

Credit Based Grading System

Grade	% Marks range (based on absolute marks)	Grade Point	Description of performance
A+	91-100	10	Outstanding
A	81-90	9	Excellent
B+	71-80	8	Very Good
B	61-70	7	Good
C+	51-60	6	Average
C	41-50	5	Satisfactory
D	31-40	4	Marginal
F	30 & below	0	Fail
I		0	Incomplete.
W		0	Withdrawal

1. The Semester Grade Points Average (SGPA) and Cumulative Grade Point Average (CGPA) shall be calculated as under:

$$SGPA = \frac{\sum_{i=1}^n c_i P_i}{\sum_{i=1}^n c_i}$$

Where C_i is the number of credits offered in the i^{th} subject of a Semester for which SGPA is to be calculated, P_i is the corresponding grade point earned in the i^{th} subject, where $i = 1, 2, \dots, n$, are the number of subjects in that semester.

$$CGPA = \frac{\sum_{j=1}^m SG_j NC_j}{\sum_{j=1}^m NC_j}$$

here NC_j is the number of total credits offered in the j^{th} semester, SG_j is the SGPA earned in the j^{th} semester, where $j = 1, 2, \dots, m$, are the number of semesters in that course.

Equivalence of CGPA to division will be on following basis

CGPA Score	Divisions
$7.5 \leq \text{CGPA}$	First Division With Honours
$6.5 \leq \text{CGPA} < 7.5$	First Division
$5.0 \leq \text{CGPA} < 6.5$	II Division
$\text{CGPA} < 5.0$	Fail

The conversion from grade to an equivalent percentage in a given academic program shall be according to the following formula applicable.

$$\text{Percentage marks scored} = \frac{\text{CGPA}^{\text{Obtained}} \times 100}{10}$$

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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBMA-101	Mathematics-I	4(3-1-0)	50	20	30	-	-	100	3 hr	-

COURSE OBJECTIVE:

The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course will also introduce fundamentals of mathematical functions, derivatives and aspects of calculus to students.

Syllabus

UNIT-I

Recapitulation of Mathematics: Basics of Differentiation, Rolle's and Lagranges Theorem, Tangents and Normals, Indefinite Integral (Substitution, Integration using Trigonometric Identity & Integration by Parts & Definite Integral).

UNIT-II

Ordinary Derivatives & Applications: Expansion of functions by Maclaurin's & Taylor's Theorem (One Variable), Maxima and Minima of functions of two variables, Curvature (Radius, Center & Circle of Curvature for Cartesian Coordinates), Curve Tracing.

UNIT-III

Partial Derivatives & Applications: Definition, Euler's Theorem for Homogeneous Functions, Differentiation of Implicit Functions, Total Differential Coefficient, Transformations of Independent Variables, Jacobians, Approximation of Errors.

UNIT-IV

Integral Calculus: Definite Integrals as a Limit of Sum, Application in Summation of series, Beta and Gamma functions (Definitions, Relation between Beta and Gamma functions, Duplication formula, Applications of Beta & Gama Functions).

UNIT-V

Applications of Integral Calculus: Multiple Integral (Double & Triple Integrals), Change of Variables, Change the Order of Integration, Applications of Multiple Integral in Area, Volume, Surfaces & Volume of Solid of Revolution about X-Axis & Y-Axis.

OUTCOMES:

- This course equips students to have basic knowledge and understanding in one fields of materials, integral and differential calculus.

REFERENCES:

1. Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002 (Indian Edition).
2. B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007. Potter, Goldberg & Edward, Advanced Engineering Mathematics, Oxford University Press.
3. S. S. Shastry, Engineering Mathematics, PHI Learning
4. C.B. Gupta, Engineering Mathematics I & II, McGraw Hill India, 2015

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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Chemistry

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBCH-101	Chemistry	4(2-1-1)	50	20	30	25	25	150	3hr	2hr

COURSE OBJECTIVE:

The objective of this foundational course is to develop general familiarity and understanding with the following areas in chemistry: inorganic, organic, physical chemistry, electrochemistry, photochemistry and Thermo chemistry. The course also intended to make students work effectively and safely in the laboratory working environment. Last portion of curriculum addresses critical thinking and numerically analyzing the chemical problems.

Syllabus

UNIT-I

Molecular Structure & Bonding: VSEPR Model, Valance-Bond Theory, Molecular Orbital Theory, Molecular Orbital of Polyatomic Molecules.

Electrochemistry: Arrhenius theory of electrolytic dissociation, Transport Number, Kohlrausch's Law, Solubility Product, Redox Reaction, Electrochemical & Concentration Cells.

UNIT-II

Chemical & Phase Equilibrium: Phase Diagram for single component system (Water), Phase diagram for Binary Eutectic System (Copper-Silver), Corrosion of metals in acids, Corrosion by Oxygen, Corrosion by Metal Contact.

Reaction Dynamics: Order, Molecularity, Rate Law, Methods of determining order of reaction (1st & 2nd Order).

UNIT-III

Polymers & Polymerization: Monomers, Polymers, their classification, thermoplastics & thermosetting with examples, Bio-Polymerization, Bio-Degradable

Polymerization, Preparation, Properties & Technical Applications of PVC, PVA, Teflon, Nylon6, & Nylon6:6, Polyester, Phenol-Formaldehyde, Urea-Formaldehyde, Natural & Synthetic Rubber, Vulcanization of Rubber.

UNIT-IV

Photochemistry: Photo-excitation of organic molecules, Jablonski Diagram, Laws of Photochemistry and quantum yield, some examples of photochemical reactions, chemistry of vision and other applications of photochemistry.

Thermo chemistry: Fundamental concept of first law, work, heat, energy and enthalpies, relation between C_v & C_p . Second Law: Entropy, Free Energy, (The Helmholtz and Gibbs) and chemical potential.

UNIT-V

Numerical problems based on water analysis and water softening process. Determination of hardness by complexometry, Alkalinity and its determination and their relevant numerical problems, testing of lubricating oils, viscosity and viscosity index, flash & fire point, cloud & pour point, Aniline Point, Carbon Residue, Steam-emulsion number, Neutralization number, Saponification number.

OUTCOMES:

- The knowledge gained on polymer chemistry, thermodynamics. spectroscopy, phase rule and Nano materials will provide a strong platform to understand the concepts on these subjects for further learning.

LIST OF EXPERIMENTS

As per suggested by the course coordinator.

REFERENCES

1. Lee, J. D, Author, Concise Inorganic Chemistry, Oxford University Press Albery.
2. R. A., Physical Chemistry, John Wiley and Sons.
3. N. Krishnamurthy, P. Vallinayagam, Engineering Chemistry, PHI Learning Pvt. Ltd. Kuriacose J.C. and Rajaram J., Chemistry in Engineering and Technology, Tata McGraw Hill.

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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: English

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBEN-101	English	4(3-0-1)	50	20	30	25	25	150	3 hr	2hr

COURSE OBJECTIVE:

The objective of this foundational course is to develop the second language learners' ability to use the four fundamental language skills – listening, speaking, writing and reading. The objective of this laboratory is to practice English phonetics through audio & visual aids and computer software. It intends to enable student to speak English correctly with confidence.

Syllabus

UNIT-I

Grammar – Applied Grammar and usage, Parts of Speech, Articles, Tenses, Subject-Verb Agreement, Prepositions, Active and Passive Voice, Reported Speech: Direct and Indirect, Sentence Structure, Punctuations.

UNIT-II

Vocabulary Development – Using Dictionaries and Thesaurus, Synonyms, Antonyms, Homophones, One Word Substitution, Affixation: Prefixes & Suffixes, Derivation from root words, Jargon, Scientific Jargon.

UNIT-III

Developing Reading Skills – Reading Comprehension, Process, Active & Passive Reading, Reading Speed Strategies, Benefits of effective reading, note-making, note-taking, Reading comprehension of technical material and SQ3R reading technique.

UNIT-IV

Developing Writing Skills – Planning, Drafting & Editing, Writing with style, right-words selection, writing effective sentences, developing logical paragraphs, art of condensation, précis, essay, technical definition and technical description.

UNIT-V

Business Correspondence – Business Letters, Parts & Layouts of Business Letters, Writing Resume/ Application Calling/ Sending Quotations/ Orders/ Complaints and E-mails.

OUTCOMES:

Learners should be able to

- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.
- Listen/view and comprehend different spoken discourses/excerpts in different accents

Topics for the Laboratory:

1. Basic Grammar & Vocabulary Practice (Synonyms, Antonyms, Analogies, Sentence Completion, Correctly Spelt Words, Idioms, Proverbs, Common Errors.
2. Phonetic Symbols, Pronunciations
3. Listening Skills – Including Listening Comprehension
4. Extempore and JAM (Just a Minute Session)
5. Role Play – I
6. Role play – II
7. Body Language
8. Debate
9. Oral Presentation – Preparation & Delivery using Audio – Visual Aids with stress on body language and voice modulations. (Topics to be selected by the Instructor)

REFERENCES

1. A.J. Thomson and A.V. Martinet, A Practical English Grammar, Oxford IBH
 2. Pub Sanjay Kumarm Pushp Lata, English for Effective Communication, Oxford
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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBCE-101	Engineering Mechanics	4(2-1-1)	50	20	30	25	25	150	3 hr	2hr

COURSE OBJECTIVE:

1. To familiarize with different branches of mechanics
2. To familiarize with Static equilibrium of particles
3. To familiarize with Properties of surfaces and volumes.
4. To familiarize with fundamental concepts of dynamics

Syllabus

UNIT-I

Coplanar Concurrent Forces: Introduction to Engineering Mechanics: What is Engineering Mechanics? Classification of Engineering Mechanics, Statics, Dynamics, Kinematics, Kinetics etc. Fundamental Laws of Mechanics.

UNIT-II

Resolution and Composition of Forces: Force, Pressure and Stress, Free Body Diagram, Bow's Notation, Characteristics and Effects of a Force, System of Forces, Resolution of a Force, Composition of Forces, Resultant / Equilibrant Force, Law of Parallelogram of Forces, Law of Triangle of Forces, Polygon Law of Forces, Lami's Theorem, Equilibrium of a Body Under Two / Three/More Than Three Forces. Law of Superposition of Forces.

UNIT-III

Coplanar Non Concurrent Forces: Moment of a Force, Principle of Moments/ Varignon's Theorem, Parallel Forces : Resultant of Parallel Forces, Couple: Moment of a Couple, Resolution of Force into a Couple. Coplanar Non Concurrent Forces: Resultant of Coplanar, Non Con-Current Forces.

UNIT-IV

Beams: Types of Beams: Simply Supported Beam, Overhanging Beam, Cantilever Beam. Types of Supports of a Beam or Frame: Roller, Hinged and Fixed Supports. Load on the Beam or Frame: Different Types of Loading. Support Reaction of a Beam or Frame: Analytical Method. Truss Analysis: Method of Joints & Sections.

UNIT-V

Centroid and Centre of Gravity: Centroid, Centre of Gravity, Determination of Centroid of Simple Figures, Centroid of Composite Sections. Centre of Gravity of Solid Bodies. Area Moment of Inertia: Basic Concept of Inertia, Definition of Moment of Inertia, Theorems of Moment of Inertia, Radius of Gyration, Polar Moment of Inertia of Standard Sections, Moment of Inertia of Composite Section, Principal Moment of Inertia, Mass Moment of Inertia.

Introduction to Dynamics: Overview of Dynamics, Basic Concepts and Terms Used in Dynamics, Motion, Types of Motion, Newton's Laws of Motion, Newton's Law of Gravitation.

OUTCOMES:

- Ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration.
- Ability to analyse the forces in any structures.
- Ability to solve rigid body subjected to dynamic forces.

LIST OF EXPERIMENTS

As per suggested by the course coordinator.

REFERENCES

1. K.L Kumar, Engineering Mechanics, Tata McGraw- Hill Education.
2. Ferdinand. P. Beer. E, Russell Johnston Jr., David Mazurek, Philip J Cornwell, "Vector Mechanics for Engineers: Statics and Dynamics" McGraw - Hill
3. Timoshenko, and Young, "Engineering Mechanics", Tata Mc-Graw Hill.
4. P.N. Chanchandramouli, Engineering Mechanics, PHI Learning Private Limited.

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBME-102	Engineering Graphics	4(2-0-2)	50	20	30	25	25	150	3 hr	2hr

COURSE OBJECTIVE:

1. To familiarize with the construction of geometrical figures.
2. To familiarize with the projection of 1D, 2D and 3D elements .
3. To familiarize with the sectioning of solids and development of surfaces.
4. To familiarize with the Preparation and interpretation of building drawing .

Syllabus

UNIT-I

Projections of Points, Straight Lines and Planes: Types and use of Lines, Lettering & Dimensioning, Various types of projection System, Projection of Points in different quadrants, projections of lines and planes for parallel, perpendicular & inclined to horizontal and vertical reference planes.

UNIT-II

Projections Solids and Development of Surfaces: Cylinder, Cone, Pyramid, & Sphere with axes parallel, perpendicular & inclined to both reference planes. Development of surfaces of various solids. Sections of Solids Section planes, Sectional views, True shape of Sections for Prism, Cylinder, Pyramid, and Cone & Sphere. Orthographic Projections of Simple objects and Machine Components like Bolts and Screw.

UNIT-III

Isometric projections: Isometric scales, isometric views of Simple objects.

UNIT-IV

Introduction to computer-aided drafting (CAD): Cartesian and Polar Co-ordinate system, Absolute and Relative Co-ordinates systems; Basic drawing commands: Line, Point, Rectangle, Polygon, Circle, Arc, Ellipse, Polyline; Basic editing Commands: Basic Object Selection Methods, Window and Crossing Window, Erase, Move, Copy, Offset, Fillet, Chamfer, Trim, Extend, Mirror. Display Commands: Zoom, Pan, Redraw, and Regenerate; Simple dimensioning and text, Simple exercises.

UNIT-V

Solid Modelling: Basics of 2-D solid modeling.

OUTCOMES:

On Completion of the course the student will be able to

- Perform free hand sketching of basic geometrical constructions and multiple views of objects.
- Do orthographic projection of lines and plane surfaces.
- Draw projections and solids and development of surfaces.
- Prepare isometric and perspective sections of simple solids.
- Demonstrate computer aided drafting.

LIST OF EXPERIMENTS

Drawing for topics covered in the theory as suggested by the course coordinator.

REFERENCES

1. N.D. Bhatt and V.M.Panchal, Engineering Drawing Plane and Solid Geometry, Charotar Publishing House.
2. James leach, AutoCAD 2015 Instructor, SDC Publications.

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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Chemistry

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBCH-102	Environmental Sciences.*	2(1-0-1)*	-	-	-	-	100	100		-

COURSE OBJECTIVE:

This course introduces students to environment concerns. Students are expected to learn about environment, factors affecting it, environmental ethics and its protection through lectures, presentations, documentaries and field visits.

SYLLABUS

UNIT-I

Definition, Scope & Importance, Need For Public Awareness- Environment definition, Eco system - Balanced ecosystem, Human activities - Food, Shelter, Economic and social Security.

Effects of human activities on environment- Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment. Sustainable Development.

UNIT-II

Natural Resources- Water Resources, Availability and Quality aspects.

Water borne diseases, Water Induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth, Material cycles- Carbon, Nitrogen and Sulphur Cycles.

Energy-Different types of energy, Electro-magnetic radiation.

Conventional and Non-Conventional sources - Hydro Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Bio.gas. Hydrogen as an alternative future source of Energy.

UNIT-III

Environmental Pollution and their effects. Water pollution, Land pollution.

Noise pollution, Public Health aspects, Air Pollution, Solid waste management, e-waste management
Current Environmental Issues of Importance: Population Growth, Climate Change and Global warming- Effects, Urbanization, Automobile pollution. Acid Rain Ozone Layer depletion, Animal Husbandry,

UNIT IV

Environmental Protection- Role of Government, Legal aspects, initiatives by Non-governmental organizations (NGO), Environmental Education, Women Education.

UNIT-V

Introduction of government policies and green economy: Introduction to GST-CGST and SGST, Swachh Bharat Abhiyan- initiatives, responsibilities and future aspects , Cash-less economy-modes of payment-money transfer(advantages and disadvantages) , Making in India concept.

COURSE OUTCOMES:

On completion of this course, students will be able to

- Describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- critically analyze technical subject matter (written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical /research problems in new contexts

REFERENCES

- 1.R. Rajagopalan, Environmental Studies, Oxford IBH Pub, 2011.
- 2.Kogent Learning Solutions Inc., Energy, Environment, Ecology and Society, Dreamtech, 2012.
- 3.Rag, R. L, Ramesh, Lekshmi Dinachandran, Introduction to sustainable engineering

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBME-101	Introduction to Mechanical Engineering.*	2 (0-0-2)	-	-	-	-	100	100	-	3hr

COURSE OBJECTIVE:

This course introduces students to mechanical engineering and its sub-domains. Students are expected to learn about scope, current and future trends, jobs, innovations & research opportunities in the field of mechanical engineering. Course content will be covered through lectures, assignments, case-studies, presentations, documentaries and field visits.

Syllabus

UNIT-I

What is Engineering, Who are Mechanical Engineers, Overview of Mechanical Engineering, its domains, scope and its utility in different areas; Specializations available with in mechanical Engineering (thermal, production and design) and job opportunities in mechanical Engineering.

UNIT-II

Basic definitions of terms related to Thermodynamics, First and Second law of Thermodynamics, Properties of Steam, Introduction to Boilers, Terminology of IC Engines, Two and Four Stroke Petrol and Diesel Cycle.

UNIT-III

Introduction to mechanical properties, basic manufacturing processes, pattern, type and its use in metal casting, Introduction of welding, brazing and soldering processes

UNIT-IV

Case study on any topic from Manufacturing Engineering Magazine Published by Society of Manufacturing Engineers (USA), Machinist Magazine, Technorama

published by Institution of Engineers (India) and Manufacturing Today and any other magazine related to mechanical engineering..

UNIT-V

Overview of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Society of Automotive Engineers, American Society of Mechanical Engineers (ASME); Indian Society of Mechanical Engineers (ISME) etc ; Emerging areas and new technologies in the field of mechanical engineering (3D Printing)

COURSE OUTCOMES:

On completion of this course, students will be able to

- Utilize the understanding in designing and assess the performance of heat engines and utilize various thermodynamic cycles and its applications.
- Select the suitable thermal devices for the specified industrial applications.
- appreciate and check the working of IC engines taking environmental issue and performance into consideration

REFERENCES

1. Jonathan Wickert, Kemper Lewis, An Introduction to Mechanical Engineering, CENGAGE Learning.
2. Michael Clifford, Kathy Simmons, Philip Shipway, An Introduction to Mechanical Engineering: Part 1 and Part 2, Taylor and Francis.

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: English

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBEN-102	Communication.*	2 (0-0-2)*	-	-	-	-	100	100	-	3hr

COURSE OBJECTIVE:

The objective of this course is to help students to acquire reading and writing skills in a self-learning mode.

Syllabus

- Students are advised to read at least 3 books (novels, short stories, poems) written in English by authors of Indian origin.
- Genres may range from *Art, Culture, Business, Classics, Psychology, Travel, Science, Sports and Poetry* leaving aside all other genres.
- Students are expected to read actively and critically.
- Each student will have to make a separate choice of books depending upon his/ her interest at the time of course-registration in consultation with the course coordinator.
- Course Coordinator while recommending a book must ensure the book's level to be at least above 10th standard.
- The set of books *must contain at least one book covering following themes:*
 - a. Biography or Autobiography of any of the eminent Indian in the field of science, technology, engineering and sports

OR

- b. Books by Indian Industrialists/ Innovators in the areas of science, technology and engineering
- Any book(s) that is objectionable or is banned by the *Government of Madhya Pradesh* for any reasons whatsoever will not be permitted for the course.
 - One book is expected to be read in a period of not more than *20 days* after which students have to submit a *hand-written* review briefing the following aspects:
 - i. Relevance of the book title to the content
 - ii. About the main character and other characters
 - iii. Setting of the book

- iv. Main Idea/ Theme of the book
- v. Write précis and make presentation in consultation with the teacher
- vi. Write 3 quotations from the book
- vii. Message of the book and the student take away

COURSE OUTCOMES:

On completion of this course, students will be able to

- establish a basic understanding of grammar
- learn the basic vocabulary
- improve basic technical writing skills
- think and write creatively for comparatively smaller tasks
- develop reading and understanding skills with respect to skimming and scanning.

REFERENCES

1. My Experiments with Truth by Mahatma Gandhi.
2. Wings of Fire by Dr. APJ Abdul Kalam.
3. History of Everything by Stephen Hawkings
4. A Passage to India by E.M. Forster.
5. The Argumentative Indian by Amartya Sen.
6. The Old Man and the Sea by Ernest Hemingway.
7. Life of Pi by William Dalrymple.
8. The Alchemist by Paulo Coehlo.
9. The Eighth Habbit by Stephen Covey.
- 10 .The Road Less Travelled by M.Scott Peck.

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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBMA-201	Mathematics-II	4 (3-1-0)	50	20	30	-	-	100	3 hr	-

COURSE OBJECTIVE:

The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course deep understanding of matrix, differential equations as well as a strong sense of how useful the subject can be in other disciplines of learning.

SYLLABUS

UNIT-I

Matrices & Linear Systems: Rank of a Matrix (By reducing it to Elementary Transformation, Echelon & Normal Forms), Solution of Simultaneous equations by Elementary Transformation Methods, Consistency & Inconsistency of Equations, Eigen Values & Eigen Vectors, Cayley- Hamilton Theorem.

UNIT-II

Ordinary Differential Equations-I: First-order differential equations (Separable, Exact, Homogeneous, Linear), Linear differential Equations with constant coefficients.

UNIT-III

Ordinary Differential Equations-II: Homogeneous linear differential equations, Simultaneous linear differential equations. Second-Order Linear Differential Equations with Variable Coefficients: Solution by Method of Undetermined Coefficients, ByS Known Integral, Removal of First Derivative, Change of Independent Variable and Variation of Parameters.

UNIT-IV

Partial Differential Equations-I: Definition, Formulation, Solution of PDE (By Direct Integration Method & Lagranges Method), Non-Linear Partial Differential Equation of First order {Standard I, II, III & IV), Charpit's General Method of Solution Partial

Differential equations.

UNIT-V

Partial Differential Equations-II: Partial Differential Equations with Constant Coefficients (Second and Higher Orders Homogeneous and Non- Homogeneous equations), Partial differential Equations Reducible to equations with constant coefficients, The Method of Separation of Variables.

OUTCOMES

- The understanding of the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.

REFERENCES:

1. Dean G. Duffy, Advanced Engineering Mathematics with MATLAB, CRC Press, 2013. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons Inc.
2. Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002 (Indian Edition).
3. B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007. Shanti Narayan, A Course of Mathematical Analysis. S.Chand & Co. Delhi.
4. Marwaha, Introduction to Linear Algebra, PHI Learning.

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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Physics

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theor y	Pract ical
			Major	Mino r	Sessi onal.	End Sem	Lab Work			
TBPH-101	Physics	4 (2-1-1)	50	20	30	25	25	150	3 hr	2hr

Syllabus

UNIT-I

Elasto-dynamics: Simple Harmonic Motion, Electric Flux, displacement vector, Columb law, Gradient, Divergence, Curl, Gauss Theorem, Stokes theorem, Gauss law in dielectrics, Maxwell's equation: Integral & Differential form in free space, isotropic dielectric medium.

Lasers: Properties of lasers, types of lasers, derivation of Einstein A & B Coefficients, Working He-Ne and Ruby lasers.

UNIT-II

Fibre Optics: Light guidance through optical fibre, types of fibre, numerical aperture, V-Number, Fibre dispersion (through ray theory in step index fibre), block diagram of fibre optic communication system.

UNIT-III

Quantum Mechanics: Black body radiation, ultraviolet catastrophe, Crompton effect, plates theory of radiation, phase and group velocity, particle in a box, uncertainty principle, well-behaved wave equation, Schrodinger equation, application to particle in a box.

UNIT-IV

Optics: Interference, division of amplitude & division of wave front, young's double slit experiment, thin film interference, Newton Ring Experiment. Diffraction: Difference between interference and diffraction, types of diffraction, single slit,

double slit & n-slit diffraction, Resolving power of grating.

UNIT-V

Semiconductors: Crystalline and Amorphous solids, Band theory of solids, mobility and carrier concentrations, properties of P-N junction, Energy bands, hall effect, VI characteristics of photodiode, zener diode and photovoltaic cell

Nuclear Physics: Nuclear composition, mass defect, binding energy, nuclear force, liquid drop model, elementary idea about nuclear fission and fusion.

OUTCOMES:

- The students will have knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

LIST OF EXPERIMENTS:

Experiments as suggested by the course coordinator.

REFERENCES

A Bezier, Concepts of Modern Physics, McGraw Hills
Ghatak, Optics, McGraw Hills

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Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBME-203	Fundamentals Of Mechanical Engineering	3 (1-1-1)	50	20	30	25	25	150	3 hr	2hr

COURSE OBJECTIVE:

1. To familiarize with the basic concept of Mechanical Engineering
2. To familiarize with the scope of Mechanical Engineering
3. To familiarize with the job prospects of Mechanical Engineer.

Syllabus

UNIT-I

MECHANICAL PROPERTIES AND DEFORMATION MECHANISM: Mechanisms of plastics deformation, slip and twinning- Types of fracture Mechanical Properties of Materials , Testing of materials under tension, compression and shear loads Hardness tests (Brinell, Vickers and Rockwell) Impact test Izod and Charpy test Fatigue and creep failure Mechanism. Ferrous and Non-ferrous materials Non-Metallic Materials, Alloys and Phase diagram

UNIT-II

POWER GENERATION: External and Internal Combustion engines Auto, Diesel & Dual Cycles Comparative Study- Hydro, Thermal and nuclear power plant (layout, element/component description, advantages, disadvantages and applications). Simple Problem. Introduction to Steam, Water and gas Turbines, Basics of Rankine & joules cycle, centrifugal pumps.

UNIT-III

MACHINE ELEMENTS: Springs: Helical and leaf springs, Springs in Series and Parallel, Cams: Types of Cams and followers Cam profile power Transmission,

Gears (terminology, Spur, helical and bevel gears, gear trains. Belt drives: types Chain drives Simple problems. Introduction to Mechanisms, four bar chain, Inversions.

UNIT-IV

THERMAL ENGINEERING: Basic concepts of thermodynamics, Concept of system, Introduction to Zeroth, First and Second law of Thermodynamics, Salient features of steam boilers, accessories and mountings, High pressure boilers Basic modes of heat transfer, Fourier's Law, Stefan's Boltzmann's Law, Newton's law. Concept of refrigeration and air-conditioning, Ton of refrigeration, COP, Working of domestic refrigerator and air-conditioner.

UNIT-V

MANUFACTURING PROCESSES: Sheet Metal Work processes (applications, advantages/ disadvantages). Welding Types- Equipment- Tools and Accessories Techniques employed- Applications, advantages/disadvantages. Gas cutting- Brazing and Soldering. Lathe Practice: Types- Description of main Components- Cutting tools- Work Holding Devices, Basic Operation of lathe. Simple Problems Drilling Practices: Introduction- Types and Description of tools. Simple Problems

COURSE OUTCOMES:

At the end of this course students will:

- Able to do thermodynamic analysis of cycles.
- Understand the construction, operation and performance of different IC engines.
- Various components and operations of different types of power plants will be understood.

LIST OF EXPERIMENTS:

Experiments as suggested by the course coordinator.

EVALUATION:

Evaluation will be the continuous an integral part of the class as well through external assessment.

REFERENCES

1. D.S Kumar, Basic Mechanical Engineering, Katson publication.
2. R.K. Rajput, Basic Mechanical Engineering, Laxmi Publication.
3. P.K. Nag, Basic Mechanical Engineering, TMH Publication.
4. R.K. Rajput, Manufacturing Technology, Laxmi Publication
5. Michael Clifford, Kathy Simmons, Philip Shipway, An Introduction to Mechanical Engineering: Part 1 and Part 2, Taylor and Francis.

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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Electronics & Communication Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBEC-101	Introduction to Electronics Engineering	3 (1-1-1)	50	20	30	25	25	150	3 hr	2hr

Syllabus

UNIT-I

SIGNALS: Introduction, Representation of Discrete-time Signals: Graphical Representation, Functional Representation, Tabular Representation, Sequence Representation. Elementary Signals: Unit Step Function, Unit Ramp Function, Unit Parabolic Function, Unit Impulse Function, Sinusoidal Signal, Real Exponential Signal, Complex Exponential Signal, Rectangular Pulse Function, Triangular Pulse Function, Signum Function, Sinc Function, Gaussian Function. Basic Operations on Signals: Time Shifting, Time Reversal, Amplitude Scaling, Time Scaling, Signal Addition, Signal Multiplication. Classification of Signals: Deterministic and Random Signals, Periodic and Non-periodic Signals, Energy and Power Signals, Causal and Non-causal Signals, Even and Odd Signals.

UNIT-II

DIODE AND ITS CIRCUITS: Introduction to Semiconductor theory: Classification of materials- Insulators, conductors and semiconductors and their Energy Bands, Types of semiconductors- Intrinsic, Extrinsic. PN Junction Diode: Biasing and operation of PN Diode, V-I characteristics, Limiting Values of PN Diode, Breakdown in PN Diode, Applications of PN Diode.

Zener Diode: V-I Characteristics, Applications of Zener Diode.

Rectifier Circuits: PN Diode as a Rectifier, Half Wave Rectifier, Full Wave Rectifier, Full Wave Bridge Rectifier, Clipping Circuits, Clamper Circuits.

UNIT-III

NUMBER SYSTEMS: Introduction, Binary Number System, Octal Number System, Decimal Number System, Hexadecimal System, Conversions: Binary to Decimal conversion and vice-versa, Octal to Decimal Conversion and vice versa, Hexadecimal to Decimal Conversion and vice-versa, Binary to Hexadecimal Conversion and vice-versa, Octal to Decimal and vice-versa, Octal to Hexadecimal and vice-versa.

Complements: One's Complement, Two's Complement, Nine's Complement, Ten's Complement.

Binary Arithmetic (addition, subtraction, multiplication, division), Octal Arithmetic, Hexadecimal Arithmetic, Signed Numbers, Floating Numbers, Codes.

UNIT-IV

BOOLEAN ALGEBRA AND LOGIC GATES: Introduction, Definitions, Principle of Duality, Basic Theorems, Applications of Boolean Algebra, Boolean Functions, Complement of Boolean Function.

Logic Gates (Symbol, Truth Table, Logic Diagram): And, OR, NOT, NAND, NOR, XOR, XNOR. Universal Gates: NAND Gate and NOR Gate implementation, Realization of other Logic Operations using NAND/NOR. Buffer, Negative and Positive Logic, Mixed Logic.

UNIT-V

COMMUNICATIONS SYSTEMS: Introduction to Communication Systems, Elements of Communication Systems: Transmitter, Channel, Receiver, Noise. IEEE Frequency Spectrum Used in Communication Systems: Frequency Bands, Units of Measurement and Abbreviations, Bandwidth and other Parameters, Spectrum Assignment and Regulation. Need of Modulation, Amplitude Modulation, Frequency Modulation, Communication Media and its Classification: Guided and Unguided Propagation.

OUTCOMES:

- Ability to identify the electrical components explain the characteristics of electrical machines.
- Ability to identify electronics components and use of them to design circuits.

Practicals: To be decided by the Course Co-ordinator.

REFERENCES:

1. Hwei P. Hsu, Schaum's Outline of Signals and Systems, McGraw-Hill.
2. A.V. Oppenheim, A.S. Willsky, S Hamid Nawab, Signals and Systems, PHI.
3. A Anand Kumar, Signals and Systems, PHI.

4. Basics of Electronics Engineering, Wiley India Pvt. Ltd.

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AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBME-201	Concepts in Engineering Design	3 (2-1-0)	50	20	30	-	-	100	3 hr	-

COURSE OBJECTIVE:

The primary objective of the course is to introduce concepts in engineering design to students from all the engineering disciplines. This course broadly covers the prerequisites for an innovative design followed by concepts of products design cycle right from planning, designing, manufacturing, distributing and its usage.

Syllabus

UNIT-I

Introduction to engineering Design process: Its importance, types of designs, various ways to think about design like visualization, photography etc, simplified iteration model, design versus scientific method, a problem solving methodology.

UNIT-II

Considerations of a good design Achievement of performance requirements, Total life cycle, Regulatory and social issues in Indian context

UNIT-III

Description of Design Process Conceptual Design, Embodiment Design, Detail Design, Planning for Manufacture, Planning for distribution, planning for Use, Planning for the retirement of the product.

UNIT-IV

Product Design Cycle, Identification of customer needs and market research essentials, concept generation, technology and market assessment

An exposure to various aspects of design including visual, creative and user-centric design (Visual merchandising, trends, materials, technology and techniques).

Evolution in Transportation and Communication Technology, Bullock Cart to Lear Jets, Personal messengers to Cell Phones, Fighter planes.

UNIT-V

Introduction to any one as a case study:

1. Communication Design.
2. Industrial Design.
3. IT Integrated Design.
4. Textile Design.
5. Inter disciplinary Design.

OUTCOMES:

- Understand production systems and their characteristics.
- Apply forecasting and scheduling techniques to production systems
- Develop an understanding on quality management philosophies and frameworks
- Adopt TQM methodologies for continuous improvement of quality.
- Measure the cost of poor quality, process effectiveness and efficiency to identify areas for improvement.

REFERENCES

1. George E. Dieter and Linda C. Schmidt, Engineering Design, McGraw Hill Education (India) Pvt. Ltd.
2. Arvid Eide, Introduction to Engineering Design, McGraw Hill.
3. Otto. K and Wood, K, Product Design, Pearson Education.

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBME-202	Manufacturing Practices.*	3(1-0-2)*	-	-	50	-	50	100	-	

COURSE OBJECTIVE:

1. To familiarize with the basics of tools and equipments used in fitting, carpentry, sheet metal, welding and smithy
2. To familiarize with the production of simple models in the above trades.

Syllabus

UNIT-I

FITTING: Tools & Equipments – Practice in filing. Making Vee Joints, Square, Dovetail joints and Key making - plumbing.

Suggested Mini project – Assembly of simple I.C. engines

UNIT-II

CARPENTRY: Tools and Equipments- Planning practice. Making Half Lap, Dovetail, Mortise & Tenon joints.

Suggested Mini project - model of a single door window frame.

UNIT-III

SHEET METAL: Tools and equipments– practice. Making rectangular tray, hopper, scoop, etc.

Suggested Mini project - Fabrication of a small cabinet, dust bin, etc.

UNIT-IV

Tools and equipments - Arc welding of butt joint, Lap joint, Tee fillet.

Demonstration of gas welding, TIG & MIG welding.

UNIT-V

SMITHY: Tools and Equipments – Making simple parts like hexagonal headed bolt, chisel.

FOUNDRY: Tools and Equipments, Mould making, conducting casting operation of a job.

COURSE OUTCOMES:

On completion of this course, students will be able to

- Make half lap joint and dovetail joint in carpentry.
- Make welded lap joint, butt joint and T-joint.
- Prepare sand mould for cube, conical bush, pipes and V pulley.
- Fabricate parts like tray, frustum of cone and square box in sheet metal.

REFERENCES

1. S K Hazara Choudhary, Gopal.T.V, Kumar.T, and Murali.G, “A first course on workshop practice – Theory, Practice and Work Book”, Suma Publications, Chennai, 2005.
2. Kannaiah.P and Narayanan.K.C, “Manual on Workshop Practice”, Scitech Publications Venkatachalapathy.V.S “First year Engineering Workshop Practice”, Ramalinga Publications.

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional	End Sem	Lab Work			
TBCS-201	Computer Programming.*	3 (2-0-1)*	-	-	-	-	100	100	-	

Syllabus

Unit – I: Introduction to computer

What is computer: Characteristics of Computers, Basic Applications of Computer, and Classifications of computer.

Components of Computer System: Central Processing Unit(CPU), Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software.

Representation of data/Information, concepts of data processing: Definition of Information and data, Basic data types, Storage of data/Information as files.

Unit – II: Introduction to Windows & DOS

Operating system and basics of Windows.

The User Interface: Using Mouse and Moving Icons on the screen, The My Computer Icon, The Recycle Bin, Status Bar, Start and Menu & Menu-selection, running an Application, Windows Explorer Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows.

Windows Setting: Control Panels, Wall paper and Screen Savers, Setting the date and Sound, Concept of menu Using Help.

Advanced Windows: Using right Button of the Mouse, Creating Short cuts, Basics of Window Setup, Notepad, and Window Accessories.

Comparison of DOS and Windows, Switching between DOS and Windows, Basic DOS Commands

Unit – III: Working with MS Word

An Introduction to MS Word, Elements of MS word: The Menu Bar, Using the Help, Using

the Icons below menu bar, Opening Documents and Closing documents, Save and Save AS, Page Setup, Printing of Documents, Scrolling the Document by line/paragraph, Fast Scrolling and Moving Pages, Text Creation and Manipulation, Paragraph and Tab Setting, Text Selection, Cut, copy and paste, Font and Size selection, Bold ,Italic and Underline, Alignment of Text: Center, Left, right and Justify, Changing font, Size and Color, Bullets and Numbering, Use of Tab and Tab setting, Changing case, Draw Table, Delete/insertion of row and columns.

Unit – IV: Working with MS Excel and Power Point

Elements of MS Excel: Opening of excel Sheet, The menu bar, Creation and deletion of cells, Cell inputting, Enter texts numbers and dates, Creation of tables, Cell Height and Widths, Copying of cells, Providing Formulas for basic operations.

Elements of MS Power Point: Opening a Power Point Presentation, Using Wizard for creating a presentation, Creation of Presentation: Title, Text Creation, Fonts and Sizes, Bullets and indenting, Moving to Next Slide, Selection of type of Slides, Importing text from word documents, Moving to next Slide, The Slide manager, Background and Text colors, Using the Slide Show, Printing the Slides and Handouts.

Unit – V: Introduction to ‘C’ language

Basics of C- language, components of a C program, data types, variables and identifiers, arithmetic operators and expressions, compiling and executing c program, functions and operators, conditional statements and loops, arrays, structures and unions, pointers and file processing.

OUTCOMES:

At the end of the course, the student should be able to:

- Design C Programs for problems.
- Write and execute C programs for simple applications.

List of Practicals:

01. Study and practice of Internal & External DOS commands.
02. Study and Practice of MS windows – Folder related operations, My-Computer, window explorer, Control Panel.
03. Creation and editing of Text files using MS- word.
04. Creation and operating of spreadsheet using MS-Excel.
05. Creation and editing power-point slides using MS- power point
06. WAP to illustrate Arithmetic expressions in C.
07. WAP to illustrate Arrays in C
8. WAP to illustrate functions in C.

9. WAP to illustrate pointers in C.
10. WAP to illustrate structures and unions.

Reference Books:

1. Fundamentals of Computers : E Balagurusamy, TMH
2. Introduction of Computers : Peter Norton, TMH
3. Kerningham & Ritchie “The C programming language”, PHI
4. Kanetkar Y. “Let us C”, BPB.
5. Microsoft_Office_2007_Illustrated_Windows_XP_Edition_Introductory by David W. Beskeen, Jennifer Duffy.

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Social Science

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
TBSS-201	Universal Human Values and Professional Ethics	3 (0-0-3)*	-	-	50	-	100	150	-	-

COURSE OBJECTIVE:

This introductory course input is intended

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature

Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.

Syllabus

UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Understanding the need, basic guidelines, content and process for Value Education
2. Self Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations

4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfill the above human aspirations: understanding and living in **harmony** at various levels

UNIT 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
8. Understanding the needs of Self ('I') and 'Body' - *Sukh* and *Suvidha*
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensure *Sanyam* and *Swasthya*
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

13. *Understanding Harmony in the family – the basic unit of human interaction*
14. Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*;

Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship

15. Understanding the meaning of *Vishwas*; Difference between intention and competence
16. Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship
17. Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals
18. Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj*), Universal Order (*Sarvabhaum Vyawastha*)- from family to world family!
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

19. Understanding the harmony in the Nature
20. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
21. Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
22. Holistic perception of harmony at all levels of existence
- Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

23. Natural acceptance of human values

24. Definitiveness of Ethical Human Conduct

25. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

26. 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.

27. Case studies of typical holistic technologies, management models and production systems

28. 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

Expected outcome:

1. The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify right or wrong, and referring to any external source like text or instrument or any other person cannot enable them to verify with authenticity; it will only develop assumptions.

2. The students are able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.

3. The students are able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facilities in most of the cases, while they have given higher priority to earning of physical facilities in their life ignoring relationships and not being aware that right understanding is the most important requirement for any human being.

4. The students feel confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are able to make out how these courses can be made appropriate and holistic.

5. The students are able to grasp the right utilization of their knowledge in their streams of

Technology/Engineering/ Management to ensure mutually enriching and recyclable productions systems.

6. The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for a happy and prosperous society.

Reference Material

The primary resource material for teaching this course consists of

a. The text book

R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

b. The teacher's manual

R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010

c. A set of DVDs containing

- Video of Teachers' Orientation Program
- PPTs of Lectures and Practice Sessions
- Audio-visual material for use in the practice sessions

In addition, the following reference books may be found useful for supplementary reading in connection with different parts of the course:

1. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.
2. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
3. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991
4. Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and HarperCollins, USA
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *limits to Growth*, Club of Rome's Report, Universe Books.
6. Subhas Palekar, 2000, *How to practice Natural Farming*, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
7. A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
8. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
9. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.

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