

**SYLLABUS**

**AND**

**SCHEME**

**B.TECH CIVIL ENGINEERING**

(2006 Admission on wards )

**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**B.TECH DEGREE COURSE IN CIVIL ENGINEERING**  
**Scheme of examinations**

**SEMESTER I&II**

Code No	Subject	Hrs/week		Int.	Uni v.	Total
		L	T/D/P			
CE/CS/EB/EC/EE/EI/IT/ME/SE 101	Engineering Mathematics –I	3		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 102	Engineering. Physics	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 103	Engineering Chemistry	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 104	Engineering Mechanics	3	1	50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 105	Engineering Graphics	1	3	50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 106	Basic Civil & Mechanical Engineering	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 107	Basic Electrical & Electronics Engineering	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 108	Computer Programming	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 109	Technical Communication & Social Science	3		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 110	Computer Programming Lab	-	3	100		100
CE/CS/EB/EC/EE/EI/IT/ME/SE 111	Workshops Practice	-	3	100		100
	TOTAL	20	10	650	900	1550

**SEMESTER III**

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 301	Engineering. Mathematics –II	4		50	100	150
CE 302	Surveying –I	3	1	50	100	150
CE /EE 303	Strength of Materials	3	1	50	100	150
CE 304	Concrete Technology	4		50	100	150
CE 305	Fluid Mechanics -I	3	1	50	100	50
CE 306	Engineering Materials & Building Construction	4		50	100	150
CE 307	Survey Practicals –I	-	3	100		100
CE 308	Strength of Materials Lab	-	3	100		100
	TOTAL	21	9	500	600	1100

## STREAM A

### SEMESTER IV

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 401A/B	Engineering Mathematics –III	4		50	100	150
CE 402A/B	Surveying –II	3	1	50	100	150
CE 403A/B	Mechanics of Structures	3	1	50	100	150
CE 404A/B	Engineering Geology & Seismology	4		50	100	150
CE 405A/B	Fluid Mechanics II	3	1	50	100	150
CE 406A/B	Construction Engineering & Management - I	3	1	50	100	150
CE 407 A	Survey Practicals –II	-	3	100		100
CE 408 A	Fluid Mechanics Lab	-	3	100		100
	TOTAL	20	10	500	600	1100

### SEMESTER V

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 501A/B	Engineering Mathematics –IV	4		50	100	150
CE 502A/B	Analysis of Structures –I	3	1	50	100	150
CE 503A/B	Design of Structures-I	3	1	50	100	150
CE 504A/B	Geotechnical Engineering –I	3	1	50	100	150
CE 505A	Transportation Engineering –I	4		50	100	150
CE 506A/B	Construction Engineering & Management -II	4		50	100	150
CE 507 A	Geotechnical Engineering Lab	-	3	100		100
CE 508 A	Transportation Engineering Lab	-	3	100		100
	TOTAL	21	9	500	600	1100

### SEMESTER VI

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 601A	Environmental Engineering -I	3	1	50	100	150
CE 602A/B	Analysis of Structures –II	3	1	50	100	150
CE 603A/B	Design of Structures-II	3	1	50	100	150
CE 604A/B	Geotechnical Engineering –II	3	1	50	100	150
CE 605A	Transportation Engineering –II	4		50	100	150
CE 606A/B	Water Resources & Irrigation Engineering	4		50	100	150
CE 607 A	CAD in Civil Engineering	-	3	100		100
CE 608 A	Environmental Engineering Lab	-	3	100		100
	TOTAL	20	10	500	600	1100

## SEMESTER VII

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 701A	Environmental Engineering - II	4		50	100	150
CE 702A/B	Prestressed Concrete Structures	3	1	50	100	150
CE 703A/B	Earthquake Engineering	3	1	50	100	150
CE 704A/B	Quantity Surveying and Valuation	3	1	50	100	150
CE 705A/B	Elective -I	3	1	50	100	150
CE 706A	Computer Applications in Civil Engg.		3	100		100
CE 707A	Construction and Structural Engg ..Lab	-	3	100		100
CE 708A/B	Seminar	-	2	50		50
CE 709A	Project		2	50		50
	TOTAL	16	14	550	500	1050

## SEMESTER VIII

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 801A/B	Architecture & Town Planning	4		50	100	150
CE 802A/B	Construction Safety & Fire Engineering	4		50	100	150
CE 803A/B	Retrofitting and Rehabilitation of Structures	4		50	100	150
CE 804A/B	Elective –II	4	1	50	100	150
CE 805A	Building Technology and NDT Lab	-	3	100		100
CE 806A	Project		10	200		200
CE 807A	Viva Voce				100	100
	TOTAL	16	14	500	500	1000

**Grand Total**

**8000**

### *Elective –I*

- 705 (a) Finite Element Method .  
 (b) Advanced Construction Techniques & Field Quality Control  
 .( c) Advanced Foundation Engineering.  
 (d) Groundwater Engineering  
 (e) Highway & Airfield Pavement Design

### *Elective –II*

- 804 (a) Bridge Engineering  
 (b) Cost Effectives Building Techniques.  
 (c) Ground Improvement Techniques  
 (d) Remote Sensing & GIS.  
 (e) Industrial Waste Engineering & Management

## STREAM B

### SEMESTER IV

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 401A/B	Engineering Mathematics –III	4		50	100	150
CE 402A/B	Surveying –II	3	1	50	100	150
CE 403A/B	Mechanics of Structures	3	1	50	100	150
CE 404A/B	Engineering Geology & Seismology	4		50	100	150
CE 405A/B	Fluid Mechanics II	3	1	50	100	150
CE 406A/B	Construction Engineering and Management - I	4		50	100	150
CE 407 B	Survey Practicals –II	-	3	75		75
CE 408 B	Fluid Mechanics Lab	-	3	75		75
CE 409 B	Industrial/Field Training		6	75		75
	TOTAL	21	15	525	600	1125

### SEMESTER V

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 501A/B	Engineering Mathematics –IV	4		50	100	150
CE 502A/B	Analysis of Structure –I	3	1	50	100	150
CE 503A/B	Design of Structures-I	3	1	50	100	150
CE 504A/B	Geotechnical Engineering –I	3	1	50	100	150
CE 505 B	Transportation Engineering	4		50	100	150
CE 506A/B	Construction Engineering Management II	4		50	100	150
CE 507 B	Geotechnical Engineering Lab	-	3	75		75
CE 508 B	Transportation Engineering Lab	-	3	75		75
CE 509 B	Industrial/Field Training		6	75		75
	TOTAL	21	15	525	600	1125

### SEMESTER VI

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 601B	Environmental Engineering	3	1	50	100	150
CE 602A/B	Analysis of Structure –II	3	1	50	100	150
CE 603A/B	Design of Structures-II	3	1	50	100	150
CE 604A/B	Geotechnical Engineering –II	3	1	50	100	150
CE 605B	MIS & Finance Management	4		50	100	150
CE 606A/B	Water Resources & Irrigation Engineering	4		50	100	150
CE 607 B	CAD in Civil Engineering	-	3	75		75
CE 608 B	Environmental Engineering Lab	-	3	75		75
CE 609 B	Industrial/Field Training		6	75		75
	TOTAL	20	16	525	600	1125

## SEMESTER VII

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 701 B	Contracts & Legal Aspects in Construction	5		50	100	150
CE 702A/B	Prestressed Concrete Structures	3	1	50	100	150
CE 703A/B	Earthquake Engineering	3	1	50	100	150
CE 704A/B	Quantity Surveying and Valuation	3	1	50	100	150
CE 705A/B	Elective -I	3	1	50	100	150
CE 706B	Computer Applications in Civil Engineering		3	75		75
CE 707 B	Construction & Structural Engg Lab		3	75		75
CE 708A/B	Seminar		2	50		50
CE 709 B	Industrial/Field Training		6	75		75
	TOTAL	17	18	525	500	1025

## SEMESTER VIII

Code No	Subject	Hrs/week		Int.	Univ.	Total
		L	T/D/P			
CE 801A/B	Architecture and Town Planning	4		50	100	150
CE 802A/B	Construction Safety & Fire Engineering	4		50	100	150
CE 803A/B	Retrofitting & Rehabilitation of Structures	4		50	100	150
CE 804A/B	Elective –II	4	1	50	100	150
CE 805B	Industrially Oriented Project	-	13	250		250
CE 806B	Viva Voce				100	100
	TOTAL	16	14	450	500	950

**Grand Total**

**8000**

### *Elective –I*

- 705 (a) Finite Element Method .  
 (b) Advanced Construction Techniques & Field Quality Control  
 (c) Advanced Foundation Engineering.  
 (d) Groundwater Engineering.  
 (e) Highway & Airfield Pavement Design

### *Elective –II*

- 804 (a) Bridge Engineering.  
 (b). Cost Effectives Building Techniques  
 (c) Ground Improvement Techniques  
 (d) Remote Sensing & GIS.  
 (e) Industrial Waste Engineering & Management

## SYLLABUS FOR B. TECH CIVIL ENGINEERING (2006 Admissions)

### CE/CS/EB/EC/EE/EI/IT/ME/SE 101 ENGINEERING MATHEMATICS I

#### MODULE I

##### **Ordinary differential equations:**

First order differential equations-Methods of solution and Simple applications Linear differential equations of higher orders with constant co-efficients-Methods of solution of these equations. Cauchy's Linear differential equations. Simultaneous linear differential equations- Simple applications of linear differential equations in engineering problems - Electrical Circuits, Mechanical Systems

#### MODULE II

**Infinite series:** Integral test, comparison test, ratio test, Cauchy's root test, Raabe's test, series of positive and negative terms, concept of absolute convergence, alternating series, Leibniz test(No proofs for any of the above tests) Power series: Interval of convergence of power series, Taylor and Maclaurin series of functions.

Leibniz formula for the nth derivative of the product of two functions (No proof), use of Leibniz formula for the determination of co-efficients of the power series.

#### MODULE III

Partial differentiation: Partial differentiation-Concept of partial derivative - Chain rule- Total derivative- Euler's theorem for homogeneous functions, Differentials and their applications in errors and approximations, Jacobians - Maxima minima of functions of two variables(Proof of the result not required)-Simple applications.

Taylor's series expansion for a function on two variables-Simple problems

Co-ordinate systems: Rectangular co-ordinates-Polar co-ordinates-In plane and in Space Cylindrical polar co-ordinates-Spherical polar co-ordinates.

#### MODULE IV

##### **Integral calculus:**

Application of definite integrals: Area, Volume, Arc length, Surface area.

Improper Integrals-Beta function-Gamma function Multiple integrals: Evaluation of double integrals-Change of order of integration. Evaluation of triple integrals-Change of Variables in integrals.

Applications of multiple integrals Plane Area, Surface area & Volumes of solids

##### **References**

1. Mathematical Techniques: Oxford University Press
2. Engineering Mathematics: T.Veerarajan, TMGH Publishers
3. Higher Engineering Mathematics: B.S.Grewal, Khanna Publishers
4. Engineering mathematics -Vol1:S.S.Sastry, PHI publishers Advanced Engineering Mathematics: Erwin Kreyzig, Wiley Eastern

*Type of Questions for University Exam.*

*Q 1. Eight short answer questions of 5 marks with two questions from each of the four modules.*

*Q 2. to Q.5 : Two questions A & B of 15 marks from each module with option to answer either A or B.*

## CE/CS/EB/EC/EE/EI/ME/IT/SE 102: ENGINEERING PHYSICS

### Module I:

Interference of light - Michelson interferometer - Applications-Interference in thin films Antireflection coatings - Interference filters - Fringes produced by air wedge - Testing of flat surfaces- Diffraction of light -Zone plate - Plane diffraction grating - Reflection and transmission gratings - Determination of wavelength of light - Dispersive and resolving powers - Polarization of light - Double refraction - Nicol's prism - Quarter and half wave plates - Elliptically and circularly polarized light - Optical activity - Specific rotation - Half-shade polarimeter Applications of polarized light.

### Module II:

Lasers and Holography - Properties of laser light - Coherence of light - Principles of laser action - Population inversion - Optical pumping - Metastable states - Conditions for laser action Types of lasers - Helium-Neon, Ruby and Semiconductor lasers - Applications of lasers Principles of holography - Recording and Reconstruction of holograms - Applications of holography- Fiber optics - Light transmission through optical fiber - Numerical aperture - Multi and single mode fibers - Step index and graded index fibers - Fiber drawing - Fiber optic communication (basic ideas) - Ultrasonics - Generation of ultrasonic waves - Applications of Ultrasound.

### Module III:

Quantum mechanics - Heisenberg's uncertainty principle - Experimental illustrations - Quantum mechanical wave equation - Time independent Schrodinger equation - Physical significance of wave function - Properties of the wave function - Solution of Schrodinger equation - Atomic and nuclear physics - The Vector atom model- Quantization of orbital angular momentum - Electron spin - Magnetic moment of orbital electron - Pauli's exclusion principle- Zeeman effect - Stark effect - Raman effect. Nuclear physics - Nuclear forces - Properties of the nucleus - Nuclear reactions-Nuclear reaction cross section-Artificial radioactivity - Nuclear reactors - Nuclear fusion - Thermonuclear reactions-Controlled thermonuclear reactions.

### Module IV :

X-rays - Production of X-rays - Origin of X-rays and X-ray spectra - Moseley's law - Properties of X-rays - Applications of X-rays - Diffraction of X-rays by crystals - Bragg's law Crystallography - Unit cell - Seven crystal systems - Bravais space lattices - Packing factor Lattice planes and Miller indices - Energy bands in solids - Conductors, semiconductors and insulators - Intrinsic and extrinsic semiconductors - Conductivity of semiconductors - Fermi level - Applications of semiconductors - p-n junctions - solar cells - Hall effect and its applications - Superconductivity - Superconducting transition - The Meissner effect - Type I and Type n superconductors - Isotope effect - High temperature superconductors - Josephson effect - SQUIDS - Applications of superconductors

### References

J. Jacob Philip - A text book of Engineering Physics, Educational Publishers and Distributors 2002

2. A.S. Vasudeva - Modern Engineering Physics, S. Chand & Co.

3. M.R. Sreenivasan - Physics for Engineers - New Age International

*Type of Questions for University Exam.*

*Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.*

*Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.*



## CE/ CS/EB/EC/EE/EI/ME/IT/SE 103 ENGINEERING CHEMISTRY

### Module I

Solid state chemistry: Fundamentals, Bonding in solids, Born-Haber cycle, Point defects, Methods to improve reactivity of solids, Free electron theory, Band theory, Fermi level in semiconductors, Molecular field theory of magnetic materials, Conventional and organic superconductors, High temperature superconductors, Liquid crystals, Applications. Solid surface characterisation: Electron spectroscopy for chemical analysis, Chemical shift, BET isotherm, Thermodynamics of adsorption.

Module II Electrochemistry: Fundamentals, Electrode potentials, Types of electrodes, Salt bridge, emf measurement. Concentration cells, Acids and bases, Buffer solutions, pH measurements, Polarisation, Overvoltage. Power generation: Secondary cells, Fuel cells, Photovoltaic effect, Solar cells. Corrosion: Different forms of corrosion, Prevention of corrosion.

Chemical Kinetics: reaction rate, rate constant, rate law, reaction order, first order, second order, pseudo-first order reactions, integrated rate laws, half-life of a reaction and its relation to rate constant. Molecularity, simple unimolecular and bimolecular reactions. Arrhenius equation.

Fast reactions - flash photolysis, flow techniques and relaxation methods.

Module III Chemical Thermodynamics: Fundamentals, Molecular interpretation of internal energy, enthalpy and entropy, Heat of reaction, Kirchhoff's equation, Trouton's rule, Entropy changes accompanying different processes, Nernst heat theorem, Third-law. Free energy: Dependence on pressure and temperature, Gibbs-Helmholtz equation, Free energy changes and equilibrium constant, Chemical potential, Fugacity, Thermodynamics of biochemical reactions.

Module IV Engineering materials: Industrial polymers-polymerization techniques, structure-property relationships, polymer additives, polymer processing methods (extrusion, injection, compression, transfer and blow molding methods). Nanomaterials: definition, classification and applications.

Nanometals and nanoceramics - examples and properties.

Lubricants: classification, functions and properties. Mechanism of lubrication.

Refractories: classification and properties. Portland cement, lime and plaster of Paris manufacture, setting and hardening.

Chemistry of optical fibres, fullerenes and organoelectronic materials (introduction only).

### Text Books

1. Peter Atkins and Julio de Paula Elements of Physical Chemistry, Oxford University Press, 2005
2. Shashi Chawla A Text Book of Engineering Chemistry (3rd edn.); Dhanpat Rai & Co, New Delhi, 2003.

Referencess

- |                                   |  |
|-----------------------------------|--|
| 1. Atkins, P.W.,                  | Physical Chemistry, Oxford University Press, UK, 1998  |
| 2. Bhatnagar, M. S.,              | Textbook of Pure & Applied Physical Chemistry, A. H. Wheeler & Co, New Delhi, 1999.          |
| 3. Geoffrey Ozin, Andre Arsenault | Nanochemistry: A Chemical Approach to Nanomaterials.; Royal Society of Chemistry, U.K. 2005. |

*Type of Questions for University Exam.*

*Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.*

*Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.*

## CE/ME/EC/CS/SE/IT/EB/EI/EE 104 ENGINEERING MECHANICS

### A) STATICS

#### MODULE I

**Concurrent forces in a plane:** Principles of statics. Composition and resolution of forces. Equilibrium of concurrent forces in a plane. Method of projection. Method of moments. Friction.

**Parallel forces in a plane:** Two parallel forces. General case of parallel forces in a plane. Centre of parallel forces and centre of gravity, Pappus theorems, centroids of composite plane figures and curves. Distributed forces in a plane.

#### MODULE II

**Properties of areas:** . Moment of inertia of a plane figure with respect to an axis in its plane. Polar moment of inertia. Product of inertia. Principal axes. Mass moment of inertia of material bodies.

**General case of forces in a plane:** Composition of forces in a plane. Equilibrium of forces in a plane. Plane trusses - Method of joints. Method of sections. Plane frames : Method of members. **Principle of virtual work:** Equilibrium of ideal systems, stable and unstable equilibrium.

### B) DYNAMICS

#### MODULE III

**Rectilinear translation:** Kinematics of rectilinear motion. Differential equation of rectilinear motion. Motion of a particle acted upon by a constant force, by a force as a function of time and by a force proportional to displacement. Simple harmonic motion. D'Alembert's principle. Momentum and impulse. Work and energy, ideal systems, conservation of energy. Impact.

#### MODULE IV

**Curvilinear translation:** Kinematics of curvilinear translation. Differential equations of motion. Motion of a projectile. D'Alembert's principle in curvilinear motion. Moment of momentum. Work and energy in curvilinear motion.

**Rotation of a rigid body:** Kinematics of rotation. Equation of motion of a rigid body rotating about a fixed axis. Rotation under the action of a constant moment. Compound pendulum. General case of moment proportional to the angle of rotation. D'Alembert's principle of rotation. Resultant inertia force in rotation. Principle of angular momentum in rotation. Energy equation for rotating bodies.

### REFERENCESS

1. Engineering Mechanics - Timoshenko and Young - McGraw Hill Book Company.
2. Mechanics for Engineers (Vol. 1- Statics and Vol.2 -Dynamics) - Beer F. P. & Johnston E. R. - Tata McGraw Hill.
3. Engineering Mechanics (Vol. 1- Statics and Vol.2 -Dynamics) - Merriam H. L. & Kraige L. G. - John Wiley and Sons.
3. Engineering mechanics- Biju N-Educational Publications –

*Type of Questions for University Exam.*

*Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.*

*Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.*

## CE/ME/EC/CS/SE/IT/EB/EI/EE 105 ENGINEERING GRAPHICS

### **MODULE I**

**Introduction to engineering graphics.** Drawing instruments and their use. familiarisation with current Indian Standard Code of Practice for general engineering drawing.

Scales- plain scale ,vernier scale, diagonal scale.

Conic sections- Construction of ellipse, parabola, hyperbola - construction of cycloid, involute, archimedian spiral and logarithmic spiral- drawing tangents and normals to these curves.

### **MODULE II**

**Introduction to orthographic projections-** plane of projection- principles of first angle and third angle projections, projection of points in different quadrants.

Orthographic projection of straight lines parallel to one plane and inclined to the other plane- straight lines inclined to both the planes- true length and inclination of lines with reference planes- traces of lines.

Projection of plane laminae of geometrical shapes in oblique positions.

### **MODULE III**

**Projection of polyhedra and solids of revolution-** frustum, projection of solids with axis parallel to one plane and parallel or perpendicular to other plane- projection of solids with axis inclined to both the planes- projection of solids on auxiliary planes.

Section of solids by planes inclined to horizontal or vertical planes- true shape of sections.

### **MODULE IV**

**Development of surface** of cubes, prisms, cylinders, pyramids and cones

**Intersection of surfaces-** methods of determining lines of intersection - intersection of prism in prism and cylinder in cylinder.

### **MODULE V**

**Introduction to isometric projection-** isometric scales, isometric views- isometric projections of prisms, pyramids, cylinders, cones and spheres.

**Introduction to perspective projections :** visual ray method and vanishing point method- perspective of circles- perspective views of prisms and pyramids.

### **REFERENCES**

- |                                   |  |
|-----------------------------------|--|
| 1. Engineering Graphics           | P.I.Varghese & K.C. John, JET Publishers |
| 2. Elementary engineering drawing | N.D.Bhat, Charotar publishing house      |
| 3. Geometric drawing,             | P.S.Gill , B.D Kataria &sons Ludhiana    |
| 4. Engineering Graphics           | P I Varghese, VIP Publishers.            |

*Type of Questions for University Exam.*

*Q 1. to Q.5 : Two questions A & B of 20 marks from each modules with option to answer either A or B.*

**CE/CS/EB/EC/EE/EI/IT/ME/SE 106 BASIC CIVIL AND MECHANICAL ENGINEERING**

**(A) CIVIL ENGINEERING**

**MODULE I**

**Materials:** *Cement* - varieties and grade of cement and its uses. *Steel*- types of steel for reinforcement bars, steel structural sections. *Brick*- varieties and strength , tests on bricks.

*Aggregates*- types & requirements of good aggregates. *Concrete*- grades of concrete as per IS code, water cement ratio, workability, mixing, batching, placing, compaction and curing.

**Construction :** *Foundation*- types of foundations- isolated footing, combined footing, raft, pile & well foundations,

**MODULE II**

**Super structure :** Brick masonry, English bond and Flemish bond , Stone masonry, Random rubble masonry. *Roofing*- Steel trusses, roofing for industrial buildings

**Surveying:** Principles, instruments, ranging and chaining of survey lines, errors in chaining, field work, field book, selection of survey stations, reconnaissance ,,

**Levelling :** Levelling instruments, different types, temporary adjustments, mean sea level, reduced level of point, booking of field notes, reduction of levels by height of collimation method.

**Text Books & References :**

- |   |  |
|---|--|
| 1. Engineering materials                | : Rangawala                            |
| 2. Building construction                | : Punmia                               |
| 3. A Text book of building construction | : N.K.R. Murthy                        |
| 4. Fundamentals of Civil Engineering-   | : Roy M Thomas-Educational Publishers. |
| 5. A Text book of building construction | : Jha & Sinha                          |
| 6. Surveying & Levelling                | : T P Kanetkar                         |
| 7. Surveying & Levelling                | : Hussain                              |

**B) MECHANICAL ENGINEERING**

**MODULE III**

Thermodynamics: thermodynamic systems - open, closed and isolated systems, equilibrium state. of a system, property' and state, process, cycle, work, Zeroth law of thermodynamics-concept of temperature, temperature scales. First law - internal energy, enthalpy. Second law - Kelvin-Planck and Clausius statements, Carnot Cycle.

Refrigeration and Air conditioning: Vapour compression and vapour absorption refrigeration systems, summer and winter Air conditioning, Comfort and industrial Air conditioning.

Elementary ideas of simple reaction and impulse turbines, compounding of turbines.

#### MODULE IV

Internal Combustion Engines: working of two stroke and four stroke Petrol and Diesel engines, simple Carburettor, ignition system, fuel pump, fuel injector, cooling system, lubricating system.

Transmission of Power: Belt drives (open and closed), chain drives.

Metal fabrication: Welding - Arc, gas, resistance welding, Welding defects, Soldering, Brazing

#### Text Books & References:

- |  |                                    |
|--|------------------------------------|
| 1. Engineering Thermodynamics                  | P.K.Nag                            |
| 2. Engineering Thermodynamics                  | D.B. Spalding & E.H.Cole           |
| 3. Engineering Thermodynamics                  | Van Wylon                          |
| 5. Thermodynamics                              | J.P.Holman                         |
| 6. Elements of Internal Combustion Engines     | Rogowsky, Tata McGraw Hill         |
| 7. Fundamentals of Internal Combustion Engines | Gill, Smith & Ziurys, Oxford & IBH |
| 8. Refrigeration and Air Conditioning,         | Stoecker Tata McGraw Hill          |

*Type of Questions for University Exam.*

#### **PartA -**

**Question 1- 4 short answer questions of 5 marks each. 2 questions from each module**

**Question 2-3 – There will be two choices from each module .Answer one question from each module of 15 marks**

#### **Part B**

**Question 4-4 short answer questions of 5 marks each. 2 questions from each module**

**Question 5-6 – There will be two choices from each module .Answer one question from each module of 15 marks**

**CE/CS/EB/EC/EE/ EI/IT/ME/SE 107 BASIC ELECTRICAL ENGINEERING&  
ELECTRONICS**

**(A) ELECTRICAL ENGINEERING**

**Module I**

Basic principles of Electric circuits: Review of Ohms law - Definition of resistance, current, voltage and power - Series and parallel circuits- constant voltage source and constant current source.

Network Theorems: Kirchoffs laws- Network analysis by Maxwell's circulation currents Thevenin's theorem - Superposition theorem -Norton's theorem - Simple illustrative problems on network theorems.

Review of electrostatics - Coulomb's Law- Electric field strength and Electric flux density capacitance.

**Module II**

Review of electromagnetic induction -Faraday's Law- Lenz's Law - mutually induced emf.

Magnetic circuits - magnetic field of a coil - Ampere turns calculation - magnetic flux - flux density - field strength.

Measuring instruments: Working principle of galvanometer, Ammeter, Voltmeter, watt meter & energy meter.

AC fundamentals: Generation of alternating voltage and current - equations of sinusoidal voltage and current - wave form, cycle frequency, time period, amplitude, phase difference, rms value, average value, power factor & form factor. Vector diagram - addition and subtraction of vectors- sine waves in phase and out of phase. AC circuits: RC, RL, RLC circuits-series and parallel - current, voltage and power relationships. Poly phase circuits: vector representation phase sequence - star and delta connections.

**(B) ELECTRONICS ENGINEERING**

**Module III**

Passive components: Resistor - Capacitor - Inductor - Color coding. Transformer- different types, construction.

Semiconductors: Energy band diagram - intrinsic & extrinsic semi conductors, doping - PN junction - Diodes, Zener diodes- Characteristics - Application of diodes. Rectifiers- Half wave, full wave and Bridge rectifiers - Ripple factor and regulation.

Transistors: - PNP and NPN transistors - theory of operation - Transistor configurations characteristics - comparison.

Special semiconductor devices - PET - SCR - LED - LCD - V -I characteristics, applications.

**Module IV**

Fundamentals of Instrumentation: Transducers - Definition - Classification - Active & passive - Transducer for position, pressure, velocity, vibration and temperature measurements.

CRO - principle of operation - measurement of amplitude, frequency and phase.

Fundamentals of Communication: Analog communication - concept of modulation, demodulation. Types: AM - FM -PM- Block diagram of general communication system - Basic concepts of digital communication - Block diagram.

Text Book:

1. Basic Electronics - Solid State - B. L. Theraja, S. Chand & Co.
2. Fundamentals of Electrical Engineering - Leonard S. Bobrow, Oxford University Press.

Further References:

1. Electrical Technology: Edward Hughes, Addison Wesley Publication
2. Electronic Devices & Circuits: G.K. Mithal & Ravi Mittal, Khanna Publishers

*Type of Questions for University Exam.*

*Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.*

*Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.*



## CE/CS/EB/EC/EE/E1/IT/ME/SE 108 COMPUTER PROGRAMMING

### Module 1

**Introduction to programming in C:** Fundamental data types- integer, floating point, and enumerated data types, typedef Expressions – arithmetic, relational and logic operators, Type conversion – simple and compound statement, Access to standard library, standard I/O-getchar, putchar, Formatted I/O, scanf, printf, error handling, line input and out put, control structures, selection statement, **IF, SWITCH, WHILE, DO WHILE, FOR, BREAK, CONTINUE, GOTO, RETURN** statements.

### Module 2

**Functions:** Declarations and functions, parameter passing mechanism, storage classes-scope, visibility, and life time of variables, AUTO, EXTERN, STATIC and REGISTER modifiers, Recursion.

### Module 3

**Arrays :** Single and multi dimensional arrays, sorting, selection sort, search-linear search and binary search, Structures and union.

### Module 4

**Pointers:** Pointers and addresses, pointer arrays, function returning pointers, pointers to function, pointer arithmetic, pointers to structures, array of structures, preprocessor directive, command line arguments

### Text Book

1. Mullish & Cooper The Spirit of C An introduction to Modern programming Jaico Publication 1988
2. B.S. Gotfried (Schaum series, TMH)- Programming in C, \*

### References:

1. Pradeep Dey and Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford 2006
2. Varghese Paul- Computer Fundamentals, \* EPD, Kochi
3. Brian W. Kernighan and Dennis M. Richie, "The C Programming Language" PHI, 2<sup>nd</sup> ed.,

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

**CE/CS/EB/EC/EE/EI/ME/IT/SE 109 TECHNICAL COMMUNICATION AND  
SOCIAL SCIENCES**

**(Module IV Environmental Studies: 1 hour per week, Other modules : 2 hours per week)**

**PART - A TECHNICAL COMMUNICATION**

**Module I**

**(25 hours)**

Oral Communication: starting and ending a conversation; telling and asking people to do things; expressing opinions and ideas, decisions and intentions, offers and invitations, feelings, right and wrong, numbers and money.

Purpose and audience; dealing with customers and clients; face-to-face discussions; meetings and attending meetings; checking understanding; raising questions; giving and receiving feedback; using body language; leading and directing discussions; concluding discussions; using graphics in oral presentations

Reading Comprehension and reference skills: skimming and scanning; factual and inferential comprehension; prediction; guessing meaning of words from context; word reference; comprehending graphics in technical writing.

Reading strategies; reading speed; reading between the lines for hidden meaning; interpreting graphics; using a dictionary; using an index; using a contents list to find information; choosing the right reference source.

**Module II**

**(20 hours)**

Written Communication: note making and note taking; summarising; notes and memos; developing notes into text; organisation of ideas: cohesion and coherence; paragraph writing: ordering information in space and time; short essays: description and argument; comparison and contrast; illustration; using graphics in writing: tables and charts; diagrams and flow-charts; maps, plans and graphs.

Spelling rules and tips; writing a rough draft; editing and proof reading; writing the final draft; styling text; filling in complex forms; standard letters; CV; writing a report; writing leaflets and brochures; writing references; essay writing:

expository writing; description of processes and products; classification; the instructional process; arguments and presentation of arguments; narrating events chronologically.

**PART - B SOCIAL SCIENCES**

**Module III**

**(15 hours)**

Science, Technology and Ethics

Impact of science and technology on the development of modern civilization. The philosophy of modern science: scientific determinism - uncertainty principle. Relevance of scientific temper. Science and religion. Science and technology in developing nations. Technological advances of modern India. Intermediate and appropriate technology.

Development of technical education in India.

Senses of Engineering Ethics - Variety of moral issues - Types of inquiry - Moral dilemmas - Moral autonomy Kohlberg's theory - Gilligan's theory - Consensus and Controversy - Professional ideals and virtues - Attributes of an ethical personality - Theories about right action - Self interest.

Responsibilities and Rights of engineers - Collegiality and Loyalty - Respect for authority - Collective bargaining Confidentiality - Conflicts of interest - Professional rights.

Module IV Environmental Studies: ( 30 hours)

Natural resources - issues related to the use and over exploitation of forest resources, water resources, mineral resources, food resources and energy resources - role of an individual in conservation of natural resources - equitable use of resources for sustainable life styles.

Concept of an ecosystem - structure and function - energy flow in the ecosystem - ecological succession - food chains, food webs and ecological pyramids - structure and functions of a forest ecosystem and an aquatic ecosystem.

Definition of biodiversity - genetic, species and ecosystem diversity - biogeographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.

Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, marine pollution, thermal pollution and nuclear hazards - Causes, effects and control measures of urban and industrial solid wastes - Role of an individual in prevention of pollution - An overview of the various environmental legislations in India - Issues involved in enforcement of environmental legislation.

The concept of sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, water shed management - Resettlement and rehabilitation of people; its problems and concerns - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust - Population growth and problems of population explosion - Environmental ethics: issues and possible solutions..

Text Books:

Meenakshi Raman and Sangeetha Shanna : Technical Communication: Principles and Practice, Oxford University Press, 2004

Rajagopalan. R :	Environmental Studies: From Crisis to Cure, Oxford University Press, 2005
Jayashree Suresh and B.S. Raghavan	Professional Ethics, S. Chand & Company
WC Dampier	Ltd, 2005. History of Science, Cambridge University Press.

Adrian Doff & Christopher Jones,	References:
	Language in Use. Upper intermediate, self-study workbook & classroom book, Cambridge University Press, 2000

Krishna Mohan & Meenakshi Raman,	Effective English Communication ,Tata Mc-Graw HiII,2000.
Edmund D. Seebaur & Robert L. Barry	Fundamentals of Ethics for Scientists and Engineers, Oxford University Press, 2001
Krishna Mohan & Meera Banerji,	Developing Communication Skills Mac Millan India Ltd,2000.
Rajendra Pal & JS Koriahalli	Essentials of business communication, S. Chand & Company Ltd
Sarah Freeman,	Study Strategies, Orient Longman, 1978.
Meenambal T , Uma R M and K MuraU	Principles of Environmental Science and Engineering, S. Chand & Company Ltd, 2005

University Examination pattern

The question paper will have two parts. Part A (Technical Communication) will cover Modules I, II and will have a weightage of 50 marks. Part B ( Social Sciences) will cover Module III and Module IV (Environmental Studies) and will have a weightage of 50 marks. Part A and Part B will have to be answered in separate answer books.

Part A

University examination pattern

Q1- 4 short type questions of 5 marks, 2 each from module I and II

Q II - 2 questions A and B of 15 marks from module I with choice to answer any one QIII-2 questions A :md B of! 5 marks from module II ",ith choice, to answer an)' one

Part B

University examination pattern

Q I - 5 short type questions of 4 marks, 2 from module III and 3 from module IV

QII- 2 questions A and B of to marks from module III with choice to answer anyone

Q III -2 questions A and B of 20 marks from module IV with choice to answer any one

## **CE/CS/EB/EC/EE/EI/ME/IT/SE 110 COMPUTER PROGRAMMING LABORATORY**

1. Study of as commands. General introduction to application packages.
- 2 Programming using C control structures & pointers.
3. Searching & sorting
4. Creation and use of databases in a suitable database package
5. Programming exercises in C.

*Note : 50 % marks is earmarked for continous evaluation, and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50 % marks separately for the two components to be eligible for a pass in that subject.*

## **CE/CS/EB/EC/EE/EI/ME/IT/SE 111 ELECTRICAL AND MECHANICAL WORKSHOPS**

### **ELECTRICAL WORKSHOP**

1. One lamp controlled by one switch
2. Series and parallel connections of lamps.
3. Stair case wiring.
4. Hospital Wiring.
5. Godown wiring.
6. Fluroscet lamp.
7. Connection of plug socket.
8. Different kinds of joints.
9. Transformer winding.
10. Soldering practice.
11. Familiarisation of CRO.

### **MECHANICAL WORK SHOP**

- 1) Fitting Shop.
- 2) Sheet Metal Shop
- 3) Foundry Shop
- 4) Welding Shop
- 5) Carpentry Shop (Preliminary exercises for beginners in all shops. Specific models may be designed by the teachers.)

Introduction to the use of concrete mix.

*Note : 50 % marks is earmarked for continous evaluation, and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50 % marks separately for the two components to be eligible for a pass in that subject.*