

**SRI SHANMUGHA COLLEGE OF ENGINEERING AND
TECHNOLOGY**

(An Autonomous Institution)

Pullipalayam, Morur (Po.), Sankari (Tk.),
Salem (Dt.) - 637 304.

B.E. / B.Tech. Programmes

REGULATIONS 2023

(Version 1.0)



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CHAIRMAN-ACADEMIC COUNCIL



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PREAMBLE

Currently, the students are different from the students of the past in various ways. Nowadays, they prefer to make independent decisions on their own. However, the student aspirations and the demands of the workplace have become highly diverse. Particularly, employers expect students to have multidisciplinary competencies, leadership skills, and proficiency in ICT (Information and Communication Technology). The rigid cohort system of learning offers little flexibility to students in selecting the courses of their choice and helps little in becoming a well-rounded personality.

India has become a permanent member of Washington Accord. As an educational institution, the "Outcome Based Education (OBE)" is being adopted to ensure the required outcomes (knowledge, skills, and attitude / behavior) acquired by the learners.

Choice Based Credit System (CBCS) is a proven, flexible mode of learning in higher education which facilitates a student to have guided freedom in selecting his/her own choices of courses in the curriculum for completing a degree program. The regulations, curricula and syllabi have been carried out further to make it more flexible and adaptive to the technological advancements happening in the world.

CBCS not only offers a wide choice for students to build their own expertise, but also enhances their skill in planning. A Mentor / Class Advisor helps the student in identifying the courses to be studied in each semester based on programme requirement, course prerequisites, the students' academic ability, interest in various disciplines, past academic history, proposed course outcomes and other related criteria.

SCOPE

This Regulations 2023 is applicable to all students admitted into various B.E. / B.Tech. Programmes offered by the institution from the Academic Year (AY) 2023 - 2024 and onwards. The medium of instruction is English for all the Courses, Examinations, Seminar presentations, Project reports, and any other courses registered by the students.

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1 PRELIMINARY DEFINITIONS AND NOMENCLATURE

Table 1.1 Preliminary Definitions and Nomenclature

S.No.	Name	Definition
1	Programme	Refers to Degree Programme viz., B.E. / B.Tech.
2	Discipline	Refers to Branch or Specialization in B.E. / B.Tech. Degree Programme, viz., Agricultural Engineering, Biomedical Engineering, etc.
3	Course	Refers to Theory, Practical, Theory cum Practical and Project.
4	Head of the Institution	Refers to the Principal.
5	Controller of Examinations (CoE)	Refers to the authority of the Institution who is responsible for all activities of the Examinations of the Institution.
6	Head of the Department	Refers to Head of the Department concerned.
7	University	Refers to Anna University, Chennai
8	Institution	Refers to Sri Shanmuga College of Engineering and Technology.
9	L – T – P – C	Refers to Lecture, Tutorial, Practical, and Credits, respectively.
10	Curriculum	Refers to the various components / courses studied in each programme that provide appropriate outcomes (knowledge, skills and attitude/ behaviour) in the chosen programme of study.
11	Academic Council (AC)	The committee includes Principal, CoE, HoDs, University Nominees, Academic Experts, Industry Experts and senior faculty members. This committee is responsible for framing of academic policies, approval of regulations curriculum and syllabi etc.

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S.No.	Name	Definition
12	Department Advisory Board (DAB)	The board includes HoD, Faculty members of the department, Alumni, Experts from other reputed institutions and industries. They review the progress of the department activities and recommend new or revised targets. The board finds the gap between curriculum and industry requirements based on the feedback received from the stakeholders and suggests for suitable corrective actions.
13	Board of Studies (BoS)	The committee includes HoD, all faculty members of department, University Nominee, Alumni, Experts from other reputed institutions and industries. Its function includes reviewing and updating curriculum, syllabi from time to time, introducing new courses of study, recommending panel of examiners.

2 ADMISSION REQUIREMENTS

The candidate seeking admission to the B.E. or B.Tech. Programme must fulfil the admission requirements set by Anna University, Chennai, and the Directorate of Technical Education (DoTE) as specified below.

2.1 Regular Admission

Students for admission to the first semester of the eight semester B.E. / B.Tech. Degree Programme shall be required to have a pass in Higher Secondary Examination (Academic 10 + 2) Curriculum or its equivalent examinations with Mathematics, Physics and Chemistry.

The eligibility criteria such as marks, number of attempts and physical fitness shall be as prescribed by the Syndicate of the University from time to time.

2.2 Lateral Entry Admission

The candidates who possess the Diploma in Engineering / Technology awarded by the State Board of Technical Education, Tamil Nadu or its equivalent are eligible to apply for Lateral entry admission to the third Semester of the B.E. / B.Tech programme as per the guidelines fixed by the DoTE from time to time.

OR

The candidates who possess a Bachelor's Degree in Science (B.Sc.) (10+2+3 stream) with Mathematics as a subject at the B.Sc. level are eligible to apply for Lateral Entry admission to the third Semester of B.E./B.Tech. Programmes, as per the guidelines given by the DoTE from time to time. Such candidates shall undergo two additional Engineering subject(s), one in the third Semester and the other in the fourth Semester, as bridge courses. In addition, any

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changes in admission procedure as notified by the Government of Tamil Nadu will be followed.

2.3 Readmission

Students under the 2017 or 2021, who have discontinued for reasons other than disciplinary action, may be readmitted to the 2023 regulation. Department Advisory Board (DAB) and BoS shall discuss and recommend the exemption and addition of courses to be registered by the student concerned during readmission. The details shall be forwarded to the Academic Council for approval and the council's decision shall be final.

3 PROGRAMMES OFFERED

SSCET offers 4 year (8 Semesters) B.E. / B.Tech degree programme affiliated to Anna University, Chennai, under Choice Based Credit System (CBCS) for regular students and 3 year (6 semesters) B.E/B.Tech. Degree programme for lateral-entry students in the following programmes of Engineering and Technology as in Table 3.1

Table 3.1 List of B.E./B.Tech. Programmes offered

B.E. Degree Programmes	B.Tech. Degree Programmes
➤ Biomedical Engineering	➤ Agricultural Engineering
➤ Computer Science and Engineering	➤ Artificial Intelligence and Data Sciences
➤ Computer Science and Engineering (Cyber Security)	➤ Information Technology
➤ Electronics and Communication Engineering	
➤ Mechanical Engineering	

4 STRUCTURE OF THE PROGRAMME

4.1 Categorization of Courses

Every programme shall have a distinct curriculum with syllabi consisting of theory, theory cum practical and practical courses approved by the respective Board of Studies are broadly categorized under:

- I. **Humanities, Social Sciences and Management Courses (HSMC)** courses include Technical English, Tamil courses, Professional Ethics and Human Values, Communication skills, Total Quality Management etc.
- II. **Basic Science Courses (BSC)** include Mathematics, Chemistry, Physics, Biology etc.
- III. **Engineering Science Courses (ESC)** include Engineering Practices, Engineering Graphics, Basics of Civil / Mechanical / Electrical / Electronics / Instrumentation, Computer Engineering, etc.
- IV. **Professional Core Courses (PCC)** include the core courses related to a particular discipline or programme.

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- V. **Professional Elective Courses (PEC)** comprise elective courses relevant to the chosen discipline or programme. It will be offered from the fifth semester onwards.
- VI. **Open Elective Courses (OEC)** include the courses offered by a department to other programmes. There will be a pool of open elective courses offered by different departments for the students of other programmes. Proper choice of professional elective courses or open elective courses across Semesters V to VII will enable students to specialize in an emerging area within and outside their chosen programme of study. The concerned Class Advisor / mentor shall guide the students in selecting the appropriate courses.
- VII. **Mandatory Courses (MC)** are non-credit courses and completion status of this course will be mentioned in the grade sheets.
- VIII. **Employability Enhancement Courses (EEC)** include Project and/or Internship, Seminar, Professional practices, Industrial/Practical Training, Soft Skills, Value Added and online Certificate Courses etc.

4.2 Personality and Character Development

- All students shall enroll in any one of the personality and character development programmes (NCC/NSS/NSO/YRC/CLUBS) and undergo training for about 80 hours and attend a camp of about seven days. The training shall include classes on hygiene and health awareness and also training in first-aid. National Cadet Corps (NCC) will have about 20 parades.
- National Service Scheme (NSS) will have social service activities in and around the College / Institution. The activities shall include practical projects on recycling and reusing biodegradable and dry waste.
- National Sports Organization (NSO) will have sports, games, drills and physical exercises. Youth Red Cross (YRC) will have activities related to social services in and around College/Institutions. While the training activities will normally be during weekends, the camp will normally be on vacation period.
- The details of Personality and Character Development completed certificate should be submitted to the CoE at the end of seventh semester and the details will be printed in the seventh semester grade sheet as completed.

4.3 Induction Programme

The students immediately after admission should undergo a mandatory three weeks induction programme comprising physical activities, yoga, creative arts, universal human values, proficiency modules, motivational and career guidance lectures by eminent experts, visits to local areas and familiarization with the department/programme and training on creativity and innovation.

4.4 Number of courses per Semester

Curriculum of each Semester will have a combination of lecture courses not exceeding seven from Theory courses and Theory cum practical courses and four from Employability

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Enhancement and Laboratory Courses. But, the total number of courses per Semester shall not exceed 10. Each course may have credits assigned as per clause 4.5.

4.5 Credit Assignment

Each course is usually allotted a certain number of credits, as mentioned in the table 4.1

Table 4.1 Credit Assignment for Theory and Laboratory course

Contact period per week	Credit
1 Lecture Period	1
1 Tutorial Period	1
1 Laboratory Period (also for EEC courses like Seminar / Project Work / Case study, etc.)	0.5

The credit distribution for various categories of courses is as mentioned in the table 4.2

Table 4.2 Credit Distribution

Category	Credit range
Humanities, Social Science and Management Courses (HSMC)	09 - 15
Basic Science Courses (BSC)	24 – 28
Engineering Science Courses (ESC)	17 – 26
Professional Core Courses (PCC) which includes Skill and Ability Enhancement Courses	58 – 68
Professional Elective Courses (PEC)	12 – 18
Open Elective Courses (OEC)	09 - 12
Employability Enhancement Courses (EEC)	15 - 20
Mandatory Courses (MC)	3 to 4 courses

The minimum prescribed credits required for the award of the degree is specified in the table 4.3

Table 4.3 Minimum Credit Requirement

Programme	Prescribed Credit Requirement
B.E Biomedical Engineering	165
B.E Computer Science and Engineering	165
B.E Computer Science and Engineering (Cyber Security)	163
B.E Electronics and Communication Engineering	164
B.E Mechanical Engineering	167

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B.Tech Agricultural Engineering	167
B.Tech Artificial Intelligence and Data Sciences	165
B.Tech Information Technology	164

4.6 Industrial Training / Internship

The students may undergo an Industrial training / Internship at any reputed research organization / University / Industry for the specified period mentioned in the curriculum during the summer or winter vacation with the prior approval of the Head of the Department and Principal. After completing the industrial training/internship, the student must submit an report, attendance and training certificate signed by the competent authority to the Head of the Department.

The credit will be assigned for the Industrial training / Internship based on the duration of training session as specified in Table 4.4

Table 4.4 Credit Assignment for Industrial training/internship

Duration	Credit
2 Weeks	1
4 weeks	2
6 weeks	3

4.7 Industrial Visit/ Field Visit

Each student must attend at least one Industrial Visit/Field Visit every semester from the second year onwards. The Heads of Departments shall confirm that essential arrangements are made in this regard.

4.8 Value Added Courses

Students can opt for the Value Added Courses offered by various departments from semester III to VII. A Separate Certificate will be issued on successful completion of the course.

4.9 Online Courses

Students may have the option to register for SWAYAM / NPTEL offered online courses. These courses must be recommended by the Department Advisory Board and approved by the respective BoS. A maximum of nine credits earned can be transferred with the due approval for either programme core, professional elective or open elective courses. These credits can replace up to three courses. The duration of the course and the corresponding number of credits can be found in Table 4.5. The marks scored in the SWAYAM / NPTEL exam shall be converted into grades as per the Table 4.6.

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Table 4.5 Duration of the course and Number of credits

S. No.	No. of Weeks	No. of Credits
1	4	1
2	8	2
3	12	3

Table 4.6 Conversion of Marks into Grade

Marks Obtained	Equivalent Grade
Greater than 80	O
76 to 80	A+
71-75	A
61-70	B+
51-60	B
41-50	C

4.10 One Credit Courses

One credit course shall be offered by an industry with a Memorandum of Understanding (MoU) or by an industry expert. Students may choose such one-credit courses from III to VI semester for a duration of 15 hours. These courses must adhere to the regulations of the programme and be approved by the BoS. A student will also be permitted to register for the one-credit courses offered by other departments, provided the student has fulfilled the necessary prerequisites or the courses that may not require any prerequisites. However, students can request for an exemption from one of the elective courses by notifying to the Head of the Department in writing at the beginning of the semester. To qualify for this exemption, they must meet an equivalence requirement stating that one elective (in the VI or VII Semester) is equivalent to three one-credit courses completed during the previous semesters III to VI. If a student decides not to exempt elective courses, the one credit courses studied by the student will be considered under additional course studied and it will not be considered for the calculation of CGPA.

5 PROVISION FOR HONOURS AND MINOR DEGREE

The guidelines as mentioned in the table 5.1 shall be followed for the award of B.E. / B. Tech. Honours and Minor Degrees for the students admitted from the academic year 2023-2024 onwards

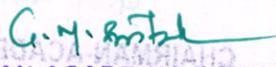

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Table 5.1 Honours and Minor Degree

S.N o	Name of the additional Degree	Eligibility	Credit requirement
1	B. E / B. Tech Honours degree	7.5 CGPA till third semester with no history of Backlogs	18 Credits from more than one vertical of the same programme
2	B. E / B. Tech Minor in other specialization	7.5 CGPA till third semester with no backlogs	18 credits in any one of the verticals offered from other Engineering programmes

- Out of these 18 additional credits, the students can earn a maximum of 9 credits from NPTEL with the recommendation of DAB and the BoS.
- B.E. / B.Tech. (Honours) and B.E./B.Tech (Minor) degrees will be optional for students.
- The students can register for the above mentioned facilities from the fifth semester onwards.
- If a student decides not to opt for Honours, after completing a certain number of additional courses, the additional courses studied shall be considered instead of the professional elective courses which are part of the curriculum. If the student has studied more number of such courses than the number of Professional Elective courses required as per the curriculum, the courses with higher grades shall be considered for the calculation of CGPA. Remaining courses shall be printed in the grade sheet, however, they will not be considered for the calculation of CGPA.
- If a student decides not to opt for Minor degree, after completing a certain number of courses, the additional courses studied shall be considered instead of open elective courses which are part of the curriculum. If the student has studied more number of such courses than the number of open electives required as per the curriculum, the courses with higher grades shall be considered for calculation of CGPA. Remaining courses shall be printed in the grade sheet, however, they will not be considered for the calculation of CGPA.

6 DURATION OF THE PROGRAMME

- Each academic year will consist of two semesters. Each semester shall normally consist of 75 working days or 450 hours or 540 periods of 50 minutes each.
- The normal and maximum permissible number of semesters for each programme is as given in table 6.1.

Table 6.1: Duration of the Programme

Category	Number of Semesters	
	Minimum	Maximum
Regular	8	14
Lateral	6	12

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7 COURSE REGISTRATION

- Each student has to register for all the courses of that particular semester as per the curriculum requirement with the facility to add or drop courses. From the II to VIII semesters, the student has the option of registering for additional courses or dropping existing courses. The total number of credits that a student can add or drop is limited to 6, subject to a maximum of 2 courses for the entire duration. However, the students who opt for addition or dropping of courses shall do so within 15 days from the start of the semester. The registration details of the student shall be approved by the Head of the Institution and forwarded to the Controller of Examinations. The courses that a student registers in a particular semester may include
 - i. Courses of the current semester.
 - ii. Courses dropped in the lower semesters.
 - iii. Courses added from the higher semesters.
 - iv. Backlog courses.
- After registering for a course, a student shall attend the classes, satisfy the attendance requirements, earn Continuous Internal Assessment marks and appear for the End Semester Examinations.
- Dropping of a course in a semester shall not be considered as an arrear.
- Any professional and open elective courses shall be offered by a Department only if a minimum of 15 students register for that course, subject to the approval of the Head of the Department.
- A student has to earn the total number of credits specified in the curriculum of the respective programme of study in order to be eligible to obtain the degree. However, if the student wishes, then the student is permitted to earn more than the total number of credits prescribed in the curriculum of the student's programme within the minimum duration of the programme.
- A student shall register for the project work only in the final semester.
- The students can register for a maximum of 36 credits in a particular semester. However, this does not include the Re-appearance (U) and Withdrawal (W) courses registered by the student for the examination.
- The students who fails in a professional core course/ professional elective / open elective / Laboratory course / Project work / Seminar and any other EEC courses in the current semester examination shall register for the same in the subsequent semesters as arrear examination.

8 REGISTRATION OF RE-APPEARANCE (U) COURSES

- 8.1 The student who failed in a theory course, theory cum practical course and practical course will register for a re-appearance for the particular course in the succeeding semesters.
- 8.2 After the registration, a student may or may not attend the classes for the re-appearance registration courses, and the attendance requirement is not mandatory.
- 8.3 Suppose the student has failed in a professional or open elective course. In that case, they

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may register for the same course or other professional elective or an open elective course in the following Semester. However, the change of elective courses is allowed only once for a particular course.

8.4 In this case, the student shall attend the classes and satisfy the attendance requirements to earn Continuous Internal Assessment marks.

8.5 Suppose a student is not permitted to write the end-semester examination of a course or some courses due to lack of attendance or any other reason. In that case, the student has to register for that / those course(s) again when offered next, attend the class and fulfil the attendance requirements.

9 REQUIREMENTS FOR APPEARING FOR THE END-SEMESTER EXAMINATION

A student who has satisfied the following requirements shall be eligible to appear for the End-Semester Examinations.

- Generally, every student is expected to attend all classes and secure 100% attendance. However, to give provision for specific unavoidable reasons such as medical / participation in sports, the student is expected to attend at least 75% of the classes. Therefore, they shall secure not less than 75% (after rounding off to the nearest integer) of the overall attendance percentage.

- Nevertheless, a student who secures overall attendance between 65% and 74% in the current Semester due to medical reasons (prolonged hospitalization/accident / specific illness) participation in sports events / NCC / Competition may be allowed to appear for the current end-semester examinations, depending on the condition that the student will submit the medical certificate/sports participation certificate attested by the Head of the Department along with condonation form and same may be forwarded to the Controller of Examinations for verification and approval to attend the end-semester examinations. However, during the entire programme of study, a student can avail of this facility for a maximum of two times (two semesters), regardless of the number of courses.

- The students who satisfied the attendance requirements with the payment of the prescribed examination fee and other fees shall be allowed to appear for the end-semester examinations.

- Candidates who have less than 65% overall attendance will not be permitted to write the End Semester Examinations and are not permitted to go to next / subsequent semester. They have to repeat the incomplete semester during the next academic year.

- In case of re-appearance (Arrear) registration for a course, the attendance requirement, as mentioned above is not mandatory. However, the student must register for the end semester examination by paying the prescribed fee.

- A student who has already appeared and passed the examination for a course in a semester is not permitted to re-appear for the examination in the same course for improvement of grades.

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10 MENTOR AND CLASS ADVISOR

10.1 Mentor

Each faculty member in the department will be appointed as a mentor for a certain number of students by the Head of the Department to support the students in planning their courses of study and for general suggestions on academic activities. The mentor will counsel and guide the students in registration, re-appearance and withdrawal of courses. The mentor will frequently monitor the attendance and academic progress of the students (Mentees). The mentor will inform the parents about the performance and improvement of the mentee.

The responsibilities of the mentor are

- To guide and support the students for the enrolment and participation in curricular and co-curricular activities.
- To support the students in enrollment and registration of courses.
- To authorize the final registration of the courses at the start of each Semester.

10.2 Class Advisor

There shall be a class advisor for each class. The class advisor may be one of the course instructors of the class. He / She will be appointed by the Head of the Department of the department concerned. The class advisor is the ex-officio member and the Convener of the class committee meetings. The responsibilities of the class advisor shall be:

- To act as the channel of communication between the Head of the Department and the students of the respective class.
- To collect and maintain various statistical details of students.
- To help the chairperson of the class committee in the planning and conduct of the class committee meetings.
- To monitor the academic performance of the students including attendance and to inform to the class committee.
- To focus on the students' welfare activities like awards, medals, scholarships, contests, and industrial visits.

11 COMMITTEES

11.1 Common Course Committee

The theory course with the same name and course code handled by more than one faculty member for same programme / various programmes will have a "Common Course Committee". This committee comprises faculty members teaching that course and student representatives from each discipline registered for the particular course. One of the faculty members from this committee will be nominated as the course coordinator by the Head of the Department / Head of the Institution or Principal respectively. The meeting of Common Course Committee shall be conducted as per the tentative schedule given in the table 11.1.

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Table 11.1 Tentative Schedule for Common Course Committee Meeting

Meeting	Tentative Schedule
I	Before the Commencement of Semester
II	Two Weeks before CIA I
III	Two Weeks before CIA II

During these meetings, the student members have to interact and express their representations and requirements of all students to improve the effectiveness of the teaching–learning process. The student members must convey the minutes of these meetings to all the students.

In addition, the Common Course Committee, except the student members, shall be responsible for ensuring uniform evaluation through the common question papers during Continuous Assessment and End-Semester Examinations.

11.2 Class Committee Meeting

Class Committee comprises of all faculty members handling the courses of a particular semester and seven student representatives (at least three male and three female students of all categories) from the class concerned. One of the above faculty member, nominated by the Head of the Department shall act as class advisor and the committee shall be constituted by the Head of the Department within 10 days from the commencement of classes. The class advisor will coordinate the activities of this committee. The class advisor will convene the class committee meetings by inviting all members with the agenda and shall prepare the minutes of the meeting, which will be approved by the Head of the Department.

The meeting of Class Committee shall be conducted as per the tentative schedule given in the table 11.2

Table 11.2 Tentative Schedule for Class Committee Meeting

Meeting	Tentative Schedule
I	Within one week from the Commencement of Semester
II	Two Weeks before CIA I
III	Two Weeks before CIA II

During these meetings, the student members shall meaningfully interact and express their opinions and suggestions of all the students to improve the effectiveness of the teaching–learning process.

12 SYSTEM OF EXAMINATION

The total marks for each course (Theory, Practical, Theory cum Practical and Project Work) will be 100, comprising of two components namely Continuous Internal Assessment (CIA) marks and End

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Semester Examination Marks (ESE). However, there are EEC and Mandatory courses that have only Continuous Internal Assessment for 100 marks.

12.1 ASSESSMENT PARAMETERS FOR AWARDING MARKS

The evaluation shall be based on Outcome Based Education (OBE) and the relevant rubrics shall be followed based on the category of courses. The weightage for the continuous internal assessment and end semester examination is given in Table 12.1.

Table 12.1 Assessment of Courses

S. No.	Category of Courses	Continuous Internal Assessment Marks (%)	End Semester Examination Marks (%)
1.	Theory	40	60
2.	Theory cum Practical	50	50
3.	Practical	60	40
4.	Project Work	60	40
5.	Mini Project / Industrial training / Seminar / Case Study / Internship etc.,	100	-
6.	One / Two Credit Courses	100	-
7.	Mandatory Courses	100	-

12.1.1 Theory Courses

Continuous Assessment comprises two written tests based assessments and objective tests /Online Quiz carrying the weight of 60% and an activity based assessment (Individual Assignment / Case Study / Seminar / Tutorial etc.,) with 40% weightage of marks conducted by the course instructor. The End Semester Examination for all theory courses is conducted for 3 hours. The assessment components along with the weightage for both Continuous Internal Assessment and end semester examination is shown in Table 12.2.

Table 12.2 Assessment Scheme for Theory Course

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
			Total	40	60	

*The End Semester Examination shall be conducted for 100 marks and shall be proportionally reduced to 60 marks.

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12.1.2 Laboratory Courses:

For Laboratory Courses out of 100 marks, the maximum marks for Continuous Assessment is 60 and the End Semester Examination carries 40 marks. Every laboratory experiment shall be evaluated based on the rubrics. The continuous assessment for laboratory courses follows the pattern given in Table 12.3. The end semester examination shall be conducted for 100 marks and shall be proportionately reduced for 40 marks and rounded to the nearest integer.

Table 12.3 Assessment Scheme for laboratory Course

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
Total				60	40

12.1.3 Theory with Practical Courses

There shall be two continuous assessments: the first assessment (maximum marks: 100) will be similar to assessment of theory course and the second assessment (maximum marks: 100) will be similar to assessment of laboratory course respectively. The weighted average of these two assessments shall be converted into 50 marks and rounded to the nearest integer. The credit value of a course consisting of different contact hours of lecture and practical component is given in Table 12.4 along with the assessment pattern shown in Table 12.5.

Table 12.4 The percentage distribution of the marks for the Theory cum Practical Courses

L	T	P	C	Continuous Internal Assessment Theory (Total 20%)	Continuous Internal Assessment Laboratory (Total 30%)	End Semester Examination (50%)
1	0	2	2	Test 1 Test 2	Experiment and Model Exam	Laboratory only (50%)
1	0	4	3	Test 1 Test 2	Experiment and Model Exam	Laboratory only (50%)
2	0	2	3	Test 1 Test 2	Experiment and Test	Theory only (50%)
3	0	2	4	Test 1 Test 2	Experiment and Test	Theory only (50%)

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Table 12.5 Scheme of Assessment for Theory cum Practical Component

Assessment	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
Theory Component						
CIA I	3 hours	2.5 units	100	10		
CIA II	3 hours	2.5 units	100	10	20	50
Practical Component						
Observation & Analysis of Experimental results, Viva Voce, Quiz based on rubrics.		All Experiments	75	22.5	30	-
Model Exam	3 hours		25	7.5		
Total					50	50

12.1.4 One Credit Courses / Mandatory Courses:

One-credit courses shall carry 100 marks and be evaluated through Continuous Internal Assessment only as shown in table 12.6.

Table 12.6 Scheme of Assessment for One Credit Courses / Mandatory Courses

Continuous Internal Assessment		Total Marks
Individual Assignment / Case Study / Seminar / Mini Project	Written Test	100
50	50	

12.1.5 Procedure for Evaluation of Project Work

- For Project work out of 100 marks, the maximum marks for Continuous Internal Assessment is 60 and the End Semester Examination carries 40 marks. Project work may be assigned to a group of students, not exceeding 4 per group. There shall be three reviews during the semester by a review committee constituted by the Head of the Department concerned including the guide / supervisor of the project group. In the case of industrial projects/Research organizations, the marks allotted for supervisor will be shared equally by the supervisor from the Department and Coordinator/Supervisor from industry/Research organizations.
- The project work shall be undertaken by students either in industry or in the college. The total credit for project work in semester VIII is 10. The scheme of the valuation is given below in Table 12.7.
- The last date for submission of the project report is three days before the last working day of

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the semester. If a student fails to submit the project report on or before the last working day or the student has submitted the project report but did not appear for the viva-voce examination, it will be considered as fail in the Project Work and the student shall re-register for the same in the subsequent semester. The evaluation report shall be sent to the office of Controller of Examinations by the Head of the Department.

Table 12.7 Continuous Internal Assessment and End Semester Examinations evaluation for Project Work

Continuous Assessment		Marks	End Semester Examination	Marks
Review-I	Literature Survey, Topic identification and Justification	5	Report	
	Work plan with report	5	External	10
Review-II	Detailed work with design and experimentation	20	Presentation & Viva-voce	
Review-III	Results, discussions, Conclusions & Final Presentation	20	Supervisor	10
	Project Work Published: Conferences /Journals/Patent	10	Internal	10
	Total	60		40

12.1.6 Assessment for Mini Project

The Mini Project shall carry 100 marks and shall be evaluated through three reviews as continuous assessments. The first and second reviews are to be evaluated by a three member committee constituted by the Head of The Department which includes the supervisor, coordinator and an expert from the Department. At the end of the semester the student shall submit a brief report on the Mini Project. The third review will be conducted based on this report and Viva-Voce Examination conducted by the same committee and the evaluation report shall be sent to the office of Controller of Examinations by the Head of the Department. The breakup of marks is given in Table 12.8.

Table 12.8 Continuous Assessment for Mini Project

Mini Project	Continuous Internal Assessment			
	Review I	Review II	Review III (50 Marks)	
			Report	Viva-Voce Examination
Marks	25	25	20	30

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12.1.7 Assessment for Industrial Training/Internship

Industrial Training / internship shall carry 100 marks and shall be evaluated through continuous assessment only as per the guidelines given in Table 12.9. At the end of the Industrial Training/internship, the student shall submit a certificate from the organization where the student has undergone training and a brief report about the training. The evaluation will be made based on the report, presentation and a Viva-Voce Examination conducted by a three members Departmental Committee constituted by the Head of the Department consisting of one coordinator and two faculty members. Certificates (issued by the Organization) submitted by the student shall be attached to the mark list and sent to the office of Controller of Examinations by the Head of the Department. The evaluation shall be carried out as per the procedure shown in Table 12.9.

Table 12.9 Assessment for Internship / Industrial Training

Internship / Industrial Training		
Evaluation Marks (100)		
Report	Presentation	Viva-Voce
40	30	30

13 ATTENDANCE RECORD AND ACADEMIC AUDIT

- As a part of continuous assessment, every faculty must maintain an Attendance and Assessment record, which consists of individual student's attendance for each theory or, practical, or project work and the details of the topic covered for each course. This should be submitted to the Head of the Department during the first week of every month to verify syllabus coverage and individual student's attendance and marks for the particular course. After the verification, the Head of the Department will submit the record at the end of the semester to the principal.
- To ensure continuous internal assessment and the quality of teaching–learning process, the Academic Audit will be conducted for every course taught during the particular Semester. The continuous internal assessment process will be audited based on verifying individual assignment /case study report/ mini project or project report and test question paper with answer scripts. The industrial training/internship records will be audited based on the verification of the evaluation report and training report with the attendance certificate submitted by the students. The laboratory courses will be audited based on the lab manual, attendance and assessment record, and observation and record notebook for each student. The Head of the Department shall form a committee with an external expert from the reputed technical institutions to conduct the Academic Audit for every course once in a semester.

14 PASSING REQUIREMENTS

- 14.1 A student who secures not less than 50% of the total marks prescribed for the course

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(Continuous Internal Assessment plus End Semester Examination) with a minimum of 45% of the marks prescribed for the end-semester examination will be declared to have passed the course and accomplished the relevant number of credits. This criterion is applicable for theory, practical, theory cum practical courses and project work.

- 14.2 Suppose a student fails to secure a pass in a theory / practical / theory cum practical course other than an elective course. In that case, the student shall register and appear only for the end-semester examination in the consequent Semester. In this case, the continuous assessment marks scored by the student in the first appearance shall be retained and considered for all subsequent attempts until the student secures a pass. However, from the third attempt onwards, if a student fails to obtain pass marks (Continuous Internal Assessment + End Semester Examination) as per clause 14.1, then the student shall be declared to have passed the examination if they secure a minimum of 50% marks prescribed for the end-semester examinations alone.
- 14.3 If a student is absent during the viva - voce examination for the project work, it would be considered as fail. If a student fails to secure a pass mark as per clause 14.1, the student has to re-register and re-appear for the viva voce examination for the project work in the subsequent Semester.
- 14.4 A student can apply for revaluation of his/her end semester examination answer script in a theory course / theory cum practical course, following the guidelines given by CoE. Revaluation is not permitted for practical, project and other EEC courses.

15 AWARD OF LETTER GRADES AND GRADE SHEET

- As per the credit points and grade points, the letter grades are awarded to the students based on their performance in the evaluation process.
- The numerical weight allotted to each letter grade is based on relative or absolute grading. The relative grading will be followed when the number of students applying for the grading system is greater than or equal to 30. The absolute grading will be followed when the number of students applying for the grading system is less than 30. The relative grading method does not apply to laboratory, Project and Continuous Internal Assessment Courses. The absolute grading grade range and letter grade are specified in the table 15.1.

Table 15.1 Grade Assignment for absolute grading

O	A+	A	B+	B	C	U
91-100	81-90	71-80	61-70	56-60	50-55	< 50

The performance of a student shall be reported using letter grades, each carrying certain points as detailed in table 15.2

G.M. Antek

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Table 15.2 Grade and Grade points

Letter Grade	Grade Points
O (Outstanding)	10
A + (Excellent)	9
A (Very Good)	8
B + (Good)	7
B (Average)	6
C (Satisfactory)	5
U (Re-appearance)	0
W (Withdrawal)	0

Where, 'U' ---Re-appearance required

15.1 GPA and CGPA Calculation

The Grade Point Average (GPA) is calculated using the formula:

GPA

$$= \frac{\sum [(course\ credits) \times (grade\ points)] \text{for all courses successfully cleared in the specific Semester}}{\sum (course\ credits) \text{ for all courses successfully cleared in the specific Semester}}$$

The Cumulative Grade Point Average (CGPA) is calculated from the first Semester (third semester for lateral entry students) to the final Semester using the formula.

CGPA

$$= \frac{\sum [(course\ credits) \times (grade\ points)] \text{for all courses successfully cleared in all the Semester so far}}{\sum (course\ credits) \text{ for all courses successfully cleared in all the semesters}}$$

The GPA and CGPA are computed only for the students with a pass in all the courses. The GPA and CGPA show a student's academic performance for a particular semester and consecutive semesters.

- A grade sheet shall be issued for each Semester with grades obtained in each course, GPA and CGPA.
- If any student loses their grade sheets, they can apply for a duplicate grade sheet with payment of the prescribed fee and satisfying other procedure requirements.
- The issue of the grade sheet may be withheld or stopped for a particular student if they have not cleared their dues/if there is disciplinary action against them/ any other reason.
- After registering for the End-semester Examination, for some reason, if a particular student does not appear for the End-Semester Examinations in a course, then it will be considered as an ABSENT, and 'U' grade will be given in the grade sheet. They have to re-appear for the End semester Examination in a subsequent semester as per clause 14.
- The grades obtained for the non-credit courses / additional credit courses will not be considered for calculating GPA and CGPA.
- On completing Personality and Character Development activities as per clause 4.2, a 'Completed' remark will appear in the Grade sheet.

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16 ELIGIBILITY FOR THE AWARD OF DEGREE

A student shall be declared to be eligible for the award of the B.E. / B.Tech. Degree provided the student has

- I. Successful completion of all the courses under the different categories, as specified in the regulations, within a maximum period of 7 years for regular admission / 6 years for lateral entry admission from the commencement of the first Semester to which the student was admitted.
- II. Successfully passed any additional courses prescribed whenever the student is readmitted under Regulations R 2023 from the earlier Regulations.
- III. No disciplinary action must be pending against them.
- IV. The award of Degree must have been approved by the Syndicate of the University.

17 CLASSIFICATION OF THE DEGREE AWARDED

17.1 First Class with Distinction:

- A student who satisfies the following conditions shall be declared to have passed the examination in First class with Distinction:
- Should have passed the examination of all the courses of all the eight semesters (Six Semesters for Lateral Entry) in the student's first appearance within five years (Four years for Lateral Entry), which includes authorized break of study of one year. Withdrawal from examination (vide Clause 18) will not be considered as an appearance.
- Should have secured a CGPA of not less than 8.50.
- Should not have been prevented from writing end semester examination in any of the courses of the Curriculum making up the total credit requirement.
- A student who satisfies norms given in clause 5 becomes eligible for classification of the degree with B.E./B.Tech. (Hons) and B.E./B.Tech. Minor. Details are provided in Table 17.1.

Regulation Year	Degree Year	Regulation Year	Degree Year	Regulation Year	Degree Year
1970	B.E. (Hons)	1970	B.E. (Hons)	1970	B.E. (Hons)
1971	B.E. (Hons)	1971	B.E. (Hons)	1971	B.E. (Hons)
1972	B.E. (Hons)	1972	B.E. (Hons)	1972	B.E. (Hons)
1973	B.E. (Hons)	1973	B.E. (Hons)	1973	B.E. (Hons)
1974	B.E. (Hons)	1974	B.E. (Hons)	1974	B.E. (Hons)
1975	B.E. (Hons)	1975	B.E. (Hons)	1975	B.E. (Hons)
1976	B.E. (Hons)	1976	B.E. (Hons)	1976	B.E. (Hons)
1977	B.E. (Hons)	1977	B.E. (Hons)	1977	B.E. (Hons)
1978	B.E. (Hons)	1978	B.E. (Hons)	1978	B.E. (Hons)
1979	B.E. (Hons)	1979	B.E. (Hons)	1979	B.E. (Hons)
1980	B.E. (Hons)	1980	B.E. (Hons)	1980	B.E. (Hons)
1981	B.E. (Hons)	1981	B.E. (Hons)	1981	B.E. (Hons)
1982	B.E. (Hons)	1982	B.E. (Hons)	1982	B.E. (Hons)
1983	B.E. (Hons)	1983	B.E. (Hons)	1983	B.E. (Hons)
1984	B.E. (Hons)	1984	B.E. (Hons)	1984	B.E. (Hons)
1985	B.E. (Hons)	1985	B.E. (Hons)	1985	B.E. (Hons)
1986	B.E. (Hons)	1986	B.E. (Hons)	1986	B.E. (Hons)
1987	B.E. (Hons)	1987	B.E. (Hons)	1987	B.E. (Hons)
1988	B.E. (Hons)	1988	B.E. (Hons)	1988	B.E. (Hons)
1989	B.E. (Hons)	1989	B.E. (Hons)	1989	B.E. (Hons)
1990	B.E. (Hons)	1990	B.E. (Hons)	1990	B.E. (Hons)
1991	B.E. (Hons)	1991	B.E. (Hons)	1991	B.E. (Hons)
1992	B.E. (Hons)	1992	B.E. (Hons)	1992	B.E. (Hons)
1993	B.E. (Hons)	1993	B.E. (Hons)	1993	B.E. (Hons)
1994	B.E. (Hons)	1994	B.E. (Hons)	1994	B.E. (Hons)
1995	B.E. (Hons)	1995	B.E. (Hons)	1995	B.E. (Hons)
1996	B.E. (Hons)	1996	B.E. (Hons)	1996	B.E. (Hons)
1997	B.E. (Hons)	1997	B.E. (Hons)	1997	B.E. (Hons)
1998	B.E. (Hons)	1998	B.E. (Hons)	1998	B.E. (Hons)
1999	B.E. (Hons)	1999	B.E. (Hons)	1999	B.E. (Hons)
2000	B.E. (Hons)	2000	B.E. (Hons)	2000	B.E. (Hons)
2001	B.E. (Hons)	2001	B.E. (Hons)	2001	B.E. (Hons)
2002	B.E. (Hons)	2002	B.E. (Hons)	2002	B.E. (Hons)
2003	B.E. (Hons)	2003	B.E. (Hons)	2003	B.E. (Hons)
2004	B.E. (Hons)	2004	B.E. (Hons)	2004	B.E. (Hons)
2005	B.E. (Hons)	2005	B.E. (Hons)	2005	B.E. (Hons)
2006	B.E. (Hons)	2006	B.E. (Hons)	2006	B.E. (Hons)
2007	B.E. (Hons)	2007	B.E. (Hons)	2007	B.E. (Hons)
2008	B.E. (Hons)	2008	B.E. (Hons)	2008	B.E. (Hons)
2009	B.E. (Hons)	2009	B.E. (Hons)	2009	B.E. (Hons)
2010	B.E. (Hons)	2010	B.E. (Hons)	2010	B.E. (Hons)
2011	B.E. (Hons)	2011	B.E. (Hons)	2011	B.E. (Hons)
2012	B.E. (Hons)	2012	B.E. (Hons)	2012	B.E. (Hons)
2013	B.E. (Hons)	2013	B.E. (Hons)	2013	B.E. (Hons)
2014	B.E. (Hons)	2014	B.E. (Hons)	2014	B.E. (Hons)
2015	B.E. (Hons)	2015	B.E. (Hons)	2015	B.E. (Hons)
2016	B.E. (Hons)	2016	B.E. (Hons)	2016	B.E. (Hons)
2017	B.E. (Hons)	2017	B.E. (Hons)	2017	B.E. (Hons)
2018	B.E. (Hons)	2018	B.E. (Hons)	2018	B.E. (Hons)
2019	B.E. (Hons)	2019	B.E. (Hons)	2019	B.E. (Hons)
2020	B.E. (Hons)	2020	B.E. (Hons)	2020	B.E. (Hons)
2021	B.E. (Hons)	2021	B.E. (Hons)	2021	B.E. (Hons)
2022	B.E. (Hons)	2022	B.E. (Hons)	2022	B.E. (Hons)
2023	B.E. (Hons)	2023	B.E. (Hons)	2023	B.E. (Hons)

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Table17.1 Classification for the award of the B.E/ B. Tech. degree in First class with distinction

Degree (i)	Duration of Programme (ii)	Duration permitted (iii)	Additional credits above the requirement of curriculum (iv)	CGPA (v)	Pass in (vi)	Break of study (vii)	Prevention due to lack of attendance (viii)	Withdrawal from writing end semester examination (ix)
B.E./B.Tech. (Lateral / Regular)	3 / 4 Years (Lateral / Regular)	4 / 5 Years (Lateral / Regular)	Nil	8.50	First Attempt	One year authorized break of study included in the Duration permitted	Not permitted	Will not be considered as an attempt
B.E./B.Tech. (Honours)	3 / 4 years (Lateral / Regular)	4 / 5 years (Lateral / Regular)	18 credits from more than one verticals of the same programme	8.50	First Attempt	One year authorized break of study included in the Duration permitted	Not permitted	Will not be considered as an attempt
B.E/B.Tech. Minor in other specialization	3 / 4 years (Lateral / Regular)	4 / 5 years (Lateral / Regular)	18 credits from any one vertical of the other programmes	8.50	First Attempt	One year authorized break of study included in the Duration permitted	Not permitted	Will not be considered as an attempt

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17.2 First Class

A student who satisfies the following conditions shall be declared to have passed the examination in First class:

- Should have passed the examination of all the courses of all eight semesters (Six Semester for Lateral Entry) within five years (within Four years for Lateral Entry), which includes one year of authorized break of study (if availed) or prevention from writing the End Semester Examination due to lack of attendance (if applicable).
- Should have secured a CGPA of not less than 6.50.
- A student who satisfies norms given in clause 5 becomes eligible for classification of the degree with B.E./B.Tech. (Honours) and B.E./B.Tech. minor. Details are provided in Table 17.2.

17.3 Second Class

- Students who pursue B.E./B.Tech. in Regular mode or lateral entry mode or B.E./B.Tech. minor in specialization of another discipline and who are not covered in clauses 17.1 and 17.2 and who qualify for the award of the degree shall be declared to have passed the examination in Second Class.
- A student who is absent in the End Semester Examination in a course / project work after having registered for the same shall be considered to have appeared in that examination (except approved withdrawal from end semester examinations as per clause 18) for the purpose of classification.
- Student earned additional 18 credits as per Clause 5, but does not satisfy the conditions mentioned in 17.1 or 17.2 shall not be awarded B.E./B.Tech.(Hons.) In such case if the student becomes eligible for First Class, while computing CGPA with the PE/OE courses with higher grades the student shall be awarded B.E. / B.Tech. in First Class only.

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Table 17.2 Classification for the award of the B.E/ B. Tech. degree with First class

Degree (i)	Duration of Programme (ii)	Duration permitted (iii)	Additional credits above the requirement of curriculum (iv)	CGPA (v)	Pass in (vi)	Break of study (vii)	Prevention due to lack of attendance (viii)	Withdrawal from writing end semester examination (ix)
B.E./B.Tech (Lateral/ Regular)	3 / 4 Years (Lateral/ Regular)	4 / 5 Years (Lateral/ Regular)	Nil	6.50	-	One year authorized break of study included in the Duration permitted	Included in the Duration permitted	-
B.E./B.Tech. (Honours)	3 / 4 years (Lateral/ Regular)	4 / 5 years (Lateral/ Regular)	18 credits from more than one vertical of the same programme	7.50	First Attempt	One year authorized break of study included in the Duration permitted	Not permitted	Will not be considered as an attempt
B.E/B.Tech. Minor in other specialization	3 / 4 years (Lateral/ Regular)	4 / 5 years (Lateral/ Regular)	18 credits from any one vertical of the other programmes	6.50	-	One year authorized break of study included in the Duration permitted	Included in the Duration permitted	-

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18. PROVISION FOR WITHDRAWAL FROM EXAMINATIONS

- A student may, for valid reasons, (medically unfit / unexpected family situations / sports approved by the Principal and the Head of the Department) be granted permission to withdraw from appearing for the end semester examination in any course or courses in any one of the semester examinations during the entire duration of the degree programme. The application shall be sent to the CoE through the Head of the Institution with required documents.
- Withdrawal application is valid if the student is otherwise eligible to write the examination (Clause 9) and if it is made TEN days before the date of the examination(s) in that course or courses and recommended by the Head of the Institution and approved by the Controller of Examinations. For a student to withdraw from a course / courses, he/she should have registered for the course, fulfilled the attendance requirements (vide clause 9) and earned continuous assessment marks.
- Notwithstanding the requirement of mandatory TEN days' notice, applications for withdrawal for special cases under extraordinary conditions will be considered on merit of the case.
- If a student withdraws a course or courses from writing end semester examinations, he/she shall register the same in the subsequent semester and write the semester end examination(s).
- Withdrawal shall not be considered as an appearance for deciding the eligibility of a student for First Class with Distinction.
- Withdrawal is permitted for the end semester examinations in the final semester only if the period of study of the student concerned does not exceed 5 years or 4 in the case of lateral entry.

19. PROVISION FOR BREAK OF STUDY

- A student is generally allowed to avail authorized break of study under valid reasons such as accident or hospitalization due to prolonged ill health or any other valid reasons and rejoin the programme in a later semester. He / She shall apply in advance to the principal, through the Head of the Department, stating the reasons, therefore, in any case, not later than the last date for registering for that semester examination.
- A student can avail authorized break of study only once during the entire study period for a maximum period of one year. However, in an extraordinary situation, the student may apply for an additional break of study not exceeding another year by paying a prescribed fee for the study break.
- The students allowed to rejoin the programme after a break of study/prevention due to lack of attendance shall be governed by the rules and regulations in force at the time of rejoining.
- The students rejoining in new regulations shall apply to the Principal in the prescribed format through the Head of the Department at the beginning of the readmitted semester itself for

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prescribing additional/exemption courses, if any, from any semester of the regulations in force to bridge the curriculum in-force and the old curriculum.

- The total period of completion of the programme calculated from the commencement of the semester to which the student was admitted shall not exceed the maximum period specified in clause 6, irrespective of the period of break of study in order to qualify for the award of the degree.
- If any student is prevented for want of required attendance, the prevention period shall not be considered as an authorized break of study.
- Suppose a student has not reported to the college for two consecutive semesters without intimation. In that case, the student's name shall be permanently deleted from the college enrollment. Such students are not permitted to get re-admission under any situations.
- If a regular student wants to take up a job/start-up/entrepreneurship during the study period, he/she may apply for an authorized break of study for one year. The student shall join the job/start-up/entrepreneurship only after getting approval from the Head of the Institution.
- No fee applies to students during the Break of Study period.

20 METHODS FOR REDRESSAL OF GRIEVANCES IN EVALUATION

Students who are not satisfied with the grades awarded in the End Semester Examination of Theory and Embedded Courses (with theory component) for regular and arrear exams can seek redressal as illustrated in Table 20.1

Table 20.1 Grievance Redressal Mechanism

S.No	Redressal Sought	Methodology
1	Revaluation	<ul style="list-style-type: none"> ➢ Apply for photo copy of answer script. ➢ Apply for revaluation after course expert recommendation
2	Challenge of Evaluation	<ul style="list-style-type: none"> ➢ Apply for photo copy of answer book. ➢ Apply for revaluation after course expert recommendation. ➢ Apply for challenge of Evaluation.

Note: All applications to be made to CoE along with the payment of the prescribed fee.
A student can apply for photocopy of his/her End Semester Examination answer script in a Theory and Theory cum practical courses, within a week from the declaration of results, on payment of a prescribed fee through proper application to the Controller of Examinations with the approval of Head of Department. The answer script is to be valued and justified by a course expert, who handled the course and recommend the student to apply for revaluation. Based on the recommendation, the student can register for revaluation through proper application and prescribed fee payment approved by course expert, Head of The Department. The Controller of Examinations will arrange for the revaluation and the results will be intimated to the student concerned through the Head of the Department. Revaluation is not permitted for Practical

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Courses, Continuous Internal Assessment Courses and EEC courses.

20.1 Challenge of Evaluation

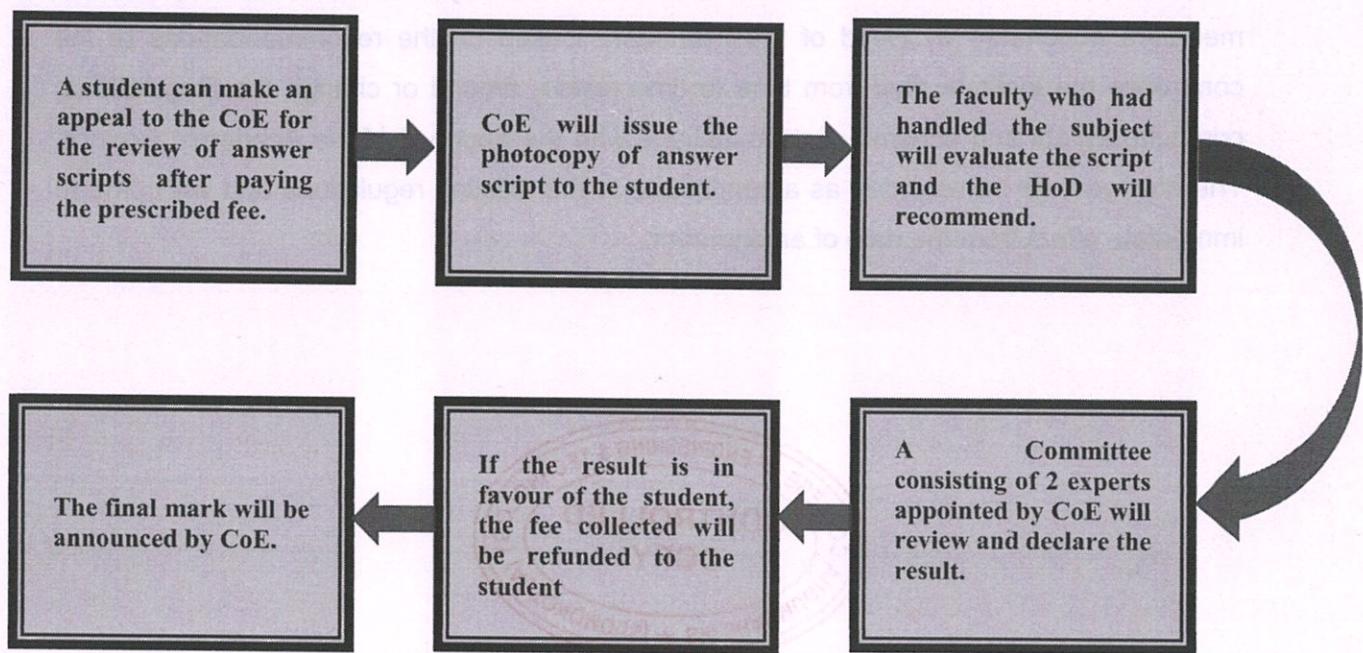


Figure 20.1 Challenge of Evaluation

21 MALPRACTICES

Students taking exams shall be prohibited from entering into the Examination Halls / Laboratories with any book or portion of book, manuscript, or any unauthorized written/ printed/ electronic content, communicating with or copying from each other or communicating with anyone outside the Examination Hall / Laboratories. Electronic gadgets, Programmable calculator and mobile phone shall not be permitted inside the Examination hall / Laboratories. However, any required code books and data sheets / books as specified in the question paper will be supplied inside the Examination hall / laboratories by the office of the Controller of Examinations.

The students are warned that any form of malpractice will be dealt severely. The punishment may include debarring/cancelling the particular examinations registered for by the student in that semester, and/or award of Zero marks to all registered courses of that Semester. Severe violations would attract stricter punishments. Disciplinary action will be taken against the students by the college authorities after conducting enquiry.

22 DISCIPLINE

Every student is required to maintain discipline and decorum both inside and outside the institution campus. They shall follow all the rules and regulations and should not indulge in any activity which can tarnish the reputation of the University or Institution. The Principal shall refer any act of indiscipline by students to the Discipline and Welfare Committee and other appropriate committees for action.

G. A. Patel
CHAIRMAN-ACADEMIC COUNCIL
CHAIRMAN-ACADEMIC COUNCIL

23 REVISION OF REGULATIONS, CURRICULUM AND SYLLABI

A Review and Revision Committee will be formed under the leadership of Head of the Institution with Controller of Examinations, Member Secretary of Academic Council and four members nominated by Head of the Institution. Based on the recommendations of the committee the institute may from time to time revise, amend or change the Regulations, curricula, syllabi and scheme of examinations with the approval of the Academic Council. The changes will be recorded as amendments in the existing regulations and will come to immediate effect from the date of amendment.



Approved in Academic Council Meeting on 07.11.2023

Chairman-Academic Council

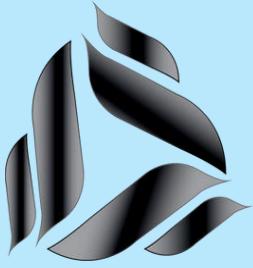
G. M. Sankar

CHAIRMAN-ACADEMIC COUNCIL

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Approved in Academic Council Meeting on 07.11.2023

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**SRI SHANMUGHA COLLEGE OF ENGINEERING AND
TECHNOLOGY**

(An Autonomous Institution)

Pullipalayam, Morur (Po.), Sankari (Tk.),
Salem (Dt.) - 637 304.

**B.TECH.
AGRICULTURAL ENGINEERING**

CURRICULUM

CHOICE BASED CREDIT SYSTEM

REGULATIONS 2023



SRI SHANMUGHA COLLEGE OF ENGINEERING AND TECHNOLOGY
 (Autonomous)

Approved by AICTE, Affiliated to Anna University,
 Accredited by NAAC, NBA (ECE/CSE/MECH) and ISO 9001:2015 Certified
 Pullipalayam, Sankari, Salem (Dt.)

CURRICULUM

CHOICE BASED CREDIT SYSTEM

B.TECH.

AGRICULTURAL ENGINEERING



REGULATION 2023

CHAIRMAN-BOARD OF STUDIES

Institute vision:

To be an institute of repute in all fields of education by implementing the best practices akin to global standards for fostering domain knowledge and developing research attitude among students to make them globally competent.

Institute Mission:

- Achieving excellence in Teaching & Learning process using state-of-the-art resources.
- Extending opportunity to upgrade faculty knowledge and skills.
- Implementing the best student training practices for requirements of industrial scenario of the state.
- Motivating faculty and students in research activity for real time application

Department of Agricultural Engineering

Vision

To produce Agricultural Engineers with enriched knowledge and moral values to achieve excellence in academic, industry and research-centric environments.

Mission

- M1:** To provide a conducive learning atmosphere to improve the analytical, design and investigation knowledge through effective teaching-learning Processes.
- M2:** To create an amicable environment to solve societal problems through continuing education programmes and research.
- M3:** To develop students ethically responsible for the benefit of society through cultural, social and economic awareness.

Program Educational Outcomes (PEOs)

- PEO1:** Practice Agricultural Engineering and Technology concepts across diverse Industrial, societal, and real-world contexts.
- PEO2:** Pursue higher education for professional development
- PEO3:** Become Agripreneur with leadership qualities and continuously contributes to societal needs ethically.

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PROGRAM OUTCOMES (POs)

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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PROGRAM OUTCOMES (PO)**Program Specific Outcomes (PSOs)**

PSO1: Develop the student's expertise in the field of agricultural engineering by using diverse resources, farm mechanization, and processing.

PSO2: Students can acquire knowledge on IoT, Drone Technology applications in Agriculture and Automation in Agriculture sectors.

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SRI SHANMUGHA COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

Approved by AICTE, Affiliated to Anna University,
Accredited by NAAC, NBA (ECE/CSE/MECH) and ISO 9001:2015 Certified
Pullipalayam, Sankari, Salem (Dt.)

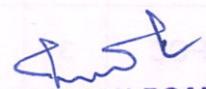
B.TECH AGRICULTURAL ENGINEERING

REGULATION – 2023
CHOICE BASED CREDIT SYSTEM
CURRICULUM



I SEMESTER

Course Code	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23EN101	Communicative English	HSMC	3	0	0	3	40	60	100
23MA201	Engineering Mathematics –I	BSC	3	1	0	4	40	60	100
23PH201	Physics for Engineers	BSC	3	0	0	3	40	60	100
23CY201	Chemistry for Engineers	BSC	3	0	0	3	40	60	100
23CS301	Problem Solving and Python Programming	ESC	3	0	0	3	40	60	100
23TA101	Heritage of Tamils/தமிழர் மரபு	HSMC	1	0	0	1	100	-	100
Practical Course(s)									
23PC201	Physics and Chemistry Laboratory	BSC	0	0	4	2	60	40	100
23CS302	Problem Solving and Python Programming Laboratory	ESC	0	0	4	2	60	40	100
23EN102	Communication Laboratory	HSMC	0	0	2	1	60	40	100
Mandatory Course									
23MC801	Induction Programme	MC	2 Weeks			0	-	-	-
Total			16	1	10	22	480	420	900


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II SEMESTER										
Code No.	Course	Category	Periods / Week			C	Maximum Marks			
			L	T	P		CIA	ESE	Total	
Theory Course(s)										
23MA202	Engineering Mathematics –II	BSC	3	1	0	4	40	60	100	
23ME301	Engineering Graphics	ESC	3	1	0	4	40	60	100	
23EC301	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	40	60	100	
23TA102	Tamils and Technology/தமிழரும் தொழில்நுட்பமும்	HSMC	1	0	0	1	100	-	100	
Theory with Practical Course(s)										
23IT301	Programming in C	ESC	3	0	2	4	50	50	100	
23AG401	Principles of Agronomy and crop production	PCC	2	0	2	3	50	50	100	
Practical Course(s)										
23ME302	Engineering Practices Laboratory	ESC	0	0	4	2	60	40	100	
Employability Enhancement Course(s)										
23ME701	Design Thinking	EEC	2	0	0	2	40	60	100	
Total				17	2	8	23	420	380	800

III SEMESTER										
Code No.	Course	Category	Periods / Week			C	Maximum Marks			
			L	T	P		CIA	ESE	Total	
Theory Course(s)										
23MA204	Engineering Mathematics-III	BSC	3	1	0	4	40	60	100	
23AG402	Fluid Mechanics	PCC	3	0	0	3	40	60	100	
23ME303	Engineering Mechanics	ESC	3	0	0	3	40	60	100	
23AG301	Engineering Thermodynamics and Heat Transfer	ESC	3	0	0	3	40	60	100	
Theory with Practical Course(s)										
23AG403	Surveying and Levelling	PCC	3	0	2	4	50	50	100	
23AG404	Soil Mechanics	PCC	3	0	2	4	50	50	100	

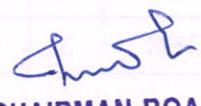


B.Tech Agricultural Engineering (R-2023)

Practical Course(s)									
23AG405	Fluid Mechanics Laboratory	PCC	0	0	2	1	60	40	100
23AG406	Computer Aided Design laboratory	PCC	0	0	2	1	60	40	100
Employability Enhancement Course(s)									
23HS701	Soft skills-I	EEC	1	0	0	1	100	-	100
Total			19	1	8	24	480	420	900

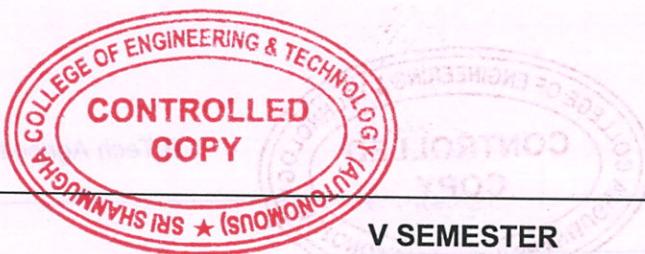
IV SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23MA206	Statistics and Numerical Methods	BSC	3	1	0	4	40	60	100
23ME406	Theory of Machines	PCC	3	0	0	3	40	60	100
23AG407	Hydrology and Water Resources Engineering	PCC	3	0	0	3	40	60	100
23ME408	Strength of Materials	PCC	3	0	0	3	40	60	100
23HS101	Universal Human Values-II	HSMC	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23AG408	Unit Operations in Agricultural Processing	PCC	2	0	2	3	50	50	100
Practical Course(s)									
23ME410	Strength of Materials Laboratory	PCC	0	0	2	1	60	40	100
Employability Enhancement Course(s)									
23HS702	Soft skills-II	EEC	1	0	0	1	100	-	100
Mandatory Course(s)									
23MC802	Environmental Sciences and Disaster Management	MCC	2	0	0	0	100	-	100
Total			20	1	4	21	510	390	900


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V SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23AG409	Machine Design	PCC	3	0	0	3	40	60	100
23AGXXX	Professional Elective – I	PEC	3	0	0	3	40	60	100
23AGXXX	Professional Elective – II	PEC	3	0	0	3	40	60	100
23XXXXX	Open Elective* - I	OEC	3	0	0	3	40	60	100
Theory with Practical Course(s)									
23AG410	Tractors and Farm Engines	PCC	3	0	2	4	50	50	100
23AG411	Irrigation and Drainage Engineering	PCC	3	0	2	4	50	50	100
Practical Course(s)									
23AG412	Design of Farm Machinery and Structures	PCC	0	0	2	1	60	40	100
Employability Enhancement Course(s)									
23HS703	Soft skills-III	EEC	1	0	0	1	100	-	100
23AG701	Field Training	EEC	2 Weeks			1	100	-	100
Mandatory Course(s)									
23MC805	Rural Agricultural Work Experience	MC	1 Week			0	100	-	100
Total			19	0	6	23	620	380	1000

*Open Elective - Shall be chosen from the list of open electives offered by other Programs

VI SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Theory Course(s)									
23AGXXX	Professional Elective – III	PEC	3	0	0	3	40	60	100
23AGXXX	Professional Elective – IV	PEC	3	0	0	3	40	60	100
23XXXXX	Open Elective* - II	OEC	3	0	0	3	40	60	100

**CONTROLLED
COPY**

B.Tech Agricultural Engineering (R-2023)

Theory with Practical Course(s)

23BM420	IoT in Agricultural Systems	PCC	2	0	2	3	50	50	100
23AG413	Post-Harvest Technology	PCC	3	0	2	4	50	50	100
23AG414	Farm Machinery and Equipment	PCC	3	0	2	4	50	50	100

Employability Enhancement Course(s)

23AG702	Mini Project	EEC	0	0	4	2	100	-	100
23HS704	Soft skills -IV	EEC	1	0	0	1	100	-	100

Mandatory Course(s)

23MC803	Cyber Security	MC	2	0	0	0	100	-	100
Total			20	0	10	23	570	330	900

VII SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total

Theory Course(s)

23HS103	Entrepreneurship and IPR	HSMC	3	0	0	3	40	60	100
23AG415	Soil and Water Conservation Engineering	PCC	3	0	0	3	40	60	100
23AG416	Remote Sensing and Geographical Information System	PCC	3	0	0	3	40	60	100
23AGXXX	Professional Elective – V	PEC	3	0	0	3	40	60	100
23XXXXX	Open Elective* - III	OEC	3	0	0	3	40	60	100

Theory with Practical Course(s)

23AG417	Renewable Energy Resource Technology	PCC	3	0	2	4	50	50	100
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Practical Course(s)

23AG418	Remote Sensing and GIS Laboratory	PCC	0	0	2	1	60	40	100
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Employability Enhancement Course(s)

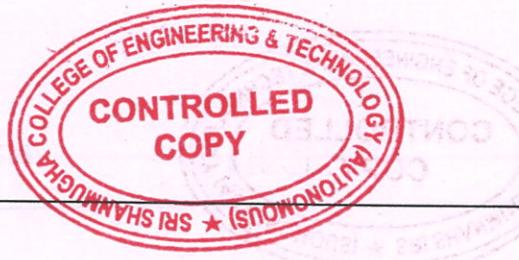
23AG703	Internship*	EEC	2 Weeks			1	100	-	100
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Mandatory Course

23MC804	Indian constitution	MC	1	0	0	0	100	-	100
	Total		19	0	4	21	510	390	900

VIII SEMESTER

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
Employability Enhancement Course(s)									
23AG704	Project Work	EEC	0	0	20	10	60	40	100
	TOTAL		0	0	20	10	60	40	100

Total Credits: 167

PROFESSIONAL ELECTIVES

Vertical – I FOOD PROCESSING

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
23AG511	Refrigeration and Cold Storage	PEC	3	0	0	3	40	60	100
23AG512	Food and Dairy Engineering	PEC	3	0	0	3	40	60	100
23AG513	Process Engineering of Fruits and Vegetables	PEC	3	0	0	3	40	60	100
23AG514	Storage and Packaging Technology	PEC	3	0	0	3	40	60	100
23AG515	Food Process Equipment and Design	PEC	3	0	0	3	40	60	100
23AG516	Food Plant Design and Management	PEC	3	0	0	3	40	60	100
23AG517	Emerging Technologies in Food Processing	PEC	3	0	0	3	40	60	100
23AG518	Agricultural By Products and Management	PEC	3	0	0	3	40	60	100

Vertical – II FARM MACHINERY AND ENERGY

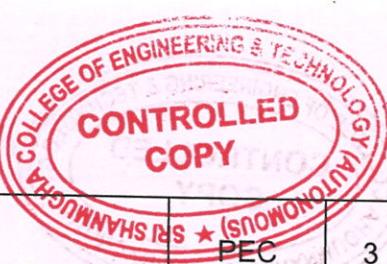
23AG521	Farm Power and Machinery Management	PEC	3	0	0	3	40	60	100
23AG522	Testing and Evaluation of Farm Machinery and Equipment	PEC	3	0	0	3	40	60	100

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23AG523	Biochemical and Thermochemical Conversion of Biomass	PEC	3	0	0	3	40	60	100
23AG524	Waste and by Product Utilization	PEC	3	0	0	3	40	60	100
23AG525	Human Engineering and Safety in Farm Machinery Operations	PEC	3	0	0	3	40	60	100
23AG526	Precision Farming Equipment	PEC	3	0	0	3	40	60	100
23AG527	Solar and Wind Energy System	PEC	3	0	0	3	40	60	100
23AG528	AI and Robotics in Agriculture	PEC	3	0	0	3	40	60	100

Vertical – III WATER MANAGEMENT AND PROTECTED CULTIVATION

23AG531	Watershed Planning and Management	PEC	3	0	0	3	40	60	100
23AG532	Groundwater and Well Engineering	PEC	3	0	0	3	40	60	100
23AG533	Design of Advanced Irrigation System	PEC	3	0	0	3	40	60	100
23AG534	Protected Cultivation	PEC	3	0	0	3	40	60	100
23AG535	On-farm Water Management	PEC	3	0	0	3	40	60	100
23AG536	Irrigation Water Quality and Waste Water Management	PEC	3	0	0	3	40	60	100
23AG537	Climate Change and Adaptation	PEC	3	0	0	3	40	60	100
23AG538	Landscape Architecture	PEC	3	0	0	3	40	60	100

Vertical – IV IT AND AGRICULTURAL BUSINESS MANAGEMENT

23AG541	Integrated Farming System	PEC	3	0	0	3	40	60	100
23AG542	Agricultural Business Management	PEC	3	0	0	3	40	60	100
23AG543	Sustainable Agriculture and Food Security	PEC	3	0	0	3	40	60	100
23AG544	Systems Analysis in Agricultural Engineering	PEC	3	0	0	3	40	60	100
23AG545	IT in Agricultural System	PEC	3	0	0	3	40	60	100
23AG546	Automation in Agriculture	PEC	3	0	0	3	40	60	100
23AG547	Agri Clinic	PEC	3	0	0	3	40	60	100
23AG548	Agricultural Extension	PEC	3	0	0	3	40	60	100


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OPEN ELECTIVE COURSES (For Other Programmes)

Course Code	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
23AG601	Principles of Food Preservation	OEC	3	0	0	3	40	60	100
23AG602	Organic Farming	OEC	3	0	0	3	40	60	100
23AG603	Renewable Energy Technology	OEC	3	0	0	3	40	60	100
23AG604	Urban Horticulture	OEC	3	0	0	3	40	60	100
23AG605	Roof Top Gardening Techniques	OEC	3	0	0	3	40	60	100
23AG606	Value Addition in Agricultural Products	OEC	3	0	0	3	40	60	100

MINOR ELECTIVE COURSE

LAND AND WATER MANAGEMENT

Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CIA	ESE	Total
23AG901	Hydrology and Water Resources Engineering	MEC	3	0	0	3	40	60	100
23AG902	Irrigation and Drainage Engineering	MEC	3	0	0	3	40	60	100
23AG903	Ground Water and Well Engineering	MEC	3	0	0	3	40	60	100
23AG904	Soil and Water Conservation Engineering	MEC	3	0	0	3	40	60	100
23AG905	On-farm Water Management	MEC	3	0	0	3	40	60	100
23AG906	Micro Irrigation	MEC	3	0	0	3	40	60	100


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SUMMARY

S.No	Category	Credits per semester								Total Credits	Credits as per AU
		I	II	III	IV	V	VI	VII	VIII		
1	HSMC	5	1	0	3	0	0	3	0	12	12
2	BSC	12	4	4	4	0	0	0	0	24	22
3	ESC	5	13	6	0	0	0	0	0	24	19
4	PCC	0	3	13	13	12	11	11	0	63	64
5	PEC	0	0	0	0	6	6	3	0	15	21
6	OEC	0	0	0	0	3	3	3	0	09	12
7	EEC	0	2	1	1	2	3	1	10	20	15
8	MC	✓			✓	✓	✓	✓		5 Courses	2 Course
Total		22	23	24	21	23	23	21	10	167	165

HSMC - Humanities and Social Sciences

BSC - Basic Science Courses

ESC - Engineering Science Courses

PCC - Professional Core Courses

PEC - Professional Elective Courses

OEC - Open Elective Courses

EEC - Employability Enhancement Courses

MC - Mandatory Courses (Non-Credit Courses)

MEC - Minor Elective Course

CIA - Continuous Internal Assessment

ESE - End Semester Examination

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I SEMESTER

23EN101	COMMUNICATIVE ENGLISH (Common to all B.E./B.Tech Programmes)	L 3	T 0	P 0	C 3
Category	HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSE (HSMC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Enable the students to assimilate the correct patterns of the language.
- Develop students' insight into the structure of the English language.
- Enrich vocabulary bank, to communicate more effectively in English,
- Express opinions including facts & ideas & maintain conversation in everyday situations.
- Use digital literacy tools their LSRW skills can be enhanced and to master good speaking Skills with different strategies.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Outline the basics of English communication	Understand
CO 2	Contrast the ways in which written and spoken communication differ.	Understand
CO 3	Relate the descriptive and analytical words, phrases, and sentence structures.	Understand
CO 4	Identify various text kinds and understand their connotative and denotative implications.	Apply
CO 5	Utilize several text kinds using the proper formats.	Apply

Course Contents

Unit – I	Basics of Communication	9
Listening – Telephone conversation & Writing message, gap filling; Reading – Telephone message, bio-note; Writing – Personal profile; Grammar – Simple present tense, Present continuous tense, Asking questions (wh-questions); Vocabulary – GRE Vocabulary.		
Unit – II	Narration	9
Listening – Travel/Fiction podcast, Watching a travel documentary; Reading – An excerpt from a travelogue, Newspaper Report; Writing – Narrative (Event, personal experience etc.); Grammar – Subject – verb agreement, Simple past, Past continuous Tenses; Vocabulary – Antonyms, Word formation (Prefix and Suffix).		
Unit – III	Description	9
Listening – Conversation, Radio/TV advertisement/BBC Documents; Reading – A tourist brochure and planning an itinerary, descriptive article / excerpt from literature; Writing – Definitions, Descriptive writing, Checklists; Grammar – Future tense, Perfect tenses, Preposition; Vocabulary – Adjectives and Adverbs.		


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Unit – IV	Classification	9
Listening – Announcements and filling a table; Reading – An article, social media posts and classifying (channel conversion – text to table), IELTS & TOEFL, BEC materials; Writing – Note making, Note taking and Summarising, a classification paragraph; Grammar – Connectives, Transition words; Vocabulary – Contextual vocabulary, Words used both as noun and verb, Classification related words.		
Unit – V	Expression of Views	9
Listening – Debate / Discussion; Reading – Formal letters, Letters to Editor, Opinion articles / Blogs; Writing – Letter writing/ Email writing (Enquiry / Permission, Letter to Editor), Resume Writing; Grammar – Question tags, Indirect questions, Yes / No questions; Vocabulary – Compound words, Phrasal verbs, Articles-Review of Movie/Documentary/Short-films.		
Total : 45 Hours		

Text Books
1. Anna University, Division of Humanities and Social Sciences. English for Engineers and Technologists. Vol. 1: A Skills Approach, Orient Longman, 2002.
2. Trimble, Louis, English for Science and Technology. Vol. 1: A Discourse Approach, Cambridge University Press. 2023.
3. Kumar, Sanjay & Lata, Pushp. Communication Skills. New Delhi: Oxford University Press, 2018.
Reference Books
1. C.Richards Jack. Interchange Fifth Edition, Cambridge University Press, 2017.
2. Wallwork Adrian, Springer. English for Academic Correspondence and Socializing. Cambridge University Press. 2011.
3. Cortrell, Stella. The Study Skills Handbook. Fourth Edition, Red Globe Press, 2013.
4. Kumar, Sanjay & Lata, Pushp. Communication Skills, Oxford University Press, 2011.
Additional / Web References
1. https://nptel.ac.in/courses/109106094
2. nptel.ac.in/courses/109/104/109104090/
3. http://www.uefap.com/grammar/gramfram.htm

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	-	-	-	-	2	-	-	-	2	3	-	3			
CO 2	-	-	-	-	2	-	-	-	2	3	-	3			
CO 3	-	-	-	-	2	-	-	-	2	3	-	3			
CO 4	-	-	-	-	2	-	-	-	2	3	-	3			
CO 5	-	-	-	-	2	-	-	-	2	3	-	3			
Average	-	-	-	-	2	-	-	-	2	3	-	3			

3 – High

2 – Medium

1 – low

“-” - No Correlation



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Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
Total			40	60		

23MA201	ENGINEERING MATHEMATICS- I (Common to all B.E/ B.Tech Programmes)	L	T	P	C
		3	1	0	4
Category	Basic science (BS)				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Develop the use of matrix algebra techniques that are needed by engineers for practical applications.
- Familiarize the student with differentiation rules.
- Familiarize the student with functions of several variables this is needed in many branches of engineering.
- Acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.
- Acquire the knowledge of ordinary differential equation in both variable and constant coefficients.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Make use of matrix theory for solving system of linear equations and compute eigenvalues and eigenvectors required for matrix diagonalization process.	Apply
CO 2	Interpret various concepts of differential calculus like limit, continuity, differentiability, Successive differentiation and study it's applicability in maxima and minima of one variable.	Understand
CO 3	Construct the application of partial differentiation and apply for evaluating maxima and minima of functions of multi variables.	Apply
CO 4	Make use of the concept of change of order of integration to evaluate multiple integrals and their usage in computing the area and volume.	Apply
CO 5	Illustrate ordinary differential equations to solve constant and variable coefficient problems.	Understand



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Course Contents

Unit – I	Matrices	9+3
Characteristic equation -Eigenvalues and Eigenvectors of a real matrix – Properties of Eigenvalues and Eigenvectors - Diagonalization of matrices- Reduction of a quadratic form to canonical form by orthogonal transformation- Nature of quadratic form-Cayley -Hamilton theorem.		
Unit – II	Differential Calculus	9+3
Representation of functions -Limit of a function - Continuity- Derivatives -Differentiation rules - Taylor's series - Maclaurin series- Maxima and Minima of functions of one variable.		
Unit – III	Multivariable Calculus	9+3
Partial differentiation - Homogeneous functions and Euler's theorem - Jacobians -Taylor's series for functions of two variables - Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.		
Unit – IV	Multiple Integrals	9+3
Double integrals - Area enclosed by plane curves- Double integrals in polar coordinates - Change of order of integration -Triple integrals - Volume of solids (Cartesian Co-ordinates only).		
Unit – V	Ordinary Differential Equations	9+3
Higher order linear differential equations with constant coefficients -Homogeneous Equation of Euler's and Legendre's Types of linear equations with Variable Coefficients - Method of variation of parameters.		
Total : 60 Periods		

Text Books

1. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Grewal.B.S. "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.
3. James Stewart, " Calculus: Early Transcendentals ", Cengage Learning, 8th Edition, New Delhi, 2015.

Reference Books

1. Anton. H, Bivens. I and Davis. S, "Calculus", Wiley, 10th Edition, 2016.
2. Bali. N., Goyal. M. and Watkins. C., "Advanced Engineering Mathematics", Firewall Media, New Delhi, 7th Edition, 2009.
3. Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.

Additional / Web References

1. <https://nptel.ac.in/courses/122104018>
2. <https://nptel.ac.in/courses/111105122>
3. <https://nptel.ac.in/courses/111107108>


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COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	2	3	2	3	2	3	2	3	2	3	2
CO 2	3	2	3	2	3	2	3	2	3	2	3	2
CO 3	3	2	3	2	3	2	3	2	3	2	3	2
CO 4	3	2	3	2	3	2	3	2	3	2	3	2
CO 5	3	2	3	2	3	2	3	2	3	2	3	2
Average	3	2	3	2	3	2	3	2	3	2	3	2

"3" – High

"2" – Medium

"1" – low

"-“ - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
				Total	40	60

23PH201	PHYSICS FOR ENGINEERS (Common to BME, Mech, ECE and AGRI)	L	T	P	C
		3	0	0	3
Category	Basic Sciences				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Make the students effectively achieve an understanding of mechanics.
- Enable the students to gain knowledge of electromagnetic waves and its applications.
- Introduce the basics of oscillations, optics and lasers.
- Equip the students to be successfully understand the importance of quantum physics.
- Motivate the students towards the applications of quantum mechanics.

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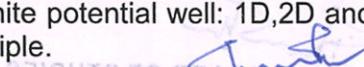
Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Interpret the concepts of mechanics in the rotational system.	Understand
CO 2	Explain the Maxwell's equations and time varying electric field to show the nature of propagation of electromagnetic waves, radiation pressure and its energy through free space, non-conducting and conducting media.	Understand
CO 3	Interpret the foundational knowledge of physics to recognize phenomena of oscillations, optics and lasers.	Understand
CO 4	Extend the concepts of Schrodinger wave equation to calculate the matter waves energy & momentum, probability of finding the particle and wave function of quantum system.	Understand
CO 5	Make use of advanced physics concepts of quantum theory and its application in tunneling microscopes.	Apply

Course Contents

Unit – I	Mechanics	9
Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies – motion of the CM – kinetic energy of system of particles. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of M .I –moment of inertia of continuous bodies – M.I of a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic molecule - gyroscope - torsional pendulum – double pendulum –Introduction to nonlinear oscillations.		
Unit – II	Electromagnetic Waves	9
The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum, Conditions on the wave field - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - polarization - Producing electromagnetic waves - Energy and momentum in EM waves: Intensity, waves from localized sources, momentum and radiation pressure - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium vacuum interface for normal incidence.		
Unit – III	Oscillations , Optics and Lasers	9
Simple harmonic motion - resonance –analogy between electrical and mechanical oscillating systems - waves on a string - standing waves - traveling waves - Energy transfer of a wave - sound waves - Doppler effect. Reflection and refraction of light waves - total internal reflection - interference – Michelson interferometer –Theory of air wedge and experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients - population inversion - Nd-YAG laser, CO ₂ laser, semiconductor laser –Basic applications of lasers in industry.		
Unit – IV	Basic Quantum Mechanics	9
Photons and light waves - Electrons and matter waves –Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle.		


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Unit – V	Applied Quantum Mechanics	
The harmonic oscillator(qualitative)- Barrier penetration and quantum tunneling(qualitative)- Tunneling microscope - Resonant diode - Finite potential wells (qualitative)- Bloch's theorem for particles in a periodic potential –Basics of Kronig-Penney model and origin of energy bands.		
Total : 45 Hours		

Text Books

1. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, "Concepts of Modern Physics", McGraw-Hill, Seventh Edition, 2017.
2. E.M.Purcell and D.J.Morin, "Electricity and Magnetism", Cambridge Univ.Press, 2013.
3. Gaur R K, Gupta S L "Engineering Physics", Dhanpat Rai Publications., 2013.
4. Hugh D. Young, Roger A. Freedman, Lewis Ford .A "University Physics with Modern Physics", Pearson Education., India, 2008.

Reference Books

1. R.Wolfson "Essential University Physics". Volume 1 & 2. Pearson Education (Indian Edition), 2009.
2. Paul A. Tipler, "Physics – Volume 1 & 2", CBS, (Indian Edition), 2004.
3. K.Thyagarajan and A.Ghatak. "Lasers: Fundamentals and Applications", Laxmi Publications, (Indian Edition), 2019.
4. Halliday D, Resnick R, Walker J "Fundamentals of Physics", Wiley Publications, 2013.

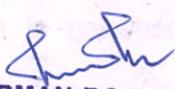
Additional / Web References

1. <https://archive.nptel.ac.in/courses/115/106/115106119/>
2. <https://archive.nptel.ac.in/courses/115/101/115101005/>
3. <https://archive.nptel.ac.in/courses/115/102/115102124/>
4. <https://archive.nptel.ac.in/courses/115/101/115101107/>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	1	-	-	-	-	-	-	-	-	-	-	-
CO 2	3	-	-	-	-	-	-	-	2	-	-	2
CO 3	3	-	-	-	-	-	-	-	2	-	-	2
CO 4	3	-	-	-	-	-	-	-	2	-	-	2
CO 5	3	-	-	-	-	-	-	-	2	-	-	2
Average	3	-	-	-	-	-	-	-	2	-	-	2

3 – High 2 – Medium 1 – low “-” - No Correlation


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Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
Total			40		60	

23CY201	CHEMISTRY FOR ENGINEERS (Common to all B.E.,/B.Tech Programmes)	L	T	P	C
		3	0	0	3
Category	Basic Sciences				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Impart knowledge on the various sources of water and its impurities.
- Impart knowledge on the basic principles and preparatory methods of nanomaterials.
- Facilitate the understanding of different types of fuels, their preparation, properties and Combustion characteristics.
- Familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.
- Familiarize different types of polymeric materials, their general preparation methods and applications to futuristic material fabrication needs.

Course Outcomes (COs)

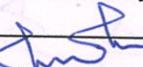
On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Recognize water quality parameters and water treatment techniques for the polluted water.	Understand
CO 2	Outline the various synthesis processes of nanomaterial and enumerate its applications in various fields.	Understand
CO 3	Illustrate the composition, calorific values, uses of natural fuels and the manufacture of synthetic and bio fuels.	Understand
CO 4	Infer the knowledge of operating ideology, working process and application of energy conversion and storage devices.	Understand
CO 5	Reveal the basic concepts, processing of polymer and its chemistry in engineering and technology.	Understand


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Course Contents

Unit – I	Water treatment	9
Water: Sources and impurities, Water quality parameters: Definition and significance of-color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, fluoride and arsenic. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process.		
Unit – II	Nanochemistry	9
Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials: Definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.		
Unit – III	Fuels and combustion	9
Fuels: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking - octane number, diesel oil – cetane number; Power alcohol and biodiesel. Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method. CO ₂ emission and carbon foot print.		
Unit – IV	Energy sources and storage devices	9
Stability of nucleus: mass defect (problems), binding energy; Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Wind energy; Geothermal energy; Batteries: Types of batteries, Primary battery - dry cell, Secondary battery - lead acid battery and lithium-ion battery; Electric vehicles – working principles; Fuel cells: H ₂ -O ₂ fuel cell, microbial fuel cell; Supercapacitors: Storage principle, types and examples.		
Unit – V	Polymer chemistry	9
Introduction: Functionality-degree of polymerization. Classification of polymers (Source, Structure, Synthesis and Intermolecular forces). Mechanism of free radical addition polymerization. Properties of polymers: T _g , tacticity, molecular weight-number average, weight average, viscosity average and polydispersity index (Problems). Techniques of polymerization: Bulk, emulsion, solution and suspension. Engineering Plastics: Polyamides, Polycarbonates and Polyurethanes. Compounding and Fabrication Techniques: Injection, Extrusion, Blow and Calendering.		
Text Books		Total : 45 Hours
1. P. C. Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.		


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2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2012.
3. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

Reference Books

1. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.
2. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
3. O.V. Roussak and H.D. Gesser, Applied Chemistry: A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

Additional / Web References

1. <https://nptel.ac.in/courses/122101001>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	2	-	-	-	-	2	-	1	-	-	1
CO 2	3	-	-	-	-	-	-	-	-	-	-	1
CO 3	3	-	-	-	-	-	2	-	1	-	-	1
CO 4	3	-	-	-	-	-	2	-	-	-	-	1
CO 5	3	-	-	-	-	-	-	-	1	-	-	1
Average	3	-	-	-	-	-	2	-	1	-	-	1

3 – High

2 – Medium

1 – low

"-" - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
				Total	40	60


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23CS301	PROBLEM SOLVING AND PYTHON PROGRAMMING (Common to all B.E/ B.Tech Programmes)	L	T	P	C
		3	0	0	3
Category	Engineering Science				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Understand the basics of algorithmic problem solving.
- Develop and solve problems using python conditionals and loops.
- Develop and use function calls to solve problems.
- Construct python data structures - lists, tuples, dictionaries to represent complex data.
- Implement input/output with file exceptions in python.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Develop logical solutions to simple and complex computational problems.	Apply
CO 2	Develop and execute python programs using conditionals and loops	Apply
CO 3	Implement python programs using functions for searching operations	Apply
CO 4	Execute the lists, tuples and dictionary created in python	Apply
CO 5	Implement a module to read & write data with exceptions.	Apply

Course Contents

Unit – I	Basic Programming Representations	9
Fundamentals of Computer, Identification of Computational Problems, Algorithms, building blocks of algorithms (statements, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.		
Unit – II	Different Data Types	9
Introduction to python, Python interactive and script mode, data types: numeric, boolean, string, list, tuple, dictionary and set; identifier, variables, keywords, expressions, statements, assignment, precedence of operators, comments, indentation; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.		
Unit – III	Functional Flow	9
Conditionals: Boolean values and Operators, if statement, alternative statement, nested statements, chained conditional; Iteration: state, while, for, break, continue, pass; Input and Output; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string methods, string module; Lists as arrays, creation of arrays and operations on arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.		

Unit – IV	Types of Data Structures	9
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, advanced list processing - list comprehension (Map, Filter, Lambda and Reduce); Tuples: tuple introduction, tuple assignment, tuple as return value; Dictionaries: operations and methods; Sets: set introduction, set operations; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation.		
Unit – V	Files, Modules, Packages	9
Files: text files, reading and writing files, file positions, format operator, directory methods, command line arguments, Exceptions: errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).		
Total : 45 Periods		

Text Books

- Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
- Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.

Reference Books

- Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
- G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
- John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021.

Additional / Web References

- <https://learnengineering.in/ge3151-problem-solving-and-python-programming/>
- <https://www.scribd.com/document/546667558/GE3151-PROBLEM-SOLVING-AND-PYTHON-PROGRAMMING>
- <https://paddeepz.net/ge3151-notes-problem-solving-and-python-programming-regulation-2021-anna-university/>
- https://onlinecourses.nptel.ac.in/noc21_cs32/

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	3	3	3	2	-	-	-	-	-	2	2
CO 2	3	3	3	3	2	-	-	-	-	-	2	2
CO 3	3	3	3	3	2	-	-	-	-	-	2	2
CO 4	2	2	-	2	2	-	-	-	-	-	2	2
CO 5	3	2	-	-	2	-	-	-	-	-	2	2
Average	2	3	3	3	2	-	-	-	-	-	2	2

3 – High

2 – Medium

1 – Low

‘-’ - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
			Total	40	60	

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தமிழ் மரபு

23TA101 தமிழ் மரபுக்கால வரையறை

L T P C

1001

அலகு 1 மொழி மற்றும் இலக்கியம்:

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கிகயத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு 2 மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக்கலை:

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஜம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கள், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு 3 நாட்டுப்புறக் கலைகள் மற்றும் வீர வினையாட்டுகள்:

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் வினையாட்டுகள்.

அலகு 4 தமிழர்களின் தினைக் கோட்பாடுகள்:

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறங்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்க காலத்தில் ஏற்றுமைதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு 5 இந்திய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:

இந்திய விவடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு.

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநால் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு).
5. Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils – The Classical Period (Dr. S. Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu), (Published by: International Institute of Tamil Studies)
8. The Contributions of Tamils of Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – ‘Sangam City Civilization on the banks of river Vaigai; (Jointly published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr. K.K. Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by RMRL) – Reference Book.


CHAIRMAN-BOARD OF STUDIES

HERITAGE OF TAMILS

23TA101

**L T P C
1 0 0 1**

UNIT I LANGUAGE AND LITERATURE

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyan and Bharathidhasan.

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART - SCULPTURE

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்லியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு).
5. Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils – The Classical Period (Dr. S. Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu), (Published by: International Institute of Tamil Studies)
8. The Contributions of Tamils of Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – ‘Sangam City Civilization on the banks of river Vaigai; (Jointly published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr. K.K. Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by RMRL) – Reference Book.

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BOARD OF STUDIES

23PC201	PHYSICS AND CHEMISTRY LABORATORY (Common to all B.E./B.Tech Programmes)	L	T	P	C
		0	0	4	2
Category	Basic sciences				
Pre requisites	Physics and chemistry				

Course Objectives

The course is intended to

- Measure various physical parameter of solid and matter waves.
- Identify the velocity of ultrasonic waves in different liquid medium.
- Measure acceptance angle, groove width and wave length of laser.
- Demonstrate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO and chloride.
- Familiarize with electro analytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Develop the experimental skills on physical properties of materials and matter waves.	Apply
CO 2	Make use of concepts of sound to measure physical properties of given liquids.	Apply
CO 3	Identify various physical parameters of object with concepts of optics.	Apply
CO 4	Analyze the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	Apply
CO 5	Determine the amount of metal ion through volumetric techniques.	Apply

List of Experiments in physics (Any Seven Experiments)

S.No	List of Exercises	CO	Blooms Taxonomy
1.	Simple harmonic oscillations of cantilever.	CO 1	Apply
2.	Non-uniform bending - Determination of Young's modulus.	CO 1	Apply
3.	Melde's string experiment.	CO 1	Apply
4.	Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids.	CO 2	Apply
5.	Photoelectric effect.	CO 3	Apply
6.	Air wedge - Determination of thickness of a thin sheet/wire.	CO 3	Apply
7.	a) Optical fibre -Determination of Numerical Aperture and acceptance angle b) Compact disc- Determination of width of the groove using laser.	CO 3	Apply
8.	Laser- Determination of the wave length of the laser using grating.	CO 3	Apply

Total : 30 Periods

List of Experiments in Chemistry (Any Seven Experiments)

S.No	List of Exercises	CO	Blooms Taxonomy
1.	Preparation of Na ₂ CO ₃ as a primary standard and estimation of acidity of a water sample using the primary standard.	CO 4	Apply
2.	Determination of types and amount of alkalinity in a water sample - Split the first experiment into two.	CO 4	Apply
3.	Determination of total, temporary & permanent hardness of water by EDTA method.	CO 4	Apply
4.	Determination of DO content of water sample by Winkler's method.	CO 4	Apply
5.	Determination of chloride content of water sample by Argentometric method.	CO 4	Apply
6.	Determination of strength of given hydrochloric acid using pH meter.	CO 5	Apply
7.	Determination of strength of acids in a mixture of acids using conductivity meter.	CO 5	Apply
8.	Estimation of iron content of the given solution using potentiometer.	CO 5	Apply

Total : 30 Periods**Mapping of Course Outcomes (COs) with Programme Outcomes (POs)**

CO	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	2	2	-	-	-	-	-	-	2	-	-	-
CO 2	2	2	-	-	-	-	-	-	2	-	-	-
CO 3	2	2	-	-	-	-	-	-	2	-	-	-
CO 4	2	2	-	-	-	-	-	-	2	-	-	-
CO 5	2	2	-	-	-	-	-	-	2	-	-	-
Average	2	2	-	-	-	-	-	-	2	-	-	-

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
Total				60	40


CHAIRMAN-BOARD OF STUDIES

23CS302	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY (Common to all B.E/ B.Tech Programmes)	L	T	P	C
		0	0	3	1.5
Category	Engineering Science				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Develop the problem-solving skills to complex problems
- Develop the basic programming constructs in Python.
- Implement various gaming strategies in python to solve real world problems.
- Model a data structure using lists, tuples, dictionaries in python.
- Make use of input / output operations with files in Python.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO No.	Course Outcome	Bloom's Level
CO 1	Develop algorithmic solutions to simple computational problems	Apply
CO 2	Implement programs in Python using conditionals and loops for solving problems.	Apply
CO 3	Implement programs in Python for real time applications using functions	Apply
CO 4	Implement programs in Python for real time applications using exception handling.	Apply
CO 5	Develop gaming applications using Python	Apply

S.No	List of Exercises	CO	Bloom's Taxonomy
1.	Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.)	CO 1	Apply
2.	Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).	CO 2	Apply
3.	Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)	CO 2	Apply
4.	Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of	CO 3	Apply

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	a car/ Materials required for construction of a building – operations of list & tuples)		
5.	Implementing programs using Functions. (Factorial, largest number in a list, area of shape)	CO 3	Apply
6.	Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy)	CO 4	Apply
7.	Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)	CO 4	Apply
8.	Implementing real-time/technical applications using Exception handling. (divide by zero error, voter's age validity, student mark range validation)	CO 4	Apply
9.	Exploring Pygame tool.	CO 4	Apply
10.	Developing a game activity using Pygame like bouncing ball, car race etc.	CO 5	Apply
Total : 45 Periods			

Reference Books	
1.	Manual-prepared by SSCET
Additional / Web References	
1.	http://nptel.ac.in/courses/112104113/
2.	http://nptel.ac.in/courses/112108148/

CO	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	3	3	3	2	-	-	-	-	-	2	2
CO 2	3	3	3	3	2	-	-	-	-	-	2	2
CO 3	3	3	3	3	2	-	-	-	-	-	2	-
CO 4	2	2	-	2	2	-	-	-	-	-	2	-
CO 5	2	2	-	-	2	-	-	-	-	-	2	-
CO 6	2	2	-	-	2	-	-	-	-	-	2	-
Average	2	3	3	3	2	-	-	-	-	-	2	2


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Passed in Board of Studies Meeting on 27.10.2023

Approved in Academic Council Meeting on 07.11.2023

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
			Total	60	40

CHAIKIN-BOARD OF STUDIES

Passed in Board of Studies Meeting on 27.10.2023

Approved in Academic Council Meeting on 07.11.2023

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23EN102	Communication Laboratory (Common to All B.E/B.Tech Programs)	L	T	P	C
		0	0	2	1
Category	HUMANITIES, SOCIAL SCIENCE AND MANAGEMENT COURSE (HSMC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Improve the communicative competence of learners
- Help learners use language effectively in academic /work contexts
- Develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.
- Build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.
- Use language efficiently in expressing their opinions via various media.

Course Contents

Unit – I

Introduction to Fundamental of Communication

6

Listening - Listening for general information-specific details- conversation: Introduction to classmates - Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form; BBC Radio/Research find YouTube channel.

Speaking - making telephone calls-Self Introduction; Introducing a friend; - 42 politeness strategies-making polite requests, making polite offers, replying to polite requests and offers- understanding basic instructions (filling out a bank application for example), PPT Presentation.

Unit – II

Narration

6

Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities, Oral writing (Extract videos), and Document national statement. Listening to TED Talks. Speaking - Narrating personal experiences / events-Talking about current and temporary situations & permanent and regular situations* - describing experiences and feelings engaging in small talk-describing requirements and abilities, making predictions- talking about a given topic-giving opinions, understanding a website-describing processes.

Unit – III

Reading

6

Reading – Reading Novel/ Auto-biography/ Award winning novels/ Self motivation books/ Basic economics books.



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ding- longer texts- close reading, Reading exercise: IELTS & TOEFL, BEC, Journals, Newspapers, Reading edition, Comprehension-reading longer texts- reading different types of texts- magazines.

Unit - V	Writing	6
Writing- brainstorming -writing short essays – developing an outline- identifying main and subordinate ideas- dialogue writing. Fill in the blanks: Proposal, Resume writing, PPT, AI tools, Letter writing, informal or personal letters-e-mails-conventions of personal email. Using Chat GPT & Language tools, screening of English movies.		

Total : 30 Hours

Text Books

1. Anna University, Division of Humanities and Social Sciences, *English for Engineers and Technologists*. Vol. 1: A Skills Approach, Orient Longman, 2002.
2. Trimble Louis, *English for Science and Technology*, Vol. 1: A Discourse Approach. England: Cambridge University Press, 2023.
3. Kumar, Sanjay & Lata, Pushp. *Communication Skills*, Oxford University Press, 2011.

Reference Books

1. C.Richards Jack. *Interchange Fifth Edition*, Cambridge University Press, 2017.
2. Wallwork Adrian, Springer. *English for Academic Correspondence and Socializing*, Cambridge University Press. 2011.

Additional / Web References

1. <https://nptel.ac.in/courses/109106094>
2. nptel.ac.in/courses/109/104/109104090/
3. <http://www.uefap.com/grammar/gramfram.html>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

Cos	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	-	-	-	-	2	-	-	-	2	3	-	3			
CO 2	-	-	-	-	2	-	-	-	2	3	-	3			
CO 3	-	-	-	-	2	-	-	-	2	3	-	3			
CO 4	-	-	-	-	2	-	-	-	2	3	-	3			
CO 5	-	-	-	-	2	-	-	-	2	3	-	3			
Average	-	-	-	-	2	-	-	-	2	3	-	3			

"3"- High

"2" – Medium

"1" – low

"-" - No Correlation

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Passed in Board of Studies Meeting on 27.10.2023

Approved in Academic Council Meeting on 07.11.2023


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S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
			Total	60	40

23MC801 INDUCTION PROGRAMME

This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over. The induction programme has been introduced by AICTE with the following objective:

“Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.”

“One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character. “

Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

(i) Physical Activity

This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc.

(ii) Creative Arts

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it everyday for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later.



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B.Tech Agricultural Engineering (R-2023)

(iii) Universal Human Values

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and dont's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

(iv) Literary Activity

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

(v) Proficiency Modules

This would address some lacunas that students might have, for example, English, computer familiarity etc.

(vi) Lectures by Eminent People

Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

(vii) Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

(viii) Familiarization to Dept./Branch & Innovations

They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

(ix) Department Specific Activities

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering

/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

CHAPTER NINE • GRADE 9 STANDARDS



II SEMESTER

23MA202	ENGINEERING MATHEMATICS-II (Common to all B.E/ B.Tech Programmes)	L 3	T 1	P 0	C 4
Category	Basic Sciences (BS)				
Pre requisites	23MA201				

Course Objectives

The course is intended to

- Demonstrate the basic concepts of PDE for solving standard partial differential equations.
- Interpreting techniques of vector calculus to solve problems in integration over a curve.
- Familiarize the concepts of complex integration to solve contour problems.
- Introduce Fourier series analysis which is central to many applications in Engineering apart from its use in solving boundary value problems.
- Acquaint the student with Fourier transform techniques used in wide variety of situations.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Demonstrate the formation of PDE to solve homogeneous and non-homogeneous problems.	Understand
CO 2	Acquire knowledge vector calculus to evaluate integration over a curve.	Apply
CO 3	Construct Cauchy integral theorem and residue theorem to evaluate contour integration.	Apply
CO 4	Utilize the fourier series of periodic functions and solve differential equations using fourier analysis.	Apply
CO 5	Contrast mathematical principles on transforms of periodic and non-periodic functions.	Understand

Course Contents

Unit – I	Partial Differential Equations	9+3
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Formation of partial differential equations - Singular integrals - Solutions of standard types of first order partial differential equations - Lagrange's linear equation - Homogenous Linear partial differential equations of second and higher order with constant coefficients.

CHAIRMAN-BOARD OF STUDIES

Passed in Board of Studies Meeting on 27.10.2023

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Unit – II	Vector calculus	9+3
Gradient and directional derivative - Divergence and curl - Irrotational and solenoidal vector fields - Line integral over a plane curve - Surface integral and volume integral - Green's, Gauss divergence and Stokes' theorems (proofs excluded).		
Unit – III	Complex Integration	9+3
Line integral - Cauchy's theorem and integral formula - Taylor's and Laurent's series - Singularities - Residues - Residue theorem-Application of residue theorem for evaluation of real integrals - Use of circular contour and semi-circular contour with no pole on real axis.		
Unit – IV	Fourier series	9+3
Dirichlet's conditions – General Fourier series – Odd and even functions – Half range Sine and Cosine series - Parseval's identity – Harmonic Analysis – Complex form of Fourier series.		
Unit – V	Fourier Transform	9+3
Fourier integral theorem - Fourier transform pair - Sine and Cosine transforms - Properties - Transform of elementary functions - Convolution theorem - Parseval's identity.		
Total : 60 Periods		

Text Books

1. Friedberg. A.H., Insel. A.J. and Spence. L., "Linear Algebra", Prentice Hall of India, New Delhi, 4th Edition, 2004.
2. Grewal. B.S, "Higher Engineering Mathematics", 41st Edition, Khanna Publications, New Delhi, 2011.
3. Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", Eighth Edition, Laxmi Publications Pvt Ltd., 2011.

Reference Books

1. Kolman. B. Hill. D.R., "Introductory Linear Algebra", Pearson Education, New Delhi, First Reprint, 2009.
2. Dass, H.K., and Er. Rajnish Verma," Higher Engineering Mathematics", S. Chand Private Ltd., 2011.
3. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2012.

Additional / Web References

- 1.<https://nptel.ac.in/courses/111106094>
- 2.<https://archive.nptel.ac.in/courses/111/103/111103070/>
- 3.<https://nptel.ac.in/courses/111106111>

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CHAIRMAN-BOARD OF STUDIES

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	1	2	3	4	5	6	7	8	9	10	11	12
CO 2	3	2							1	1		
CO 3	3	2							1	1		
CO 4	3	2							1	1		
CO 5	3	2							1	1		
Average	3	2							1	1		

"3" – High

"2" – Medium

"1" – low

"-“ - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*	
CIA I	3 hours	2.5 units	100	12	24	60	
CIA II	3 hours	2.5 units	100	12			
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc.,				16		60	
(8 marks during CIA I and 8 marks during CIA II)				Total		40	
				40		60	

CHAIRMAN-BOARD OF STUDIES

23ME301	ENGINEERING GRAPHICS	L	T	P	C
Category	Engineering Sciences	3	1	0	4
Pre requisites	NIL				

Course Objectives

The course is intended to

- Develop graphical skills for the construction of curves
- Expose the orthographic principles through lines and planes.
- Demonstrate the concepts of orthographic projections of solids
- Impart the knowledge on sectioning solids and development of lateral surfaces of solids
- Exposure to the significance of isometric projections

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Sketch the engineering curves as per engineering drawing standards	Understand
CO 2	Illustrate the orthographic projections to construct lines and planar surface	Understand
CO 3	Construct the orthographic views of solids	Apply
CO 4	Develop the lateral surfaces of solids using drawing standards	Apply
CO 5	Sketch the isometric projection and perspective projection of simple solids	Apply

Course Contents

Unit – I	Plane Curves	12
Importance of graphics in engineering applications – Use of drafting instruments – Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves.		
Unit – II	Projection of Lines and Plane Surface	12
	Orthographic projection-Principal planes-First angle projection-Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.	
Unit – III	Projection of Solids	12

CHIRUMAN-BOARD OF STUDIES

Projection of solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three Dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects.

Unit – IV	Projection of Sectioned Solids and Development of Surfaces	12
Sectioning of prisms, pyramids, cylinder, and cone in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other - obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids - Prisms, pyramids cylinders and cones.		
Unit – V	Isometric Projection	12
Principles of isometric projection — isometric scale - isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method. Practicing three dimensional modeling of isometric projection of simple objects by CAD Software (Not for examination)		
Total : 60 Hours		

Text Books

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Natarajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.
3. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.

Reference Books

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2 nd Edition, 2019.
2. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.
3. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015
4. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.

Additional / Web References

1. <https://nptel.ac.in/courses/112103019>
2. https://en.wikipedia.org/wiki/Engineering_drawing



CHAIRMAN-BOARD OF STUDIES

Passed in Board of Studies Meeting on 27.10.2023

Approved in Academic Council Meeting on 07.11.2023

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
CO 2	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
CO 3	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
CO 4	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
CO 5	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-
Average	3	2	2	-	-	-	-	-	-	3	-	2	3	3	-

3 – High

2 – Medium

1 – low

“-” - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
						60
					Total	40
						60

23EC301	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common to all B.E/ B.Tech. Programmes)	L	T	P	C
		3	0	0	3
Category	Engineering Sciences				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Solve electric circuits using basic laws.
- Impart knowledge of types, construction and working principles of transformer and concepts of protective devices.
- Familiarize the types, construction and working principles of electrical machines.

- Introduce the characteristics and applications of analog devices and logic gates.
- Acquaint the functional elements and working of measuring instruments.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Compute the electric circuit parameters using basic laws.	Apply
CO 2	Explain the construction and working of transformers and the concepts of protective devices.	Understand
CO 3	Explain the construction and working principles of Electrical Machines.	Understand
CO 4	Interpret the characteristics of analog electronic devices and logic gates	Apply
CO 5	Select appropriate measuring instruments for the given application.	Apply

Course Contents**Unit – I ELECTRICAL CIRCUITS**

9

DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws –Independent and Dependent Sources – Simple problems- Nodal Analysis, Mesh analysis with independent sources only

Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor, Steady state analysis of RLC circuits.

Unit – II TRANSFORMERS AND ELECTRICAL INSTALLATIONS

9

Transformer: Single Phase Transformer: Construction, principle of operation, EMF Equation, types of transformer, Regulation, Efficiency and applications of Transformer, Three phase transformer. Types of wires and cables, earthing, protective devices - switch fuse unit - Miniature circuit breaker - moulded case circuit breaker - earth leakage circuit breaker, safety precautions and First Aid.

Unit – III ELECTRICAL MACHINES

9

Construction of electrical machine, Working principle of Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction and working principle of alternator, Single phase Induction Motor, three phase induction motor.

Unit – IV ANALOG AND DIGITAL ELECTRONICS

9

Analog electronics: Resistor, Inductor and Capacitor in Electronic Circuits- Semiconductor Materials: Silicon, Germanium – PN Junction Diodes, Zener Diode –Characteristics Applications, Transistors: IV characteristics of BJT, FET, IGBT, UJT, Applications

Digital electronics: Number Systems - Code Converters: BCD, Gray Code, Excess 3 – 1's complement, 2's complement - Logic Gates.

Unit – V MEASUREMENTS AND INSTRUMENTATION

9

Functional elements of an instrument, Operating Principle, types –Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Standards and calibration, Instrument Transformers-CT and PT, DSO- Block diagram- Data acquisition.

Total : 45 Hours

Text Books

1. S. K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2011.
2. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", McGraw Hill Education, Second Edition, 2020
3. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, New Delhi, 2014.
4. James A Svoboda, Richard C. Dorf, Introduction to Electric Circuits, Wiley, 2018

Reference Books

1. Muthusubramanian, R. Basic Electrical & Electronics Engineering, Tata McGraw Hill Education Private Limited, 2009.
2. Thomas L. Floyd, 'Electronic Devices', Pearson Education, Tenth Edition, 2017.
3. Thomas L. Floyd, 'Digital Fundamentals', Pearson Education, Eleventh Edition, 2018.
4. H.S. Kalsi, 'Electronic Instrumentation', McGraw-Hill education, New Delhi, 2018

Additional / Web References

1. <https://archive.nptel.ac.in/courses/117/106/117106108/>
2. <https://nptel.ac.in/courses/108/105/108105132/>
3. <https://nptel.ac.in/courses/108105153>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	-	-	-	-	-	-	-	2	2			
CO 2	3	2	2	-	-	-	-	-	-	-	1	2			
CO 3	3	2	2	-	-	-	-	-	-	-	2	2			
CO 4	3	2	2	-	-	-	-	-	-	-	2	2			
CO 5	3	1	1	-	-	-	-	-	-	-	2	2			

B.Tech Agricultural Engineering (R-2023)

B.Tech Agricultural Engineering (R-2023)														
Average	3	1.8	1.8	-	-	-	-	-	-	-	-	1.8	2	

3 – High

2 - Medium

1 | 84

68 N. G. A.

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12		
CIA II	3 hours	2.5 units	100	12	24	
Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	60
					Total	40
						60

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Passed in Board of Studies Meeting on 27.10.2023

Approved in Academic Council Meeting on 07.11.2023

CHARTERED-BAR STUDIES

தமிழரும் தொழில்நுட்பமும்

23TA102

L T P C

1001

அலகு 1 நெசவு மற்றும் பானைத் தொழில்நுட்பம்:

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு 2 வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் மற்றும் சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டிமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால், செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக்கலை.

அலகு 3 உற்பத்தித் தொழில்நுட்பம்:

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எ.கு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு 4 வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்:

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுழித் தூம்பின் முக்கியத்துவம் - காலநடை பராமரிப்பு - காலநடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

அலகு 5 அறிவியல் தமிழ் மற்றும் கணிததமிழ்:

அறிவியல் தமிழின் வளர்ச்சி - கணிததமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநால் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு).
5. Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils – The Classical Period (Dr. S. Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu), (Published by: International Institute of Tamil Studies)
8. The Contributions of Tamils of Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – ‘Sangam City Civilization on the banks of river Vaigai; (Jointly published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr. K.K. Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by RMRL) – Reference Book.

TAMILS AND TECHNOLOGY

23TA102

LTPC1001

UNIT I WEAVING AND CERAMIC TECHNOLOGY

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு).
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு).
5. Social Life of Tamils (Dr. K.K. Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils – The Classical Period (Dr. S. Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr. S.V. Subatamanian, Dr. K.D. Thirunavukkarasu), (Published by: International Institute of Tamil Studies)
8. The Contributions of Tamils of Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies).
9. Keeladi – ‘Sangam City Civilization on the banks of river Vaigai; (Jointly published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr. K.K. Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamilnadu).
12. Journey of Civilization Indus to Vaigai (R. Balakrishnan) (Published by RMRL) – Reference Book.

23IT301	PROGRAMMING IN C (Common for all programmes)	L	T	P	C
		3	0	2	4
Category	Engineering Science				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Illustrate the constructs of C Language.
- Summarize C programs using arrays and strings.
- Implement modular applications in C using functions.
- Execute applications in C using pointers and structures.
- Examine the input/output and file handling in C.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
	Theory	
CO 1	Summarize the fundamentals of C Programming constructs.	Understand
CO 2	Illustrate the applications using arrays and strings.	Understand
CO 3	Integrate the modular applications in C using functions.	Apply
CO 4	Execute the applications in C using structures and pointers.	Apply
CO 5	Prepare the applications using sequential and random access file processing.	Apply
	Laboratory	
CO 6	Execute the knowledge on C programming constructs.	Apply
CO 7	Experiment the programs in C using arrays and strings.	Apply
CO 8	Choose the applications in C using functions.	Apply

CO 9	Examine the applications in C using structures and pointers.	Apply
CO 10	Prepare the applications in C using file processing.	Apply

Course Contents

Unit – I	Basics of C Programming	9
Introduction to programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements – Decision making statements - Switch statement - Looping statements		
Unit – II	Arrays and Strings	9
Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional arrays - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search.		
Unit – III	Functions and Pointers	9
Modular programming - Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions –Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.		
Unit – IV	Structures and Union	9
Structure - Nested structures – Pointer and Structures – Array of structures – Self-referential structures – Dynamic memory allocation - Singly linked list – typedef – Union - Storage classes and Visibility.		
Unit – V	File Processing	9
Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments.		
Total : 45 Periods		

List of Exercises

S.No.	Name of the Exercise	CO	Bloom's Level

Chairman
CHAIRMAN-BOARD OF STUDIES

1	I/O statements, operators, expressions	CO 6	Apply
2	decision-making constructs: if-else, go to, switch-case, break-continue	CO 6	Apply
3	Loops: for, while, do-while	CO 6	Apply
4	Arrays: 1D and 2D,multi-dimensional arrays, traversal	CO 7	Apply
5	Strings: operations	CO 7	Apply
6	Functions: call, return, passing parameters by (value, reference), passing arrays to function.	CO 8	Apply
7	Recursion	CO 8	Apply
8	Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers	CO 9	Apply
9	Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions.	CO 9	Apply
10	Files: reading and writing, File pointers, file operations, random access, processor directives.	CO 10	Apply

Text Books

1. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Pearson Education, Second Edition, 2015.

Reference Books

1. Paul Deitel and Harvey Deitel, "C How to Program: with an Introduction to C++", Pearson Education, Eighth edition, 2018.
2. Yashwant Kanetkar, Let us C, BPB Publications, 17th Edition, 2020.
3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.
4. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford University Press, Second Edition, 2013.
5. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Pearson Education, 1st Edition, 2013.

Additional / Web References

1. <https://nptel.ac.in/courses/106104128>
2. <https://www.coursera.org/specializations/c-programming>
3. <https://www.udemy.com/course/c-programming-for-beginners/>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

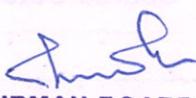
COs	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	-	3	-	-	-	2	-	-	2	-	-	-
CO 2	3	2	2	-	3	-	-	-	2	-	-	3	-	-	-
CO 3	3	3	2	-	3	-	-	-	2	-	-	2	-	-	-
CO 4	3	2	2	-	3	-	-	-	2	-	-	3	-	-	-
CO 5	3	2	3	-	3	-	-	-	2	-	-	2	-	-	-
CO 6	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
CO 7	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
CO 8	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
CO 9	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
CO 10	3	2	2	3	-	-	-	-	-	-	-	3	-	-	-
Average	3	2.1	2.1	3	3	2	-	-	2	-	-	2.7	-	-	-

3 – High

2 – Medium

1 – Low

“-” - No Correlation


CHAIRMAN-BOARD OF STUDIES

Assessment	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
Theory Component						
CIA I	3 hours	2.5 units	100	10	20	50
CIA II	3 hours	2.5 units	100	10		
Practical Component						
Observation & Analysis of Experimental results, Viva Voce, Quiz based on rubrics.		All Experiments	75	22.5	30	-
Model Exam	3 hours		25	7.5		
Total				50	50	

23AG401	Principles of Agronomy and Crop Production	L	T	P	C
		2	0	2	3
Category	Professional Core Course				
Pre requisites	Nil				

Course Objectives

The course is intended to

- To introduce the students to principles of agricultural and horticultural crop production
- Understand the crop selection and establishment procedures.
- Learn about the different management practices during crop establishment and growth.
- To introduce the production practices of agricultural and horticultural crops.
- To delineate the role of agricultural engineers in relation to various crop production practices.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
	Theory	

CHIRAMAN-BOARD OF STUDIES

CO 1	Apply the fundamental knowledge to the agriculture sector and crop production for sustainable production.	Apply
CO 2	Categorize crop selection and establishment techniques for efficient utilization of available resources.	Analyze
CO 3	Analysis of different crop management practices for profit maximization.	Analyze
CO 4	Examine the cultivation practices of various agricultural crops to increase productivity	Apply
CO 5	Apply the principles of cultivation practices in horticultural crops to increase the yield with the incorporation of protected structures.	Apply
Laboratory		
CO 6	Apply the fundamental knowledge to identify the crops and crop establishment techniques.	Apply
CO 7	Categorize crop nursery and fertilizer application techniques for efficient utilization of available resources.	Analyze
CO 8	Analysis of different weed management with IWM practices for profit maximization.	Analyze
CO 9	Examine the irrigation and crop protection techniques for various agricultural crops to increase productivity.	Apply
CO 10	Apply the principles of cultivation practices in crops to adopt proper maturity indices and harvesting techniques to increase the yield and profit.	Apply

Course Contents

Unit – I	AGRICULTURE AND CROP PRODUCTION	6
Introduction to agriculture and its crop production sub-sectors - field crop production and horticulture; Factors affecting crop growth and production: genetic (internal) and environmental (external) factors; Crop management through environmental modification and adaptation of crops to the existing environment through crop cultural practices.		
Unit – II	CROP SELECTION AND ESTABLISHMENT	6
Regional and seasonal selection of crops; Systems of crop production; Competition among crop plants; Spacing and arrangement of crop plants; Field preparation for crops including systems of tillage; Establishment of an adequate crop stand and ground cover, including selection and treatment of seed, and nursery growing.		
Unit – III	CROP MANAGEMENT	6
Crop water Management; Crop nutrition management - need for supplementation to soil supplied nutrients, sources, generalized recommendations, methods and timing of application of supplemental nutrients including fertigation scheduling; Crop protection including management of weeds, pests and pathogens; Integrated methods of managing water, nutrients and plant protection; Types and methods of harvest.		
Unit – IV	PRODUCTION PRACTICES OF AGRICULTURAL CROPS	6

Generalized management and cultivation practices for important groups of field crops in Tamil Nadu: cereal crops, grain legumes, oil seed crops, sugarcane, and fiber crops, and special purpose crops such as those grown for green manure and fodder.

Unit – V	PRODUCTION PRACTICES OF HORTICULTURAL CROPS	6
Important groups of horticultural crops in Tamil Nadu such as vegetable crops, fruit crops, flower crops; Cultivation practices of representatives of each group; Special features of production of horticultural crops - green house cultivation.		

Total : 30 Periods

List of Exercises

S.No.	Name of the Exercise	CO	Bloom's Level
1	Practical Identification of field and horticultural crops.	CO 6	Apply
2	Seeds - estimation of seed rate, germination of seeds.	CO 6	Apply
3	Nursery, demonstration on different types in field.	CO 7	Analyze
4	Fertilizers-type, estimation of recommended dose	CO 7	Analyze
5	Weeds, identification of major weed type and IWM	CO 8	Analyze
6	Demonstration on weeding implements and Herbicide uses	CO 8	Analyze
7	Irrigation - Methods of irrigation – surface, sub-surface and Micro irrigation system	CO 9	Apply
8	Pest identification and control, demonstration of IPM methods	CO 9	Apply
9	Harvesting methods for various field and horticultural crops and implements used	CO 10	Apply
10	Observing in demonstration field, cultivation of wet land, dry land and garden land crops and documenting of growth stage and recording of biometric observations	CO 10	Apply

Total : 30 Periods

Text Books

1. Rajendra Prasad, Text Book of Field Crop Production. Directorate of Information and Publication, Krishi Anusandhan Bhavan, Pusa, New Delhi, 2015.
2. Reddy T. Sankara G.H. Yellamanda Reddi, Principles of Agronomy, Kalyani Publishers, New Delhi, 2005.
3. Handbook of Agriculture. ICAR Publications, New Delhi, 2011.

Reference Books

1. Bose T. K. and L.P.Yadav. Commercial Flowers, Naya Prakash, Calcutta.1989.
2. Crop Production Guide, Tamil Nadu Agricultural University Publication, Coimbatore. 2005
3. Kumar, N., Abdul Khader, M. Rangaswami, P. and Irulappan, I. Introduction to spices, plantation crops, medicinal and aromatic plants. Rajalakshmi Publications, Nagercoil. 1993.
4. Kumar, N. Introduction to Horticulture", Rajalakshmi Publications. Nagercoil, 7th edition, 2015.
5. Shanmugavel, K.G. Production Technology of Vegetable Crops. Oxford India Publications, New Delhi. 1989.

Additional / Web References

1. <http://www.agritech.tnau.ac.in/>
2. <https://ecourses.icar.gov.in/>
3. <https://agrimoon.com/agriculture-icar-ecourse-pdf-book/>
4. <https://agribooks.co/angrau-notes-pdf-download/>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	2	2	-	-	-	2	-	3	-	-	3	2	-
CO 2	3	2	2	-	-	-	2	-	3	-	-	3	2	-
CO 3	3	3	2	-	-	-	2	-	3	-	-	3	2	-
CO 4	3	2	2	-	-	-	2	-	3	-	-	3	2	-
CO 5	3	2	3	-	-	-	2	-	3	-	-	3	3	-
CO 6	3	2	2	-	-	-	2	-	2	-	-	3	2	-
CO 7	3	2	2	3	2	2	2	-	3	-	-	3	2	-
CO 8	3	2	2	3	2	2	2	-	3	-	-	3	2	-
CO 9	3	2	2	3	2	2	2	-	3	-	-	3	2	-
CO 10	3	2	2	3	2	2	2	-	3	-	-	3	2	-
Average	3	2	2	3	2	2	2	-	3	-	-	3	2	-

3 – High

2 – Medium

1 – Low

'-' - No Correlation

 **CHAIRMAN-BOARD OF STUDIES**

Assessment	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
Theory Component						
CIA I	3 hours	2.5 units	100	10	20	50
CIA II	3 hours	2.5 units	100	10		
Practical Component						
Observation & Analysis of Experimental results, Viva Voce, Quiz based on rubrics.		All Experiments	75	22.5	30	-
Model Exam	3 hours		25	7.5		
Total					50	50

23ME302	ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2
Category	Engineering Sciences				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Understand the basic carpentry, plumbing, sheet metal and welding operations.
- Understand various wiring circuits and soldering & checking of continuity.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work	Understand
CO 2	Make joints in wood materials used in common household wood work	Apply
CO 3	Weld various joints in steel plates using arc welding work and use sheet metal practices in fabrication	Apply
CO 4	Wire various electrical joints in common household electrical wiring	Apply
CO 5	Solder and test simple electronic circuits; Assemble and dismantle computer	Apply

S.No	List of Exercises	CO	Blooms Taxonomy
GROUP-A (CIVIL & MECHANICAL)			
1.	Assemble the pipeline connections using tools for the given layout	CO 1	Apply
2.	Making wooden T- Joint, and lap joint using carpentry tools	CO 1	Apply
3.	Basic machining work- simple turning and facing	CO 2	Apply
4.	Welding a butt and lap joint using welding process	CO 3	Apply
5.	Make a tray in sheet metal for the given dimensions	CO 3	Apply
GROUP-B (ELECTRICAL & ELECTRONICS)			
6.	Stair case wiring	CO 4	Apply
7.	Fluorescent lamp wiring	CO 4	Apply
8.	Energy meter wiring	CO 4	Apply
9.	Soldering simple electronic circuits and check the continuity	CO 5	Apply
10.	Assembly and dismantle of computer/ laptop/Mobile phones	CO 5	Apply

Total : 60 Periods

Reference Books

1. Manual-prepared by SSCET

Web References

1. <https://be-iitkgp.vlabs.ac.in/exp/familiarisation-resistor/>
2. <https://fab-coep.vlabs.ac.in/exp/computer-controlled-cutting/>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
CO 2	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
CO 3	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-

B.Tech Agricultural Engineering (R-2023)

CO 4	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
CO 5	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-
Average	3	2	2	2	1	-	-	-	3	2	-	-	3	2	-

3. – High 2 – Medium 1 – low “ - No Correlation

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
Total				60	40

20ME701	DESIGN THINKING	L	T	P	C
		2	0	0	2
Category	Employment Enhancement Course				
Pre requisites	Nil				

Course Objectives

The objectives of this course are to

- Acquire knowledge in Design thinking concepts and process.
- To inculcate attitude to solve societal problems using design thinking tools
- Develop skills in solving problems using ideation tools.
- Conceive, conceptualize, design and demonstrate innovative ideas using prototypes
- Apply concepts for testing of prototypes

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Apply Design thinking concepts and principles to perform human centered design process for creative problem solving.	Apply
CO 2	Derive empathy maps to visualize user attitudes and behavior for gaining insights of customers.	Apply

CO 3	Develop innovative products or services for a customer base using ideation techniques.	Apply
CO 4	Use design thinking tools to build prototypes for complex problems using gathered user requirements.	Apply
CO 5	Improve prototype by testing it with a specific set of users for making it sustainable by following ethics.	Apply

Course Contents

Unit – I	Design Thinking Process	6
Types of the thinking process, Common methods to change the human thinking process, Design thinking: Definition, Origin of design thinking, Importance of design thinking, Design vs Design thinking, Problem solving, Understanding design thinking and its process model, Design thinking tools.		
Unit – II	Empathize	6
Design thinking phases, How to empathize, Role of empathy in design thinking, purpose of empathy maps, Things to be done prior to empathy mapping, Activities during and after the session, Understanding empathy tools : Customer Journey Map, Personas.		
Unit – III	Ideation	6
Challenges in idea generation, need for systematic method to connect to user, Visualize, Empathize, and Ideate method, Importance of visualizing and empathizing before ideating, Applying the method, Ideation Tools: How Might We? (HMW), Story board, Brainstorming.		
Unit – IV	Prototype	6
Prototype - Prototyping as a mindset, prototype examples, prototyping for products; Why we prototype? Fidelity for prototypes, Process of prototyping- Minimum Viable prototype.		
Unit – V	Testing of Prototypes	6
Prototyping for physical products: uniqueness for physical products, Prototyping for digital products: What's unique for digital products, Preparation; Preparation; Testing prototypes with users.		
Total : 30 Hours		

Text Books

1. Robert A Curedale, Design Thinking Process & Methods 4th Edition, December 2017,
2. Michael G. Luchs, Scott Swan , Abbie Griffin, "Design Thinking – New Product Essentials from PDMA", Wiley, 2015.

Reference Books

1. Ulrich &Eppinger, "Product Design and Development", 3rd Edition, McGraw Hill, 2004
2. Idris Mootee, "Design Thinking for Strategic Innovation", 2013, John Wiley & Sons Inc
3. Kathryn McElroy, "Prototyping for Designers: Developing the best Digital and Physical Products", O'Reilly, 2017.
4. S.Salivahanan, S.Suresh Kumar, D.Praveen Sam, "Introduction to Design Thinking", Tata Mc Graw Hill, First Edition,2019.

Additional / Web References



III SEMESTER

23MA204	ENGINEERING MATHEMATICS - III (Common to AGRI, BME, ECE & MECH Programmes)	L	T	P	C
		3	1	0	4
Category	Basic Science				
Pre requisites	Engineering Mathematics - I & II				

Course Objectives

The course is intended to make the students to

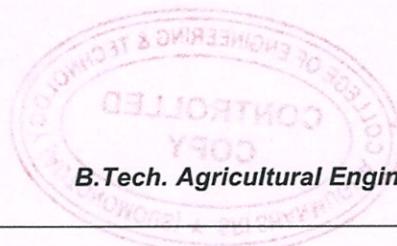
- Introduce the basic concepts of probability and one-dimensional random variables.
- Introduce the basic concepts of distribution functions.
- Introduce the basic concepts of two-dimensional random variables
- Introduce the effective mathematical tools for the solutions of ordinary differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.
- Various methods of Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Solve the basic concepts of probability, conditional probability, Baye's theorem and random variables.	Apply
CO 2	Interpret the basic concepts of one dimensional random variables and standard distributions.	Apply
CO 3	Use the concepts of two dimensional random variables and to analyse the relations, transformations of random variables	Apply
CO 4	Choose discrete transforms to solve difference equations using z-transform.	Apply
CO 5	Use Laplace transform to solve periodic, non-periodic functions and linear differential equation.	Apply

CHAIRMAN-BOARD OF STUDIES

**Course Contents**

Unit – I	Probability and One Dimensional Random Variables	9+3
Probability – The axioms of probability – Conditional probability – Baye's theorem - One dimensional random variable: Discrete and continuous random variables – Moments.		
Unit – II	Distributions	9+3
Discrete distributions - Binomial distribution, Poisson distribution, Geometric distribution. Continuous Distributions - Uniform distribution, Exponential distribution and Normal distribution.		
Unit – III	Two - Dimensional Random Variables	9+3
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression– Transformation of random variables.		
Unit – IV	Z – Transforms	9+3
Z-transforms - Elementary properties – Inverse Z-transform (using partial fraction and residues) – Initial and final value theorems - Convolution theorem – Solution of difference equations using Z - transform.		
Unit – V	Laplace Transforms	9+3
Existence conditions – Transforms of elementary functions and properties - Initial and final value theorems – Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear second order ordinary differential equations with constant coefficients.		
Total : 60 Periods		

Text Books

- Johnson. R.A., Miller. I.R and Freund. J.E, " Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 9th Edition, 2018.
- Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata Mc Graw Hill, 4th Edition, 2017.
- Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th Edition, 2020.

Reference Books

- Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", Laxmi Publications Pvt. Ltd, 10th Edition, 2021.
- Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 9th Edition, 2020.
- Ibe, O.C., "Fundamentals of Applied Probability and Random Processes ", 2nd Indian Reprint, Elsevier, 2014.

Additional / Web References

- <https://archive.nptel.ac.in/courses/111/104/111104079/>
- <https://nptel.ac.in/courses/108106151>
- <https://archive.nptel.ac.in/courses/111/106/111106139/>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2													
CO 2	3	2													
CO 3	3	2													
CO 4	3	2													
CO 5	3	2													
Average	3	2													
3 – High		2 – Medium		1 – Low		“-” - No Correlation									

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for internal marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 Hours	2.5 Units	100	12	24	60
CIA II	3 Hours	2.5 Units	100	12		
Objective Test / Online Quiz, Assignment / Case study , Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
			TOTAL		40	60

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CHAIRMAN-BOARD OF STUDIES

23AG402	FLUID MECHANICS	L	T	P	C
		3	0	0	3
Category	Professional Core courses (PCC)				
Pre requisites	Physics for Engineers				

Course Objectives

The course is intended

- To introduce the students about the properties of the fluids, behaviour of fluids under static conditions
- To get the knowledge on kinematic and dynamic conditions through the control volume approach and expose them to the applications of the conservation laws.
- To expose the applications of the conservation laws to a) flow measurements b) flow through pipes (both laminar and turbulent).
- The students will be exposed to the basic concepts of open channel flows with significance to steady uniform flows along with flow measurements in open channels.
- To impart basic knowledge of dimensional analysis and model studies along with flow through pipes and classification of pumps the basic principles of working and to design centrifugal pump.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Demonstrate the properties of fluid and its behavior in static conditions along with pressure measurements.	Apply
CO 2	Relate the conservation laws applicable to fluid flows and its application through fluid kinematics and dynamics	Apply
CO 3	Categorize the various types of flow in fluids to infer the losses involved in flows.	Apply
CO 4	Choose the basics characteristics of open channel flows and analysis of steady uniform flow with hydraulically efficient channel sections and to measure the flows in artificial/natural channels	Apply
CO 5	Use the various types of dimensional analysis and model studies and apply the performance of pumps for estimating the power, efficiencies and characteristic curves	Apply

Course Contents		<i>Weightage</i>
Unit – I	Properties of Fluids	9
Fluids-definition, units of measurement, Properties. Fluid pressure and measurement – simple, differential and micro manometers - Mechanical gauges – calibration. Hydrostatic forces on surfaces – total pressure and centre of pressure - Horizontal- vertical and inclined plane surface - Pressure diagram – total pressure on curved surface. Archimedes principles – buoyancy – meta centre – metacentric height.		
Unit – II	Fluid Flow Analysis	9
Types of fluid flow – velocity and acceleration of a fluid particle - Rotational – irrotational circulation and vorticity - Flow pattern – stream line – equipotential line – stream tube path line – streak line – flow net – velocity potential – stream function. Principles of conservation of mass – energy – momentum – continuity equation in Cartesian coordinates - Euler's equation of motion.		
Unit – III	Flow Measurements	9
Bernoulli's equation – applications – Orifice – sharp edged orifice discharging free – submerged orifice – mouthpiece - Flow through orifice under variable head – time of emptying a tank with and without inflow. Flow through pipes – laminar and turbulent flow in pipes - Reynold's experiment - Darcy – Weisbach equation for friction head loss – Chezy's formula – Manning's formula – Hazen-Williams formula - Major and minor losses in pipes – hydraulic gradient line – energy gradient line. Siphon – water hammer in pipes – gradual and sudden closure of valves.		
Unit – IV	Open Channel flow	9
Types of flow in channel – uniform flow – most economical section of channel – Circular-Rectangular – trapezoidal-Triangular. Specific energy and critical depth - momentum in open channel flow – specific force – critical flow – computation. Flow measurement in channels – notches – rectangular, Cipolletti and triangular – float method - Flow measurement in rivers/ streams/ canals – weirs – free and submerged flow – current meter – Parshall flume.		
Unit – V	Dimensional Analysis & Pumps	9
Dimensional analysis – Fundamental dimensions – dimensional homogeneity – Rayleigh's method and Buckingham Pi-Theorem - concept of geometric, kinematic and dynamic similarity-Non dimensional numbers – Pump terminology – Types of pumps – Head of pump – Losses and efficiencies -Selection of pump capacity -Centrifugal pump, Turbine pump, Submersible pump, Jet pump, Air lift pump, Reciprocating pump, Sludge pump- Components and Working principle.		
		Total :45 Periods
Text Books		
1. Modi, P.N. and Seth S.M., "Hydraulics and Fluid Mechanics". Standard Publishers Distributors, New Delhi, 22 nd Edition.		
2. Bansal, R.K., A text book of "Fluid Mechanics and Hydraulic Machinery", Laxmi Publications (P) Ltd., New Delhi, 2nd edition, 2022		
3. Subramanya K., "Flow in Open Channels", McGraw Hill Education (India) Pvt. Ltd., New Delhi, 5th edition, 2019.		

Reference Books																					
1. Jain A. K. "Fluid Mechanics including Hydraulic Machines", Khanna Publishers, New Delhi, 1st edition, 2014.																					
2. S K Som; Gautam Biswas and S Chakraborty, "Introduction to Fluid Mechanics and Fluid Machines", McGraw Hill Education (India) Pvt. Ltd., 3rd edition, 2017.																					
3. Chandramouli P N, "Applied Hydraulic Engineering", Yes Dee Publisher, 1st edition, 2017																					
4. Ven Te Chow, "Open Channel Hydraulics", McGraw Hill, New York, 1st edition, 2009.																					
5. Subramanya K, "Fluid Mechanics and Hydraulic Machines: Problems and Solutions", McGraw Hill Education (India) Pvt. Ltd., New Delhi, 2nd edition, 2018.																					
Additional / Web References																					
1. www.onesmartclick.com/engineering/fluid-mechanics.html																					
2. www.it.iitb.ac.in/vweb/engr/civil/fluid_mech/course.html																					
Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)																					
COs	POs												PSOs								
	1	2	3	4	5	6	7	8	9	10	11	12	1	2							
CO 1	3	2	2	-	-	-	-	-	-	-	-	-	3	2							
CO 2	3	2	2	-	-	-	-	-	-	-	-	-	3	2							
CO 3	3	2	2	-	-	-	-	-	-	-	-	-	3	2							
CO 4	3	2	2	-	-	-	-	-	-	-	-	-	3	2							
CO 5	3	2	2	-	-	-	-	-	-	-	-	-	3	2							
Avera	3.00	2.00	2.00	-	-	-	-	-	-	-	-	-	3.00	2.00							
"3"- High "2" – Medium "1" – low "-" - No Correlation																					
Assessment Components		Duration		Syllabus to be covered		Max. Marks		Weightage for Internal Marks		Continuous Internal Assessment Marks		End Semester Examination Marks*									
CIA I		3 hours		2.5 units		100		12		24		60									
CIA II		3 hours		2.5 units		100		12													
<ul style="list-style-type: none"> Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II) 										16											
Total										40		60									

23ME303	ENGINEERING MECHANICS (Common to Mechanical and Agricultural Engineering)	L	T	P	C
		3	0	0	3
Category	Engineering Science (ES)				
Pre requisites	Physics for Engineers				

Course Objectives

The course is intended to

- Understand the use of scalar and vector analytical techniques for analyzing forces in statically determinate structures
- Familiarize the concept of equilibrium of rigid bodies, vector methods and free body diagram
- Impart the knowledge of distributed forces, surface, loading on beam and intensity
- Learn the principles of friction forces at the contact surfaces of various engineering Systems
- Expose to the concept of dynamic forces exerted in rigid bodies

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Interpret the techniques to find net effect in both two dimensional and three dimensional force systems on particle based approach	Understand
CO 2	Manipulate the effect of forces in a rigid body using equilibrium conditions for the given force system	Apply
CO 3	Solve the properties like centroids, area and mass moment of inertia for the given surfaces and solids	Apply
CO 4	Choose problems to compute the effect of friction in an engineering system	Apply
CO 5	Use the dynamic principles to study the motion characteristic of a given system	Apply

Course Contents		
Unit – I	Statics of Particles	9
Fundamental Concepts and Principles, Systems of Units, Statics of Particles -Forces in a Plane, Resultant of Forces, Resolution of a Force into Components, Rectangular Components of a Force, Unit Vectors. Equilibrium of a Particle- Newton's First Law of Motion, Space and Free-Body Diagrams, Forces in Space, Equilibrium of a Particle in Space.		
Unit – II	Equilibrium of Rigid Bodies	9
Principle of transmissibility – Moment of force about a point – Varignon's theorem – Moment of a couple – Equivalent couple – Moment of force about an axis – Coplanar non-concurrent forces acting on rigid bodies – Resultant and equilibrium – Resolution of a given force into force couple system – Equilibrium in three dimensions – Reactions and supports, Analysis of frames.		
Unit – III	Distributed Forces	9
Centre of gravity, Centre of mass and Centroid – Moment of Inertia of simple and complex areas – Radius of gyration – Polar moment of inertia - Mass moment of Inertia of simple solids– Product of inertia.		
Unit – IV	Friction	9
The Laws of Dry Friction, Coefficients of Friction, Angles of Friction, Wedge friction, Wheel Friction, Rolling Resistance, Ladder friction.		
Unit – V	Dynamics of Particles	9
Kinematics - Rectilinear Motion and Curvilinear Motion of Particles. Kinetics- Newton's Second Law of Motion -Equations of Motions, Dynamic Equilibrium, Energy and Momentum Methods - Work of a Force, Kinetic Energy of a Particle, Principle of Work and Energy, Principle of Impulse and Momentum, Impact of bodies.		
		Total : 45 Hours

Text Books		
1.	Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, Sanjeev Sanghi, "Vector Mechanics for Engineers: Statics and Dynamics", McGraw Higher Education., 12th Edition, 2019.	
2.	Hibbeler, R.C., "Engineering Mechanics: Statics, and Engineering Mechanics: Dynamics", Prentice Hall, 13th edition, 2013	
3.	Irving H. Shames, Krishna Mohana Rao G, "Engineering Mechanics – Statics and Dynamics", Pearson Education Asia Pvt. Ltd., 4th Edition, 2005.	
Reference Books		
1.	Meriam J L and Kraige L G, "Engineering Mechanics: Statics and Engineering Mechanics: Dynamics", Wiley student, 7th edition, 2013.	
2.	Timoshenko S, Young D H, Rao J V and Sukumar Pati, "Engineering Mechanics", McGraw Hill Higher Education, 5th Edition, 2013.	
Additional / Web References		

1. <https://nptel.ac.in/courses/122104015>
 2. <https://archive.nptel.ac.in/courses/112/106/112106286/>
 3. <https://nptel.ac.in/courses/112103109>

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
<ul style="list-style-type: none"> • Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., • (8 marks during CIA I and 8 marks during CIA II) 					16	
			Total		40	60

“3” – High

"2" – Medium

“1” – low

"-“ - No Correlation

23AG301	ENGINEERING THERMODYNAMICS AND HEAT TRANSFER	L	T	P	C
		3	0	0	3
Category	Professional Core courses (PCC)				
Pre requisites	Physics for Engineers				

Course Objectives

The course is intended to

- Impart knowledge on the basics and application of zeroth and first law of thermodynamics.
- Impart knowledge on the second law of thermodynamics in analyzing the performance of thermal devices.
- Teach the various properties of steam through steam tables and Mollier chart.
- Learn the principal mechanism of heat transfer under steady state and transient conditions.
- Learn the principal mechanism of Mass transfer

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Solve the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems.	Apply
CO 2	Use the second law of thermodynamics in analyzing the performance of thermal devices through energy and entropy calculations.	Apply
CO 3	Demonstrate Rankine cycle to steam power plant and compare few cycle improvement methods	Apply
CO 4	Relate heat conduction equations to different surface configurations under steady state and transient conditions and solve problems.	Apply
CO 5	Interpret free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and explain basic laws for Radiation	Apply

Course Contents

Unit – I	Basic Concepts and First Law	9
Basic concepts - concept of continuum, comparison of microscopic and macroscopic approach. Path and point functions. Intensive and extensive, total and specific quantities. System and their types. Thermodynamic Equilibrium State, path and process. Quasi-static, reversible and irreversible processes. Heat and work transfer, definition and comparison, sign convention. Displacement work and other modes of work .P-V diagram. Zeroth law of thermodynamics – concept of temperature and thermal equilibrium– relationship between temperature scales –new temperature scales. First law of thermodynamics –application to closed and open systems – steady and unsteady flow processes.		

Unit – II	Second Law and Availability Analysis	9
Heat Reservoir, source and sink. Heat Engine, Refrigerator, Heat pump. Statements of second law and its corollaries. Carnot cycle Reversed Carnot cycle, Performance. Clausius inequality. Concept of entropy, T-s diagram, Tds Equations, entropy change for - pure substance, ideal gases - different processes, principle of increase in entropy. Applications of II Law. High and low grade energy. Available and non-available energy of a source and finite body. Energy and irreversibility. Expressions for the energy of a closed system and open systems. Energy balance and entropy generation. Irreversibility. I and II law Efficiency.		
Unit – III	Properties of Pure Substance and Steam Power Cycle	9
Formation of steam and its thermodynamic properties, p-v, p-T, T-v, T-s, h-s diagrams. p-v-T surface. Use of Steam Table and Mollier Chart. Determination of dryness fraction. Application of I and II law for pure substances. Ideal and actual Rankine cycles, Cycle Improvement Methods - Reheat and Regenerative cycles, Economizer, preheater, Binary and Combined cycles.		
Unit – IV	Heat Transfer	9
General Differential equation of Heat Conduction– Cartesian and Polar Coordinates – One Dimensional Steady State Heat Conduction — plane and Composite Systems, Free and Forced Convection during external flow over Plates and Cylinders and Internal flow through tubes. Heat Exchanger Types - Overall Heat Transfer Coefficient – Fouling Factors Analysis – LMTD method - NTU method. Black Body Radiation – Grey body radiation		
Unit – V	Mass Transfer	9
Basic Concepts – Diffusion Mass Transfer – Fick's Law of Diffusion – Steady state Molecular Diffusion– Convective Mass Transfer – Momentum, Heat and Mass Transfer Analogy –Convective Mass Transfer Correlations.		
Total :45 Periods		
Text Books		
1. Chatopadhyay. P "Engineering Thermodynamics", oxford University Press, New Delhi, Second edition, 2016. 2. Nag. P.K., "Engineering Thermodynamics", Tata McGraw-Hill, New Delhi, 6 th Edition, 2017. 3. Rathakrishnan E., "Fundamentals of Engineering Thermodynamics" Prentice-Hall India, Second Edition, 2023 4. R.C. Sachdeva, "Fundamentals of Engineering Heat & Mass transfer", New Age International Publishers, 6 th Edition.		
Reference Books		
1. Arora C.P, "Thermodynamics", Tata McGraw-Hill, New Delhi, 8 th Edition, 2016. 2. Holman. J. P., "Thermodynamics", 3rd Ed. McGraw-Hill, 6 th Edition. 3. Mathur& Sharma Steam Tables, Jain Publishers, New Delhi, 3rd edition, 2013. 4. Merala C, Pother, Craig W, Somerton, "Thermodynamics for Engineers", Schaum Outline Series, Tata McGraw-Hill, New Delhi, 2008. 5. Kothandaraman, C.P., "Fundamentals of Heat and Mass Transfer", New Age International, New Delhi, 4 th Edition, 2006.		

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs													PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
CO 1	3	2	2	2	-	-	-	-	-	-	-	-	-	2	-
CO 2	3	2	2	2	-	-	-	-	-	-	-	-	-	2	-
CO 3	3	2	2	2	-	-	-	-	-	-	-	-	-	2	-
CO 4	3	2	2	2	-	-	-	-	-	-	-	-	-	2	-
CO 5	3	2	2	2	-	-	-	-	-	-	-	-	-	2	-
Average	3	2	2	2	-	-	-	-	-	-	-	-	-	2	-

"3" – High

"2" – Medium

"1" – low

"-“ - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	24	60
CIA II	3 hours	2.5 units	100	12		
<ul style="list-style-type: none"> • Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., • (8 marks during CIA I and 8 marks during CIA II) 						
Total					40	60

Code No.	Title	Semester	Total Contact Hours	Practical Hours	L-T-P-C			
					L	T	P	C
23AG403	SURVEYING AND LEVELLING	IV	100	30	3	0	2	4
Category	Professional Core courses (PCC)							
Pre requisites	Nil							

Course Objectives

The course is intended to

- Introduce the rudiments of plane surveying and geodetic principles to Agricultural engineers.
- Learn various methods of levelling and contour practices for earth work calculations.
- Introduce the concepts of theodolites for angular measurements.
- Introduce modern surveying practices such as total station, drone surveying to solve the real-world problems.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Summarize the knowledge of surveying fundamentals and chain surveying practices to execute measurements on the field.	Understand
CO 2	Make use of compass and plane tables to demarcate directions and plot field diagrams.	Apply
CO 3	Use methods of levelling to evaluate earth work requirements.	Apply
CO 4	Demonstrate angular measurements with theodolite to solve real world measurements with obstructions.	Apply
CO 5	Summarize knowledge of various modern surveying practices such as total station and drone surveying to generate high resolution spatial data.	Understand

Course Contents

Unit – I	Fundamentals and Chain Surveying	9
Definition - Classifications - Basic principles - Equipment and accessories for ranging and chaining - Methods of ranging - well conditioned triangles - Errors in linear measurement and their corrections - Obstacles - Traversing - Plotting - Applications - Enlarging and reducing figures - Areas enclosed by straight lines - Irregular figures - Digital Planimeter.		

Unit – II	Compass and Plane Table Surveying	9
Compass - Basic principles - Types - Bearing - Systems and conversions - Sources of errors - Local attraction - Magnetic declination - Dip - Traversing - Plotting - Adjustment of closing error - applications - Plane table and its accessories - Merits and demerits - Radiation - Intersection - Resection - Traversing - sources of errors - applications.		
Unit – III	Levelling and its Applications	9
Level line - Horizontal line - Datum - Benchmarks - Levels and staves - temporary and permanent adjustments - Methods of levelling - Fly levelling - Check levelling - Procedure in levelling - Booking - Reduction - Curvature and refraction - Reciprocal levelling - sources of errors in levelling - Longitudinal and Cross-section - Plotting - Contouring - Methods - Characteristics and uses of contours - Methods of interpolating contours - Computation of cross sectional area and volumes - Earthwork calculations - Capacity of reservoirs.		
Unit – IV	Theodolite Surveying	9
Horizontal and Vertical angle measurements - Temporary and permanent adjustments - Heights and distances - Tacheometric surveying - Stadia Tacheometry - Tangential tacheometry - Trigonometric levelling - Single plane method - Double plane method.		
Unit – V	Modern Surveying	9
Total Station: Digital Theodolite - EDM - Advantages - Parts and accessories - Working principle - Errors - Field procedure and applications. GPS: Advantages - System components - Signal structure - Receiver components and antenna - Data processing - Errors in GPS - Field procedure and applications – Aerial Surveying - Purpose - Field applications.		
Total : 45 Periods		
Text Books		
1. Punmia B.C., Ashok K. Jain and Arun K. Jain, "Surveying Vol. I & II", Lakshmi Publications Pvt Ltd, New Delhi, Sixteenth Edition, 2016. 2. Kanetkarand T.P., S. V. Kulkarni, "Surveying and Levelling", Parts 1 & 2, Pune Vidyarthi Griha Prakashan, Sixth Edition Pune, 2024.		
Reference Books		
1. Subramanian R., "Surveying and Levelling", Oxford University Press, Second Edition, 2019. 2. James M. Anderson and Edward M. Mikhail, "Surveying-Theory and Practice", Mc Graw Hill, Seventh Edition, 2021. 3. Bannister and Raymond S., "Surveying", Longman, Seventh Edition, 1998. 4. Roy S.K., "Fundamentals of Surveying", Prentice Hall of India, Second Edition, 2020. 5. Arora K. R. , "Surveying Vol I & II", Standard Book House, Seventeenth Edition. 1993.		
Additional / Web References		
1. https://archive.nptel.ac.in/courses/105/104/105104101/ 2. https://nptel.ac.in/courses/105107122 3. https://onlinecourses.nptel.ac.in/noc22_ce05/preview		

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CO 1	3	2	2	-	-	-	-	-	2	-	-	-	2	2
CO 2	3	2	2	-	-	-	-	-	2	-	-	-	2	2
CO 3	3	2	2	-	-	-	-	-	2	-	-	-	2	2
CO 4	3	2	2	-	-	-	-	-	2	-	-	-	2	2
CO 5	3	2	2	-	-	-	-	-	2	-	-	-	2	2
Average	3	2	2	-	-	-	-	-	2	-	-	-	2	2

"3" – High

"2" – Medium

"1" – low

"-“ - No Correlation

S.No	List of Experiments	CO	Blooms Taxonomy
1.	Aligning, ranging and chaining of a line	CO 1	Apply
2.	Setting out works – Foundation marking using tape single Room and Double Room	CO 1	Apply
3.	Compass Traversing – Measuring Bearings & arriving included angles	CO 2	Apply
4.	Plane Table Surveying - Radiation and Intersection method	CO 2	Apply
5.	Fly levelling - Height of collimation method, Rise and Fall method	CO 3	Apply
6.	Check levelling - Height of collimation method, Rise and Fall method	CO 3	Apply
7.	Contouring - Radial contouring	CO 3	Apply
8.	Measurement of Horizontal Angles by Repetition & Re-iteration Method	CO 4	Apply
9.	Heights and distances by Tangential Tacheometry	CO 4	Apply
10.	Determine distance between two points and area of a closed traverse using Total Station	CO 5	Apply
Total : 30 Periods			

Assessment	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
Theory Component						
CIA I	3 hours	2.5 units	100	10	20	50
CIA II	3 hours	2.5 units	100	10		
Practical Component						
Observation & Analysis of Experimental results, Viva Voce, Quiz based on rubrics.	All Experiments	75	22.5	30	-	-
Model Exam		25	7.5			
Total				50	50	

23AG404	SOIL MECHANICS	L	T	P	C
		3	0	2	4
Category	Professional Core courses (PCC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Expose the fundamental knowledge of soil physics
- Learn classifications of soil and soil surveying methods.
- Introduce the concepts of phase relationships and compaction techniques.
- Introduce engineering properties of soil to determine soil shear and permeability.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Summarize soil characteristics and plant nutrient availability to execute agriculture field practices.	Understand
CO 2	Identify the factors affecting soil formation and describe processes involved.	Understand
CO 3	Demonstrate soil phase relationships to evaluate engineering properties of soil.	Apply
CO 4	Use the basic understanding of flow through soil medium and its impact of engineering solution	Apply
CO 5	Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium.	Apply

Course Contents		
Unit – I	Introduction and Soil Physics	9
	Soil - Definition - Major components - Soil forming minerals and processes - soil profile - physical properties - texture - density - porosity - consistence - colour - specific gravity - capillary and non-capillary - plasticity. Soil air - soil temperature - soil water - classification of soil water - movement of soil water. Soil colloids - organic and inorganic matter - ion exchange - pH - Plant nutrient availability.	
Unit – II	Soil Classification and Survey	9
	Soil taxonomy - Soils of Tamil Nadu and India, Soil Survey - Types and Methods of Soil Survey - Field mapping - mapping units - base maps - preparation of survey reports - concepts and uses - Land capability classes and subclasses - soil suitability - Problem soils - Reclamation.	
Unit – III	Engineering Properties of Soil	9
	Phase relationship – Index properties – Significance – BIS classification system – Unified classification system – Compaction of soils – Theory, Laboratory and field tests – Field Compaction methods – Factors influencing compaction of soils.	
Unit – IV	Effective stress and Permeability	9
	Soil - water - Static pressure in water - Effective stress concepts in soils - Capillary phenomena - Permeability interaction - Hydraulic conductivity - Darcy's law - Determination of Hydraulic Conductivity - Laboratory Determination (Constant head and falling head methods) and field measurement pumping out in unconfined and confined aquifer - Factors influencing permeability of soils.	
Unit – V	Shear Strength	9
	Shear strength of cohesive and cohesion less soils – Mohr-Coulomb failure theory – shear strength - Direct shear, Triaxial compression, UCC and Vane shear tests – Pore pressure parameters – Factors influences shear strength of soil.	
Total : 45 Periods		
Text Books		
1.	Nyle C. Brady, "The Nature and Properties of Soil", Macmillan Publishing Company, 15 th Edition, New York, 2017.	
2.	Punmia, B.C., "Soil Mechanic and Foundation" Laxmi Publishers, New Delhi, 18 th Edition, 2015.	
Reference Books		
1.	Edward J. Plaster., "Soil Science", Cengage Learning India Ltd, New Delhi, Second Edition, 2009.	
2.	Arora, K.R. "Soil Mechanics and Foundation Engineering", Standard Publishers and Distributors, New Dehi, 2011.	
3.	Murthy, V.N.S. "Soil Mechanics and Foundation Engineering", UBS Publishers and Distributors, New Delhi, 2018.	
4.	Sehgal, S.B., "Textbook of Soil Mechanics", CBS Publishers and Distributors New Delhi, 2016.	
5.	Gopal Ranjan, A S R Rao, "Basic and Applied Soil Mechanics", New Age International Publication, 3rd Edition, 2016	
Additional / Web References		
1.	https://archive.nptel.ac.in/courses/126/105/126105016/	
2.	https://nptel.ac.in/courses/105103097	
3.	https://archive.nptel.ac.in/courses/105/105/105105168/	

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	POs													PSOs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CO 1	3	2	-	-	-	-	-	-	2	-	-	-	2	-
CO 2	3	2	-	-	-	-	-	-	2	-	-	-	2	-
CO 3	3	2	-	-	-	-	-	-	2	-	-	-	2	-
CO 4	3	2	-	-	-	-	-	-	2	-	-	-	2	-
CO 5	3	2	-	-	-	-	-	-	2	-	-	-	2	-
Average	3	2	-	-	-	-	-	-	2	-	-	-	2	-

"3" – High

"2" – Medium

"1" – low

"--" - No Correlation

S.No	List of Experiments	CO	Blooms Taxonomy
1	Study of Soil Forming Rocks and Minerals	CO 1	Apply
2	Determination of Soil moisture and Organic Carbon	CO 1	Apply
3	Determination of Macro Nutrient Analysis in the soil (N, P, K)	CO 1	Apply
4	Determination of pH & Electrical Conductivity	CO 1	Apply
5	Determination of index properties of soils (Liquid limit and Plastic limit)	CO 2	Apply
6	Determination of Field Density (Unit Weight) of Soil by Core Cutter and Sand Replacement Method	CO 3	Apply
7	Determination of Grain Size Distribution of Soil by using Mechanical shaker	CO 3	Apply
8	Determination of hydraulic conductivity using Darcy's law	CO 4	Apply
9	Determination of moisture – density relationship using standard proctor compaction test	CO 5	Apply
10	Determination of shear strength in cohesive soil using vane shear test	CO 5	Apply
Total : 30 Periods			

Assessment	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
Theory Component						
CIA I	3 hours	2.5 units	100	10	20	50
CIA II	3 hours	2.5 units	100	10		
Practical Component						
Observation & Analysis of Experimental results, Viva Voce, Quiz based on rubrics.	All Experiments	75	22.5	30	-	-
Model Exam		25	7.5			
Total				50	50	50

23AG405	FLUID MECHANICS LABORATORY	L	T	P	C
		0	0	2	1
Category	Professional Core courses (PCC)				
Pre requisites	Nil				
Course Objectives	<p>The course is intended to</p> <ul style="list-style-type: none"> ● To provide practical knowledge in verification of principles of fluid flow ● To impart knowledge in measuring pressure, discharge and velocity of fluid flow in pipes. ● To understand Major and Minor Losses ● To impart the knowledge in measuring discharge and velocity of flow in open channel flow ● To gain knowledge in performance testing of Hydraulic Pumps at constant speed and Head 				
Course Outcomes					
On successful completion of the course, students will be able to					
CO. No.	Course Outcome				
CO 1	Experiment the flow through Venturimeter and Orifice meter				
CO 2	Use Bernoulli equation for calibration of flow measuring devices				
CO 3	Interpret the head, discharge and velocity of fluids in open channel flow				
CO 4	Discover friction factor in pipes and compare with Moody diagram				
CO 5	Interpret the performance characteristics of hydraulics pump and turbines				

S.No	List of Experiment	CO	Blooms Taxonomy
1.	Calibration of Rotameter	CO 1	Apply
2.	Flow through Venturimeter	CO 1	Apply
3.	Flow through a circular Orifice	CO 1	Apply
4.	Determination of mean velocity by Pitot tube	CO 2	Apply
5.	Verification of Bernoulli's Theorem	CO 2	Apply
6.	Flow through a Rectangular/Triangular Notch	CO 3	Apply
7.	Flow through a Parshall Flumes	CO 3	Apply
8.	Determination of friction coefficient in pipes	CO 4	Apply
9.	Determination of losses due to bends, fittings and elbows	CO 4	Apply
10.	Characteristics of Centrifugal pump	CO 5	Apply
11.	Characteristics of Reciprocating pump	CO 5	Apply
12.	Characteristics of Pelton wheel turbine	CO 5	Apply

Total : 30 Periods

Reference Books

1. Manual-prepared by SSCET

Additional References

1. Hydraulic Laboratory Manual, Centre for Water Resources, Anna University, 2015.
2. Modi P.N. and Seth S.M., Hydraulics and Fluid Mechanics. Standard Book House. New Delhi, 2017.
3. Subramanya K, Fluid Mechanics and Hydraulic Machines, Tata McGraw Hill Edu. Pvt. Ltd.2011

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs													PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
CO 1	3	2	2	2	-	-	-	-	3	-	-	3	2	2		
CO 2	3	2	2	2	-	-	-	-	3	-	-	3	2	2		
CO 3	3	2	2	2	-	-	-	-	3	-	-	3	2	2		
CO 4	3	2	2	2	-	-	-	-	3	-	-	3	2	2		
CO 5	3	2	2	2	-	-	-	-	3	-	-	3	2	2		
Average	3	2	2	2	-	-	-	-	3	-	-	3	2	2		

"3" – High

"2" – Medium

"1" – low

"-“ - No Correlation

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination	100	25	15	
			Total	60	40

23AG406	COMPUTER AIDED DESIGN LABORATORY	L 0	T 0	P 2	C 1					
Category	Professional Core Courses (PCC)									
Pre requisites	Engineering Graphics									
Course Objectives										
<ul style="list-style-type: none"> Utilize the power and precision of drafting and design tools used in the farm machinery design and manufacturing industries. Apply basic CAD concepts to develop and construct accurate 2D and 3D geometry through creation of basic geometric constructions. 										
Course Outcomes										
On successful completion of the course, students will be able to										
CO. No.	Course Outcome	Bloom's Level								
CO1	Identify the application of different tools of drafting package	Understand								
CO2	Illustrate the drawing with proper orientation and functional requirements using drafting software	Understand								
CO3	Create the plan and layout of underground pipes and check dams	Apply								
CO4	Create 2D models of Engineering Components.	Apply								
CO5	Create 3D models of Engineering Components.	Apply								

S.No	List of Experiment	CO	Blooms Taxonomy
1.	Summarize the Capabilities of Software for Drafting and Modeling – Coordinate Systems	CO 1	Understand
2.	Drawing of a Title Block with necessary Text and Projection Symbol	CO 1	Understand
3.	Drawing of Curves a) Parabola b) Spiral c) Involutes	CO 2	Understand
4.	Drawing of Front View and Top View of Simple Solids a) Prism b) Pyramid c) Cylinder d) Cone	CO 2	Understand
5.	Drawing Front View, Top View and Side View a) V-Block b) Base of a Mixie c) Simple Stool d) Objects with Hole and Curves	CO 2	Understand
6.	Planning and Layout of farmstead	CO 3	Apply
7.	Drawing of Check dam	CO 3	Apply
8.	Drawing Sectional Views a) Prism b) Pyramid c) Cylinder d) Cone	CO4	Apply
9.	Drawing Isometric Projection of Simple Objects	CO4	Apply
10.	Creation of 3-D Models of Simple Objects	CO 5	Apply
11.	Obtaining 2-D Multi-View Drawings from 3-D Model	CO 5	Apply
Total : 30 Periods			

Reference Books

- Manual-prepared by SSCET

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	POs													PSOs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CO 1	2	2	3	-	2	-	-	-	3	-	-	-	3	2
CO 2	2	2	3	-	2	-	-	-	3	-	-	-	3	2
CO 3	2	2	3	-	2	-	-	-	3	-	-	-	3	2
CO 4	2	2	3	-	2	-	-	-	3	-	-	-	3	2
CO 5	2	2	3	-	2	-	-	-	3	-	-	-	3	2
Average	2	2	3	-	2	-	-	-	3	-	-	-	3	2

"3" – High

"2" – Medium

"1" – low

"-“ - No Correlation

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	75	45	40
2	Model Examination				
		Total	60	40	

23HS701	SOFT SKILLS – I (Common to all B.E/B.Tech Programmes)	L	T	P	C
		1	0	0	1
Category	EMPLOYABILITY ENHANCEMENT COURSE (EEC)				
Pre requisites	Nil				

Course Objectives

The course is intended to make the students to

1. Develop communication skills and self-confidence
2. Acquire problem-solving ability and leadership skills.
3. Introduce various Techniques of Time management and decision-making skills.
4. Become effective Communicators and presentation skills.
5. Enhance their body language and workplace Etiquette.

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Demonstrate Thinking skills, Team building.	Understand
CO 2	Express problem-solving and leadership skills	Understand
CO 3	Choose decision-making and Time Management	Apply
CO 4	Manipulate employment communication and presentation skills	Apply
CO 5	Show workplace etiquette and body language	Apply

Course Contents

Unit – I	Thinking skills and team building	3
Introduction -Core thinking skills- Categories of thinking analysis-development and human value introduction relationship behavior zones and self - self-questionnaire		
Unit – II	Problem-solving and leadership skills	3
Introduction-need for problem-solving-Skills for problem-solving-the process of problem-solving-methods of problem-solving-Importance of leadership of leadership -Styles of leadership		
Unit – III	Decision-making and time management	3
Introduction to decision making-Features of decision-making-Scope of decision-making-purpose of decision-making-Types of decision-making-process of decision-making.-Importance -Methods of Time Management		
Unit – IV	Employment communication and communication skills	3
Introduction-Writing CV-Interview skills-Formal communication and phone etiquette-Meetings Tautology-Introduction-Prerequisites of presentation-Types of presentation-Effective presentation-Presentation practices.		
Unit – V	Workplace etiquette and body language	3
Introduction-behavior at work-Personal etiquette-Travel etiquette-Binomials-Posture and stance-Emblems and gestures-Effective body language-Proxemics and haptics in body language.		
		Total: 15 Periods

Text Books

1. Alex, K. "Soft Skills: Know Yourself and Know the World", New Delhi: S. Chand & Company Ltd., 2011.
2. Butterfield, Jeff "Soft Skills for Everyone", Delhi: Cengage Learning, 2012.
3. Apps, Judy "Voice & Speaking Skills for DUMMIES", West Sussex: John Wiley & Sons, Ltd., 2012.

Reference Books

1. Abidi, Aeda and Ritu Chaudhry, "English for Engineers", Delhi: Cengage Learning India Pvt. Ltd., 2010.
2. Manallack, Stephen, "Soft Skills for a Flat World", New Delhi: Tata McGraw Hill Education Pvt. Ltd., 2012.

Additional / Web References

1. <https://positivepsychology.com/positive-mindset/>
2. <https://www.labvanced.com/content/research/blog/2022-12-5-perception-skills-psychology/>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
CO 2	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
CO 3	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
CO 4	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
CO 5	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
Average															

3– High

2 – Medium

1 – low

‘-’ - No Correlation

Continuous Internal Assessment		End Semester Examination	Total Marks
Assessment Component			
Continuous Assessment	100	CONTROLLED COPY	100

Passed in Board of Studies Meeting on 21.06.2024

Approved in Academic Council Meeting on 05.07.2024

CHAIRMAN-BOARD OF STUDIES



IVSEMESTER

23MA206	STATISTICS AND NUMERICAL METHODS (Common to AGRI, BME, ECE, MECH Programmes)	L	T	P	C
Category	Basic Science(BS)	3	1	0	4
Pre requisites	Engineering Mathematics - I & II				

Course Objectives

The course is intended to make the students to

1. Apply the necessary basic concepts of statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
2. Acquaint the knowledge of testing of hypotheses for small and large samples which plays an important role in real life problems.
3. Introduce the basic concepts of solving algebraic and transcendental equations.
4. Introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
5. Acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Choose the different samples of data at different levels of significance using various hypothesis testing.	Apply
CO 2	Construct an experiment with proper observations and measurement to get valid results using design methods.	Apply
CO 3	Identify the basic concepts of solving algebraic and transcendental equations.	Apply
CO 4	Identify the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	Apply
CO 5	Make use of various techniques and methods for solving first and second order ordinary differential equations.	Apply

Course Contents

Unit – I	Testing of Hypothesis	9+3
Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.		
Unit – II	Design of Experiments	9+3
One way and two way classifications - Completely randomized design – Randomized block design – Latin square design		
Unit – III	Numerical Solution of Equations and Eigen value problems	9+3
Solving algebraic and transcendental equations: Newton's- Raphson method - Solutions of system of linear equations –Elimination method: Gauss elimination method and Gauss Jordan method – Iterative methods: Gauss Jacobi and Gauss Seidel Methods.		
Unit – IV	Numerical Differentiation and Integration	9+3
Numerical Differentiation: Equal intervals - Newton's forward, backward difference interpolation polynomials. Unequal Intervals - Lagrange's and Newton's divided difference interpolation polynomials. Numerical Integration: Single integration – Trapezoidal rule and Simpson's 1/3 rule- Double integration: Trapezoidal rule and Simpson's rule.		
Unit – V	Initial value problems for Ordinary Differential Equations	9+3
Single step methods: Euler's method - Fourth order Runge- Kutta method - Taylor's series method for solving first order differential equations – Multi step methods: Milne's predictor corrector methods for solving first order differential equations.		
Total : 60 Periods		

Text Books

1. Grewal. B.S, "Higher Engineering Mathematics", Khanna Publications, Delhi, 45th Edition, 2020.
2. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
3. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

Reference Books

1. Dass, H.K., and Rajnish Verma," Higher Engineering Mathematics", S. Chand Private Ltd., 45th edition, 2014
2. Glyn James, "Advanced Modern Engineering Mathematics", Pearson Education, 3rd Edition, 2018.
3. Burden, R.L and Faires, J.D, "Numerical Analysis Cengage Learning", 9th Edition, 2016.

Additional / Web References

1. <https://archive.nptel.ac.in/courses/103/106/103106120/>
2. <https://archive.nptel.ac.in/courses/127/106/127106019/>
3. <https://nptel.ac.in/courses/111107063>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO 2	3	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO 3	3	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO 4	3	2	-	-	-	-	-	-	1	1	-	-	-	-	-
CO 5	3	2	-	-	-	-	-	-	1	1	-	-	-	-	-
Average	3	2	-	-	-	-	-	-	1	1	-	-	-	-	-
3 – High				2 – Medium				1 – Low				'-' - No Correlation			

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for internal marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 Hours	2.5 Units	100	12	24	60
CIA II	3 Hours	2.5 Units	100	12		
Objective Test / Online Quiz, Assignment / Case study , Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					16	
					TOTAL	
					40	60

23ME406	THEORY OF MACHINES (Common to Mechanical and Agricultural Engineering)	L	T	P	C
		3	0	0	3
Category	Professional Core Courses (PCC)				
Pre requisites	Engineering Mechanics				

Course Objectives

The course is intended to

- Applying the basic components of mechanisms, analyzing the assembly with respect to the displacement, velocity, and acceleration at any point in a link of a mechanism and design cam mechanisms for specified output motions.
- Applying the basic concepts of toothed gearing and kinematics of gear trains
- Analyzing the effects of friction in machine elements
- Analyzing the force-motion relationship in components subjected to external forces and analyzing of standard mechanisms.
- Analyzing the undesirable effects of unbalances resulting from prescribed motions in mechanism and the effect of dynamics of undesirable vibrations.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Discuss the basics of mechanism.	Understand
CO 2	Solve problems on gears and gear trains.	Apply
CO 3	Examine friction in machine elements.	Apply
CO 4	Appraise the performance of various governors and application of gyroscope principles	Analyse
CO 5	Infer the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient.	Analyse

at least one year

Course Contents		
Unit – I	Kinematics of Mechanisms	9
	Mechanisms – Terminology and definitions – kinematics inversions of 4 bar and slide crank chain kinematics analysis in simple mechanisms – velocity and acceleration polygons– Analytical methods– cams – classifications – displacement diagrams - layout of plate cam profiles – motion of the followers.	
Unit – II	Gears and Gear Trains	9
	Spur gear – law of toothed gearing – involute gearing – Interchangeable gears – Gear tooth action interference and undercutting – contact ratio - nonstandard teeth – gear trains – parallel axis gears trains – epicyclic gear trains – automotive transmission gear trains.	
Unit – III	Friction in Machine Elements	9
	Surface contacts – Sliding and Rolling friction – Friction drives – Friction in screw threads – Bearings and lubrication – Friction clutches – Belt and rope drives – Friction aspects in brakes– Friction in vehicle propulsion and braking.	
Unit – IV	Governors and Gyroscopes	9
	Governors – Types – Centrifugal governors – Gravity controlled and spring controlled centrifugal governors – Characteristics – Effect of friction – Controlling force curves. Gyroscopes –Gyroscopic forces and torques – Gyroscopic stabilization – Gyroscopic effects in Automobiles, ships and airplanes.	
Unit – V	Balancing and Vibration	9
	Static and Dynamic balancing – Balancing of revolving and reciprocating masses – Balancing machines – free vibrations – Equations of motion – natural Frequency – Damped Vibration – bending critical speed of simple shaft – Torsional vibration – Forced vibration – harmonic Forcing – Vibration isolation.	
Total : 45 Periods		

Text Books

1. Uicker, J.J., Pennock G.R and Shigley, J.E., "Theory of Machines and Mechanisms", Oxford University Press, 5th edition, 2017.
2. Ramamurthi. V, "Mechanics of Machines", Narosa Publishing House, 3rd edition, 2009.
3. Khurmi, R.S and Gupta, J.K., "Theory of Machines", S. Chand Publishing, 14th edition, 2005.

Reference Books

1. Amitabha Ghosh and Asok Kumar Mallik, "Theory of Mechanisms and Machines", Affiliated East-West Pvt. Ltd., 3rd edition, 1988.
2. Rao.J.S. and Dukkipati.R.V. "Mechanism and Machine Theory", New Age International Pvt. Ltd., 2nd edition, 2014.
3. Rattan, S.S, "Theory of Machines", McGraw-Hill Education Pvt. Ltd., 5th edition, 2019.
4. Robert L. Norton, Kinematics and Dynamics of Machinery, Tata McGraw-Hill, 3rd edition, 2009.
5. Wilson and Sadler, Kinematics and Dynamics of Machinery, Pearson, 3rd edition, 2008.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CO 1	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO 2	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO 3	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO 4	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO 5	3	2	-	-	-	-	-	-	-	-	-	-	-	2
Average	3	2	-	-	-	-	-	-	-	-	-	-	-	2

"3" – High

"2" – Medium

"1" – low

"- " - No Correlation

B.Tech. Agricultural Engineering(R-2023)

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12	2 4	60
CIA II	3 hours	2.5 units	100	12		
<ul style="list-style-type: none"> • Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., • (8 marks during CIA I and 8 marks during CIA II) 					16	
Total				40		60


CHAIRMAN-BOARD OF STUDIES

Passed in Board of Studies Meeting on 21.06.2024

Approved in Academic Council Meeting on 05.07.2024

23AG407	HYDROLOGY AND WATER RESOURCES ENGINEERING	L 3	T 0	P 0	C 3
Category	Professional Core courses (PCC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Introduce the students, the concepts of hydrological processes.
- Stratify the techniques to effectively store runoff water
- Learn briefly about hydrological extremes.
- Introduce the concepts of groundwater aquifers.
- Prepare the students to quantify, regulate and manage water resources.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Use knowledge of Precipitation and meteorological measurements to execute rainfall measurements on the field.	Apply
CO 2	interpret the catchment characteristics to demarcate directions of runoff and flow measurements.	Apply
CO 3	Identify hydrological extremes such floods and droughts to take preventive measures.	Understand
CO 4	Infer the engineering of storage structures to effectively utilize reservoirs.	Understand
CO 5	Identify the aquifers and flow patterns to evaluate recharge requirements.	Understand

Course Contents		
Unit – I	Precipitation and Abstractions	9
Hydrological cycle - Types and forms of precipitation - Meteorological measurements - Rain gauges - Spatial analysis of rainfall data using Thiessen polygon and Iso-hyetal methods - Interception - Evaporation: Measurement, Evaporation suppression methods - Infiltration: Horton's equation - Double ring infiltrometer - Infiltration indices – Evapotranspiration and its Measurements.		
Unit – II	Runoff	9
Catchment: Definition, Morphological characteristics - Factors affecting runoff - Runoff estimation using Strange's table and empirical methods - SCS-CN method - Stage discharge relationship - Flow measurements - Hydrograph - Unit hydrograph.		
Unit – III	Flood and Drought	9
Natural disasters - Flood estimation - Flood management - Definitions of drought: Meteorological, Hydrological, Agricultural and Integrated - IMD method - Drought Management-Drought Prone Area Programme (DPAP).		
Unit – IV	Reservoirs	9
Classification of reservoirs - Site selection - General principles of design - Spillways - Elevation - Area - Capacity curve - Storage estimation - Sedimentation - Life of reservoirs.		
Unit – V	Groundwater and Management	9
Origin - Classification and types - Properties of aquifers - Governing equations - Steady and unsteady flow - Well Hydraulics - Occurrence of Groundwater - Well Drilling methods - Artificial recharge - RWH in rural and urban areas		
Total : 45 Periods		

Text Books	
1.	Subramanya K, "Engineering Hydrology" - Tata McGraw Hill, 4 th Edition, 2017.
2.	Jayarami Reddy P, "Hydrology", Tata McGraw Hill, 3 rd Edition, 2016.
Reference Books	
1.	David Keith Todd, "Groundwater Hydrology" John Wiley & Sons, Inc, 3 rd Edition, 2011.
2.	Ven Te Chow, Maidment, D.R. and Mays, L.W. "Applied Hydrology", McGraw Hill International Book Company, Recent edition. 1st edition, 2017.
3.	Raghunath.H.M., "Hydrology", Wiley Eastern Ltd.,3 rd Edition,2015.
4.	Bhagu R. "Chahar, Groundwater Hydrology", McGraw Hill Education (India) Pvt Ltd, New Delhi, 1st edition, 2017.

Course Outcomes												
Additional / Web References												
1. https://archive.nptel.ac.in/courses/105/105/105105214/												
2. https://archive.nptel.ac.in/courses/105/103/105103213/												
3. https://nptel.ac.in/courses/105103213/												

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CO 1	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 2	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 3	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 4	3	2	-	-	-	-	-	-	-	-	-	2	2	-
CO 5	3	2	-	-	-	-	-	-	-	-	-	2	2	-
Average	3	2	-	-	-	-	-	-	-	-	-	2	2	-

"3" – High

"2" – Medium

"1" – low

"-“ - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 hours	2.5 units	100	12		
CIA II	3 hours	2.5 units	100	12	24	
					16	60
					Total	40
						60

- Objective Test / Online Quiz, Assignment / Case study Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc.,
- (8 marks during CIA I and 8 marks during CIA II)

Syllabus

have

breakdown

view

done

also

23ME408	STRENGTH OF MATERIALS (Common to AGRI & MECH)	L	T	P	C
		3	0	0	3
Category	Professional Core courses (PCC)				
Pre requisites	Engineering Mechanics				

Course Objectives

The course is intended to make the students to

- Understand the concepts of stress, strain, principal stresses and principal planes.
- Study the concept of shearing force and bending moment due to external loads in determinate beams and their effect on stresses.
- Determine stresses and deformation in circular shafts and helical spring due to torsion.
- Compute slopes and deflections in determinate beams by various methods.
- Study the stresses and deformations induced in thin and thick shells.

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Interpret the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.	Understand
CO 2	Illustrate the shear force, bending moment and bending stresses in beams	Apply
CO 3	Choose the basic equations of torsion in designing of shafts and helical springs	Apply
CO 4	Manipulate the slope and deflection in beams using different methods.	Apply
CO 5	Solve thin and thick shells for applied pressures.	Apply

Course Contents

Unit – I	Stress, Strain and Deformation of Solids	9
Rigid bodies and deformable solids – Tension, Compression and Shear Stresses - Deformation of simple and compound bars – Thermal stresses – Elastic constants - Volumetric strains – Stresses on inclined planes – Principal stresses and principal planes – Mohr's circle of stress.		
Unit – II	Transverse Loading on Beams and Stresses in Beams	9
Beams – Types - Transverse loading on beams – Shear force and Bending moment in beams – Cantilever, Simply supported and overhanging beams. Theory of simple bending – Bending stress distribution – Load carrying capacity – Proportioning of sections – Flitched beams – Shear stress distribution.		
Unit – III	Torsion	9
Theory of Torsion – Stresses and Deformations in Solid and Hollow Circular Shafts – Combined bending moment and torsion of shafts - Power transmitted to shaft – Shaft in series and parallel – Closed and Open Coiled helical springs – springs in series and parallel.		
Unit – IV	Deflection of Beams	9
Elastic curve – Governing differential equation - Double integration method - Macaulay's method – Area moment method - Conjugate beam method for computation of slope and deflection of determinate beams.		
Unit – V	Thin and Thick Cylinders	9
Stresses in thin cylindrical shells due to internal pressure - circumferential and longitudinal stresses - Deformation in thin cylinders – Spherical shells subjected to internal pressure – Deformation in spherical shells – Thick cylinders - Lame's theory.		
Total :45 Periods		

Text Books

1. Bansal, R.K., "Strength of Materials", Laxmi Publications (P) Ltd., 4th edition, 2018.
2. Jindal U.C., "Strength of Materials", Asian Books Pvt. Ltd., New Delhi, 1st edition, 2016
3. R.S.Khurmi, "Strength of materials", S.Chand Publishers, 26th edition, 2019

Reference Books	
1.	Egor. P.Popov "Engineering Mechanics of Solids" Prentice Hall of India, 2nd edition, 2019
2.	Subramanian R., "Strength of Materials", Oxford University Press, Oxford Higher Education Series,7 th Edition, 2011.
3.	Hibbeler, R.C., "Mechanics of Materials", Pearson Education, 10 th Edition, 2016.
4.	Ferdinand P. Been, Russell Johnson, Jr. and John J. Dewole "Mechanics of Materials", Tata McGraw Hill Publishing „co. Ltd., New Delhi, 3 rd Edition, 2016.
Additional / Web References	
1.	https://nptel.ac.in/courses/112107146
2.	https://nptel.ac.in/courses/112107147

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	3	2	-	-	-	-	-	-	-	-	-	-	2
CO 2	3	3	2	-	-	-	-	-	-	-	-	-	-	2
CO 3	3	3	2	-	-	-	-	-	-	-	-	-	-	2
CO 4	3	3	2	-	-	-	-	-	-	-	-	-	-	2
CO 5	3	3	2	-	-	-	-	-	-	-	-	-	-	2
Average	3	3	2	-	-	-	-	-	-	-	-	-	-	2

"3" – High

"2" – Medium

"1" – low

"-“ - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for internal marks	Continuous Internal Assessment Marks	End Semester Examination Marks*	
CIA I	3 Hours	2.5 Units	100	12	24	60	
CIA II	3 Hours	2.5 Units	100	12			
Objective Test / Online Quiz, Assignment / Case study , Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc.,						16	
(8 marks during CIA I and 8 marks during CIA II)							
TOTAL			40		60		

23HS101	UNIVERSAL HUMAN VALUES – II (Common to all B.E/B.Tech Programmes)	L	T	P	C
		3	0	0	3
Category	HSMC				
Pre requisites	Universal Human Values - I				

Course Objectives

The course is intended to

- Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
- Strengthening of self-reflection.
- Development of commitment and courage to act.

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Associate themselves, and their surroundings (family, society, nature)	Understand
CO 2	Summarize responsibilities in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind	Understand
CO 3	Express better critical ability	Understand
CO 4	Interpret their commitments towards what they have understood (human values, human relationship and human society)	Understand
CO 5	Use what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction	Apply

Course Contents

Unit – I	Course Introduction - Need, Basic Guidelines, Content and Process for Value Education	9
-----------------	--	----------

Purpose and motivation for the course, recapitulation from Universal Human Values-I, Self-Exploration—what is it? - Its content and process; ‘Natural Acceptance’ and Experiential Validation- as the process for self-exploration- Continuous Happiness and Prosperity- A look at basic Human Aspirations- Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority - Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario - Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Unit – II	Understanding Harmony in the Human Being - Harmony in Myself!	9
Understanding human being as a co-existence of the sentient 'I' and the material 'Body'- Understanding the needs of Self ('I') and 'Body' - happiness and physical facility - Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) - Understanding the characteristics and activities of 'I' and harmony in 'I' - Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail - Programs to ensure Sanyam and Health.		
Unit – III	Understanding Harmony in the Family and Society- Harmony in Human Relationship	9
Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship - Understanding the meaning of Trust; Difference between intention and competence – Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship - Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.		
Unit – IV	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence	9
Understanding the harmony in the Nature - Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all pervasive space - Holistic perception of harmony at all levels of existence.		
Unit – V	Implications of the above Holistic Understanding of Harmony on Professional Ethics	9
<ul style="list-style-type: none"> . Natural acceptance of human values - Definitiveness of Ethical Human Conduct - Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order - Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. - Case studies of typical holistic technologies, management models and production systems - Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations - Sum up. 		
Total : 45 Hours		

Text Books

1. Gaur R R, Asthana R, Bagaria G P, "A Foundation Course in Human Values and Professional Ethics", Excel Books, second Revised Edition, New Delhi, 2019.
2. Gaur R R, Sangal R, Bagaria G P, "Human Values and Professional Ethics" Excel Books, New Delhi, 3rd edition, 2010.
3. Tripathi A N, "Human Values", New Age International. Publishers, New Delhi, 1st edition, 2004.

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1st edition, 1999
2. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi, reprint 2023.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	-	-	-	-	-	3	2	3	2	-	-	2
CO 2	-	-	-	-	-	3	2	3	2	-	-	2
CO 3	-	-	-	-	-	3	2	3	2	-	-	2
CO 4	-	-	-	-	-	3	2	3	2	-	-	2
CO 5	-	-	-	-	-	3	2	3	2	-	-	2
Average	-	-	-	-	-	3	2	3	2	-	-	2
3 – High			2 – Medium			1 – low			“-” - No Correlation			

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for internal marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 Hours	2.5 Units	100	12	24	60
CIA II	3 Hours	2.5 Units	100	12		
Objective Test / Online Quiz, Assignment / Case study , Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc.,					16	
(8 marks during CIA I and 8 marks during CIA II)						
					TOTAL	40
						60

23AG408	UNIT OPERATIONS IN AGRICULTURAL PROCESSING	L	T	P	C
		2	0	2	3
Category	Professional Core courses (PCC)				
Pre requisites	Nil				

Course Objectives

The course is intended to

- Introduce the Scope, importance and key concept of the agro processing
- Gain fundamental knowledge in evaporation, filtration, sedimentation, processing, crystallization and distillation in processing of agricultural produce
- Expose the fundamentals of various unit operations in agricultural processing
- Impart knowledge in the concepts of size reduction
- Understand the factors influencing various unit operations in agriculture processing

Course Outcomes (COs)

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO 1	Choose the evaporation process and types of evaporators for food industry	Apply
CO 2	Interpret the principles of filtration and mechanical separation equipment	Apply
CO 3	Modify the size reduction and grinding equipment and understand the factors affecting the process	Apply
CO 4	Interpret the gas-liquid and solid-liquid equilibrium concepts and factors influencing equilibrium separation process.	Apply
CO 5	Illustrate crystallization and distillation processes and identify processing equipment.	Apply

Course Contents

Unit – I	Evaporation and Concentration	6
Unit operations in food processing –conservation of mass and energy –evaporation – definition – Types of evaporators – single and multiple effect evaporation- boiling point elevation – capacity – economy and heat balance- Problems		
Unit – II	Mechanical Separation	6
Sedimentation – Stoke's law, sedimentation of particles in gas-cyclones – settling under sedimentation and gravitational sedimentation-centrifugal separations – liquid – liquid separation – centrifuge equipment - Filtration – definition –filter media – types of filtration equipment and requirements-constant rate filtration – constant pressure filtration – filter cake resistance- Problems		
Unit – III	Size Reduction	6
Size reduction – grinding and cutting –particle size distribution in comminuted products-energy and power requirements in comminuting – crushing efficiency – Rittinger's, Bond's and Kick's laws for crushing-size reduction equipment – crushers – jaw crusher, gyratory crusher-crushing rolls – grinders – hammer mills – rolling compression mills - attrition, rod, ball and tube mills – construction and operation - Problems		
Unit – IV	Contact Equilibrium Separation	6
Contact equilibrium separation processes – concentrations – gas-liquid and solid-liquid equilibrium– calculation of separation in contact– equilibrium processes-gas absorption – rate of gas absorption –properties of tower packing – types – construction – flow through packed towers-extraction – rate of extraction -equipment for leaching coarse solids – intermediate solids – basket extractor- extraction of fine material – Dorr agitator – continuous leaching – decantation systems – extraction towers-washing – equipment		
Unit – V	Crystallization and Distillation	6
Crystallization-Equilibrium –Rate of crystal growth stage-Equilibrium Crystallization-Crystallizers- Equipment-Classification- Tank-Agitated batch- Swenson-Walker and Vacuum Crystallizers- Distillation-Binary Mixtures-Flash and differential distillation-Steam distillation –Theory-Continuous distillation with rectification –Vacuum distillation - Batch distillation- Advantages and limitation- Distillation equipment- Construction and operation-Factors influencing the operation		
Total : 30 Periods		

Text Books

- Earle, R.L., "Unit operations in Food Processing", Pergamon Press, Oxford, U.K, 2nd edition, 2016.
- Sahay, K. M., and Singh K. K., "Unit operations of agricultural processing" Vikas Publishing house, 2nd edition, 2009.
- McCabe, W.L., and Smith, J.C., "Unit Operations of Chemical Engineering", Mc-Graw-Hill Inc., reprint, 2005.
- Geankoplis, C.J. "Transport Processes and Separation Process Principles", Prentice Hall, 4th Edition, 2013.

Reference Books

- Coulson, J.M and J.F., "Richardson. Chemical Engineering. Volume I to V", The Pergamon Press. New York, 6th Edition, 1999.
- Albert Ibarz and Gustavo V. Barbosa-Cánovas. Unit Operations in Food Engineering. CRC Press LLC, Florida, 1st edition, 2003.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs													PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
CO 1	3	2	-	-	-	-	-	-	3	-	-	2	2	-		
CO 2	3	2	-	-	-	-	-	-	3	-	-	2	2	-		
CO 3	3	2	-	-	-	-	-	-	3	-	-	2	2	-		
CO 4	3	2	-	-	-	-	-	-	3	-	-	2	2	-		
CO 5	3	2	-	-	-	-	-	-	3	-	-	2	2	-		
Average	3	2	-	-	-	-	-	-	3	-	-	2	2	-		

"3"— High

"2" – Medium

"1" – low

"-“ - No Correlation

S.NO	List of Experiments	CO	Blooms Taxonomy
1.	Determination of thermal efficiency and economy of single effect evaporator	CO 1	Apply
2.	Determination of separation efficiency of centrifugal separator	CO 2	Apply
3.	Determination of collection efficiency in cyclone separator	CO 2	Apply
4.	Determination of efficiency of liquid-solid separation by filtration	CO 2	Apply
5.	Performance evaluation of a sieve and determination of particle size of granular foods by sieve analysis	CO 3	Apply
6.	Determination of energy requirement in size reduction using the ball mill	CO 3	Apply
7.	Determination of energy requirement in size reduction using the hammer mill	CO 3	Apply
8.	Determination of energy requirement in size reduction using the burr mill	CO 3	Apply
9.	Determination of performance efficiency of agitator	CO 4	Apply
10.	Performance Evaluation of Crystallizer	CO 5	Apply

Total : 30 Periods

Reference Books

1. Manual-prepared by SSCET

Additional References

1. Earle, R.L., "Unit operations in Food Processing", Pergamon Press, Oxford, U.K, reprint, 1989.
2. Sahay, K. M., and Singh K. K., "Unit operations of agricultural processing". 2nd edition, 2009.
3. McCabe, W.L., and Smith, J.C., "Unit Operations of Chemical Engineering", Mc-Graw-Hill Inc., reprint, 2005.

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Assessment	Duration	Syllabus to be covered	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
Theory Component						
CIA I	3 hours	2.5 units	100	10	20	50
CIA II	3 hours	2.5 units	100	10		
Practical Component						
Observation & Analysis of Experimental results, Viva Voce, Quiz based on rubrics.	All Experiments	75	22.5	30	-	50
Model Exam		25	7.5			
Total					50	50

Discipline	Weightage (%)	Assessed in term	Weightage (%)
Viva A	7.00	both tests no test related	7
Viva A	7.00	both tests no test related	7
Viva A	7.00	both tests no test related	7
Viva A	2.00	both tests no test related	2
Viva A	2.00	both tests no test related	2
Viva A	6.00	both tests no test related	6
Viva A	4.00	both tests no test related	4
Viva A	6.00	both tests no test related	6
Viva A	6.00	both tests no test related	6
above 4.00	Test	both tests no test related	4

23ME410	STRENGTH OF MATERIALS LABORATORY (COMMON TO MECH & AGRI)	L	T	P	C
		0	0	2	1
Category	Professional Core courses (PCC)				
Pre requisites	Engineering Materials and Metallurgy, Strength of Materials				

Course Objectives	
The course is intended to	
<ul style="list-style-type: none"> To expose the students to the testing of different materials under the action of various forces and determination of their characteristics experimentally. 	

Course Outcomes		
On successful completion of the course, students will be able to		
CO. No.	Course Outcome	Bloom's Level
CO 1	Experiment the tensile, compressive and shear properties of metals by testing	Apply
CO 2	Demonstrate the hardness properties and impact strength of metals by testing	Apply
CO 3	Show the shear force, bending moment and bending stresses in beams	Apply
CO 4	Use torsion equation in design of circular shafts	Apply
CO 5	Experiment the stiffness properties of helical and carriage spring	Apply

S.No	List of Exercises	CO	Blooms Taxonomy
1	Tension test on steel rod	CO 1	Apply
2	Compression test on wood	CO 1	Apply
3	Double shear test on metal	CO 1	Apply
4	Hardness test on metals (Rockwell and Brinell Hardness Tests)	CO 2	Apply
5	Impact test on metal specimen (Izod and Charpy)	CO 2	Apply
6	Deflection test on metal beam	CO 3	Apply
7	Torsion test on mild steel rod	CO 4	Apply
8	Compression test on helical spring	CO 5	Apply
9	Tension test on helical spring	CO5	Apply
Total : 30 Periods			

Reference Books													
Manual-prepared by SSCET													
Additional References													
1. Strength of Materials Laboratory Manual, Anna University, Chennai - 600 025.													
2. IS1786-2008 (Fourth Revision, Reaffirmed 2013), 'High strength deformed bars and wires for concrete reinforcement – Specification', 2008.													

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO 1	3	3	2	-	-	-	-	-	3	-	-	-	-	2
CO 2	3	3	2	-	-	-	-	-	3	-	-	-	-	2
CO 3	3	3	2	-	-	-	-	-	3	-	-	-	-	2
CO 4	3	3	2	-	-	-	-	-	3	-	-	-	-	2
CO 5	3	3	2	-	-	-	-	-	3	-	-	-	-	2
Average	3	3	2	-	-	-	-	-	3	-	-	-	-	2

"3" – High

"2" – Medium

"1" – low

"- " - No Correlation

S. No.	Assessment Method	Max. Marks	Weightage for Internal Marks	Continuous Internal Assessment Marks	End Semester Examination Marks
1	Observation, Analysis of Experimental results & Record, Viva-voce based on rubrics.	100	7 5	45	4 0
2	Model Examination	100	2 5	15	
Total				60	40

23HS702	SOFT SKILLS – II (Common to all B.E/B.Tech Programmes)	L	T	P	C					
		1	0	0	1					
Category	EMPLOYABILITY ENHANCEMENT COURSE (EEC)									
Pre requisites	Soft Skills-I									
Course Objectives										
The course is intended to										
<ol style="list-style-type: none"> 1. help students develop communication skills and self-confidence 2. motivate students to acquire employability skills 3. introduce various interview techniques to students and guide them to tackle interviews 4. motivate students to become effective public speakers and develop leadership qualities in them 5. help students enhance their writing skills 										

Course Outcomes		
On successful completion of the course, students will be able to		
CO. No	Course Outcome	Bloom's Level
CO 1	Express the art of speaking	Understand
CO 2	Interpret body language effectively	Understand
CO 3	Develop optimistic attitude to cope in organisations	Apply
CO 4	Prepare professionally by improving perception	Apply
CO 5	Organise good etiquette and manners	Apply

Course Contents		
Unit – I	Art of Speaking	3
	Emphasizing S in LSRW, Defining communication, special features and importance of communication, types of communication networks, art of public speaking	
Unit – II	Body Language	3
	Paralinguistic features, origin & uses of body language, improving and interpreting body language	
Unit – III	Developing Positive Attitude	3
	Features and power of attitudes, attitude and behavior, ways of changing attitude in a person, attitude in workplace, positive attitude and its results, overcoming negative attitude	
Unit – IV	Improving Perception	3
	Factors influencing perception, perceptual process, perception and its application in organisations and group discussion	
Unit – V	Etiquette and Manners	3
	Modern etiquette, benefits and classification of etiquette, importance of good manners, professional manners	
Total : 15 Periods		

Text Books

1. Alex, K. *Soft Skills: "Know Yourself and Know the World"* New Delhi: S. Chand & Company Ltd., 2011.
2. Butterfield, Jeff. *"Soft Skills for Everyone"* Delhi: Cengage Learning, 2012.
3. Apps, Judy. *"Voice & Speaking Skills for DUMMIES"*. West Sussex: John Wiley & Sons, Ltd., 2012.

Reference Books

1. Abidi, Aeda and Ritu Chaudhry. *"English for Engineers"* Delhi: Cengage Learning India Pvt. Ltd., 2010.
2. Manallack, Stephen. *"Soft Skills for a Flat World"* New Delhi: Tata McGraw Hill Education Pvt. Ltd., 2012.

Additional / Web References

1. <https://positivepsychology.com/positive-mindset/>
2. <https://www.labvanced.com/content/research/blog/2022-12-5-perception-skills-psychology/>

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
CO 2	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
CO 3	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
CO 4	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
CO 5	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-
Average	-	-	-	-	2	-	-	-	2	3	-	3	-	-	-

3- High

2 – Medium

1 – low

‘-’ - No Correlation

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for internal marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
Written Test	3 Hours	5 Units	100	50	50	
Objective Test / Online Quiz, Assignment / Case study , Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc., (8 marks during CIA I and 8 marks during CIA II)					50	
			TOTAL	100		-

23MC802	ENVIRONMENTAL SCIENCES AND DISASTER MANAGEMENT (Common to all B.E/B.Tech Programmes)	L	T	P	C					
		2	0	0	0					
Category	Mandatory course									
Pre requisites	Nil									
Course Objectives										
The course is intended to make the students to										
Study about Environment and Biodiversity.										
Basic knowledge and concept of causes, effects and control of different types of environmental pollution.										
Knowledge and concept of renewable sources of energy.										
Exposure to natural and man-made disasters.										
Understand the relationship between vulnerability, disasters, and disaster prevention.										



Course Outcomes		
On successful completion of the course, students will be able to		
CO. No.	Course Outcome	Bloom's Level
CO 1	Interpret the components of Environment and Biodiversity.	Understand
CO 2	Relate the source of various pollution and its control measures.	Understand
CO 3	Classify the various sources of renewable energy and emphasis.	Understand
CO 4	Relate the types of disasters, causes and their impact on environment and society.	Understand
CO 5	Use various methods of risk reduction measures in disaster.	Apply

Course Contents		
Unit – I	Environment and Biodiversity	6
Definition, scope and importance of environment – need for public awareness. Types of biodiversity: genetic, species and ecosystem diversity – India as a mega-diversity nation – endemic and endangered species of India - threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – conservation of biodiversity: In-situ and ex-situ.		
Unit – II	Environmental Pollution	6
Causes, Effects and Preventive measures of Water, Soil and Air Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.		
Unit – III	Renewable Sources of Energy	6
Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.		
Unit – IV	Natural and Man Made Disaster	6
Natural Disaster: such as Tsunami, volcanic eruptions, Flood, Cyclone, Earthquakes, continental drift and Landslides. Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road) - Causes, effects and practical examples for all disasters.		

Unit – V	Disaster Management	6
Concept of disaster management, Effect to migrate natural disaster at National and global levels, International strategy for disaster reduction, Financial arrangements: Role of NGOs and media. Central, State, District and local administration, NDRF and Armed forces in disaster response.		
Total : 30 Hours		
Text Books		
<ol style="list-style-type: none"> 1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", New Age International Publishers, 6th Edition, 2018. 2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 1st edition, 2017. 3. Shrivastava. A. K, "TextBook of Disaster management", Scientific Publishers, 1st edition 2024. 		
Reference Books		
<ol style="list-style-type: none"> 1. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, Third Edition, 2015. 2. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. reprint, 2013. 3. "Disaster Management Act", Government of India, New Delhi, 2005. 		
Additional / Web References		
<ol style="list-style-type: none"> 1. https://onlinecourses.nptel.ac.in/noc23_hs155/preview 2. https://onlinecourses.swayam2.ac.in/cec19_hs20/preview 		

Mapping of Course Outcomes (COs) with Programme Outcomes (POs)													
COs	POs												
	1	2	3	4	5	6	7	8	9	10	11	12	
CO 1	-	-	-	-	-	2	3	2	-	-	-	-	2
CO 2	-	-	-	-	-	2	3	2	-	-	-	-	2
CO 3	-	-	-	-	-	2	3	2	-	-	-	-	2
CO 4	-	-	-	-	-	2	3	2	-	-	-	-	2
CO 5	-	-	-	-	-	2	3	2	-	-	-	-	2
Average	-	-	-	-	-	2	3	2	-	-	-	-	2
3– High				2 – Medium				1 – low				‘-’ - No Correlation	

Assessment Components	Duration	Syllabus to be covered	Max. Marks	Weightage for internal marks	Continuous Internal Assessment Marks	End Semester Examination Marks*
CIA I	3 Hours	2.5 Units	100	25	50	-
CIA II	3 Hours	2.5 Units	100	25		
Objective Test / Online Quiz, Assignment / Case study , Seminar / Tutorial, Role Play, Poster Presentation, Group Discussions, Oral Presentation, Mini Project etc.,					50	-
(8 marks during CIA I and 8 marks during CIA II)			TOTAL		100	-



- <https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process>
- <https://nptel.ac.in/courses/110106124/>
- <https://hbr.org/2018/09/why-design-thinking-works>

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3				3								2		3
CO 2	2	3			3								2		3
CO 3	2		3		3								2		3
CO 4	2		3		3								2		3
CO 5	2			3	3								2		3
Average	2.5	3	3	3	3								2		3

3. – High 2 – Medium 1 – low “-“ - No Correlation



CHAIRMAN-BOARD OF STUDIES