Annexure 2

APPLIED MATHEMATICS – I
(CALCULUS AND LINEAR ALGEBRA)

Course Code: MAT 101 **Credit Units: 04**

Total Hours: 40

Course Objective:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Contents:

Module I: Differential Calculus: (8 Hours)

Successive differentiation, Leibnitz Theorem, Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorems with remainders, Partial Differentiation, Total derivative; Maxima and minima for two variables.

Module II: Integral Calculus: (8 Hours)

Evaluation of definite and improper integrals: Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface, areas and volumes of revolutions, Multiple Integration: Double integrals (Cartesian and polar), Triple integrals (Cartesian).

Module III: Vector Calculus: (7 Hours)

Scalar and vector field, Gradient, Divergence and Curl, Directional Derivative, Evaluation of a Line Integral, Green's theorem in plane (without proof), Stoke's theorem (without proof) and Gauss Divergence theorem (without proof).

Module IV: Matrices: (7 Hours)

Inverse and Rank of a matrix, Linear systems of equations, Consistency of Linear Simultaneous Equations, linear Independence, Gauss elimination and Gauss-Jordan elimination, Eigen values, eigenvectors, Caley-Hamilton theorem, Diagonalization.

Module V: Linear algebra & Vector spaces: (10 Hours)

Linear algebra: Group, ring, field (Definition), Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, Inverse of a linear transformation, rank- nullity theorem (without proof), composition of linear maps, Matrix associated with a linear map.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in basic calculus and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:

- To apply differential and integral calculus tools to the notions of curvature and to improper integrals. Apart from various applications, they will have a basic understanding of Beta and Gamma functions.
- The mathematical tools needed in evaluating multiple integrals and their usage.
- The essential tools of matrices that are used in various techniques dealing with engineering problems.
- The tools of linear algebra including linear transformations, eigen values, diagonalization.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Suggested Text/Reference Books:

- Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
- G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- *V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.*

Annexure 2

APPLIED CHEMISTRY

Course Code: CHE 101 **Credit Units: 04**

Total Hours: 40

Course Objective:

The course aims to train the students in basic and applied principles of Chemistry. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply the knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields. The makeup of substances is always a key factor, which must be known. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject starting from the very basic bonding mechanism to the application of materials.

Course Contents:

Module I: Chemical Bonding (6 Hours)

Fajan's rule; Hybridization. Valence bond and Molecular orbital theory for diatomic molecule (H_2, N_2 & O_2); Bond order & magnetic characters of these molecules.

Module II: Thermodynamics & Chemical Equilibrium (Use of free energy in chemical equilibria) (8 Hours)

Le Chatelier's Principle; Equilibrium constant from Thermodynamic Constants; pH and pOH, Buffer Solution, Buffer Action

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Corrosion: Prevention and corrosion control.

Module III: Stereochemistry (6 Hours)

Symmetry and chirality, Isomerism; diastereomers, enantiomers, optical activity, absolute configurations of one chiral carbons and conformational analysis of ethane.

Module IV: Polymers (6 Hours)

Introduction; Polymerization; Addition and Condensation Polymerization. Thermosetting and Thermoplastic Polymers. Molecular Weight of Polymer; Rubber, Plastic and Fiber; Preparation, Properties and uses of PMMA, Polyester, Epoxy Resins and Bakelite, Silicone Polymers.

Module V: Water Chemistry (6 Hours)

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Caustic embrittlement, Boiler feed water, boiler problems; scale, sludge, Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment, Water softening processes; Lime – soda process, Ion exchange method. Water for domestic use.

Module VI: Instrumental Methods of analysis (8 Hours)

Introduction; Principles of spectroscopy; Laws of absorbance,
IR: Principle, Instrumentation and Application
UV: Principle, Instrumentation and Application
NMR: Principle, Instrumentation and Application

Course Outcomes:

After successful completion of the course students will have the knowledge and skill to:

- Apply the principles of chemical sciences to understand the very basic bonding mechanism, thermodynamic requisites and energetic consideration of reactions. Application of engineering materials in different situations such as boiler corrosion, polymer science etc.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

A: Attendance CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination

Text & References:

1. Keeler, J., De Paula, J., Atkins, P. W. (2018). Atkins' Physical Chemistry. United Kingdom: Oxford University Press. ISBN 9780198814740
2. Rattan, S. Engineering Chemistry, Arihant Publication. ISBN: 8190691910
3. Plane, R. A., Sienko, M. J. (1979). Chemistry: Principles and Applications. Japan: McGraw-Hill. ISBN 9780070573215
4. Mohan, J. (2004). Organic Spectroscopy: Principles and Applications. United Kingdom: Alpha Science. ISBN 9780849339523
5. Jain, P.; Jain. Engineering Chemistry. (2020). India: Dhanpat Rai Publishing Company (P) Limited. ISBN 978-9352165728
6. Vollhardt, P., Schore, N., Vollhardt, K. P. C. (2018). Organic Chemistry: Structure and Function. United Kingdom: Macmillan Learning. ISBN 9781319187712

Annexure 2

PROGRAMMING FOR PROBLEM SOLVING

Course Code: CSE 104 **Credit Units: 03**

Total Hours: 30

Course Objective:

The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

Course Contents:

Module I: Introduction to Programming: (3 Hours)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/ Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Module II: Programming Essential: (8 Hours)

Arithmetic expressions and precedence, Conditional Branching and Loop, Writing and evaluation of conditionals and consequent branching , Iteration and loops.

Module III: Arrays: (4 Hours)

Arrays (1-D, 2-D), Character arrays and Strings.

Module IV: Basic Algorithms: (3 Hours)

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

Module V: Function: (3 Hours)

Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

Module VI: Recursion: (3 Hours)

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Module VII: Structure: (2 Hours)

Structures, Defining structures and Array of Structures.

Module VIII: Pointers: (2 Hours)

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Module IX: File handling: (2 Hours)

Basics of file Handling.

Course Outcomes:

The student will learn

- To formulate simple algorithms for arithmetic and logical problems.
- To translate the algorithms to programs (in C language).
- To test and execute the programs and correct syntax and logical error
- To implement conditional branching, iteration and recursion.
- To decompose a problem into functions and synthesize a complete program using divide and conquer

approach.

- To use arrays, pointers and structures to formulate algorithms and programs.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
- To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
- Brian W. Kernighan and Dennis M. Ritchie, the C Programming Language, Prentice Hall of India

Annexure 2

BASIC CIVIL ENGINEERING & APPLIED MECHANICS

Course Code: CIV 101 **Credit Units: 02**

Total Hours: 20

Course Objectives:

- To understand the utility of various types of building materials.
- To understand the location, construction detail and suitability of various building elements.
- To determine the location of object on ground surface.
- To understand the effects of system of forces on rigid body in static conditions.
- Introduction to smart city and its component.

Course contents:

Module I: Building Materials: (4 Hours)
Stones, bricks, cement, timber - types, properties, test & uses, Introduction of concrete properties & Laboratory tests on concrete, curing of concrete and mortar Materials.

Module II: Surveying & Positioning: (4 Hours)
Introduction to surveying, Survey stations, Measurement of distances; conventional and EDM methods, Measurement of directions by different methods, Measurement of elevations by different methods, reciprocal levelling.

Module III: Smart City: (4 Hours)
Elements of smart city, Role of experts of various discipline of engineering in the development of smart city. Concept of green buildings, including rainwater harvesting, non-conventional sources of energy, Smart transportation and drainage system.

Module IV: Forces and Equilibrium: (4 Hours)
Graphical and Analytical Treatment of Concurrent and non-concurrent coplanar forces, free body Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses, method of joints, method of Sections.

Module V: Centre of Gravity and moment of Inertia: (4 Hours)
Centroid and Centre of Gravity, Moment of Inertia of Composite section. Support Reactions, Shear force and bending moment diagram for cantilever & simply supported beam with concentrated, distributed load and Couple.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Explain concepts and terminologies of building materials, surveying and mechanics.
- Apply various methods for surveying and mechanics.
- Determine the location, area and volume of objects on ground surface.
- Solve the problems of surveying and mechanics by using various methods.
- Analyse the effects of system of forces on rigid bodies in static conditions.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- Surveying, Vol. – 1, Punmia B.C., Laxmi Publications, 17th edition, 2016
- Building Material, B. C. Punmia, Laxmi Publications,2016
- A textbook of Engineering Mechanics, D. S. Kumar, Katsons Publications, 2013
- Basic Civil Engineering, S. Ramamrutam & R. Narayan, Dhanpat Rai Pub., 3rd edition, 2013
- Applied Mechanics, Prasad I.B., Khanna Publication 17th edition, 1996
- Surveying, Duggal, Tata McGraw Hill New Delhi, 4th edition, 2013
- Engineering Mechanics - Statics & Dynamics, R.C. Hibbler, Pearson Publications, 14th edition, 2015
- Engineering Mechanics - statics dynamics, A. Boresi & Schmidt, Cengage learning,1st edition, 2008.
- Applied Mechanics, R.K. Rajput, Laxmi Publications, 3rd edition, 2016

Annexure 2

APPLIED CHEMISTRY LAB

Course Code: CHE 121 **Credit Units: 01**
Total Hours: 20

Course Objective:

Principles of chemistry relevant to the study of science and engineering have clarity of understanding through experiments. Learning process and learning outcomes get enhanced through experiments relevant to and commensurate with theoretical knowledge. The lab course is designed to teach the students the basics and advanced chemical principles through experiments.

Four basic sciences, Physics, Chemistry, Mathematics and Biology are the building blocks in engineering and technology. Chemistry is essential to develop analytical capabilities of students, so that they can characterize, transform and use materials in engineering and apply knowledge in their field. All engineering fields have unique bonds with chemistry whether it is Aerospace, Mechanical, Environmental and other fields; the makeup of substances is always a key factor, which must be known. For electronics and computer science engineering, apart from the material, computer modeling and simulation knowledge can be inherited from the molecule designing. The upcoming field of technology like Nanotechnology and Biotechnology depends fully on the knowledge of basic chemistry. With this versatile need in view, course has been designed in such a way so that the student should get an overview of the whole subject starting from the very basic application of principles.

Course Contents:

List of experiments: [Any 10]

1. Chemical analysis of water for determination of hardness. (2 Hrs)
2. Chemical analysis of water for determination of Alkalinity. (2 Hrs)
3. Chemical analysis of water for determination of residual Chlorine. (2 Hrs)
4. Synthesis of urea - formaldehyde resin. (2 Hrs)
5. Determination of dissolved oxygen in water. (2 Hrs)
6. Determination of surface tension of a given liquid. (2 Hrs)
7. Plant pigments separation by paper chromatography. (2 Hrs)
8. Conductometric titration. (2 Hrs)
9. Determination of water modules of crystallization in Mohr's salt. (2 Hrs)
10. Application of distribution law in the determination of equilibrium constant. (2 Hrs)
11. Determination of amount of Oxalic acid and Sulphuric acid in one litre of solution. (2 Hrs)
12. pH metric titration. (2 Hrs)

Course Outcome:

The students will learn to measure molecular/system properties such as:

- Surface tension.
- Viscosity.
- Conductance of solutions.
- Redox potentials.
- Dissolved oxygen, Chloride content of water etc.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test, S/V/Q: Seminar/Viva/Quiz, HA: Home Assignment, EE: End Semester Examination

Text & References:

1. Pandey O.P. & et Al. Practical Chemistry (2010), S. Chand New Delhi. ISBN:978-8121908122.
2. Das, Subash Chandra. Advanced practical chemistry, 3/e rev. / Kolkata Quality Printing 2003
3. Vogel's Quantitative Chemical Analysis. (2009). India: Pearson Education. ISBN 9788131723258
4. S K Bhasin & Sudha Rani. Laboratory Manual on Engineering Chemistry.(2019); Dhanpat Rai Publishing Company. ISBN: 978-8187433132
5. Experiments in Applied Chemistry, Dr. Sunitta Rattan; CATSON Book Publishers.

Annexure 2

PROGRAMMING FOR PROBLEM SOLVING LAB

Course Code: CSE 124 **Credit Units: 02**
Total Hours: 40

Course Objective:
The objective of this course module is to acquaint the students with the basics of programming in C.

Course Contents:
Lab Experiments are based on the course Programming For Problem Solving (CSE 104)

List of experiments/demonstrations:

Tutorial 1: Problem solving using computers: **(2 Hours)**
Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions: **(2 Hours)**
Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions: **(4 Hours)**
Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops: **(4 Hours)**
Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting**: (4 Hours)**
Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings**: (4 Hours)**
Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value: **(4 Hours)**
Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration): **(4 Hours)**
Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls: **(4 Hours)**
Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation: **(4 Hours)**
Lab 11: Pointers and structures

Tutorial 12: File handling: **(4 Hours)**
Lab 12: File operations

Laboratory Outcomes:

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to declare pointers of different types and use them in defining self- referential structures.
- To be able to create, read and write to and from simple text files.

Annexure 2

Examination Scheme:

IA			EE			
A	**PR**	**Practical Based Test**	**Major Experiment**	**Minor Experiment**	**LR**	**Viva**
5	10	15	35	15	10	10

Note: IA –Internal Assessment, EE- External Exam, A- Attendance, PR- Performance, LR – Lab Record, V – Viva.

Annexure 2

COMMUNICATION SKILLS-I

Course Code: BCU 141 **Credit Units: 01**
Total Hours: 10

Course Objective:
The course is intended to familiarize students with the basics of English language and help them to learn to identify language structures for correct English usage.

Prerequisites: NIL

<table>
<tr><td colspan="3">Course Contents / Syllabus:</td></tr>
<tr><td>1.</td><td>Module I Essentials of English Grammar</td><td>30% Weightage</td></tr>
<tr><td></td><td>• Common Errors
• Parts of Speech
• Collocations, Relative Pronoun
• Subject-Verb Agreement
• Articles
• Punctuation
• Sentence Structure- ‘Wh’ Questions</td><td></td></tr>
<tr><td>2.</td><td>Module II Written English Communication</td><td>30% Weightage</td></tr>
<tr><td></td><td>• Paragraph Writing
• Essay Writing</td><td></td></tr>
<tr><td>3.</td><td>Module III Spoken English Communication</td><td>30% Weightage</td></tr>
<tr><td></td><td>• Introduction to Phonetics
• Syllable-Consonant and Vowel Sounds
• Stress and Intonation</td><td></td></tr>
<tr><td>4.</td><td>Module IV : Prose</td><td>10% Weightage</td></tr>
<tr><td></td><td>“Friends, Romans, Countrymen, lend me your ears” Speech by Marc Antony in Julius Caesar
❖ Comprehension Questions will be set in the End-Semester Exam</td><td></td></tr>
<tr><td>5.</td><td>Student Learning Outcomes:
The students should be able to :
• Identify Common Errors and Rectify Them
• Develop and Expand Writing Skills Through Controlled and Guided Activities
• To Develop Coherence, Cohesion and Competence in Oral Discourse through Intelligible Pronunciation.</td><td></td></tr>
<tr><td>6.</td><td>Pedagogy for Course Delivery:
• Workshop
• Group Discussions
• Presentations
• Lectures
• Extempore</td><td></td></tr>
<tr><td></td><td>Assessment/ Examination Scheme:
<table>
<tr><th>Theory L/T (%)</th><th>Lab/Practical/Studio (%)</th><th>End Term Examination</th></tr>
<tr><td>100%</td><td>NA</td><td>70%</td></tr>
</table>
Theory Assessment (L&T):
<table>
<tr><th>Components (Drop down)</th><th>CIE</th><th>Mid Sem</th><th>Attendance</th><th>End Term Examination</th></tr>
<tr><td>Weightage (%)</td><td>10%</td><td>15%</td><td>5%</td><td>70%</td></tr>
</table></td><td></td></tr>
</table>

Text:
- *Rosenblum, M. How to Build Better Vocabulary, London: Bloomsbury Publication*
- *Verma, Shalini. Word Power made Handy, S. Chand Publications*
- *High School English Grammar & Composition by Wren & Martin*

References:
- *K.K.Sinha , Business Communication, Galgotia Publishing Company.*

Additional Reading: Newspapers and Journals

Annexure 2

ENVIRONMENTAL STUDIES – I

Course Code: EVS 142 **Credit Units: 02**
Total Hours: 20

Course Objective:
The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behavior and the growth, development and maturity of living organisms. At present a great number of environmental issues, have grown and complexity day by day, threatening the survival of mankind on earth. Environment study is quite essential in all streams of studies including environmental engineering and industrial management. The objective of environmental studies is to enlighten the masses about the importance of the protection and conservation of our environment and control of human activities which has an adverse effect on the environment.

Course Contents:

Module I: The multidisciplinary nature of environmental studies: (6 Hours)
Definition, scope and importance

Need for public awareness

Module II: Natural Resources: (8 Hours)
Renewable and non-renewable resources:
Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
Role of an individual in conservation of natural resources.

Equitable use of resources for sustainable lifestyles.

Module III: Ecosystems: (3 Hours)
Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession

Food chains, food webs and ecological pyramids
Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Module IV: Biodiversity and its conservation: (3 Hours)
Introduction – Definition: genetic, species and ecosystem diversity
Biogeographical classification of India
Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values Biodiversity at global, national and local levels

India as a mega-diversity nation, Hot-spots of biodiversity

Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts, Endangered and endemic

species of India

Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Course Outcomes

Upon course completion, students will be able to understand:

- The multidisciplinary nature of environmental studies, including its definition, scope and need for public awareness.
- Our natural resources including renewable and non-renewable resources comprising of forest, water, mineral, food, energy and land resources.
- The ecosystem, their structure and function, energy flow, bio-geochemical cycles, community ecology, ecological succession, ecological pyramids, forest, grassland, aquatic and tundra ecosystem.
- Biodiversity and its conservation.
- Ecosystem diversity, species diversity and genetic diversity.
- Biological classification of India.
- Value of biodiversity.
- Biodiversity at global national and local level.
- Conservation of biodiversity.
- Characteristic of ideal ecosystem.
- Study of an artificial ecosystem.

Examination Scheme:

Components	CT	HA	S/V/Q	A	ESE
Weightage (%)	15	5	5	5	70

Text & References:

- Chauhan B. S. 2009: Environmental Studies, University Science Press New Delhi.
- Dhameja S.K., 2010; Environmental Studies, Katson Publisher, New Delhi.
- Smriti Srivastava, 2011: Energy Environment Ecology and Society, Katson Publisher, New Delhi.
- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopaedia, Jaico Publ. House, Mumbai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd. Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopaedia of Indian Natural History, Bombay Natural History Society, Bombay (R) Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p. McKinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB) Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB) Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

Annexure 2

BEHAVIOURAL SCIENCE - I

Course Code: BSU 143 **Credit Units: 01**
Total Hours: 10

Course Objective:

This course aims at imparting an understanding of:

- Understanding self & process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and its effective on personality
- Building Emotional Competency

Course Contents:

Module I: Self: Core Competency **(2 Hours)**

- Understanding of Self
- Components of Self – Self identity
- Self concept
- Self confidence
- Self image

Module II: Techniques of Self Awareness **(2 Hours)**

- Exploration through Johari Window
- Mapping the key characteristics of self
- Framing a charter for self
- Stages – self awareness, self acceptance and self realization

Module III: Self Esteem & Effectiveness **(2 Hours)**

- Meaning
- Importance
- Components of self esteem
- High and low self esteem
- Measuring your self esteem

Module IV: Building Positive Attitude **(2 Hours)**

- Meaning and nature of attitude
- Components and Types of attitude
- Importance and relevance of attitude

Module V: Building Emotional Competence **(2 Hours)**

- Emotional Intelligence – Meaning, components, Importance and Relevance
- Positive and negative emotions
- Healthy and Unhealthy expression of emotions

Student learning outcomes

- Student will Develop accurate sense of self
- Student will nurture a deep understanding of personal motivation
- Student will develop thorough understanding of personal and professional responsibility
- Student will able to analyse the emotions of others for better adjustment.

Examination Scheme:

Evaluation Components	Attendance	Journal of Success (JOS)	Social Awareness Program (SAP) SAP Report/SAP Presentation	End Semester Exam	Total
Weightage (%)	5	10	15	70	100

Suggested Readings:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

Annexure 2

FRENCH - I

Course Code: FLU144 **Credit Units: 02**
Total Hours: 20

Course Objective:
To familiarize students with the French language, with its phonetic system and its accents.
To enable students

- to greet someone in French
- to present and describe oneself and people
- to enter in contact, and begin a conversation
- to talk about one's family, tastes and preferences

Course Contents:

Dossiers 1, 2 – pg 5-24

Dossier 1 : Toi, moi, nous
Actes de Communication :
S'adresser poliment à quelqu'un, entrer en contact, se présenter, présenter quelqu'un, saluer, poser des questions
simples pour connaître quelqu'un, épeler et compter

Dossier 2 : En famille
Actes de Communication :
Parler de sa famille, Décrire quelqu'un, exprimer ses goûts, écrire et comprendre un message court, inviter
quelqu'un, exprimer la possession, la négation

Grammaire :

1. articles indéfinis, articles définis, masculin et féminin des noms et des adjectifs, pluriel des noms et des adjectifs
2. pronoms sujets et toniques, on, c'est/il est + profession,
3. masculin et féminin des adjectifs de nationalité
4. verbes- être, avoir, aller, 'er' groupe
5. l'interrogation – l'intonation, est-ce que, qui est-ce ? Qu'est-ce que? L'inversion ; où, comment, quand ; quel
6. la négation
7. adjectifs possessifs

Examination Scheme:

Components	INTERNAL				EXTERNAL	GRAND TOTAL
	MID-SEM	VIVA-VOCE	ATTENDANCE	**TOTAL**	**END SEMESTER**	**100**
Weightage (%)	15	10	5	**30**	**70**	

Text & References:

Text:
Le livre à suivre:
· Andant, Christine et al. A propos A1 Livre de l'élève. Grenoble: Presses universitaires de Grenoble, 2010.
· Andant, Christine et al. A propos A1 Cahier d'exercices. Grenoble: Presses universitaires de Grenoble, 2010.
Références :
· Girardeau, Bruno et Nelly Mous. Réussir le DELF A1. Paris: Didier, 2010.

Annexure 2

WORKSHOP/ MANUFACTURING PRACTICES LAB

Course Code: BME 224 **Credit Units: 01**

Total Hours: 20

Course Objective:

The objective of this course is to impart the basic knowledge of Manufacturing methods, CNC machines, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course Contents:

List of experiments/demonstrations:

1. Machine shop **(4 Hours)**
2. Fitting shop **(4 Hours)**
3. Carpentry shop **(2 Hours)**
4. Welding shop **(Arc welding 4 Hours + gas welding 4Hours)** **(6Hours)**
5. Smithy shop **(4 Hours)**

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance