Syllabus and Curriculum

of

B.Tech in Engineering

Common to all branches

(Combined 1st and 2nd semesters)

University of Calicut

(2014 admission)

SCHEME OF COMBINED I & II SEMESTERS B.Tech

Code	Subject	Hours/ Week			Marks		Duration of End Semester examination	Credits
		L	T	P/D	Internal	End Semester		
EN14 101	Engineering Mathematics I	2	1	0	50	100	3	4
EN14 102	Engineering Mathematics II	2	1	0	50	100	3	4
EN14 103	Engineering Physics	2	0	0	50	100	3	3
EN14 103(P)	Engineering Physics Lab.	0	0	1	50	-	-	1
EN14 104	Engineering Chemistry	2	0	0	50	100	3	3
EN14 104(P)	Engineering Chemistry Lab.	0	0	1	50	-	-	1
EN14 105	Engineering Mechanics	2	1	0	50	100	3	6
EN14 106	Basics of Civil and Mechanical Engg.	2	0	0	50	100	3	4
EN14 107	Basics of Electrical and Electronics & Communication Engg.	2	0	0	50	100	3	4
EN14 108	Engineering Graphics	1	0	3	50	100	3	6
EN14 109	Humanities and Communication Skills	2	1	0	50	100	3	2
EN14 110 (P)	Mechanical Workshops	0	0	2	100	-	-	2
EN14 111 (P)	Electrical & Civil Workshops	0	0	2	100	-	-	2
	TOTAL	17	4	9	750	900		42

EN14 101 ENGINEERING MATHEMATICS I

(Common for all B.Tech. programmes)

Teaching scheme **Credits:** 4

2 hours lecture and 1 hour tutorial per week

Objective

- *To provide an avenue to scientific knowledge which opens new vistas of mental activity.*

A sound knowledge of engineering mathematics is a "sine qua non" for the modern engineer to attain new heights in all aspects of engineering practice

- *To provide the student with plentiful opportunities to work with and apply the concepts, and to build skills and experience in mathematical reasoning and engineering problem solving.*

Module I: Differential Calculus (18 hours)

Indeterminate forms – L'Hopitals rule – Radius of curvature in Cartesian form (No proof)– Center of curvature (No proof) – Evolute – Functions of more than one variables - Idea of Partial Differentiation – Euler's theorem for Homogeneous functions – Chain rule of Partial differentiation – Jacobians – Maxima and Minima of functions of two variables.

Module II: Infinite Series (18 hours)

Definition of Convergence and Divergence of Infinite series – Ratio test – Comparison test – Raabe's test – Root test – Series of positive and negative terms – Absolute convergence – Test for Alternating series – Power series – Interval of Convergence – Taylor's series expansion of functions (No proof) – Maclaurin's series expansion of functions (No proof) – Leibnitz formula for the n^{th} derivative of product of two functions – Its use in Taylor's and Maclaurin's series expansions.

Module III: Matrices (24 hours)

Rank of a matrix – Reduction of a matrix to Echelon form – System of Linear equations – System of non-homogeneous Linear equations; Consistency of system of non-homogeneous Linear equations – System of Homogeneous Linear equations; Consistency of system of homogeneous Linear equations – Gauss's elimination method – Characteristic equation - Cayley-Hamilton Theorem – Characteristic Values and Characteristic Vectors – Diagonalisation of non-symmetric matrices using similarity transformation – Diagonalisation of real-symmetric matrices using orthogonal transformation – Quadratic forms – Definite, Semi-definite and Indefinite forms – Reduction of Quadratic forms to sum of squares by orthogonal transformation.

Module IV: Fourier series and Harmonic Analysis (18 hours)

Fourier series – Euler Formulae – Even and Odd functions – Fourier series of Even and Odd functions – Functions having arbitrary period – Fourier series of Functions having arbitrary period – Half-range expansions – Numerical method for determining Fourier coefficients.

Reference books

1. Michael D Greenberg, *Advanced Engineering Mathematics,* Pearson Education Asia.
2. Sastry S.S., *Advanced Engineering Mathematics-Vol. I and II*., Prentice Hall of India.
3. Ahsan Akhtar, Sabiha Ahsan, *Textbook of Diffrential Calculus*, Prentice Hall of India.
4. Glyn James., *Advanced Engineering Mathematics*, Pearson Education Asia.
5. Dr.ChandraMohan, Dr.Vargheese Philip, *Engineering Mathematics I,II,III & IV* , Sanguine Technical Publishers.
6. Bikas Chandra Bhui, Dipak Chatterjee, Prasun Chatterjee, *Engineering Mathematics Vol.1*, Vikas Publishing House.
7. V.Sundaram, R.Balasubramanian, K.A. Lakshminarayanan, *Engineering Mathematics, 6/e*., Vikas Publishing House.
8. J.P.Singh, *Calculus, 2/e*, Ane Books Pvt.Ltd.
9. Anthony Croft, Robert Davison, Martin Hargreaves, *Engineering Mathematics*, Pearson Education

Internal Continuous Assessment *(Maximum Marks-50)*

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.

10% - Attendance and Regularity in the class

University Examination Pattern

PART A: Analytical/problem solving SHORT questions 8x 5 marks=40 marks

Candidates have to answer EIGHT questions out of TEN. There shall be minimum of TWO and maximum of THREE questions from each module with total TEN questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 4 x 15 marks=60 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 100

EN14 102 ENGINEERING MATHEMATICS II

(Common for all B.Tech. Programmes)

Teaching scheme **Credits:** 4

2 hours lecture and 1 hour tutorial per week

Objective

- *To apply the subject at the proper place and time, while keeping him/her aware to the needs of the society where he/she can lend his/her expert service, and also to those who can be useful to the community without even going through the formal process of drilling through rigorous treatment of mathematics.*

Module I: Ordinary Differential Equations (24 hours)

Equations of first order – Separable, Homogeneous, reducible to Homogeneous and Linear, Bernoulli‘s and Exact Equations – Orthogonal trajectories – Linear second order equations – Homogeneous Linear equation of second order with constant coefficients – Non-Homogeneous Linear equation of second order with constant coefficients – Solutions of Linear equations of second order with variable coefficients (Only Cauchy‘s equation) – method of variation of parameters.

Module II: Laplace transforms (18 hours)

Gamma and Beta functions – Definitions and simple properties – Laplace transform – Inverse Laplace transform – shifting theorems – Transforms of derivatives – Transforms of integrals – Differentiation of transforms – Integration of transforms – Convolution theorem (No proof) – Transform of Unit step function – Transform of Impulse function – transforms of periodic functions – Solution of ordinary differential equations using Laplace transform.

Module III: Vector Differential Calculus (18 hours)

Vector function of a Single Variable – Differentiation of vector functions – Scalar and Vector fields – Gradient of Scalar fields – Divergence and Curl of Vector Fields – their properties – Physical meanings – Relations between the vector differential operators.

Module IV: Vector Integral Calculus (18 hours)

Line, Surface and Volume integrals – Line integrals independent of the Path – Green‘s Theorem in the plane – Gauss Divergence Theorem – Stoke‘s Theorem (Proofs of these theorems are excluded).

Reference books

1. Wylie C.R and L.C. Barrent, *Advanced Engineering Mathematics*, McGraw Hill.
2. Kreyzig E., *Advanced Engineering Mathematics*, Wiley eastern.
3. Piskunov N., *Differential and Integral calculus*, MIR Publishers.
4. Ayres F., *Matrices*, Schaum‘s Outline Series, McGraw Hill.
5. Glyn James., *Advanced Engineering Mathematics*, Pearson Education Asia.
6. Peter V O‘Neil, *Advanced Engineering Mathematics*, Thomson India Edition.
7. Bikas Chandra Bhui, Dipak Chatterjee, Prasun Chatterjee, *Engineering Mathematics Vol.1*, Vikas Publishing House.
8. Abhimanyu Singh, *Applied Mathematics II*, Ane Books Pvt.Ltd.
9. Thomas A. Garrity, *All the Mathematics you missed*, Cambridge University Press.

Internal Continuous Assessment *(Maximum Marks-50)*

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.

10% - Attendance and Regularity in the class

University Examination Pattern

PART A: Analytical/problem solving SHORT questions 8x 5 marks=40 marks

Candidates have to answer EIGHT questions out of TEN. There shall e bminimum of TWO and maximum of THREE questions from each module with total TEN questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 4 x 15 marks=60 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 100

EN 14 103: ENGINEERING PHYSICS

(Common to all Branches)

Teaching scheme : 2 hours per week **Credits: 3**

Objectives

- ***To impart the basic concepts and ideas in physics.***
- ***To develop scientific attitudes and enable the students to correlate the concepts of physics with the core* programmes.**

Module-1 (13 hours)

Interference- Basic concepts-Types of interference-Interference in thin films -Plane parallel films-Colours of thin films in reflected and transmitted light- Interference in wedge shaped films-Application in testing of optical flatness- Newton's Rings-Theory and expression for the radii of dark and bright rings in reflected system-Applications- Measurement of wave length of a monochromatic light and refractive index of a liquid.

Diffraction of light-Fresenls and Fraunhoffer classes-Difraction grating-Simple theory of plane transmission grating (normal incidence)-Resolving and dispersive powers of a grating with expressions (no derivation)-Determination of wavelength of monochromatic light using plane transmission grating.

Ultrasonics -Properties of ultrasonic waves- Piezo-electric and magnetostriction effect-Production of ultrasonic waves by piezo-electric effect method. Accoustic grating-Determination of velocity of ultrasonic waves in a liquid using ultrasonic diffractometer.- Important engineering applications of ultrasonic waves.

Module-2. (13 hours)

Polarisation-Basic concepts-Production of polarised light-Double refraction-Optic axis and principle plane-Huyghens explation of double refraction in uniaxial crystals-Positive and negative crysatals-Nicol prism-Construction and working (as polarizer and analiser)-Quarter wave and Half wave plates-Superposition of plane polarised light-Theory (analytical analysis) of elliptical and circularly polarised light- Experimental methods for producing and detecting linearly, elliptically and circularly polarized lights-Polaroids-Optical activity-Biot's laws-specific rotation-Laurent's half shade polarimeter-Determination of concentration of sugar solution-Applications of plane polarised light.
Quantum mechanics-Introduction-Duality of radiation and matter-Uncertainity
principle-Concept of wave packet-Group and phase velocities –Wave function in quantum mechanics and its physical significance-Operators in quantum mechanics (basic concepts only)-Schroedinger equation for a free particle, time dependant and independent (steady/stationary) forms and their derivations –Expectation values-Application-Particle in one dimensional box (potential well) -Eigen values and eigen functions.

Statistical mechanics -Introduction-Macroscopic and microscopic systems -Phase space-Statistical distributions-Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics-Basic postulates and distribution functions (no derivation)-Bosons and fermions.

Module-3. (13 hours)

Laser-Introduction-Spontaneous and stimulated emissions-Population inversion-Optical resonant cavity -Basic component of a laser- Characteristics of laser-Intensity, spatial and temporal coherence-

coherence length-monochromaticty-convergence-Einstein coefficients and the analysis of lasing conditions-Different laser system-Construction, working and features of Ruby, He-Ne, Nd:YAG and Semi conductor lasers Application of lasers in medicine-industry, science and communications-Holography-Basic principle-Construction and reconstruction of hologram-Applications.

Optical fibre-Basic structure-Light propagation through optic fibre-Step index and graded index fibres-Single mode and multi mode fibres-Acceptance angle and numerical aperature of a fibre.Expression for numerical aperature for a step index fibre.-Normalised frequency number (V number) of a fibre-Transmission losses in fibres-Attenuation and distortion-Fibre optic communication system-application of optic fibres

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Nano science-Basic ideas –Nano clusters-variation of properties of nano materials –Carbon nano tubes- -Applications of nano materials and nano technology (qualitative ideas only).

Module-4. (13 hours)

Semi conductor physics-Formation energy bands in solids and their classifications-Intrinsic and extrinsic semi conductors-Density of states functions of electrons and holes in the energy bands (expressions only)- Concentration of electrons in the conduction band and holes in valence band-Fermi energy - Fermi level in intrinsic and extrinsic semiconductors-Donor and acceptor levels-Variation of Fermi level with temperature and doping

Semi conductor devises-P-N junction characteristics and applications- Zener diode-Zener breakdown and avalanche breakdown- Zener diode as a voltage regulator-Working and uses of tunnel diode and varactor diode-Light emitting diode -Solar cell-Applications-Bipolar junction transistor-Characteristics of npn/pnp in CE modes-Current amplification factor.

Superconductivity-Introduction-Transition temperature-Effect of magnetic field (magnetic field and critical current density)-Meissner effect-Type I and type II super conductors-Isotopic effect-Persistent current-Flux quantization-Josephons effects-SQUID-High temperature super conductivity-Applications of super conductivity.

Text Books

1. Physics for Engineers-M.R.Seenivasan-New Age Publishers 2009 Edition.
2. A Text book of Engineering Physics-A.S.Vasudeva S.Chand Publishers 2008 Edition
3. A Text book of Electronics-S.L.Kakani and K.C. Bhandari-New Age International (p) Publishers 2000 Edition
4. Nanoscience and Technology-VS Muralidharan& A.Subramania-Ane Books Pvt.Ltd.2009 Edition
5. Engineering Physics-P.K.Palanisamy-Scitech Publishers(India) Pvt Ltd, Chennai

Reference books.

1. Fundamentals Optics- Jenkins F.A. and White H.E. Mc Graw Hill Publication
2. Optics-Ajoy Ghatak- Tata McGraw-Hill Publishing CompanyLtd
3. Introduction to solid state physics- Charles Kittel-Wiley Eastern
4. Concepts of Modern Physics –Arthur Beiser- Tata McGraw-Hill Publishing company Ltd
5. Lasers and non linear optics-B.B.Laud-Wiley Eastern

6. Introduction to Semi conductor materials and Devices-Tyagi M.S. John Wiley and Sons.
7. Nano: The essentials-T. Pradeep-Tata McGraw-Hill Publishing companyLtd.
8. Optical Fibres and Fibre Optic Communication Systems-Subir Kumar Sarkar- S. Chand Publishers.
9. Engineering Physics - G.S.Raghuvanshi - Printice Hall of India
10. Book of Optics - Brijlal and Subramanyam - S.Chand publishers
11. Modern Physics - Murukesan R- S.Chand and Co.
12. Engineering Physics - G.Aruldas, PHI Learning Private Limited.

Internal Continuous Assessment *(Maximum Marks-50)*

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.

10% - Attendance and Regularity in the class

University Examination Pattern

PART A: Analytical/problem solving SHORT questions 8x 5 marks=40 marks

Candidates have to answer EIGHT questions out of TEN. There shall be minimum of TWO and maximum of THREE questions from each module with total TEN questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 4 x 15 marks=60 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 100

EN 14 103 (P): ENGINEERING PHYSICS LAB

(Common for all branches)

Teaching scheme: 1 hour practical per week **Credit:** 1

Objectives

- *To develop scientific and experimental skills of the students*
- *To correlate the theoretical principles with application based studies.*

List of experiments:

1. Young's modulus of a bar by non-uniform bending
2. Rigidity modulus – Torsion pendulum
3. Study of surface tension of liquids (capillary method)
4. Characteristics of a solar cell
5. Study of Zener characteristics
6. Voltage regulation using Zener diode
7. LED characteristics
8. Determination of band gap energy in semi conductor using a reverse baised p-n junction.
9. Wave length measurement of a monochromatic source of light using Newton's Rings method.
10. Diameter of a thin wire or thickness of a thin strip of paper using air wedge method.
11. Determination of the refractive indices of ordinary and extra ordinary rays in quarts/calcite prism using spectrometer.
12. Determination of spectral lines of a composite source using diffraction grating and spectrometer.
13. Determination of resolving power of a plane transmission grating.
14. Determination of dispersive power of a plane transmission grating.
15. Determination of specific rotatary power or concentration of cane sugar solution using polarimeter.
16. Wave length and velocity measurement of ultrasonic waves in a liquid using ultrasonic diffractometer
17. Wave length measurement of laser using plane transmission grating standardized by sodium light
18. Static characteristics of a transistor in common emitter configuration.
19. Frequency of electrically maintained tuning fork (transverse and longitudinal modes)
20. Measurement of numerical aperture of an optical fibre

(Any 10 experiments should be done at the minimum)

Only one record need to be written by the students and there is no need of separate rough record and fair record.

Reference books:-

1. Practical physics with viva voce, Dr. S.L. Gupta and Dr. V. Kumar, Pragati Prakashan publishers
2. Experiments in Engineering Physics
   M.N. Avadhanulu, A.A. Dani and R.M. Pokley, S. Chand & Co.

Internal Continuous Assessment (Maximum Marks-50)

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class

EN 14 104: ENGINEERING CHEMISTRY

(Common for all branches)

Teaching scheme **Credits:** 3

2 hours lecture per week

Objectives

- *To familiarize the students on application oriented themes like the chemistry of materials used in engineering discipline*
- *To focus the students on the chemistry of compounds resulting from pollution, waste generation and environmental degradation and to apply the knowledge in solving these current environmental problems effectively.*

Module I (15 hours)

Organo Metallic Compounds: Definition – classification based on the nature of metal-carbon bond. Metal carbonyls – 18 electron rule – Mononuclear and polynuclear carbonyls (give examples of Fe, Co, Ni). (3 Hrs.)

Bio-Inorganic chemistry: Metal ions in biological system – trace and bulk metal ions – Haemoglobin and myoglobin (elementary idea only). (3 Hrs.)

Green chemistry – Goals of green chemistry – Limitations.Twelve principles of green chemistry with their explanations and examples – Designing a green synthesis – Prevention of waste / byproducts – Atom economy (maximum incorporation of materials used in the process) – Minimization of hazardous / toxic products – prevention of chemical accidents – Green synthesis (9 Hrs.)

Module II (15 hours)

Polymers – classification – Types of polymerization – addition, condensation, co-polymerisation, co-ordination polymerization. Polymerisation techniques – Bulk, solution, suspension and emulsion. Concept of Tg, Factors affecting Tg, Crystallinity in polymers, physical and mechanical properties (density, tensile, tear, abrasion resistance, resilience). (9 Hrs.)

Lubricants – Theories of friction – Mechanism of lubrication Thick film, thin film, extreme pressure. Classification – solid, liquid, semisolid – properties – viscosity, flash point, fire point, cloud and pour point, Aniline point, corrosion stability.(3 Hrs.)

Fuels: Classification-Calorific Value -Cracking and Reforming-Petrol Knock and octane number-Diesel knock and cetane number. Bio-Diesel. (3 Hrs.)

Module III (11 hours)

Electrochemistry – single electrode potential – Helmholtz double layer – Nernst equation – derivation – types of electrodes (S.H.E, Calomel, Quinhydrone, glass electrode), pH measurements using glass electrode, Electrochemical cells, concentration cells - salt bridge –emf measurement – Poggendorf's compensation method – Electrochemical series – applications – storage cells – Lead acid accumulator – alkaline cells – Nickel cadmium – fuel cells – H_2/O_2 fuel cell – solar cells .

Module IV (11 hours)

Corrosion and its control – theories of corrosion – dry corrosion and wet corrosion – galvanic series - corrosion of iron in acidic, neutral and basic conditions – Differential aeration corrosion, stress corrosion – galvanic corrosion – Factors influencing corrosion. Corrosion control methods – protection by sacrificial anode – Impressed current- self protecting corrosion products – Pilling Bed worth rule- Coatings – Organic (Paints and polymers) Inorganic – Metallic (galvanizing, tinning, electroplating, cementation) Nonmetallic (phosphate, chromate, anodising, chemical oxide).(8 Hrs)

Water – Hardness, alkalinity– determination of hardness- EDTA method –softening – lime soda, Ion exchange methods – purification of water for domestic use. Water pollution – BOD, COD, DO (3 Hrs.)

Reference Books.

1. Industrial Chemistry – B K Sharma
2. Seymour R.B. Introduction to Polymer Chemistry, McGraw Hill, New York, 1971.
3. Billmeyar, F.W. Text book of Polymer Science, Wiley Interscience, New York, 1971.
4. Gowarikar V.R., Viswanathan N.V., Polymer Science, Wiley Eastern Limited, New Delhi, 1986.
5. D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouer, Fundamentals of Analytical Chemistry, 8th edition.
6. A.K. Dey, Environmental Chemistry, 6th Edn., New Age International.
7. P.K. Goel, Water Pollution, Causes, Effects and Control, New Age International.
8. Cotton and Wilkinson, Advanced Inorganic Chemistry, Wiley India Pvt. Ltd., 2008. 38
9. J.E. Huheey, E.A. Keiter and R.L. Keiter , Principles structure and reactivity of Inorganic Chemistry, Derling Kindersley (India) Pvt. Ltd., 2006.
10. Puri, Sharma and Kalia, Principles of Inorganic Chemistry, Milestone Publishers and Distributors, 2008.
11. V. Kumar, Introduction to Green Chemistry, Vishal Publishing House.

Internal Continuous Assessment *(Maximum Marks-50)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Attendance and Regularity in the class

University Examination Pattern

PART A: Analytical/problem solving SHORT questions 8x 5 marks=40 marks

Candidates have to answer EIGHT questions out of TEN. There shall be minimum of TWO and maximum of THREE questions from each module with total TEN questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 4 x 15 marks=60 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 100

EN 14 104 (P): ENGINEERING CHEMISTRY LAB

(Common for all branches)

Teaching scheme
1 hour practical per week **Credit:** 1

Objectives

- *To equip the students with the working knowledge of chemical principles, nature and transformation of materials and their applications.*
- *To develop analytical capabilities of students so that they can understand the role of chemistry in the field of Engineering and Environmental Sciences*

1. Estimation of iron in Mohr's salt using standard $K_2Cr_2O_7$
2. Estimation of iron in a sample of iron ore
3. Estimation of copper in a given sample of brass
4. Estimation of total hardness in a given sample of water using EDTA.
5. Estimation of chloride ions in domestic water
6. Determination of dissolved oxygen present in a given sample of water (Winkler's Method)
7. Determination of available chlorine in a sample of bleaching powder
8. Determination of flash point and fire point of an oil using Pensky Martens flash point apparatus
9. Determination of EMF of a cell by Poggendorf's compensation method
10. Preparation of buffers and standardization of pH meter
11. Estimation of iron, chromium, lead and Cadmium in water – Colorimetrically
12. Preparation of urea –formaldehyde and phenol formaldehyde resin

- **Minimum 8 experiments should be completed.**
- **Only one record need to be written by the students and there is no need of separate rough record and fair record.**

Reference Books

1. A.I. Vogel, A Text Book of Quantitative Analysis, ELBS, London.
2. Dr. Sunita Rattan, Experiments in Applied Chemistry, S.K. Kataria and Sons, New Delhi.

Internal Continuous Assessment *(Maximum Marks-50)*

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class

EN 14 105: ENGINEERING MECHANICS

(Common for all branches)

Teaching scheme **Credits:** 4

2 hours lecture and 1 hour tutorial per week

Objectives

- *To acquaint with general approach of solving engineering problems.*
- *To illustrate the application of the theory learned in Mechanics in practical engineering problems.*
- *To lay clear fundamentals to core Engineering Subjects*

Units: *System International*

Module I (20 hours)

Introduction to engineering mechanics - units - dimensions - vector and scalar quantities - laws of mechanics - elements of vector algebra - important vector quantities - equivalent force systems – translation of a force to a parallel position - resultant of a force system - simplest resultant of special force systems - distributed force systems - equations of equilibrium - free body diagrams - free bodies involving interior sections - general equations of equilibrium - problems of equilibrium - static indeterminacy. (Both vector and scalar formulations are to be introduced to solve problems.)

Module II (20 hours)

Friction – laws of friction – simple contact friction problems. Introduction to structural mechanics - trusses - analysis of simple trusses - method of sections – method of joints. Properties of simple and composite plane areas and curves – first moment and centroid– theorems of Pappus-Guldinus - second moment of plane and composite areas – parallel and perpendicular axis theorems – polar moment of inertia of area – product of inertia and principal axis (conceptual level treatment only).

Moment of inertia of a rigid body and lamina (derivation of MI for cylinder, rod and sphere).

Module III (18 hours)

Kinematics of particles - rectilinear motion - curvilinear motion – motion of a projectile - tangential and normal acceleration

Kinetics of particles - rectilinear motion – curvilinear motion - Newton‘s second law– D‘Alembert‘s principle – motion on horizontal and inclined surfaces – motion of connected bodies.

Work, power and energy –work-energy equation – transformation and conservation of energy – impulse and momentum.

Module IV (20 hours)

Kinematics rigid bodies - rotation of a rigid body about a fixed axis - plane motion of a rigid body - instantaneous center Kinetics of rigid bodies - equations of motion of a rigid body rotating about a fixed axis – rotation under the action of a constant moment - D‘Alembert‘s principle – equations of motion for general plane motion - principle of work and energy.

Application of Graphical Methods in Mechanics – Force Poligons – Applications in truss analysis, centriod and moment of inertia

Text Books

1. Shames I.H, *Engineering Mechanics - Statics and Dynamics*, 4th ed.,Pearson Prentice, New Delhi, 2013
2. Timoshenko S. and Young D. H., *Engineering Mechanic*s, 4th ed., McGraw Hill InternationalEdition, Singapore, 1956.
3. B a s u d e b Bhattacharya., Engineering Mechanics ,Oxford University Press,2008
4. V. Jayakuumar, M Kumar, Engineering Mechanics, Prentice Hall Of India

Reference Books

1. Beer F.P and Johnston E.R., *Vector Mechanics for Engineers - Vol.1 Statics and Vol.2*
2. *Dynamics*, 3rd ed., Tata McGraw Hill, New Delhi, 2000.
3. Meriam J.L and Kraige L.G., *Engineering Mechanics - Vol.1 Statics and Vol.2 Dynamics*, 5th ed., Wiley Student Edition, Kundli, 2004
4. Hibbeler R. C. , Engineering Mechanics- Statics & Dynamics, 11 th ed., Pearson
5. Education, Delhi, 2013.

Internal Continuous Assessment *(Maximum Marks-50)*

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.

10% - Attendance and Regularity in the class

University Examination Pattern

PART A: Analytical/problem solving SHORT questions 8x 5 marks=40 marks

Candidates have to answer EIGHT questions out of TEN. There shall be minimum of TWO and maximum of THREE questions from each module with total TEN questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 4 x 15 marks=60 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 100

EN 14 106: BASICS OF CIVIL AND MECHANICAL ENGG.

(Common for all branches)

Teaching scheme **Credits:** 4

2 hours lecture

SECTION 1: BASICS OF CIVIL ENGINEERING

1 hour lecture per week

Objective

- *To give a basic knowledge of the topics in Civil Engineering.*

(In - depth treatment is not required)

Module I (13 hours)

Scope of Civil Engineering- Role of Civil Engineers in nation building.

Brief description of Engineering properties and applications of the following construction

Timber, Iron & steel. (Study on laboratory tests not expected, detailed manufacturing processes of materials not expected).

Stone and brick masonry construction- bonds used in general constructions- Cement mortar and Cement Concrete - Properties and applications- Reinforced Cement Concrete Fundamentals - points to be observed during masonry construction and concreting (Only brief description is expected).

Module II (13 hours)

Introduction to Surveying - brief description of the following instruments (i) chain and accessories (ii) Dumpy level (iii) Theodolite. Use of levelling instrument for determining reduced levels of various stations- Simple problems on levelling - use of theodolite for measuring horizontal angles – Simple problems on horizontal distance and plane area. (Only brief description is expected).

Building drawing- plan, section and elevation of a single room building with RCC roof (sketching in the paper/note book only is expected).

Type and functions of the following structural components of buildings

(i) Foundation (ii) Wall (iii) Column (iv) Beam (v) Slab (vi) Arch & Lintels (vii) Plane Trusses. (viii) Cross Sectional elements of Roads and Dams.

Text Books

1. L.S.Jayagopal and R. Rudramoorthy-—Basic Civil and Mechanical Engineering- Vikas Publishing house Pvt Ltd, New Delhi -110014.
2. Punmia. B.C —Basic Civil Engineering. Laxmi Publications
3. PC Varghese-—Building materials, Prentice Hall, India
4. PC Varghese-—Building Construction, Prentice Hall, India

Reference Books

1. Mimi Das saikia, Bhargab Mohan Das, Madan Mohan Das-—Elements of Civil Engineering‖-Prentice Hall, India
2. Rangwala. S. - Engineering Material, Charator book stall, Anand
3. Arora. K.R. Surveying Vol I and Vol II, Standard Book house,
4. Punmia. B.C - Building Constructio, Laxmi Publications
5. Rajput. R.K.- Engineering Materials, S. Chand and Company
6. Balagopal. T.S. Prabhu et.al - Building Drawing and Detailing, Spades.
7. Satheesh Gopi - Basic Civil Engineering, Pearson
8. Shibu Nalpat - Basic civil Engineering, 7th edition Nalpat publishers, Ernakulam, 2011

Internal Continuous Assessment *(Maximum Marks-25)*

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.

10% - Attendance and Regularity in the class

University Examination Pattern for Section 1

PART A: Analytical/problem solving SHORT questions 4x 5 marks=20 marks

Candidates have to answer FOUR questions out of FIVE. There shall be minimum of TWO and maximum of THREE questions from each module with total FIVE questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 2 x 15 marks=30 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 50

Note: Section 1 and Section 2 are to be answered in separate answer books Maximum 50 marks each for Section 1 and Section 2

SECTION 2: BASICS OF MECHANICAL ENGINEERING

Teaching scheme
1 hour lecture per week

Objectives

- *Gives an introduction as well as an overview on the concepts and applications of Mechanical Engineering*

Module I (13 hrs)

Sources of Energy: Introduction – Classification – Non renewable energy – Fossil fuels – solid, liquid and gaseous – Calorific value. Renewable Energy – Hydroelectric, solar, wind, biomass, biogas, ocean thermal, tidal, wave and geothermal energy.

Power Plants: Introduction – Layout and working of Diesel, Nuclear and Hydel power plants

Manufacturing process – Introduction – Elementary ideas of rolling and extrusion
Machining operations – Turning, shaping, milling and drilling

Power transmission – introduction – belt, rope, chain and gear drives, terminology, classification; advantages, disadvantages and applications

Module II (13 hrs)

Thermodynamic processes – isobaric, isochoric, isothermal, adiabatic and polytropic – workdone, P-V diagrams.

Otto cycle, Diesel cycle (derivation not required) – IC Engines – SI and CI engines, 4S and 2S engines, comparison; MPFI & CRDI Engines

Refrigeration: Introduction – working of vapour compression refrigeration system, Ton of refrigeration, COP

Hydraulic turbines – Pelton, Francis and Kaplan turbines (applications only).

Pumps – Introduction, classification – reciprocating and centrifugal – (brief description and working only).

Text Books

1. P.Balachandran –Basic Mechanical Engineering – Owl Books - Thiruvananthapuram
2. J.Benjamin – Basic Mechanical Engineering – Pentx
3. Pravin kumar – Basic Mechanical Engineering – Pearson
4. R.K. Purohit – An introduction to Mechanical Engineering – Scientific Publishers
5. Roy and Choudhary – Elements of Mechanical Engineering – Standard Publications Ltd
6 V. Prabhuraja – Basic Mechanical Engineering – Scitech Publishers

Internal Continuous Assessment *(Maximum Marks-25)*

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.

10% - Attendance and Regularity in the class

University Examination Pattern for Section 2

PART A: Analytical/problem solving SHORT questions *4x 5 marks=20 marks*

Candidates have to answer FOUR questions out of FIVE. There shall be minimum of TWO and maximum of THREE questions from each module with total FIVE questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 2 x 15 marks=30 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 50

Note: Section 1 and Section 2 are to be answered in separate answer books

Maximum 50 marks each for Section 1 and Section 2

EN14 107: BASICS OF ELECTRICAL, ELECTRONICS & COMMUNICATION ENGINEERING

(Common for all branches)

Teaching scheme **Credits:** 4

2 hours lecture per week

SECTION 1 - BASIC ELECTRICAL ENGINEERING

Objective

- *This course provides a quick overview of the concepts and results in Basic analysis that may be useful in engineering. Also it gives an introduction to Very basic concept and theory of Electrical Engineering.*

Module I: Basic Laws in Electrical Engineering (13 Hours)

What is electrical Engineering? Kirchhoff's Laws, Solution of series and parallel circuits with DC excitation. Voltage and current division rule. (2Hrs)

Magnetic circuits – MMF, Flux, Reluctance. Comparison of electric and magnetic circuits. (2 Hrs)

Faradays laws, Lenz's Law, Thump rules. Statically and dynamically induced EMF, Self and Mutual Inductance, Coefficient of Coupling. (2 Hrs)

AC circuits: - Single phase AC circuits – generation of sinusoidal EMF, cycle, frequency, time, period. Average, RMS value and Maximum value, Form factor, peak factor of sine wave only. Analysis of simple R, L, C, RL, RC, LC, and RLC circuits (Equations and waveforms in AC only). Reactance and Impedance, active, reactive and apparent power (Phasor diagram), Power factor. (4Hrs)

Three phase circuits – generation of 3 phase wave form, star and delta connection, voltage and current relationship in star and delta (Balanced case only), star to delta and delta to star conversion. (3Hrs)

Module II: Basic Concepts of Transformers and Machines (13 Hours)

Single Phase Transformer – Construction (Core & Shell), principle of operation, EMF equation, Transformation Ratio, Ideal Transformer. (3Hrs)

DC Generators and Motors: - Constructional details, Types and Configurations, EMF equation. Application of DC Motors. (3Hrs)

3 Phase Induction Motors – Parts of Induction machine (squirrel cage and Wound rotor type), Concept of Rotating magnetic field, principle of operation, slip, synchronous frequency. Application. (3Hrs)

Synchronous generator – construction, salient pole, cylindrical rotor type, principle of operation. (3Hrs)

Basic structure of power system (block diagram only). (1Hr)

Text Books:

1. Edward Hugs – Electrical & Electronic Technology, Pearson Education
2. Vincent Del Toro, Electrical Engineering Fundamentals, Pearson Education
3. SK Bhattacharya, Basic Electrical & Electronics Engineering, Pearson
4. M.S Sukhija and T.K Nagsarkar,Basic Electrical and Electronics Engineering, Oxford University press, 2012

Reference:

1. Kothari and Nagrath, Theory & problems of Basic Electrical engineering. Tata McGraw Hill
2. JB Gupta, A course in electrical engg. SK. Kataria & Sons
3. BL Theraja, Electrical Technology Vol. 1,
4. K Uma Rao, Basic Electrical Engineering, Pearson

Internal Continuous Assessment *(Maximum Marks-25)*

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project etc.

10% - Attendance and Regularity in the class

University Examination Pattern for Section 1

PART A: Analytical/problem solving SHORT questions 4x 5 marks=20 marks

Candidates have to answer FOUR questions out of FIVE. There shall be minimum of TWO and maximum of THREE questions from each module with total FIVE questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 2 x 15 marks=30 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 50

University Examination Pattern – for Section 1

Note: Section 1 and Section 2 are to be answered in separate answer books Maximum 50 marks each for Section 1 and Section 2

SECTION 2: BASICS OF ELECTRONICS AND COMMUNICATION ENGINEERING

Objectives

- *To impart knowledge about basic electronic and digital systems*
- *To give basic ideas about various communication systems (Only system level block diagram approach, no analysis required)*

Module I (13 hours)

Amplifiers**:** Principle of electronic amplifiers – Block diagram representation – Classification – Significance of input impedance, output impedance, output power, power gain, voltage gain and frequency response – noise in amplifiers – cascaded amplifiers – concept of differential amplifiers and operational amplifiers –concept of oscillators. (6 Hours)

Digital Systems **:** Logic gates – logic states – Boolean algebra – algebraic logic minimisation – generating logic diagram from Boolean expression – introduction to TTL and CMOS logic – programmable logic devices .(4 Hours)

Measurements and Data Acquisition Systems**:** Working and block diagram of CRO – sensors – actuators – principle of digital voltmeter –principle of ADC and DAC.(3 Hours)

Module II (13 hours)

Radio Communication **:** Modulation – Principle of AM & FM – block diagrams of transmitters – waveforms – band width – principle of AM & FM demodulation - comparison of AM & FM – principle of super heterodyne receiver – block diagram**.** (4 Hours)

Radar and Navigation**:** Principle of Radar – Radar equation [Derivation not required] – block schematics of pulsed Radar and continuous wave Radar – applications of Radar – introduction to navigational aids. (3 Hours)

Communication Systems **:** Principle of microwave communication- block diagrams – principle of satellite communication systems– block diagram of optical communicational systems – principle of light transmission through fibre – advantages of optical communication – basic principles of cellular communications –principle of GSM , CDMA, GPRS technologies.
(6 Hours)

Text Books

1. Neil Storey, ‗Electronics: A Systems Approach', Pearson Education, 2nd Ed., New Delhi.
2. Santhiram Kal, ‗Basic Electronics-Devices, Circuits & IT fundamentals', PHI., NewDelhi.
3. Louis E. Frenzel, ‗Principles of Electronic Communication systems', Tata McGraw Hill, New Delhi.
4. William Stallings, ‗Wireless Communications & Networks', Pearson Education, New Delhi.
5. David A. Bell, ‗Electronic Instrumentation & Measurements', PHI, New Delhi.

Internal Continuous Assessment *(Maximum Marks-25)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.
10% - Attendance and Regularity in the class

University Examination Pattern for Section 1

PART A: Analytical/problem solving SHORT questions 4x 5 marks=20 marks

Candidates have to answer FOUR questions out of FIVE. There shall be minimum of TWO and maximum of THREE questions from each module with total FIVE questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 2 x 15 marks=30 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 50

Note: Section 1 and Section 2 are to be answered in separate answer books
Maximum 50 marks each for Section 1 and Section 2

EN14 108: ENGINEERING GRAPHICS

(Common for all branches)

Teaching scheme **Credits:** 6

1 hour lecture and 3 hours practical/ drawing per week

Objectives

By going through the contents student will be able to:

- Understand systems of drawing.
- Produce orthographic drawing of points, lines and solids.
- Produce isometric views of any object.
- Develop skill to produce perspective views of any object.
- Develop skill to convert the pictorial views of simple engineering objects into orthographic views.

Module – I (8 Hours; 2Drawing Exercises)

Drawing instruments and their use - Different types of lines - Lettering and dimensioning – Scales - Familiarization with current Indian Standard Code of practice for general engineering drawing - Construction of Conic sections - Construction of Cycloid, Involutes and Helix (For internal work assessment only, not for University Examination)

Module-II (27 Hours; 5 Drawing exercises)

a) Introduction to projections - Systems of projections - Vertical, Horizontal and Profile planes - Principles of first and third angle projections - Projections of points in different quadrants - Orthographic projections of straight lines parallel to both reference planes - Perpendicular to one of the reference planes - Inclined to one and parallel to other reference plane - Inclined to both the reference planes and occupied in one quadrant - Traces of lines - True length and inclination of a line with reference planes - Line occupied in more than one quadrant - Line inclined to the two reference planes but parallel to the profile plane.

b) Projections of plane lamina of geometrical shapes - Plane lamina parallel to one of the reference planes - Inclined to one and perpendicular to the other reference plane - Inclined to both the reference planes - Inclined to the two reference planes but perpendicular to the profile plane.

Module- III (24 Hours; 5 Drawing exercises)

a) Projections of Polyhedra, Solids of revolution and Frustums - Projections of solids with axis parallel to one and inclined to the other reference plane - Axis inclined to both the reference planes - Projections of solids on auxiliary planes (Solids to be drawn: Cube, Prisms, Pyramids, Tetrahedron, Cone and Cylinder)

b) Sections of solids - Sections by cutting planes parallel to the reference planes - Cutting plane inclined to one and perpendicular to other reference plane - True shape of the section by projecting on auxiliary plane (Solids to be drawn: Cube, Prisms, Pyramids, Tetrahedron, Cone and Cylinder)

Module- IV (18 Hours; 4 Drawing exercises)

a) Development of surfaces of solids - Method of parallel line and radial line developments - Development of Polyhedra, Cylinder, Cone and sectioned solids - Development of solids having hole or cut

b) Introduction to isometric projection - Isometric scale - Isometric views - Isometric projections of Prisms, Pyramids, Cylinder, Cone, Spheres, sectioned solids and combination of them.

Module- V (19 Hours; 4 Drawing exercises)

a) Introduction to perspective projections - Classification of perspective views - Visual ray and vanishing point method of drawing perspective projection - Perspective views of plane figures such as polygons and circles - Perspective views of solids like Prisms, Pyramids and Cube.

b) Introduction to multiview projection of objects - The principle of the six orthographic views - Conversion of pictorial views of simple engineering objects into orthographic views.

c) Conventional representation of threaded fasteners - Drawing of nuts, bolts, washers and screws - Locking arrangements of nuts - Bolted and screwed joints - Foundation bolts.

Module- VI (8 Hours; 2 Drawing exercises)

a) Introduction to Computer Aided Drafting (CAD) - Preparation of engineering drawings by using any software capable of drafting and modelling - Creation of simple figures like polygon and general multiline figures - Drawing of front view and top view of solid like Prism, Pyramid and Cylinder and dimensioning - Drawing of front view and top view of objects from pictorial view.

(For internal work assessment only, not for University Examination)

NOTE: All drawing exercises mentioned above are for class work. Additional exercises where ever necessary may be given as home assignments

Text Books

1. Bhatt.N.D, Elementary Engineering Drawing, Charotar Publishing House, Delhi
2. John.K.C, Engineering graphics, PHI Learning Pvt, Ltd. 2009
3. P.I.Varghese, Engineering Graphics, VIP Publications, Thrissur
4. K.N.Anilkumar, Engineering Graphics- 5th edn,2010, Adhuth Narayanan Publishers, Kottayam

Reference Books.

1. M. B. Shah, B. C. Rana " Engineering Drawing"2nd edition – Pearson Education 2009
2. Narayana & Kannaiah, Engineering Graphics, Scitech Publishers, 2002
3. Luzadder.W.J, Foundamentals of Engineering Drawing, Prentice Hall of India

Internal Continuous Assessment (Maximum Marks-50)

60% - Drawing exercises (Best 15 sheets)

40% - Tests (minimum 2)

University Examination Pattern

No question from modules I and VI

PART A

Q 1 Two questions (a) and (b) of 20 marks each from module II, one from module II (a) and one from module II(b), with choice to answer any one.

Q II Two questions (a) and (b) of 20 marks each from module III, one from module III(a) and one from module III(b), with choice to answer any one.

Q III Two questions (a) and (b) of 20 marks each from module IV, one from module IV(a) and one from module IV(b), with choice to answer any one.

PART B

Q IV 3 Questions (a), (b) and (c) of 20 marks each from module V, one from module V(a), one from module V(b) and one from module V(c), with choice to answer any two.

EN14 109: HUMANITIES AND COMMUNICATION SKILLS

(Common to all branches)

Teaching scheme **Credits:** 2

2 hour lecture and 1 hour tutorial per week

A minimum of 12 Tutorial hours can be utilized for Language lab/extra mural lectures on communication and other topics of social and technical importance.

Objectives

- *To identify the most critical issues that confronted particular periods and locations in history;*
- *To identify stages in the development of science and technology;*
- *to understand the purpose and process of communication;*
- *to produce documents reflecting different types of communication such as technical descriptions, proposals ,and reports;*
- *To develop a positive attitude and self-confidence in the workplace; and*
- *To develop appropriate social and business ethics.*

Module I (16 hours)

Humanities, Science and Technology: Importance of humanities to technology, education and society- Impact of science and technology on the development of modern civilization. Contributions of ancient civilization: Chinese, Indian, Egyptian and Greek. Cultural, Industrial, Transportation and Communication revolutions. Advances in modern India: Achievements in information, communication and space technologies.

Module II (23 hours)

Concept of communication: The speaker/writer and the listener/reader, medium of communication, barriers to communication, accuracy, brevity, clarity and appropriateness Reading comprehension: Reading at various speeds, different kinds of text for different purposes, reading between lines.

Listening comprehension: Comprehending material delivered at fast speed and spoken material, intelligent listening in interviews

Speaking: Achieving desired clarity and fluency, manipulating paralinguistic features of speaking, task oriented, interpersonal, informal and semi formal speaking, making a short classroom presentation.

Group discussion: Use of persuasive strategies, being polite and firm, handling questions and taking in criticisms on self, turn-taking strategies and effective intervention, use of body language.

Module III (23 hours)

Written Communication: Note making and taking, summarizing, notes and memos, developing notes into text, organization of ideas, cohesion and coherence, paragraph writing, ordering information in space and time, description and argument, comparison and contrast, narrating events chronologically. Writing a rough draft, editing, proof reading, final draft and styling text.

Technical report writing: Synopsis writing, formats for reports. Introductory report, Progress report, Incident report, Feasibility report, Marketing report, Field report and Laboratory test report

Project report: Reference work, General objective, specific objective, introduction, body, illustrations using graphs, tables, charts, diagrams and flow charts. Conclusion and references Preparation of leaflets, brochure and C.V.

Module IV (16 hours)

Human relations and Professional ethics: Art of dealing with people, empathy and sympathy, hearing and listening. Tension and stress, Methods to handle stress

Responsibilities and rights of engineers- collegiality and loyalty – Respect for authority – Confidentiality – conflicts of interest – Professional rights, Rights of information, Social responsibility

Senses of ethics – variety of moral issues – Moral dilemma – Moral autonomy – Attributes of an ethical personality – right action – self interest

Reference Books

1. Meenakshi Raman and Sangeeta Sharma, *Technical Communication- Principles and Practice* Oxford University press, 2006
2. Jayashree Suresh and B S Raghavan, *Professional Ethics*, S Chand and Company Ltd, 2005
3. Subrayappa, *History of Science in India*, National Academy of Science, India
4. R C Bhatia, *Business Communication*, Ane Books Pvt. Ltd, 2009
5. Sunita Mishra and C Muralikrishna, *Communication Skills for Engineers*, Pearson Education, 2007.
6. Jovan van Emden and Lucinda Becker, *Effective Communication for Arts and Humanities Students*, Palgrave macmillam, 2009
7. W C Dampier, *History of Science*, Cambridge University Press
8. Vesilind, *Engineering, Ethics and the Environment*, Cambridge University Press
9. Larson E, *History of Inventions*, Thompson Press India Ltd.
10. Bernal J.D, *Science in History*, Penguin Books Ltd
11. Encyclopaedia Britannica, *History of Science, History of Technology*
12. Subramanian.R,*Professional Ethics,Oxford University Press,2013*
13. .Sanjay Kumar and Pushpalata,*Communication skills,Oxford University Press,2011*

Internal Continuous Assessment *(Maximum Marks-50)*

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.

10% - Attendance and Regularity in the class

University Examination Pattern

PART A: Analytical/problem solving SHORT questions 8x 5 marks=40 marks

Candidates have to answer EIGHT questions out of TEN. There shall be minimum of TWO and maximum of THREE questions from each module with total TEN questions.

PART B: Analytical/Problem solving DESCRIPTIVE questions 4 x 15 marks=60 marks

Two questions from each module with choice to answer one question.

Maximum Total Marks: 100

EN 14 110 (P): MECHANICAL WORKSHOPS

(Common for all branches)

Teaching scheme **Credits:** 2
2 hours practical per week

Objectives

- To inculcate engineering aptitude, confidence and experience towards technical skills
- To train the students mentally and physically for industries
- To impart knowledge and technical skills on basic manufacturing methods

A. **Carpentry**: study of tools and joints – planing, chiselling, marking and sawing practice, different joints , use of power tools

B. **Fitting**: study of tools, chipping, filing, cutting, drilling, tapping, male and female joints, stepped joints

C. **Smithy**: study of tools, forging of square prism, hexagonal bolt

D. **Foundry:** study of tools, sand preparation, moulding practice

E. **Sheet Metal work**: study of tools, selection of different gauge sheets, types of joints, trays and containers

F. **Welding**: study of tools, different types of joints, practice

At least 3 models should be completed by the student in each section.

Internal Continuous Assessment (Maximum Marks-100)

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class

EN 14 111(P) ELECTRICAL AND CIVIL WORK SHOPS

(Common for all branches)

Teaching scheme **Credits:** 2

2 hours of practical per week

SECTION 1: ELECTRICAL ENGINEERING WORK SHOP

Objective

- *To impart a basic knowledge of electrical circuits, machines and power systems.*

List of experiments

1. Familiarization of various types of Service mains – Wiring installations – Accessories and house hold electrical appliances.
2. Methods of earthling- Measurement of earth resistance- Testing of electrical installations- Precautions against and cure from electric shock
3. Practice of making different joints (Britannia, Married and T- Joints) on copper/ aluminium ba
4. Wiring practice of a circuit to control two lamps by two SPST switches.
5. Wiring practice of a circuit to control one lamp by two SPDT switches.
6. Wiring practice of a circuit to control one fluorescent lamp and one three pin plug socket.
7. Wiring practice of a main switch board consisting of ICDP switch, DB, MCB‘s and ELCB‘s.
8. Familiarization of various parts of electrical motors and wiring of three phase and single phase motor with starter.
9. Familiarization of energy meter and measurement of energy consumption by a single phase load.
10. Familiarization of various electrical and electronic components such as transformers, resistors, AF and RF chokes, capacitors, transistors, diodes, IC‘s and PCB.
11. Assembling and soldering practice of single phase full wave bridge rectifier circuit with i) capacitor circuit ii) regulator IC

Internal Continuous Assessment (Maximum Marks-50)

50% - Laboratory practical and record

40% - Test

10% - Regularity in the class

SECTION 2: CIVIL ENGINEERING WORK SHOP

Objectives

- *To provide experience on plotting, measuring/determining horizontal distances, level differences between stations and horizontal angles*
- *To provide experience on setting out for small buildings, masonry construction, plumbing work and model making.*

1. Chain Surveying - Study of chain and accessories, Plotting one side of a building/ Five or six points in the field using chain and cross-staff
2. Compass surveying (Study of compass, Plotting one side of a building/Five or six points in the field using compass
3. Levelling - Study of levelling instruments, Determination of reduced levels of five or six points in the field.
4. Theodolite - Study of Theodolite, Measuring horizontal angles
5. Setting out practice
6. Brick Masonry
7. Plumbing - Demonstration of plumbing fixtures-Exercise in joints
8. Model making of simple solids

Internal Continuous Assessment (Maximum Marks-50)

50% - Laboratory practical and record
40% - Test
10% - Regularity in the class