conduct of interior design business management.
3	Establishing interior design practice.
4	Legal issues of business.
5	Business management applications- People management, business information systems, financial management and control, management and economics.
6	Marketing, conditions, strategies, selling techniques, scale of professional fee and charges.
7	Duties of employer under labour welfare provisions.
8	Structure of interior designer's office, conditions of engagement.
9	Risk management plan for interior business.
10	Estimating and costing for interior work- Definition, importance and types of estimation.
11	Units, mode of measurement and standard methods of measurement for building elements.
12	Methods of rate analysis and bills of quantities.
13	Principles, practices and stages of contract design.
14	Need, importance and components professional portfolios, resumes, business cards.
15	Professional web page and e-service.
16	Professional associations and support systems.

I. Course Title : Environmental Resource Management

II. Course Code : RMCS 513

III. Credit Hours : 2(1+1)

IV. Rationale

Environmental resource management is an issue of increasing concern and can be viewed from a variety of perspectives. It involves the management of all components of the biophysical environment, and the relationships among all living species and their habitats. The essential aspects of environmental resource management are ethical, economical, social, and technological. It emphasizes on the sustainability development in future. These underling principles help students to make appropriate decisions.

V. Aim of the course

- To get an insight about the present scenario of global environment, environmental problems and management for sustainable development in future
- To provide an overview of management techniques for waste management and environment protection.

VI. Theory

Unit I: General perspectives

Man, environment and economic growth; Industrialization; Urbanization; Consumerism and environment; Environmental informatics; Environment and biotechnology; Environmental ethics.

Unit II: Ecology, environment and sustainability

Ecological environment and sustainability; Environmental dimensions of sustainable development; Equitable use of resources for sustainable development; Economical, political and cultural influences in the use of environmental resources; Role of government and non-government organizations and communities in sustainable development.

Unit III: Environmental waste management

Waste management; Waste management systems in India; Technologies for waste management; Hazardous waste management and treatment; Physical and chemical treatment; Thermal treatment and biological treatment; Hazardous waste treatment; E-Waste; Management of E-waste; Inventory management; Production process modification; Volume reduction; Recovery and reuse; Laws and regulations concerning waste management in India.

Unit IV: Energy and environment

Energy and environment; Economic growth and energy consumption; Increased energy consumption and climate change; Energy policy of India; Energy and sustainability; Sustainable energy resources.

Unit V: Environmental protection and management

Environmental economics- Concepts, evolution and its development; Important processes and technologies; Environmental protection and management; Environmental quality objectives and standards; Approaches with regard to environmental protection; Institutional and policy framework; Ministry of environment and forest, Pollution control boards.

VII. Practicals

1. Understanding the impact of urbanization and consumerism on resource utilization- Literature search
2. Report preparation on impact of urbanization and consumerism on resource utilization
3. Presentation and discussion on impact of urbanization and consumerism on resource utilization
4. Visit to any one industry to understand the types of wastes generated and their waste management practices
5. Presentation and group discussion
6. Plan awareness programme to educate college students on their role in environmental protection
7. Organizing awareness camp
8. Project work: Household waste management practices among families- Collection of review
9. Planning the research methodology
10. Designing data collection tool for collecting information on household waste management practices among families
11. Finalization of tool
12. Data collection
13. Data analysis
14. Report preparation on household waste management practices among families on household waste management practices among families



15. Presentation and Group discussion
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Book/Publication Review
- Students' presentation
- Group work
- Case studies
- Guest lectures
- Review of policy documents

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Gain knowledge about the present scenario of global environment and develop skills in the management of environmental resources for sustainable development in future
- Understand the essential aspects of environmental resource management and work on innovative solution for conservation of environmental resources
- Gain insight into management of all components of the biophysical environment

X. Suggested Reading

- Bhatnagar A. 2010. *Ecology and Environment*. Oxford Book Company, Jaipur.
- Bharucha E. 2017. *Text Book of Environmental Studies*. UGC University Press India Pvt. Ltd.
- Chary SN and Vyasula V. 2001. *Environmental Management-An Indian Perspective*. Macmillan India Ltd.
- Joseph K and Nagendran R. 2004. *Essentials of Environmental Studies*. Pearson Education Pvt. Ltd.
- International Hydropower Association. 2017. *Environmental Resources Management (ERM)*<https://www.hydopower.org/companies/environmental-resources-management-erm>
- Kuwar A and Roy PK. 2008. *Environmental Resource Management*. Daya publishing House, Delhi.
- Pandey SN and Misra SP. 2011. *Environment and Ecology*. AneBools Pvt. Ltd., New Delhi.
- Singh K and Sisodia A. 2007. *Environmental Economics: Theory and Applications*. Sage Publ.
- Singh S. 2010. *Disaster Management*. Rajdhani printers, Delhi.
- Thakur V. 2012. *A Text Book of Environmental Science*. Scientific Publishers, Jodhpur.

Weekly Lecture Schedule

Duration (week)	Topic
1	Interrelation between man, economic growth and environment; Individual rights and responsibilities towards a clean environment; Environmental ethics- meaning, libertarian view, ecological view and conservation view.
2	Impact of industrialization, urbanization and consumerism on environment- Particulate matter concentration, modification of habitat, waste generation, degraded water quality, land contamination, biodiversity loss, etc. Environmental Informatics- concept, application and benefits.
3	Environment and bio-technology, objectives of environmental biotechnology, application of environmental biotechnology for sustainable development; Role of environmental biotechnology in protection and restoration of quality of environment.

Duration (week)	Topics
4	Ecology, Environment and sustainability- meaning, resource conservation, resource preservation, ecological footprints.
5	Environmental dimensions of sustainable development- Linkages and holistic approach in conservation and equitable use of specific indicators of sustainable development such as atmosphere, water and land.
6	Economical, political and cultural influences in the use of environmental resources, Role of government and non-government organizations and communities in sustainable development.
7	Waste management- introduction, classification of wastes, principles of waste management, waste management systems in India.
8	Technologies for waste management- physic, chemical, biological processes for waste treatment; Sanitary landfill Incineration; Gasification; Biodegradation processes; Composting, and anaerobic digestion; Conventional digestion; Dry anaerobic digestion process; Two phase digestion; Water and waste water treatment.
9	Hazardous waste management and treatment, identification and classification, collection, storage, transfer, processing, and disposal; Hazardous waste treatment; Physical and chemical treatment; Thermal treatment; Biological treatment; Hazardous waste treatment in India.
10	E-Waste-Introduction, effects on environment and human health, management of e-waste, inventory management, production process modification, volume reduction, recovery and reuse, management options.
11	Laws and regulations concerning waste management in India-The Water (Prevention and Control of Pollution) Act, 1974, The Air (Prevention and Control of Pollution) Act, 1981, The Environment (Protection) Act ,1986, The Public Liability Insurance Act, 1991, Municipal Solid Wastes (Management and Handling) Rules in 2000, Hazardous Wastes (Management and Handling) Rules in 1989 (amended in 2000 and 2003), The Biomedical Waste (Management and Handling) Rules 1998 (amended in 2000 and 2003), The E-waste (Management & Handling) 2012, "Plastics (Manufacture, Usage and Waste Management) Rules, 2009" (amended in 2003).
12	Energy and environment; Economic growth and energy consumption; Increased energy consumption and climate change; Energy policy of India.
13	Sustainable energy- history and need for sustainable energy, sustainable energy resources, solar energy, wind energy, geothermal energy, ocean energy, biomass energy, hydroelectric power, green energy and green power.
14	Environmental economics- concepts, evolution and its development, important processes and technologies.
15	Environmental protection and management, Environmental quality objectives and standards; Approaches with regard to environmental protection- Voluntary environmental agreement, ecosystem approach, international environmental agreements.
16	Institutional and policy framework- Ministry of Environment and Forest, Pollution control boards.



Course Title with Credit Load Ph.D. in Resource Management and Consumer Science

Course Code	Course Title	Credit Hours
Major Courses		
RMCS 601*	Trends in Resource Management	3 (3+0)
RMCS 602*	Occupational Biomechanics	3 (2+1)
RMCS 603	Globalization and Consumer Economics	3 (2+1)
RMCS 604	Space Designing and Managerial Dimensions for Special needs	3 (1+2)
RMCS 605	Physical Ergonomics	3 (1+2)
RMCS 606	Environmental Issues and Challenges	2 (2+0)
RMCS 607	Family Dynamics and Women Power	3 (2+1)
RMCS 608	Special Project	2 (0+2)
	Total	22 (13+9)
Minor Courses		
FN604	Global Nutrition Problems	2 (2+0)
FN 608	Energy Metabolism	2 (2+0)
EECM 602	Impact Assessment of Development Programmes	3 (1+2)
EECM 603	Scaling Techniques for Behavioural Research	3 (1+2)
EECM 607	Media application and product promotion	4 (2+2)
HDFS 608	Qualitative research methods	3 (2+1)
ATS 602	Technical Textiles	3 (2+1)
ATS605	Functional Clothing	3 (2+1)
ATS 607	Operational Management in Textiles and Apparel	2 (2+0)
Supporting Courses		
A student can opt any course related to the topic of research offered by other faculties of agriculture university or SWAYAM/ MOOCS or other online courses up to a maximum of 5 credits.		
RMCS 691	Doctoral Seminar I (Core Field)	1 (1+0)
RMCS 692	Doctoral Seminar II (Optional Field)	1 (1+0)
RMCS 699	Research	75
	Total	100 Credits

*Compulsory core courses

Course Contents

Ph.D. in Resource Management and Consumer Science

- I. Course Title** : Trends in Resource Management
II. Course Code : RMCS 601
III. Credit Hours : 3(3+0)

IV. Rationale

Continuous changes in technology, economic, social and psychological understandings and structures have influence on resources and their management. In highly competitive and demanding times it is essential to train students in a manner that they are able to display good interpersonal skills by making decisions, allocate resources, and lead and direct others' activities to achieve and attain their goals. The course exposes the student to different functional areas of management to enhance the effectiveness.

V. Aim of the course

- To expose students to the emerging managerial ideas, techniques, procedures and practices and their application in the field of resource management
- To impart knowledge, skill and concepts needed to resolve resource management problems or issues.

VI. Theory

Unit I: Significance and scope of family resource management

Introduction and history of family resource management and household trends; Resource management as a process; Influences on management styles; Life management for singles, families, households and non family households; Advances in the discipline of resource management.

Unit II: History and theories of resource management

Managerial practices and concepts from ancient civilization; Early years of family resource management; Household production and consumption systems during pre modern, modern and post modern periods; Theories in resource management; Pre scientific and post scientific approach; Human and non human resource management; Systems theory; Application of systems theory to households; Economic theory; Human ecology and ecosystems; Contemporary management practices.

Unit III: Managerial competencies

Conflict Management- Concepts, types, sources and levels of conflict; Conflict resolution strategies; Conflict management; Behavioural interventions for handling conflicts; Leadership; Theories of leadership; Types of leadership; Likert's four systems of leadership and managerial grid.

Unit IV: Management of resources

Managing time as a resource; Modern tools and techniques of time management; Qualitative and quantitative time measures; Legislations, policies and research in family management.

Unit V: Organizational behaviour

Organizational culture- Concepts, process and implications of organizational culture; Organizational performance-Concept and process, measures for organizational performance, controlling for organizational performance; Overview of control techniques (Scheduling, CPM, PERT, SWOT analysis, etc.); Effective control systems; Performance appraisal-purpose, methods, essentials of good appraisal system; Organizational change- concepts and nature; Kurt Lewin theory of change; Implementing change; Managing resistance to change.

Unit VI: Managerial ethics and social responsibilities

Managerial ethics- Factors affecting ethical choices; Ethical dilemma; Social responsibility- Concept and approaches; Evaluating institutional social performance; Managing institutional ethics and social responsibility.

VII. Teaching Methods/ Activities

- Lectures
- Assignments
- Book/Publication Review
- Students presentations
- Group work
- Case studies
- Guest lectures
- Online learning

VIII. Learning Outcome

After successful completion of the course, the students will be able to:

- Appreciate the importance of resource management as a field of study and as a central management function
- Understand the essentials for effective resource management
- Apply the principles and techniques of resource management to solve major issues and get solutions for typical case problems

IX. Suggested Reading

- Elezabeth BG. 2013. *Resource Management for Individuals and Families*. Thomson Learning Inc.
- Hellregel. 2002. *Management*. Thomason Learning, Bombay.
- Koontz H and Wechrich H. 2008. *Management*. Tata McGraw Hill Inc. N.Y.
- Richar LD. 2015. *Management*. Thomson South-Western.
- Robbins SP and Decenzo DA. 2010. *Fundamentals of Management*. Pearson Education Asia, New Delhi.
- Satya Raj R and Parthasarthy A. 2009. *Management- Text & Cases*. PHI, New Delhi.
- Stephen PR and Mary AC. 2015. *Management*. 13th Edition, Prentice Hall of India. New Delhi.
- Subba Rao P. 2017. *Management and Organizational Behaviour (Text and Cases)*. Himalaya Publishing House, New Delhi.
- Trends in Management- <https://www.toppr.com/guides/business-management-and-entrepreneurship/recent-trends-in-management/>
- Tripathi PC and Reddy PN. 2013. *Principles of Management*. Tata McGraw Hill Education Pvt Ltd, ND.

Weekly Lecture Schedule

Duration (week)	Topic
1.	Introduction and history of family resource management and household trends; Resource management as a process, influences on management styles; Life management for singles, families, households and non family households.
2.	Advances in the discipline of resource management; Managerial practices and concepts from ancient civilization; Early years of family resource management-Household production and consumption systems during pre modern periods.
3.	Household production and consumption systems during modern and post modern periods; Pre scientific theories in resource management-Contributions made by Robert Owen, Charles Babbage, Henry Venner Poor , Haney Robinson.
4.	Pre scientific theories in resource management- contributions made by James Watt, Captain Henry Metcalf; Post scientific theories in resource management.
5.	Human and non human resource management- meaning, definition, scope and process; Systems theory; Application of systems theory to households; Family as a system; Family-environment interrelationship.
6.	Economic theory; Human ecology and ecosystems; Contemporary management practices; Conflict- Concept, types and sources; Levels of conflict.
7.	Conflict resolution strategies- Avoidance, De-fusion, containment, confrontation; Conflict management; Behavioural interventions for handling conflicts.
8.	Conflict stimulation techniques; Leadership- definition, meaning and characteristics; Leadership-trait and styles.
9.	Functional leadership characteristics; Theories of Leadership- Trait theory of leadership, behavioural theories of leadership; Theories of Leadership- Contingency theories, transformational leadership theory.
10.	Likert's four systems of leadership and managerial grid; Managing time as a resource; Unit of time and measurement of time.
11.	Modern tools and techniques of time management; Qualitative and quantitative time measures; Legislations, Policies and research in family management.
12.	Organizational culture- Concepts, difference between culture and climate; Process and implications of organizational culture; Components, determinants and types of organizational climate.
13.	Organizational performance-concept and process, measures for organizational performance; Controlling organizational performance; Overview of control techniques, scheduling, CPM; Overview of control techniques PERT.
14.	Controlling organizational performance- Overview of control techniques SWOT analysis; Effective control systems; Performance appraisal- Purpose, methods, essentials of good appraisal system.
15.	Organizational change- concept and nature, need ,process and resistance to organizational change; Kurt Lewin theory of change, implementing change, managing resistance to change; Managerial ethics- factors affecting ethical choices.
16.	Ethical dilemma- Social responsibility; Evaluating institutional social performance; Managing institutional ethics and social responsibility.

I. Course Title : Occupational Biomechanics

II. Course Code : RMCS 602

III. Credit Hours : 3(2+1)

IV. Rationale

Occupational biomechanics is the growing discipline necessary to improve workplace design. It focuses on the rapidly expanding body of biomechanics knowledge on

workplace situations that cause musculoskeletal injuries and disabilities. The students in this course will study the physical interaction of workers with their tools, machines and materials as well as several new methods for evaluating the bio-mechanical consequences of workplace designs.

V. Aim of the course

- To acquaint students with occupational hazards and advances in ergonomics for enhancing job fitness compatibility
- To impart knowledge and skills to devise injury prevention strategies at work and develop solutions.

VI. Theory

Unit I: Biomechanical concepts

Biomechanics as an area of study; The biomechanics of the human skeletal articulations; The biomechanics of human skeletal muscle; Application of biomechanics to movement-Qualitative and quantitative approach.

Unit II: Biomechanics of the human body

The biomechanics of the human upper extremity- shoulder, elbow wrist and hand; The biomechanics of the human lower extremity- Hip, knee, ankle and foot; The biomechanics of the human spine.

Unit III: Occupational biomechanics

Biomechanical oriented ergonomics in workplace; Activity-related soft tissue disorders (ASTDs); Work-related risk factors; Definition and ergonomic guidelines for controlling risk factors; Risk for back injuries in the workplace; Analysis and ergonomic guidelines for controlling.

Unit IV: Ergonomic task analysis and risk assessment

Ergonomic task analysis- Definition, importance and process; Occupational risk factors; Tools and techniques for identifying posture related risk factors; Tools and techniques for identifying risk factors related to forceful exertion; Tools and techniques for identifying risk factors related repetitive motion; Tools and techniques for identifying risk factors related workstation design; Tools and techniques for identifying risk factors related workplace environment; Ergonomic check points; Development of ergonomic checkpoints for various occupations.

Unit V: Application of biomechanics

Application of biomechanics for occupational safety; Use of SAMMIE (System for Aiding Man Machine Interaction Evaluation) and CAD system in occupational designs.

VII. Practicals

1. Assessing postural risks in a computer workstation
2. Designing ergonomic guidelines to overcome postural risks
3. Designing a tool to identify hazards in construction work
4. Collection of data on hazards in construction work
5. Preparation of report on hazards in construction work
6. Presentation of report and group discussion
7. Identification of hazards in agricultural operations-field level observation
8. Preparation of schedule for identification of hazards in agricultural operations
9. Data collection on hazards in agricultural operations

10. Preparation of report on hazards in agricultural operations
11. Presentation of report and group discussion
12. Designing ergonomic guidelines for risk elimination
13. Measuring occupational stress using a standardized tool
14. Collection of data on occupational stress
15. Preparation and presentation of report on occupational stress
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Publication review
- Students' presentations
- Group work
- Case studies
- On line learning

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Understand concepts of rapidly expanding body of biomechanics and their impact on workplace situations that cause musculoskeletal injuries and disabilities.
- Gain knowledge on physical interaction of workers with their tools, machines and materials as well as several new methods for evaluating the bio-mechanical consequences of workplace designs.

X. Suggested Reading

- Allan Toomingas, Svend Erik Mathiassen, Ewa WT. 2011. *Occupational Physiology*. 1st Edition, CRC Press, Taylor and Francis Group, London.
- Ayub MM and Mittal A. 1998. *Manual Material Handling*. Taylor and Francis, London.
- Chapanis A. 1996. *Human Factors in Systems Engineering*. John Wiley and Sons, New York\.
- Dalela S and Saurabh. 1999. *Text Bbook of Work Study and Ergonomics*. Standard Publishers Distributors, Delhi.
- John R Wilson and Nigel Corlett. 2005. *Evaluation of Human Work*. Third Edition Taylor and Francis Group, London.
- Kumar Shrawan. 2007. *Biomechanics in Ergonomics*. Second Edition, www.crcpress.com/product/isbn/
- Meister D. 1989. *Conceptual Aspects of Human Factors*. Johns Hopkins University Press, Baltimore, MD.
- Panero J and Zelnik M. 1979. *Human Dimension and Interior Space*. Whitney Library of Design.
- Tayyari F and Smith JL. 1997. *Occupational Ergonomics Principles and Applications*. Chapman and Hall, London.
- Wilson JR and Haines HM. 1997. Participatory Ergonomics.In: *Salvendy G (Ed.) Handbook of Human Factors and Ergonomics*. 2nd Edition, Taylor & Francis, Bristol, PA.

Weekly Lecture Schedule

Duration (week)	Topic
1	Biomechanics as an area of study and its application in occupational health; The biomechanics of the human skeletal articulations- Joint architecture, joint stability, joint flexibility.
2	Joint architecture- immovable joints, slightly movable joints, freely movable joints, articular cartilage, articular fibro cartilage, articular connective tissue; Joint



Duration (week)	Topic
	stability-Shape of the articulating bone surfaces, arrangement of the ligaments and muscles, other connective tissues.
3.	Joint flexibility-Measuring joint range of motion, factors influencing joint flexibility, flexibility and injury; The biomechanics of human skeletal muscle, behavioral properties of the musculotendinous unit, structural organization of skeletal muscle, skeletal muscle function, muscular strength, power, and endurance.
4.	Application of biomechanics to movement- Qualitative and quantitative approach; The biomechanics of the human upper extremity- structure of the shoulder, movements of the shoulder complex, loads on the shoulder.
5.	Structure of the elbow, Movements at the elbow, Loads on the elbow; Structure of the wrist, movements of the wrist, loads on wrist.
6.	Structure of the joints of the hand, movements of the hand; The biomechanics of human lower extremity- Structure of the hip, movements at the hip, loads on the hip.
7.	Structure of the knee, movements at the knee, loads on the knee; Structure of the ankle, Movements at the ankle.
8.	Structure of the foot, movements of the foot, loads on the foot; The biomechanics of the human spine- Structure of the spine, movements of the spine, muscles of the spine, loads on the spine.
9.	Biomechanical oriented ergonomics in workplace- Objectives and need; Introduction to Activity-related Soft Tissue Disorders (ASTDs)- Tendinopathies , Bursitis, Carpal Tunnel Syndrome , Carpel Tunnel Syndrome, Plantar Fasciitis and Radial Tunnel Syndrome.
10.	Definition and nature of work-related risk factors- Repetition, awkward posture, forceful exertions, Hand-arm vibration. Ergonomic guidelines for controlling risk factors related to soft tissue disorders.
11.	Analysis of risk for back injuries in the workplace; Back and shoulder over exertion injuries and risk factors such as manual materials handling, awkward postures, prolonged standing and sitting, whole body vibration.
12.	Ergonomic guidelines for controlling risk factors related to back and shoulder; Ergonomic task analysis- Definition and importance, steps in task analysis process, information collection, data recording, data analysis.
13.	Tools and techniques for identifying risk factors related to posture; (i) Rapid Upper Limb Assessment (RULA)(ii) Rapid Entire Body Assessment (REBA), (ii)Ovako Working Posture Analysis System (OWASA) 4. Biomechanical analysis.
14.	Tools and techniques for identifying risk factors related to Forceful Exertion – (i) Manual Handling Assessment Chart (MAC) (ii) Borg Scale (iii).Liberty Manual Material Handling Tables (Snook Table)(iv). NIOSH Lifting Equation.Tools and techniques for identifying risk factors related Repetitive Motion -(i). Assessment of Repetitive Tasks (ART) (ii).Occupational Repetitive Action (OCRA) Checklist (iii).OCRA Index.
15.	Tools and techniques for identifying risk factors related to workstation design – (i).Rapid Office Strain Assessment (ROSA) (ii). Anthropometry Analysis.Tools and techniques for identifying risk factors related workplace environmental –(i) Standards and guidelines as per regulations and industrial code of practice standard, (ii) Designated specific measurement instruments.
16.	Tools and techniques for identifying sources of work stress in an organizational set up; Application of biomechanics for occupational safety and accident protection and release of stress.

I. Course Title	: Globalization and Consumer Economics
II. Course Code	: RMCS 603
III. Credit Hours	: 3(2+1)

IV. Rationale

Globalization may be described as the combined influences of trade liberalization, market integration, international finance and investment, technological change, the increasing distribution of production across national boundaries, and the emergence of new structures of global governance. The global marketplace has totally changed the consumer behaviour. As change agents, young professionals need to equip themselves with knowledge and skill sets required to understand the consumer behaviour in the era of globalization.

V. Aim of the course

- To impart knowledge on consumer concepts in combination with the development of financial literacy and consumer responsibility
- To develop insight into major global economic issues having local impact on market forces and consumers.

VI. Theory

Unit I: The ontology of consumer economics

Consumer motivation- Concept, components of motivation; Maslow's motivational theory and consumer behaviour; Consumer decision process- Problem or need recognition, information search, evaluation of alternatives, purchase decision, post-purchase decision; Models of buyer decision making -Economic model, psychological models, consumer behaviour models; Influence of purchase decision- external and internal; Consumer decision styles; Risk in consumer behavior -functional risk, physical risk, financial risk, social risk, psychological risk, time risk; Adoption and diffusion of innovations; Impulse buying- definition and types; Factors influencing impulse buying behavior -consumer related factors, Situational characteristics, product characteristics, store related factors, consumer behaviour.

Unit II: Global markets

Definition and importance; Features of global marketing; Forces affecting global marketing; Objectives of global marketing; Global marketing environment; Global marketing strategies; Difference between global and international market; Advantages and disadvantages of global marketing.

Unit III: New economic policies

Introduction to new economic policies- Liberalization, privatization, globalization; Privatization-introduction, objectives; Types of privatization; Problems of privatization; Privatization in India; Privatization and global impact; Globalization-meaning, trends, factors influencing globalization; Impact of globalization on Indian economy; Positive and negative impact of globalization in India; World Trade Organization(WTO) –objectives and functions; WTO agreement; Benefits of WTO; WTO and developing countries; WTO agreement on agriculture and subsidies; General Agreement on Tariff and Trade (GATT)-Purpose, implications of GATT agreement in various areas.

Unit IV: The services

Consumer services; Service providers and their obligations towards consumers;



Citizen Charter- Vision, mission objectives, importance in public administration; Goods and Service Tax (GST)- Components of GST, benefits of GST, impact of GST on consumers.

Unit V: Agriculture and Indian economy

Indian agriculture policy; Agriculture credit in India; National agricultural insurance schemes; Agriculture marketing in India; Sustainable agriculture and food security in India; Government programmes for increasing family food security and financial security of consumers.

VII. Practicals

1. Project work: Study on impulse buying behaviour among teenage consumers- collection of review
2. Formulation of objectives for the study
3. Finalization of method of research
4. Designing a data collection tool
5. Data collection on impulse buying behaviour among teenage consumers
6. Data analysis and report writing
7. Presentation of report on impulse buying behaviour among teenage consumers
8. Presentation of the report on impulse buying behaviour among teenage consumers
9. Critical analysis of citizen charter of electricity department
10. Study the crop insurance scheme
11. Conduct farmer awareness camp on crop insurance scheme
12. Study the implementation of any one government programme for increasing family food security and financial security
13. Identify structural and functional aspects of any one agriculture market
14. Observe the functioning of selected agriculture market
15. Group discussion on functional aspects of agriculture market
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Book/Publication Review
- Students' presentation
- Group work
- Field study
- On line learning

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Develop insight into major global economic issues having local impact on market forces and consumers
- Equip them to identify, evaluate and evolve ways to address changing economic scenario due to globalization.

X. Suggested Reading

- Dasgupta Biplob. 2005. *Globalization*. Sage Publications, New Delhi.
- Kotabe Masaki and Helsen Kristiaan. 2004. *Global Marketing Management*. 3rd Edition, John Wiley & Sons.
- Loudon DL. 1988. *Consumer Behavior: Concepts and Applications*. McGraw Hill, London.

- Nayar BR. 2007. *India's Globalization*. Vistaar Publication.
- Rajagopal. 2007. *Globalization and Consumer Behavior*.
https://link.springer.com/chapter/10.1057%2F9781137281920_11
- Schiffman LG. 2004. *Consumer Behaviour*. Prentice Hall.
- Schiffman LG and Wisenblit JL. 2015. *Consumer Behaviour*. 11th Edition.
- Sharma AK. 2006. *Consumer Behaviour*. Global Vision Publication.
- Sherlekar SA. 2012. *Marketing Management*. Himalaya Publishing House, Delhi.
- Srivastava R. 2011. *Marketing Skills in Globalisation*. Subline Publications, Jaipur.

Weekly Lecture Schedule

Duration (week)	Topic
1	Consumer motivation- concept of motivation, components of motivation; Maslow's motivational theory and consumer behaviour; Stages in consumer decision process- Problem or need recognition, information search, evaluation of alternatives, purchase decision, post-purchase decision.
2	Models of buyer decision making- Economic model, psychological models, consumer behaviour models; External and Internal influence on purchase decision.
3	Consumer decision styles; Risk in consumer behaviour- functional risk, physical risk, financial risk.
4	Risk in consumer behavior - social risk, psychological risk and time risk; Impulse buying- Definition and types; Factors influencing impulse buying behaviour- Consumer related factors, situational characteristics, product characteristics, store related factors, consumer behavior.
5	Global markets- Definition, importance and features; Forces affecting global marketing.
6	Forces affecting global marketing; Global marketing strategies.
7	Difference between global and international market; Advantages and disadvantages of global marketing.
8	Introduction to new economic policies; Liberalization-meaning, objectives of liberalization policy; Economic reforms during liberalization, industrial sector reforms, financial sector reforms, tax reforms, foreign exchange reforms, potential benefits, potential risks; Privatization- Introduction, objectives, types of privatization, problems of privatization, privatization in India, privatization and global impact.
9	Globalization- Meaning, trends, factors influencing globalization, impact of globalization on Indian economy; Positive and negative impact of globalization in India.
10	Positive and negative impact of globalization in India; General Agreement on Tariff and Trade (GATT)- Purpose, implications of GATT agreement in various areas.
11	Consumer services- Definition and types of consumer services; Service providers and their obligations towards consumers.
12	Citizen charter- Vision, mission objectives, importance in public administration; Goods and Service Tax (GST)- meaning, need, applicability and mechanism of GST.
13.	Goods and Service Tax (GST) –components of GST, benefits of GST, impact of GST on consumers; Indian Agricultural Policy- Objectives and features.
14.	Agriculture credit in India-Types, sources and credit institutions. National Agricultural Insurance Schemes (NAIS).
15	Crop insurance and livestock insurance; Agriculture marketing in India.
16	Sustainable agriculture and food security in India; Government programmes for increasing family food security and financial security.

I. Course Title : Space Designing and Managerial Dimensions for Special Needs

II. Course Code : RMCS 604

III. Credit Hours : 3(1+2)

IV. Rationale

People with special needs should enjoy the freedom and ease of living in their houses. Accommodating the needs and wishes of every one is a challenge the designers' face. The designer should create living environment for users to experience it and overcome functional limitations. This course gives an opportunity for students to learn designing an environment that supports independent functioning of individuals with special needs.

V. Aim of the course

- To impart theoretical understanding and legislative requirements for universal design
- To expose students to the application of principles of universal design and develop residential and commercial interiors for people with special needs.

VI. Theory

Unit I: Introduction to interiors for special needs

Types of disabilities and their needs; Barriers in residential and commercial buildings; Theoretical perspectives on efficiency; Comfort and safety; Physical environment; Architectural dimensions- Flooring, stairs, storage, workstations, furniture, fixtures and equipment.

Unit II: Universal design

Adapted; Adaptable; Barrier free; Accessible and Universal design-Meaning, differences and features; Principles to be followed in residential and commercial buildings; Suitability of elements and principles of design- lighting, colours, textures, arrangement of furnishings, floor coverings, window placement, etc. for people with special needs.

Unit III: Managerial dimensions

Managerial dimensions with special reference to time, money and energy for people with special needs; Managerial dimensions with special reference to food and health for people with special needs; External environment support systems for people with special needs; Guidelines for support systems.

Unit IV: Policies and institutional support

Policies and institutional support for people with special needs; Legal provisions; Access standards and regulations; Physical amenities to be provided for people with special needs; Qualities; Roles and responsibilities of special care managers.

VII. Practicals

1. Identifying the existing barriers and accessibility features provided in residential buildings for people with special needs – preparation of check list
2. Data collection
3. Presentation and group discussion
4. Identifying the existing barriers and accessibility features provided in commercial buildings for people with special needs -preparation of check list

5. Data collection
6. Presentation and group discussion
7. Design and development of scale model for residential and commercials buildings for visually impaired people – preparation of conceptual drawings
8. Design and development of scale model for residential and commercials buildings for visually impaired people – preparation floor plan, elevation
9. Design and development of scale model for residential and commercials buildings for visually impaired people – preparation of landscape plans,
10. Design and development of scale model for residential and commercials buildings for visually impaired people – Preparation of scale model
11. Presentation and discussion
12. Design and development of scale model for residential and commercials buildings for hearing impaired people - Preparation of conceptual drawings
13. Design and development of scale model for residential and commercials buildings for hearing impaired people - Preparation of floor plan, elevation
14. Design and development of a scale model for residential and commercials buildings for hearing impaired people - Preparation of landscape plans,
15. Design and development of a scale model for residential and commercials buildings for hearing impaired people - Preparation of scale model
16. Presentation and discussion
17. Design and development of a scale model for residential and commercials buildings for physically challenged people - Preparation of conceptual drawings
18. Design and development of a scale model for residential and commercials buildings for physically challenged people - Preparation of floor plan, elevation
19. Design and development of a scale model for residential and commercials buildings for physically challenged people - Preparation of d landscape plans,
20. Design and development of a scale model for residential and commercials buildings for physically challenged people - Preparation of scale model
21. Presentation and discussion
22. Visit to old age homes– Preparation of observation tool
23. Collection of data on living conditions in old age homes
24. Presentation of information and group discussion
25. Visit to schools for children with special needs
26. Collecting and presenting the information on living conditions in the school
27. Design and development of a scale model of an old age home with universal design features - Preparation of conceptual drawings
28. Design and development of a scale model of an old age home with universal design features - Preparation of floor plan, elevation
29. Design and development of a scale model of an old age home with universal design features - Preparation of landscape plans,
30. Design and development of a scale model of an old age home with universal design features - Preparation of scale model
31. Presentation and group discussion
32. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Students' presentation
- Field visits

- Group work and case studies
- Guest lectures
- Online learning

IX. Learning Outcome

After successful completion of the course, the students will be able to:

- Understand the diverse needs of people with special needs
- Enforce a conscious application of universal design concepts and principles in designing for special needs
- Create an enabling environment for social inclusion of people with special needs in all fields of life

X. Suggested Reading

- Bridger RS. 1994. *Introduction to Ergonomics*. McGraw Hill.
- Dalela S and Saurabh. 1999. *Textbook of Work Study and Ergonomics*. Standard Publ.
- Designing for disabled children and children with special educational needs-
https://www.unicef.org/devpro/files/CFSManual_Ch03_052009.pdf
- Grandjean E. 1978. *Ergonomics of the Home*. Taylor & Francis.
- Ian G. 2006. *Applied Ergonomics Handbook*. Butterworths.
- Panero JZ. 1979. *Human Dimensions and Interior Space*. The Architectural Press.
- Singh S. 2007. *Ergonomics Interventions for Health and Productivity*. Himanshu Publ.

Weekly Lecture Schedule

Duration (week)	Topic
1	Types of disabilities and their needs – Intellectual, learning, mental and physical disability, vision and hearing loss, speech and language disorders, autism, chronic illness, old people, pregnant women, children, etc.
2	Barriers in residential and commercial buildings for visually impaired, physically challenged, hearing impaired and elderly.
3	Theoretical perspectives on efficiency, comfort and safety in physical environment for children, elderly and pregnant women.
4	Architectural dimensions- flooring, stairs, storage, workstations, furniture, fixtures, fittings and equipment and their suitability to people with special needs.
5	Types of design- Adapted, adaptable, barrier free, accessible and universal design; meaning ,differences and design features.
6	Principles to be followed in residential buildings-accessible features for entrance, drawing room, bed room, kitchen, bathroom, stair cases, etc.
7	Principles to be followed in commercial buildings- Accessible features for entrance, toilets, stair cases, meeting rooms, reception areas, cafeteria, etc.
8	Suitability of elements and principles of design-Lighting, colours and textures suitable for visually impaired, physically challenged, hearing impaired, etc.
9	Arrangement of furnishings- Curtains, draperies, cushions, table linen, bed linen, floor coverings, carpets, rugs, durries, floor mats for people with special needs.
10	Window placement, window treatments and architectural features for people with special needs.
11	Managerial dimensions with special reference to time, money and energy for people with special needs.
12	Managerial dimensions with special reference to food and health for people with special needs.
13	External environment support systems for people with special needs- Guidelines for support systems.
14	Policies and institutional support for people with special needs - Legal provisions, access standards and regulations

Duration (week)	Topic
15	Physical amenities to be provided for people with special needs in different institutions - Old age homes, rehabilitation centres, day care centres, retirement homes, nursing homes, therapy clinics, etc.
16	Qualities, roles and responsibilities of special care managers.

I. Course Title : Physical Ergonomics

II. Course Code : RMCS 605

III. Credit Hours : 3(1+2)

IV. Rationale

The process of ergonomics involves studying the user and studying the task, and then designing the processes and products to optimize the user's safety, health, comfort, and performance. The course is designed to provide students with a basic understanding of the principles underlying the place of people in work systems, their abilities and limitations, so that tasks and work generally may be designed for effectiveness, efficiency, health and safety.

V. Aim of the course

- To impart knowledge and skills to implement programs in ergonomics, perform ergonomic job analyses, devise injury prevention strategies and develop solutions
- To enable students to apply participatory ergonomics in various fields of work and plan ergonomic trainings.

VI. Theory

Unit I: Workplace hazards

Workplace hazards; Types, sources and classification; Hazard identification through interactive exercises; Employee survey methods; Injury log assessment; Hazard control methods.

Unit II: Work related musculoskeletal disorders

Workplace risk factors and evidence for work relatedness -posture, force, repetition, vibration, contact stress, environment; Upper limb disorders-Tenosynovitis, Carpal Tunnel Syndrome (CTS) and Tennis elbow, Repetitive Strain Injuries (RSI); Lower limb disorders-Osteoarthritis, Knee bursitis, Meniscal lesions, Stress reaction injuries, Varicose veins.

Unit III: Ergonomic guidelines for occupational health

Ergonomic program for best practices in work place and hazard reduction; Methods for integrating ergonomics into existing occupations; Workplace evaluation; Risk factor checklists; Hazard reduction- engineering control, administrative controls.

Unit IV: Systems approach to ergonomics

Organizational aspects of the human; Work interface to enhance safety; Designing work with systematic procedures to enhance safety; Safety and ergonomics culture.

Unit V: Digital human model for ergonomic analysis

Virtual ergonomics and its advantage; Introduction to digital human modeling and simulation; Techniques of virtual ergonomics evaluation using digital human modeling.

VII. Practicals

1. Identifying common hazards in a selected manufacturing industry through literature search
2. Developing a check list for identifying hazards in a selected manufacturing industry
3. Content validation of the check list
4. Pretesting of check list
5. Establishing the reliability
6. Collection of data on hazards in a selected manufacturing industry
7. Data analysis for identification of occupational hazards
8. Preparation of report on hazards in a selected manufacturing industry
- 9-12. Identification of ergonomic best practices through literature search to safe guard occupational health in manufacturing industry
13. Planning ergonomic intervention programme
- 14-28. Implementations of ergonomic interventions in the manufacturing industry
29. Collection of feedback on effectiveness of ergonomic interventions
30. Preparation of report
31. Presentation of report and group discussion
32. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Field experiments
- Students' presentations
- Group research work
- Field visits
- Guest lectures
- On line learning

IX. Learning Outcome

After successful completion of this course, the students will be able to:

- Identify potential occupational health hazards in the workplace relating to ergonomic risk factors
- Apply ergonomic principles to the creation of safer, healthier and more efficient and effective workplace
- Develop appropriate control measures to overcome ergonomic risk factors in workplace

X. Suggested Reading

- Ayub MM and Mittal A. 1998. *Manual Material Handling*. Taylor and Francis, London.
- Chapanis A. 1996. *Human Factors in Systems Engineering*. John Wiley and Sons, New York.
- Dalela S and Saurabh. 1999. *Text Book of Work Study and Ergonomics*. Standard Publishers Distributors, Delhi.
- John R Wilson and Nigel Corlett. 2005. *Evaluation of Human Work*. Third Edition, Taylor and Francis Group, London.
- Kumar Shrawan. 2007. *Biomechanics in Ergonomics*. Second Edition, www.crcpress.com/product/isbn/
- Meister D. 1989. *Conceptual Aspects of Human Factors*. Baltimore, MD: Johns Hopkins University Press.
- Panero J and Zelnik M. 1979. *Human Dimension and Interior Space*. Whitney Library of Design.

- Tayyari F and Smith JL. 1997. *Occupational Ergonomics Principles and Applications*. Chapman and Hall, London.
- Toomingas Allan, Svend Erik Mathiassen and Ewa WT. 2011. *Occupational Physiology*. 1st Edition, London, CRC Press, Taylor and Francis Group.
- Wilson JR and Haines HM. 1997. Participatory Ergonomics In: *Salvendy G (Ed.) Handbook of Human Factors and Ergonomics*. 2nd Edition, Taylor & Francis, Bristol.

Weekly Lecture Schedule

Duration (week)	Topic
1	Types, sources and classification of workplace hazards- Chemical hazards, biological hazards, physical hazards, ergonomic hazards, psychosocial factors.
2	Hazard identification through interactive exercises; Employee survey methods and injury log assessment.
3	Hazard control methods.
4	Workplace risk factors and evidence for work relatedness -posture, force, repetition, vibration, contact stress, environment.
5	Work related Upper limb disorders-Tenosynovitis, Carpal Tunnel Syndrome (CTS) and Tennis elbow.
6	Work related Repetitive Strain Injuries (RSI); Work related stress reaction injuries, varicose veins.
7	Work related lower limb disorders- osteoarthritis, knee bursitis, meniscal lesions.
8	Ergonomic best practices in work place for hazard reduction.
9	Methods for integrating ergonomics into existing occupations.
10	Workplace evaluation; Risk factor checklists.
11	Hazard reduction- Engineering control, administrative controls.
12	Organizational aspects of the human-work interface to enhance safety.
13	Designing work with systematic procedures to enhance safety.
14	Safety and ergonomic culture in workplace.
15	Virtual ergonomics and its advantage; Introduction to Digital Human Model technology.
16	Techniques of virtual ergonomics evaluation using digital human modelling.

I. Course Title : Environmental Issues and Challenges

II. Course Code : RMCS 606

III. Credit Hours : 2(2+0)

IV. Rationale

Economic development and technological changes are intimately connected with environmental change and sustainability. The students need to be equipped with an understanding of how human actions impact various plant and animal ecologies. Knowledge developed during the course will help out students to understand their own experience of environmental issues and to critically engage with policy responses to environmental challenges.

V. Aim of the course

- To introduce socio economic factors that contribute to local and global environmental issues
- To explore global environmental strategies to maintain ecological balance in micro and macro environment.

VI. Theory

Unit I: Technology and environment

Technology, environment and sustainable development; Positive and negative effect of technological advancement; Effect of technology on organisms and their habitat; Impact of industrialization on environment; Environmental consequences of agricultural development; Environmental effects of information and communication technologies.

Unit II: Global environmental issues

Global environmental issues; Challenges in building governance mechanism; Efforts at international forums; Climate change and global warming; Conservation of biodiversity and wildlife; Over population and land degradation; Exploitation of natural resources and energy crisis; Depletion of ozone layer; Acid rain; Nuclear power; Oil spill pollution; Dumping of hazardous waste.

Unit III: Environmental management system

Environmental management system; Carbon credits a market based instrument for environmental benefit; Objectives and functioning of national and international organizations in environment conservation; Environmental standards in India; Environmental management approaches; Environment audit; Methodology for environment impact assessment; Environment education.

Unit IV: Environment and human health

The effect of global environmental change on vector-borne diseases and parasites; Health effects of particulate matter in environment; Human health implications of exposure to chemical residues in the environment; Neuro toxic effects of environmental contaminants on human health; Environmental factors influencing puberty onset; Cancer risk correlated to environment, diet and genetic factors, food and fertility; Climate change and Infectious diseases; Environmental health hazards in various occupations.

VII. Teaching Methods/ Activities

- Lectures
- Assignments
- Publication review
- Students' presentations
- Group work
- Case studies

VIII. Learning Outcome

After successful completion of the course, the students will be able to:

- Develop a global perspective on environmental issues which permit them to perceive connections between culturally specific practices and global environmental impacts.
- Apply intellectual skills developed in the course in bringing lifestyle choices into conformity with environmental values.
- Critically evaluate information, analyze scientific data, reason logically, consider multiple viewpoints on environmental issues

IX. Suggested Reading

- Bharucha E. 2017. *Text Book of Environmental Studies*. UGC University Press India Pvt. Ltd.

- Bhatnagar A. 2010. *Ecology and Environment*. Oxford Book Company, Jaipur.
- Chary SN and Vyasula V. 2001. *Environmental Management-An Indian Perspective*. Macmillan India Ltd.
- Joseph K and Nagendran R. 2004. *Essentials of Environmental Studies*. Pearson Education Pvt. Ltd.
- Kumar A and Roy PK. 2008. *Environmental Resource Management*. Daya Publishing House, Delhi.
- Rao VP. 2002. *Text Book of Environmental Engineering*. Prentice Hall.
- Singh K and Sisodia A. 2007. *Environmental Economics: Theory and Applications*. Sage Publ.
- Singh S. 2010. *Disaster Management*. Rajdhani Printers, Delhi.
- Thakur V. 2012. *Text Book of Environmental Science*. Scientific publishers, Jodhpur.
- Tiwari M, Khulbe K and Tiwari A. 2016. *Environmental Studies*. I.K. International Publishing House Pvt. Ltd., New Delhi.

Weekly Lecture Schedule

Duration (week)	Topic
1	Technology, environment and sustainable development; Environmental indicators of development, environmental dimensions of sustainable development, international trade and environmental problems; Positive and negative effect of technological advancement on environment.
2	Effect of technology on organisms and their habitat, life supporting capacity of natural ecosystems and on biodiversity; Impact of industrialization on environment- Industrial pollution, global warming.
3	Environmental consequences of agricultural development- Cropping systems, land use change, ground water quality; Environmental effects of information and communication technologies- Manufacturing operations, disposal of devices and net work equipment, positive effect of economic growth and societal changes.
4	Introduction to global environmental issues- Challenges in building governance mechanism; Efforts at international forums; Climate change and global warming- Causes, The greenhouse effect; Effects of climate change and global sea level rise; Drought and extreme weather; Measures to safeguard the environment- Invest in renewable energy, adopt energy efficient practices, adopt recycling of resources.
5	Conservation of biodiversity and wildlife- Introduction, importance in terms of ecological balance, approaches towards conservation of biodiversity and wildlife; Role of individuals and government in conservation of biodiversity and wildlife; Over population and land degradation.
6	Exploitation of natural resources and energy crisis; Consequences of exploitation of natural resources; Human made energy crisis; Deletion of natural energy resource crisis; Energy policy of India; Depletion of ozone layer; The ozone depletion phenomenon; Causes of Ozone layer depletion, Consequences of ozone layer depletion.
7	Acid rain- definition, formation of acid rain, Causes of acid rain; Natural Sources, Manmade sources, Forms of acid deposits; Wet deposits, Dry deposits; Effects of acid rains; Solutions to acid rains; Alternate energy sources; Individual, national and international actions; Environmental impact of nuclear power- Introduction, problems associated with nuclear power, nuclear energy and climate change.
8	Oil spill pollution- introduction, direct and indirect effects of oil spill pollution, distinct environmental effects; Dumping of hazardous waste- Sources, and types of hazardous wastes; Health effects of hazardous wastes; Affect of hazardous wastes on environment.
9	Concept of environmental management system (EMS) - Goal, features, elements and functions; Carbon credits a market based instrument for environmental benefit-Aim, objectives and role in environment management.

Duration (week)	Topics
10	Objectives and functioning of national and international organisations in environment conservation- World Nature Organisation (WNO), United Nations Environment Programme (UNEP), International Union for Conservation of Nature(IUCN), Intergovernmental Panel on Climate Change (IPCC); Environmental standards in India.
11	Environmental management approaches- Engineering, technological and legal controls; Environment Audit -Objectives, audit tools and technology, environmental auditing in India
12	Methodology for environment impact assessment- Baseline data acquisition, environmental inventory, methodology, data products, environmental baseline monitoring, environmental monitoring network design; Environment education- Goals for curriculum development in environmental education, Guidelines and considerations for curriculum development at various levels.
13	The effect of global environmental change on vector-borne diseases and parasites; Health effects of particulate matter in environment.
14	Human health implications of exposure to chemical residues in the environment; euro toxic effects of environmental contaminants on human health.
15	Environmental factors influencing puberty onset. Cancer risk correlated to environment, diet and genetic factors, food and fertility.
16	Climate change and infectious diseases; Environmental health hazards in various occupations.

I. Course Title : Family Dynamics and Women Power

II. Course Code : RMCS 607

III. Credit Hours : 3(2+1)

IV. Rationale

India is proud of its heritage of united and stable family system. There is emergence of a gradual trend from extended families to nuclear families due to growing urbanization and industrialization. These fast changing trends in the social, cultural, economic and industrial scenario do pose a growing challenge to the institution of the family in India and especially women. The course will be valuable in creating awareness regarding various government programmes. It will also strengthen awareness regarding women rights and laws.

V. Aim of the course

- To analyze the changes brought in family due to developmental programmes
- To create awareness among students about issues related to status of women.

VI. Theory

Unit I: Women and family

Role analysis of Indian home makers during ancient period, medieval period and modern times; Impact of change in the role of women on the family system; Roles and responsibilities of women in various spheres of life; Causes of change in women's role in family and its impact on the family.

Unit II: Family dynamics

Understanding family dynamics; Family dynamics and its influences on family; Theoretical and conceptual framework to study family dynamics; Institutional norms

of family; Family structure; Family ecology and family life development programmes; Economic and psychological cost of gainful employment of women in the family.

Unit III: Family stress management

Family stress- meaning, sources and symptoms, causes, effects and consequences of stress; Stress and burnout - definition of burnout, Difference between stress and burnout, major signs of burnout; Stress and coping strategies; Types of coping strategies- appraisal focused, problem focused, emotion focused, occupation focused; Work stress-sources, consequences and coping strategies; Social support systems for facilitating women's work participation in family and society; Quantitative methods for measuring the perception of stress.

Unit IV: Women and law

Status of women in Indian; Women in family; Women and education; Women reservation; Women's economic social and cultural rights; Constitutional provisions and privileges for women in India; Special initiatives for women- National commission for women, reservation for women in local self-government, the national plan of action for the girl child(1991-2000); National policy for the empowerment of women,2001; Indian laws for the protection of women's rights against domestic violence; Women's economic empowerment and the changing world of women work; International initiatives for women's economic empowerment; United nation's bodies for women's rights; Women in the workforce- Organized and unorganized sectors; Women and occupational health and safety; Provisions for health and safety under occupational health laws in India.

VII. Practical

1. Analysis of aspects of family dynamics in different stages of family life cycle through case study
2. Report presentation and discussion
3. Evaluate implementation of any one government programme/scheme through survey-Formulation of guidelines
4. Evaluate implementation of any one government programme/scheme through survey-Field survey
5. Evaluate implementation of any one government programme/scheme through survey-Preparation of report
6. Report presentation and discussion
7. Finding out awareness about constitutional provisions and welfare schemes for women-preparation of data collection tool
8. Finding out awareness about constitutional provisions and welfare schemes for women-data collection
9. Finding out awareness about constitutional provisions and welfare schemes for women-data analysis
10. Finding out awareness about constitutional provisions and welfare schemes for women-report writing
11. Report presentation and discussion
12. Review of stress measuring tools and techniques-Collection of literature
13. Presentation on stress measuring tools and techniques
14. Group discussion on stress measuring tools and techniques
15. Proposing modifications for refinement of tool
16. End term assessment

VIII. Teaching Methods/ Activities

- Lectures
- Assignments
- Publication review
- Field visits
- Students' presentations
- Group work and case studies
- Case analysis and case studies

IX. Learning Outcome

After successful completion of this course, the students will be able to:

- Understand the transition in the role played by women in family and society
- Gain knowledge on various Government and Non-Government incentives for women development
- Understand the legal frame work for women protection

X. Suggested Reading

- Becvar D and Becvar R. 2002. *Family Therapy: A Systemic Integration*. Pearson Education, Australia.
- Brian J and Carrie LY. 2017. *Family Relationships, Marital Relationships*- <https://family.jrank.org/pages/1316/Power.html>
- Dasgupta S and Lal M. 2007. *The Indian Family in Transition*. Sage Publication, New Delhi.
- Ghadially R. 2007. *Urban Women in Contemporary India*. Sage Publication, New Delhi.
- Krishna S. 2007. *Women's Livelihood Rights*. Sage Publication, New Delhi.
- Manji F. 2006. *Development and Rights*. Rawat Publication.
- Paxton P and Hughes MM. 2007. *Women, Politics and Power*. Pine Forge Press.
- Thakur S. 2013. *Encyclopedia of Women Empowerment*. Centrum Press, New Delhi.
- Tata Institute of Social Sciences. 1994. *Enhancing the Role of the Family as an Agency for Social and Economic Development*. Bombay.

Weekly Lecture Schedule

Duration (Week) Topics

- | | |
|----|--|
| 1 | Role analysis of Indian home makers during ancient period and medieval period. |
| 2 | Role analysis of Indian home makers during modern times; Impact of change in the role of women on the family system. |
| 3 | Roles and responsibilities of women in various spheres of life; Causes of change in women's role in family and its impact on the family. |
| 4 | Family dynamics; Family dynamics and Its influences on family. |
| 5 | Theoretical and conceptual framework to study family dynamics; Institutional norms of family. |
| 6 | Family structure; Family ecology and family life development programmes. |
| 7 | Economic and psychological cost of gainful employment of women in the family; Family stress-meaning , sources and symptoms. |
| 8 | Causes , effects and consequences of stress; Stress and burnout - Definition of burnout, difference between stress and burnout, major signs of burnout. |
| 9 | Stress and coping strategies; Types of coping strategies- appraisal focused, problem focused, emotion focused, occupation focused. Work stress: Sources, consequences and coping strategies. |
| 10 | Social support systems for facilitating women's work participation in family and society; Quantitative methods for measuring the perception of stress. |
| 11 | Status of women in Indian; Women in family, women and education, women reservation; Women's economic, social and cultural rights. |

Duration (Week) Topics

- 12 Constitutional provisions and privileges for women in India; Special initiatives for women- National commission for women, reservation for women in local self-government, the national plan of action for the girl child(1991-2000).
 - 13 Indian laws for the protection of women's rights against domestic violence.
 - 14 International initiatives for women's economic empowerment.
 - 15 Women in the workforce-organized and unorganized sectors; Women and occupational health and safety.
 - 16 Occupational health hazards of farm women; Provisions for health and safety under occupational health laws in India.
-



ANNEXURE I

List of BSMA Committee Members for Community Science

Dr A. Sarada Devi, Former Dean of Home Science, ANGRAU	Chairperson
Dr Neelam Grewal, Member Punjab Public Service Commission, Ludhiana	Convenor
Dr Basanthi Barua, Former Dean of Home Science, AAU, Jorhat	Member
Dr Ritu Singhvi, Dean of Community Science, MPUA&T, Udaipur	Member
Dr T. Neeraja, Dean of Community Science, ANGRAU, Hyderabad	Member
Dr Jatinder Gulati, Dean of Home Science, PAU, Ludhiana	Member
Dr Seema Rani, Professor & Head, Extension Education, HAU, Hisar	Member
Ms Vishala, Dean of Community Science, Maratwada Agri University, Parbhani	Member
Dr Amala Kumar, Former Professor in Extension Education, PJTSAU, Hyderabad	Member
Dr Saroj Jeet Singh, Emeritus Scientist, HAU, Hisar	Member
Dr Kiran Bains, Professor & Head, Dept of Food & Nutrition, College of Community Science, PAU, Ludhiana	Expert- Foods & Nutrition



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