COURSE STRUCTURE

&

SYLLABUS
(3rd – 8th SEMESTER)

FOR B.TECH PROGRAMME
IN
CIVIL ENGINEERING

BIJU PATNAIK UNIVERSITY OF TECHNOLOGY ORISSA,
ROURKELA

2007 - 2008

COURSE STRUCTURE
SECOND YEAR B.TECH PROGRAMME
CIVIL ENGINEERING

3rd Semester				4th Semester			
Theory		*Contact Hrs.*	*Credit*	*Theory*		*Contact Hrs.*	*Credit*
		L-T-P				**L-T-P**	
BSCM 2201	Mathematics - III	3-1-0	4	BSCM 2202	Mathematics - IV	3-1-0	4
BENG 1208	Fluid Mechanics & Hydraulic Machines	3-1-0	4	CPPME 6202	Mechanics of Materials-I	3-1-0	4
BSCP 2201	Physics - II /	3-0-0	3	BSCC 2201	Chemistry - II /	3-0-0	3
BSCP 2202	Physics of Semi-Conductor Devices			BSCC 2202	Material Sciences		
	or				or		
BSCC 2201	Chemistry - II /			BSCP 2201	Physics - II /		
BSCC 2202	Material Sciences			BSCP 2202	Physics of Semi-Conductor Devices		
BCSE 3201	Object Oriented Programming UsingC++	3-0-0	3	BCSE 3202	Relational Database Management System	3-0-0	3
HSSM 4201	Engineering Economics & Costing	3-0-0	3	HSSM 4202	Organisational Behaviour	3-0-0	3
	or				or		
HSSM 4202	Organisational Behaviour			HSSM 4201	Engineering Economics & Costing		
PCAR 8205	Structurural Analysis -I	3-1-0	4	PCCI 8201	Surveying - I	3-1-0	4
	Total		**21**		**Total**		**21**
Practicals/Sessionals		*Contact Hrs.*	*Credit*	*Practicals/Sessionals*		*Contact Hrs.*	*Credit*
BENG 9202	Basic Electronics Laboratory	0-0-3	2	BENG 9201	Basic Electrical Engineering Laboratory	0-0-3	2
	or				or		
BENG 9201	Basic Electrical Engineering Laboratory			BENG 9202	Basic Electronics Laboratory		
BCSE 9201	Computer Lab (OOP)	0-0-3	2	BCSE 9202	Computer Lab (RDBMS)	0-0-3	2
BENG 9203	Mechanical Engineering Laboratory	0-0-3	2	CPCE 9201	Building Drawing	0-0-3	2
	or				or		
CPCE 9201	Building Drawing			BENG 9203	Mechanical Engineering Laboratory		
CPCE 9202	Civil Engineering Lab – I	0-0-3	2	CPCE 9204	Surveying Lab.	0-0-3	2
			8				**8**
	Total		**29**		**Total**		**29**

L-Lecture   **T-Tutorial**   **P-Practical**

3rd Semester

BSCM 2201 MATHEMATICS - III (3-1-0)

Module - I (9 Lectures)

Partial differential equations : The vibrating string. The wave equation & its solution.

The Heat equation and its solution

Module - II (10 Lectures)

Two - dimensional wave equation and its solution.

Laplace equation in polar, cylindrical and spherical coordinates. Potential.

Module - III (13 Lectures)

Complex analysis : Complex numbers and functions conformal mappings

Complex integration. Cauchy's Theorem Cauchy's integral formulas.

Module - IV (8 Lectures)

Taylor's and Laurent's series, Residue theorem, evaluation of real integrals.

The Course covered by : Advance Mathematics by E. Kreyszig, John Wiley & Son's (P) Ltd. (8th Edition)
Chapter 11 (except 11.6)
Chapter 12, 13, 14, 15

BENG 1208 - FLUID MECHANICS AND HYDRAULIC MACHINE (3-1-0)

Module – I
(12 hours)
Introduction : Scope of fluid mechanics and its development as a science

Physical property of Fluid

Density, specific gravity, specific weight, specific volume, surface tension and capillarity, viscosity, compressibility and bulk modulus, Fluid classification.

Fluid static

Pressure, Pascal's Law, Pressure variation for incompressible fluid, atmospheric pressure, absolute pressure, gauge pressure and vacuum pressure, monometer.

Hydrostatic process on submerged surface, force on a horizontal submerged plane surface, force on a vertical submerged plane surface.

Module – II   (12 hours)

Buoyancy and flotation, Archimedes' principle, stability of immersed and floting bodies, determination of metacentric height.

Fluid kinematics : Introduction, description of fluid flow, classification of fluid flow. Acceleration of fluid particles, flow rate and continuity equation, differential equation of continuity.

Fluid dynamics : Introduction, Euler's equation along a streamline, energy equation, Bernoulli's equation, Analysis of finite control volumes and its application to siphon, venture meter, orifice meter

Module – III

Turbine : Classification, reaction, Impulse, outward flow, inward flow and mixed flow turbines, Francis & Kaplan turbines, Pelton wheel, Physical description and principle of operation, Governing of Turbine.

Module – IV   (8 hours)

Centrifugal Pump : Principles of classification, Blade angles, Velocity triangle, efficiency, specific speed, characteristics curve.

Reciprocating Pump : Principles of working, slip, work done, effect of acceleration and frictional resistance, separation

Tex Books :
1. Fluid Mechanics, A.K. Mohanty, PHI
2. Introduction to Fluid Mechanics and Fluid Machines, S.K. Som and G. Biswas, TMH
3. Fluid Mechanics, Modi & Seth

BSCP 2201 PHYSICS - II (3-0-0)

This one semester Physics course is divided into four units. The unit - I deals with some aspects of nuclear physics, unit - II introduces certain features of condensed matter physics, unit - III deals with certain aspects of semiconductors and superconductors and unit - IV introduces Opto-electronic devices and fibre-optic communication system.

Unit - 1

This unit covers the basic principles and applications of different types of accelerators and their important applications.

Detailed constructional features of accelerators are not necessary.

1. Need for nuclear accelerators.
2. D.C. Accelerators : Cockcroft - Walton, Van de Graff, Tandem accelerators.
3. RF accelerators : Linear accelerator, cyclotron, electron accelerator, betatron.
4. Application of nuclear accelerators - production of radioisotopes, radiation processing of materials, medical applications.

Unit - 2

This Unit deals with diffraction in crystals and its role in determining crystal structure.

Study of crystal structure by diffraction methods, Bragg's condition for crystal diffraction, Lau condition, Miller indices, Reciprocal lattice, Geometrical structure factor, Atomic form factor.

Unit - 3

This unit deals with certain features of semiconductors and superconductors.

1. Energy bands in solids: Kronig - Penny model, allowed bands and forbidden gaps, elemental and compound semiconductors.
2. Superconductivity : Superconductors and their properties, Meisner effect, Type - I and Type - II Superconductors, Thermodynamic properties of superconductors, London equation, Application of superconductors.

Unit - 4

This unit introduces some Opto - electronic devices and fibre - optic communication system.
Laser : Principle of lasing, properties of Laser, construction and working of semiconductor laser, Application of laser.
LED : Principle construction of operation and application, Introduction to fibre optics, basic characterstics of optical fibres, optical fibre communication system.

Books Recommended :

1. Nuclear Physics, P. R. Roy & B. P. Nigan
2. Particle Accelerators, M. S. Livingston & J. P. Blewett
3. Concepts of Modern Physics, A. Beiser

4.   Introduction to Solid State Physics, C. Kittel

5.   Introduction to Lasers, A. Avadhnulu

6.   Physics - II, B. B. Swain and P. K. Jena.

BSCP 2202 PHYSICS OF SEMICONDUCTOR DEVICES (3-0-0)

Module I   (9 Hours)

An appreciation of Quantum Mechanics in determining electrical properties of semiconductor.

The Semiconductor in Equilibrium :
level, variation of EF with doping concentration and temperature.

Carrier Transport Phenomena :

Carrier Diffusion: Diffusion current density. Total current density. The Einstein relation.

Module II   (9 Hours)

Non-equilibrium Excess Carrier in Semiconductor

The Pn junction and Diode

Pn junction Diode : Ideal – current voltage relationship, Minority Carrier distribution, Ideal Pn junction currents under forward and reverse bias.

Module III   (9 Hours)

Pn junction diode (contd.) :

Temperature effects, Small signal model of Pn junction, Equivalent circuits Recombination Current.   Junction Breakdown.

Metal-Oxide- Semiconductor FET (MOSFET)
operation, Current –Voltage relation (Concepts)

Frequency limitation : Small signal Equivalent circuit.

The CMOS Technology.

Module IV   (8 Hours)

The Bipolar Transistor

Basic Principle of Operation., Simplified Transistor Current Relation. Modes of operation, Amplification with Bipolar transistors, Minority Carrier distribution Forward active mode, other modes of operation. Low Frequency Common Base Current gain,. Non-ideal effects –Base width Modulation, Breakdown Voltage. Equivalent Circuit Models –Eber's –Moll Model, Hybrid- Pi model. Frequency limitation. Large Signal Switching characteristics.

Text Book :

1.   Semiconductor Physics and Devices- Basic Principles BY Donald A. Neamen, 3rd Edition, Tata McgrawHill Edition. (Selected portion from chapters 2,4,4,6,7,8,10 &11.)

For additional reading

2.   Solid state Electronics Devices – y Ben G. Strectman and Sanjay Benerjee, 5th Edition, Pearson Edu.

BSCC 2201 CHEMISTRY - II (3-0-0)
(Total No. of Lectures = 40)

Module I (10 Lectures)

Water quality parameters and standards. Treatment of water for industrial and domestic purpose.

Hardness of Water : Types of hardness, Units of hardness, Determination of hardness(EDTA method). Disadvantages of hardwater in boiler, Water Softening Techniques (Lime soda, Ion exchange and zeolite). Boiler feed water, Water for Domestic purposes (Municipal / Drinking Water)

Module II (14 Lectures)

(To develop the basic concepts on corrosion and industrially important polymers.

1. Corrosion:

   Dry and wet corrosion, Galvanic Corrosion, Stress Corrosion, Factors affecting corrosion, Corrosion Control : (Proper design and fabrication procedure, Cathodic protection, Passivation).

   (6 Lectures)

2. Polymers:

   Nomenclature and classification, Mechanism of polymerization (free radical and ionic) Thermoplastic and thermosetting resins, Some typical useful polymers: Polyethylene, PVC, polystyrene, PMMA, Nylon 6 : 6, Nylon 6, Bakelite, Terylene, Silicones, Natural and synthetic rubbers: Neoprene, Butyl and Polyuarethane rubber, Vulcanization.

   (8 Lectures)

Module III (10 Lectures)

(To introduce the students about the basic concepts of fuels)

1. Fuels:

   Classification of fuels, calorific value, Analysis of Coal, Manufacturing process of metallurgical coke, Refining of Crude oil, Fractional distillation, Cracking, Knocking and antiknocking, Octane and Cetane number.

   Gaseous Fuel : Producer gas, Water gas, LPG & CNG.

   Combustion Calculation.

Module IV (6 Lectures)

1. Environment pollution :
   Green house effect, acid rain, depletion of ozone layer; Water pollution- bio chemical effect of lead, arsenic, mercury and fluorides, sewage-B.O.D. and C.O.D.

Books :

1. Engineering Chemistry by P. C. Jain and M. Jain.
2. Engineering Chemistry by R. Gopalan, D. Venkapaya and S. Nagarajan - Vikas Publishing House.
3. Environmental Pollution, A.K. Dey.

BSCC 2202 MATERIAL SCIENCES (3-0-0)

MODULE - I (10 Lectures)

1. Classification of Engineering Materials. Engineering properties of materials. Selection of Materials.

2. Electron theory of solids : Free electron theory of metals. Electrical conductivity; Thermal conductivity, Quantum theory of free electrons. Band theory of solids, Conductivity of metals

3. Conductors, Insulators, Semiconductors, Intrinsic and extrinsic semiconductors, Band theory of semi conductors Hall effect.

4. Super Conductors - Zero resistivity, Critical magnetic field and critical current density. Type I and II super conductors. Applications of Supercoductors.

MODULE - II (10 Lectures)

5. Dielectric Materials : Microscopic Displacement of atoms and molecules in an external dc electric field, Polarization and dielectric constant, Dielectric susceptibiity. Temperature dependence, Dielectric Breakdown. Ferro electric material Piezoelectrics, Pyroelectrics, Dielectric Materials as electrical insulators.

6. Magentic Properties of Materials : Dia, Para and Ferro magenetic materials. Theory of magnetism, Ferro magnetic materials or Ferrites, Comparison of magnetic behaviour and magnetic parameters of Dia, Para and Ferro magnetic materials.

7. Optical Properties of Materials : Scattering, Refraction, Theory of Refraction and absorption, Atomic Theory of optical properties. Lasers, Optical fibres - Principle, structure, application of optical fibre.

MODULE - III (10 Lectures)

8. Organic Materials : Polymers - Mechanism of Polymerization : Addition, condensation and co-polymerisation, applications.

    Plastics - Types : Thermosetting and thermoplastics. Transfer moulding, injection moulding, extension moulding, Blow moulding, Welding of plastics; Rubber types, application.

9. Ceramics : Types, Structure, Mechanical properties, applications

MODULE - IV (10 Lectures)

10. Composite Materials : Agglomerated Materials : Cermets, Reinforced Materials : Reinforced Concrete, Glass fibre reinforced plastics, Carbon fibre reinforced plastics, Whiskers, fibre reinforced plastics, Laminated plastic sheets, Tufnol, Properties of composites, Metal matrix composites, Manufacturing procedure for fibre reinforced composites.

11. Performance of Materials in Service : Service performance, failure, design considerations, Corrosion - types, (Atmospheric, Pitting, Stress Corrosion), Control & prevention, protective coating, Performance of metals and Ceramics at high temperature.

Text Books :

1. Callister W.D., Materials Science and Engineering, John Wiley & Sons.
2. Vijaya M. S., Rangarajan G, Materials Science, TMH
3. Rajendra V., Marikani A., Materials Science, TMH
4. Van Vlack L. H., Elements of Material Science and Engineering, Addison Wesley
5. Material Science, Raghavan
6. Processes and Material of Manufacture : Lindberg, PHI.

BCSE 3201 OBJECT ORIENTED PROGRAMMING USING C++ (3-0-0)

Module I   (10 Hours)

Introduction to object oriented programming, user defined types, polymorphism, and encapsulation. Getting started with C++ -syntax, data-type, variables, strings, functions, exceptions and statements,

namespaces and exceptions, operators. Flow control, functions, recursion. Arrays and pointers, structures.

Module II (10 Hours)

Abstraction mechanisms: Classes, private, public, constructors, member functions, static members, references etc. Class hierarchy, derived classes.

Inheritance: simple inheritance, polymorphism, object slicing, base initialization, virtual functions.

Module III (12 Hours)

Prototypes, linkages, operator overloading, ambiguity, friends, member operators, operator function, I/O operators etc.

Memory management: new, delete, object copying, copy constructors, assignment operator, this input/output.

Exception handing: Exceptions and derived classes, function exception declarations, Unexpected exceptions, Exceptions when handling exceptions, resource capture and release etc.

Module IV (8 Hours)

Templates and Standard Template library: template classes, declaration, template functions, namespaces, string, iterators, hashes, iostreams and other type.

Design using C++ design and development, design and programming, role of classes.

Text Books:

1. Bhave & Patekar- Object oriented Programming with C++, Pearson Education

2. Ashok N. Kamthane- Object oriented Programming with ANSI & Turbo C++, Pearson Education.

3. Robert Lafore- Object oriented programming in Microsoft C++.

4. Balguru Swamy-C++, TMH publication

HSSM 4201 ENGINEERING ECONOMICS AND COSTING (3-0-0)

Module I (10 Hours)

Present worth comparisons, Comparisons of assets with equal, unequal and infite lives, comparison of deferred investments, Future worth comparison, pay back period comparison.

Module II (10 Hours)

Projects : Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost –effectiveness analysis.

Module III (10 Hours)

Hours) Fixe

1. Horn green, C.T., Cost Accounting, Prentice Hall of India

2. Riggs, J.L ., Dedworth, Bedworth, D.B, Randhawa, S.U. Engineering Economics, McGraw Hill International Edition, 1996 (Chapter 2,3,4,5,7,8,9,11,12)

HSSM 4202 ORGANIZATIONAL BEHAVIOUR (3-0-0)

Module I (8 Hours)

The Study of Organizational Behaviour : Learning objectives, Definition and Meaning, Why Study OB, An OB Model, New Challenges for OB Manager.

Learning – Nature of Learning, How Learning occurs, Learning and OB.

Case Analysis

Module II (10 Hours)

Foundations of Individual Behaviour : Personality – Meaning and Definition, Determinants of Personality, Personality Traits, Personality and OB.

Perception – Meaning and Definition, Perceptual Process, Importance of Perception in OB. Motivation – Nature and Importance, Hertzberg's Two Factor Theory, Maslow's Need Hierarchy Theory, Alderfer's ERG Theory, Evaluations.

Case Analysis

Module III (12 Hours)

Organizational Behaviour Process : Communication – Importance, Types, Gateways and Barriers to Communication, Communication as a tool for improving Interpersonal Effectiveness. Groups in Organizations - Nature, Types, Why do people join groups, Group Cohesiveness and Group Decision-making Managerial Implications, Effective Team Building. Leadership – Leadership & Management, Theories of Leadership – Trait theory, Leader Behaviour theory, Contingency Theory, Leadership and Follwership, How to be an effective Leader. Conflict – Nature of Conflict and Conflict Resolution.

An Introduction to Transactional Analysis (TA).

Case Analysis

Module IV (10 Hours)

Organization : Organizational Culture – Meaning and Definition, Culture and Organizational Effectiveness. Introduction to Human Resource Management – Selection, Orientation, Training and Development, Performance Appraisal, Incentives Organizational Change – Importance of Change, Planned Change and OB techniques. International Organizational Behaviour – Trends in International Business, Cultural Differences and Similarities, Individual and Interpersonal Behaviour in Global Perspective.
Case Analysis

TEXTBOOKS :

Keith Davis, Organizational Behaviour, McGraw – Hill.
K.Aswathappa, Organizational Behaviour, Himalaya Publishing House.

REFERENCE BOOKS :

Stephen P. Robbins, Organizational Behaviour, Prentice Hall of India.
Pradip N. Khandwalla, Organizational Behaviour, McGraw – Hill, New Delhi.

PCAR 8205 STRUCTURAL ANALYSIS - I (3-1-0)

MODULE I (10 Hours)

1. Introduction to statically determinate / indeterminate Structures with reference to 2D and 3D structures. Free body diagram of structures.
2. B.M. & S.F. diagrams for different loading on simply supported beam, catilever, propped cartilever and overhanging beams. Three hinged arches, tangential shear and normal thrust.

MODULE II (12 Hours)

3. Deflection : Strain energy method, castigliane's theorems, reciprocal theorem, conjugate beam method, unit load method.

4. Deflection of joints / supports for both determinate and indeterminate trusses.

    Application of three moment theorem applied to continuous beams.

MODULE III   (12 Hours)

5. ILD for determinate structure for reactions at supports, S. F at a given section, B.M. at a given section, maximum shear and maximum B.M at a given section, problems relating to series of wheel loads, udl less than on greater and better than the span of the beam, Absolute maximum B.M.

6. ILD for B.M., S.F. normal thrust and radial shear of a three winged arch.

MODULE IV   (8 Hours)

7. Suspension cables, 3 hinged stiffering ginders

8. Introduction to space frames.

TEXT BOOKS

1. Structural Analysis - C. S. Reddy, TMH Publisher
2. Structural Analysis - Norvis & Wilber
3. Mechanics of Materials - J. M Gere & S. P. Timoshenko, CBS Publishers & Distributors.

PRACTICALS

BENG 9202 BASIC ELECTRONICS LAB. (0-0-3)

(At least 8 experiments including 1 - 7 and any one from 8 - 10)

1. Familiarity with electronics components and Devices

    Testing of a semiconductor Diode and a Transisitor. IC pins connection (Digital Multimeter should be used should be used in testing components and devices).
2. Study and use of Oscilloscope to view waveforms and measure its amplitude and frequency.
3. V - I Characterstic of a semiconductor diode. Determining DC and AC resistance.
4. Half wave and Full wave rectifiers without and with capacitor filter. Record of waveforms, Measurement of Average and rms values.
5. V - I Characterstics of anpn or pnp transistor. DC Biasing and measurement of dc voltages and currents.
6. Gain - frequency response of JFET common source R-C coupled amplifier/BJT CE RC coupled Amplifier.
7. Op amp in Inverting, non inverting, Integrating and Differentiating configuration, Record of wave forms.
8. Truth Tables of logic gates.
9. Study and experiment using MUX - DEMUX ICs / Shift Register IC.
10. Study on CMOS logic Inverter.

BENG 9201 BASIC ELECTRICAL ENGINEERING LAB. (0-0-3)

List of Experiment (Any 8 of the following)

1. Study and measurement the armature and field resistance of a DC machine.

2. Calibration of ammeter, voltmeter and wattmeter with the help of sub-standard instrument.

3. Verification of circuit theorems. Thevenin's and Superposition theorems (with DC source only).

4. Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of fuse wire.

5. Measurement of current, voltages and power in R-L-C series circuit excited by Single Phase AC supply.

6. Connection and starting of a three phase induction motor using direct online (DOL). or star-delta starter.

7. Connection and measurement of power consumption of a fluorescent lamp.

8. Determination of open circuit characteristics (OCC) of DC machine.

9. Starting and speed control of a DC shunt motor.

10. Connection and testing of a single phase energy meter (unity power factor load only)

11. Study of fan motor

BCSE 9201 COMPUTER (OOP) WITH C++ LAB. (0-0-3)
(10 classes for 10 different programs)

1. Programs on concept of classes and objects.(1 class)

2. Programs using inheritance.(1 class)

3. Programs using polymorphism.(1 class)

4. Programs on use of operator overloading.(1 class)

5. Programs on use of memory management.(1 class)

6. Programs on exception handling and use of templates.(1 class)

7. Programs on File handling in C++.(1 class)

8. Design problem on stock and accounting of a small organization, railway reservation, payroll preparation and optimization problem.(3 classes)

BENG 9203 MECHANICAL ENGINEERING LAB. (0-0-3)

Group A (Mechanics / Material Testing Lab.

1. Determination of equilibrium of coplanar forces.

2. Determination of Moment of Intertia of Flywheel

3. Determination of tensile strength of materials by Universal Testing Machine.

Group B

4. Determination of Metacentric Height and application to stability of floating bodies.

5. Verification of Bernoulli's Theorem and its application to Venturimeter.

6. Determination of Cd and Cd of Orifices.

Group C

7. Calibration of Bourden Type Pressure gauj and measurement pressure using manometers.

8. Study of Cut-Sections of 2 stroke and 4 stroke Diesel Engine.

9. Study of Cut-Sections of 2 stroke and 4 stroke Petrol Engine.

CPCE 9201 BUILDING DRAWING (0-0-3)

1. Plan, elevation, side view of residential/office building

2. Drawing of 2 bedroom/3 bedroom houses (single and two storied), ground and first floor plans, elevation and section for load bearing and framed structures.

3. Detailing of doors/windows

4. Drawing of several types of footing, bricks work, floor, staircases, masonry, arches and lintels.

5. Types of steel roof trusses

6. Detailing of floor and wall joints.

7. Project on establishment like Bank building/Post Office/Hostel/Library/Hospital/Auditorium/Factory building, etc.

CPCE 9202 CIVIL ENGINEERING LAB. - 1 (0-0-3)

Brick	(a)	Shape and size test for brick
	(b)	Water absorption test of brick
	(c)	Compressive strength of brick
Cement	(a)	Fineness of Cement
	(b)	Soundness of cement by Lechattelier test
	(c)	Specific gravity of cement
	(d)	Fineness of cement by air permeability
	(e)	Standard consistency of a given sample by Viccat test
	(f)	Initial and final setting time of cement
	(g)	Fineness modulus of fine and coarse aggregate
	(h)	Aggregate crushing value of coarse aggregate
	(i)	Compressive strength of cement mortar
	(j)	Tensile strength of cement mortar
Material Testing	(a)	Comp test of cast iron
	(b)	Rigidity modulus of Cast Iron
	(c)	Fatigue test of steel (cyclic loading)

<p align="center">4th Semester</p>

<p align="center">BSCM 2202 MATHEMATICS - IV (3-1-0)</p>

Module - I

Solution of equations by iteration, Newton's method, Secant method, Interpolation
Numerical integration and differntiation

Module - II

Gauss Siedel iteration method for solving a system of linear equations, Ruage Kutta Methods, Introductory Linear Programming, Introductory Programming

Module - III

Probability, Random variables, Probability distribution, mean & variance of distribution
Binomial, Poisson, hyper-geometric and normal distributions

Module - IV

Random sampling, estimation of parameters, confidence intervals, Testing of hypothesis, acceptance sampling, correlation and regression

Course covered by : Advance Mathematics by E. Kreyszig (8th Edition)

Chapter 17 (17.1 - 17.3, 17.5), Chapter 18 (18.4), Chapter 19 (19.1), Chapter 20, Chapter 21, Chapter 22

<p align="center">CPME 6202 MECHANICS OF MATERIALS - I (3-1-0)</p>

MODULE - I (10 Hours)

1. Analysis of Axially Loaded Members :

   Composite bars in tension and compression - temperature stresses in composite rods - statically inderterminate problem.

2. Members in Biaxial State of Stress :

   Stresses in thin cylinders, thin spherical shells under internal pressure - wire winding of thin cyliners.

MODULE - II (12 Hours)

3. Strain Deformation :

   Two dimensional state of strain, Principal strains and peincipal axes of strain measurements, Calculation of principal stresses from principal strains.

4. Shear Force and Bending Moment Diagrams for Simple Beams :
   Support reactions for statically determinate beams, relationship between bending moment and sheer force. Sheer force and Bending Moment diagrams.

MODULE - III (12 Hours)

5. Simple Bending of Beams :
   Theory of simple bending of intially straight beams, distribution of normal and sheer stress, beams of two materials, Composite beams.

6. Deflection of Beams :
   Slope and delection of beams by integration method and area - moment method.

MODULE - IV (6 Hours)

7. Torsion in solid and hollow circular shafts, Twisting moment, strength of solid and hollow circular shafts. Strength of shafts in combined bending and twisting.

8. Close - Coiled helical springs.

TEXT BOOKS :

1.   Elements of Strength of Materials by Timoshenko & Young (Fifth Edition)
        Chapter : 1, 2, 3, 4, 5, 6, 7 ,8 (Relevant articles only)

REFERENCE BOOKS :

2.   Strength of Materials by G. H. Ryder

BSCC 2201 CHEMISTRY - II (3-0-0)
(Total No. of Lectures = 40)

Module I (10 Lectures)

Water quality parameters and standards. Treatment of water for industrial and domestic purpose.

Hardness of Water : Types of hardness, Units of hardness, Determination of hardness(EDTA method). Disadvantages of hardwater in boiler, Water Softening Techniques (Lime soda, Ion exchange and zeolite). Boiler feed water, Water for Domestic purposes (Municipal / Drinking Water)

Module II (14 Lectures)

(To develop the basic concepts on corrosion and industrially important polymers.

1.   Corrosion:

        Dry and wet corrosion, Galvanic Corrosion, Stress Corrosion, Factors affecting corrosion, Corrosion Control : (Proper design and fabrication procedure, Cathodic protection, Passivation).

                                                                                      (6 Lectures)

2.   Polymers:
        Nomenclature and classification, Mechanism of polymerization (free radical and ionic) Thermoplastic and thermosetting resins, Some typical useful polymers: Polyethylene, PVC, polystyrene, PMMA, Nylon 6 : 6, Nylon 6, Bakelite, Terylene, Silicones, Natural and synthetic rubbers: Neoprene, Butyl and Polyuarethane rubber, Vulcanization.

                                                                                      (8 Lectures)

Module III (10 Lectures)

(To introduce the students about the basic concepts of fuels)

1.   Fuels:
        Classification of fuels, calorific value, Analysis of Coal, Manufacturing process of metallurgical coke,   Refining of Crude oil, Fractional distillation, Cracking, Knocking and antiknocking, Octane and Cetane number.
        Gaseous Fuel : Producer gas, Water gas, LPG & CNG.
        Combustion Calculation.

Module IV (6 Lectures)

1.   Environment pollution :
        Green house effect, acid rain, depletion of ozone layer; Water pollution- bio chemical effect of lead, arsenic, mercury and fluorides, sewage-B.O.D. and C.O.D.

Books:

1.   Engineering Chemistry by P. C. Jain and M. Jain.
2.   Engineering Chemistry by R. Gopalan, D. Venkapaya and S. Nagarajan - Vikas Publishing House.

3.   Environmental Pollution, A.K. Dey.

BSCC 2202 MATERIAL SCIENCES (3-0-0)

MODULE - I (10 Lectures)

1.   Classification of Engineering Materials. Engineering properties of materials. Selection of Materials.

2.   Electron theory of solids : Free electron theory of metals. Electrical conductivity; Thermal conductivity, Quantum theory of free electrons. Band theory of solids, Conductivity of metals

3.   Conductors, Insulators, Semiconductors, Intrinsic and extrinsic semiconductors, Band theory of semi conductors Hall effect.

4.   Super Conductors - Zero resistivity, Critical magnetic field and critical current density. Type I and II super conductors. Applications of Supercoductors.

MODULE - II (10 Lectures)

5.   Dielectric Materials : Microscopic Displacement of atoms and molecules in an external dc electric field, Polarization and dielectric constant, Dielectric susceptibiity. Temperature dependence, Dielectric Breakdown. Ferro electric material Piezoelectrics, Pyroelectrics, Dielectric Materials as electrical isulators.

6.   Magentic Properties of Materials : Dia, Para and Ferro magenetic materials. Theory of magnetism, Ferro magnetic materials or Ferrites, Comparison of magnetic behaviour and magnetic parameters of Dia, Para and Ferro magnetic materials.

7.   Optical Properties of Materials : Scattering, Refraction, Theory of Refraction and absorption, Atomic Theory of optical properties. Lasers, Optical fibres - Principle, structure, application of optical fibre.

MODULE - III (10 Lectures)

8.   Organic Materials : Polymers - Mechanism of Polymerization : Addition, condensation and co-polymerisation, applications.

        Plastics - Types : Thermosetting and thermoplastics. Transfer moulding, injection moulding, extension moulding, Blow moulding, Welding of plastics; Rubber types, application.

9.   Ceramics : Types, Structure, Mechanical properties, applications

MODULE - IV (10 Lectures)

10.   Composite Materials : Agglomerated Materials : Cermets, Reinforced Materials : Reinforced Concrete. Glass fibre reinforced plastics, Carbon fibre reinforced plastics. Whiskers, fibre reinforced plastics, Laminated plastic sheets. Tufnol, Properties of composites. Metal matrix composites, manufacturing procedure for fibre reinforced composites.

11.   Performance of Materials in Service : Service performance, failure, design considerations, Corrosion - types, (Atmospheric, Pitting, Stress Corrosion), Control & prevention, protective coating, Performance of metals and Ceramics at high temperature.

Text Books :

1.   Callister W.D., Materials Science and Engineering, John Wiley & Sons.
2.   Vijaya M. S., Rangarajan G, Materials Science, TMH
3.   Rajendra V., Marikani A., Materials Science, TMH

4. Van Vlack L. H., Elements of Material Science and Engineering, Addison Wesley

5. Material Science, Raghavan

6. Processes and Material of manufacture : Lindberg, PHI.

BSCP 2201 PHYSICS - II (3-0-0)

This one semester Physics course is divided into four units. The unit - I deals with some aspects of nuclear physics, unit - II introduces certain features of condensed matter physics, unit - III deals with certain aspects of semiconductors and superconductors and unit - IV introduces Opto-electronic devices and fibre-optic communication system.

Unit - 1

This unit covers the basic principles and applications of different types of accelerators and their important applications.

Detailed constructional features of accelerators are not necessary.

1. Need for nuclear accelerators.

2. D.C. Accelerators : Cockcroft - Walton, Van de Graff, Tandem accelerators.

3. RF accelerators : Linear accelerator, cyclotron, electron accelerator, betatron.

4. Application of nuclear accelerators - production of radioisotopes, radiation processing of materials, medical applications.

Unit - 2

This Unit deals with diffraction in crystals and its role in determining crystal structure.

Study of crystal structure by diffraction methods, Bragg's condition for crystal diffraction, Lau condition, Miller indices, Reciprocal lattice, Geometrical structure factor, Atomic form factor.

Unit - 3

This unit deals with certain features of semiconductors and superconductors.

1. Energy bands in solids: Kronig - Penny model, allowed bands and forbidden gaps, elemental and compound semiconductors.

2. Superconductivity : Superconductors and their properties, Meisner effect, Type - I and Type - II Superconductors, Thermodynamic properties of superconductors, London equation, Application of superconductors.

Unit - 4

This unit introduces some Opto - electronic devices and fibre - optic communication system.

Laser : Principle of lasing, properties of Laser, construction and working of semiconductor laser, Application of laser.

LED : Principle construction of operation and application, Introduction to fibre optics, basic characterstics of optical fibres, optical fibre communication system.

Books Recommended

1. Nuclear Physics, P. R. Roy & B. P. Nigan

2. Particle Accelerators, M. S. Livingston & J. P. Blewett

3. Concepts of Modern Physics, A. Beiser

4. Introduction to Solid State Physics, C. Kittel

5. Introduction to Lasers, A. Avadhnulu

6. Physics - II, B. B. Swain and P. K. Jena.

BSCP 2202 PHYSICS OF SEMICONDUCTOR DEVICES (3-0-0)

Module I (9 Hours)

An appreciation of Quantum Mechanics in determining electrical properties of semiconductor.

The Semiconductor in Equilibrium :

Equilibrium distribution of electrons & holes, the n0 and p0 equation, intrinsic carrier concentration; Do pant atoms and energy levels, ionization energy; the extrinsic semiconductor, the n0 p0 product, position of Fermi-energy level, variation of EF with doping concentration and temperature.

Carrier Transport Phenomena :

Carrier drift: mobility, conductivity, velocity saturation:

Carrier Diffusion: Diffusion current density. Total current density. The Einstein relation.

Module II (9 Hours)

Non-equilibrium Excess Carrier in Semiconductor

Excess carrier generation and recombination, characteristics of excess carriers-continuity equation and time – dependent Diffusion equation. Ambipolar Transport – Derivation of equation and applications.

The Pn junction and Diode

Basic structure, built-in potential barrier, Electric field, space charge width; Reverse applied bias-space charge width and Electric field. Junction capacitances.

Pn junction Diode : Ideal – current voltage relationship, Minority Carrier distribution, Ideal Pn junction currents under forward and reverse bias.

Module III (9 Hours)

Pn junction diode (contd.):

Temperature effects, Small signal model of Pn junction, Equivalent circuits Recombination Current. Junction Breakdown.

Metal-Oxide- Semiconductor FET (MOSFET)

The MOS structure : Energy band diagrams, Depletion Layer thickness, Work function difference, Flat band Voltage, Threshold Voltage, Charge distribution, Capacitance –Voltage characteristics.

The basic MOSFET operation, Current –Voltage relation (Concepts)

Frequency limitation : Small signal Equivalent circuit.

The CMOS Technology.

Module IV (8 Hours)

The Bipolar Transistor

Basic Principle of Operation., Simplified Transistor Current Relation. Modes of operation, Amplification with Bipolar transistors, Minority Carrier distribution Forward active mode, other modes of operation. Low Frequency Common Base Current gain,. Non-ideal effects –Base width Modulation, Breakdown Voltage. Equivalent Circuit Models –Eber's –Moll Model, Hybrid- Pi model. Frequency limitation. Large Signal Switching characteristics.

Text Book :

1. Semiconductor Physics and Devices- Basic Principles BY Donald A. Neamen, 3rd Edition, Tata McgrawHill Edition. (Selected portion from chapters 2,4,4,6,7,8,10 &11.)

For additional reading :

2. Solid state Electronics Devices – y Ben G. Strectman and Sanjay Benerjee, 5th Edition, Pearson Edu.

BCSE 3202 RELATIONAL DATABASE MANAGEMENT SYSTEMS (3-0-0)

Module I (10 Hours)

Database System Architecture - Data Abstraction, Data Independence, Data Definitions and Data Manipulation Languages.
Data models - Entity Relationship(ER), Mapping ER Model to Relational Model, Network .Relational and Object Oriented Data Models, Integrity Constraints and Data Manipulation Operations.

Module II (10 Hours)

Relation Query Languages, Relational Algebra, Tuple and Domain Relational Calculus, SQL and QBE.
Relational Database Design: Domain and Data dependency, Armstrong's Axioms, Normal Forms, Dependency Preservation, Lossless design, Comparison of Oracle & DB2

Module III (8 Hours)

Query Processing and Optimization: Evaluation of Relational Algebra Expressions, Query Equivalence, Join strategies, Query Optimization Algorithms.

Module IV (12 Hours)

Storage Strategies: Indices, B-Trees, Hashing, Transaction processing: Recovery and Concurrency Control, Locking and Timestamp based Schedulers, Multiversion and Optimistic Concurrency Control Schemes.
Advanced topics: Object-Oriented and Object Relational databases. Logical Databases, Web Databases, Distributed Databases, Data Warehouse and Data Mining.

Text Books :-

1. Elmaski & Navathe -Fundamentals of Database Systems, 4th Edition, Pearson Education
2. C.J.Date - An introduction to Database Systems, Pearson Education
3. Bipin Desai -An introduction to Database System, Galgotia Publication.

HSSM 4202 ORGANIZATIONAL BEHAVIOUR (3-0-0)

Module I (8 Hours)

The Study of Organizational Behaviour : Learning objectives, Definition and Meaning, Why Study OB, An OB Model, New Challenges for OB Manager.

Learning – Nature of Learning, How Learning occurs, Learning and OB.

Case Analysis

Module II (10 Hours)

Foundations of Individual Behaviour : Personality – Meaning and Definition, Determinants of Personality, Personality Traits, Personality and OB.

Perception – Meaning and Definition, Perceptual Process, Importance of Perception in OB. Motivation – Nature and Importance, Hertzberg's Two Factor Theory, Maslow's Need Hierarchy Theory, Alderfer's ERG Theory, Evaluations.

Case Analysis

Module III (12 Hours)

Organizational Behaviour Process : Communication – Importance, Types, Gateways and Barriers to Communication, Communication as a tool for improving Interpersonal Effectiveness. Groups in Organizations - Nature, Types, Why do people join groups, Group Cohesiveness and Group Decision-making Managerial Implications, Effective Team Building. Leadership – Leadership & Management, Theories of Leadership – Trait theory, Leader Behaviour theory, Contingency Theory, Leadership and Follwership, How to be an effective Leader. Conflict – Nature of Conflict and Conflict Resolution.

An Introduction to Transactional Analysis (TA).

Case Analysis

Module IV (10 Hours)

Organization : Organizational Culture – Meaning and Definition, Culture and Organizational Effectiveness. Introduction to Human Resource Management – Selection, Orientation, Training and Development, Performance Appraisal, Incentives Organizational Change – Importance of Change, Planned Change and OB techniques. International Organizational Behaviour – Trends in International Business, Cultural Differences and Similarities, Individual and Interpersonal Behaviour in Global Perspective.

Case Analysis

TEXTBOOKS :

Keith Davis, Organizational Behaviour, McGraw – Hill.

K.Aswathappa, Organizational Behaviour, Himalaya Publishing House.

REFERENCE BOOKS :

Stephen P. Robbins, Organizational Behaviour, Prentice Hall of India.
Pradip N. Khandwalla, Organizational Behaviour, McGraw – Hill, New Delhi.

HSSM 4201 ENGINEERING ECONOMICS AND COSTING(3-0-0)

Module I (10 Hours)

Present worth comparisons, Comparisons of assets with equal, unequal and infite lives, comparison of deferred investments, Future worth comparison, pay back period comparison.

Module II (10 Hours)

Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost – effectiveness analysis.

Module III (10 Hours)

Hours) Fixe

Text Book

1. Horn green, C.T., Cost Accounting, Prentice Hall of India

2. Riggs, J.L ., Dedworth, Bedworth, D.B, Randhawa, S.U. Engineering Economics, McGraw Hill International Edition, 1996 (Chapter 2,3,4,5,7,8,9,11,12)

PCCI 8201 SURVEYING - I (3-1-0)

Module I (8 Hours)

1. Linear measurement and chain survey : Use of various types of chains and tapes measurement of correct length of line, Direct and indirect ranging, chaining along sloping ground. Obstacle in chaining, errors and their elimination. **Module II** (12 H

2. Compass surveying : Use of prismatic compass, temporary adjustment, bearing of a line, local attractions, correction of bearing.

3. Plane table surveying : Methods of plane table, radiations. intersection, traversing and resection. 2-point and 3-point problem. Adjustment and common error in plane table survey.

Module III (10 Hours)

4. Levelling : Use of dumpy level and levelling staff. Temporary and Permanent adjustments of dumpy level. Reduction of levels by H.I and rise and fall method. Curvature and refraction error, sensitiveness of level tube, reciprocal levelling, levelling difficulties and common errors.

Module - IV (12 Hours)

5. Contouring : Contour interval and horizontal equivalent. Characterstics of contours, methods of contouring - different and indirect method, contour gradient.

6. Theodolite Survey : Use of theodilite, temporary adjustment, measuring horzontal and vertical angles, theodilite traversing

Books :

1. Surveying & levelling Vol - 1, T. P. Kanetkar & S. V. Kulkarni
2. Surveying - Vol - I, B. C. Purnia
3. Surveying, Husain & Nagnas

PRACTICALS

BENG 9201 BASIC ELECTRICAL ENGINEERING LAB. (0-0-3)

List of Experiment (Any 8 of the following)

1. Study and measurement the armature and field resistance of a DC machine.

2. Calibration of ammeter, voltmeter and wattmeter with the help of sub-standard instrument.

3. Verification of circuit theorems. Thevenin's and Superposition theorems (with DC source only).

4. Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of fuse wire.

5. Measurement of current, voltages and power in R-L-C series circuit excited by Single Phase AC supply.

6. Connection and starting of a three phase induction motor using direct online (DOL). or star-delta starter.

7. Connection and measurement of power consumption of a fluorescent lamp.

8. Determination of open circuit characteristics (OCC) of DC machine.

9. Starting and speed control of a DC shunt motor.

10. Connection and testing of a single phase energy meter (unity power factor load only)

11. Study of fan motor

BENG 9202 BASIC ELECTRONICS LAB. (0-0-3)

(At least 8 experiments including 1 - 7 and any one from 8 - 10)

1. Familiarity with electronics components and Devices

   Testing of a semiconductor Diode and a Transisitor. IC pins connection (Digital Multimeter should be used should be used in testing components and devices).

2. Study and use of Oscilloscope to view waveforms and measure its amplitude and frequency.

3. V - I Characterstic of a semiconductor diode. Determining DC and AC resistance.

4. Half wave and Full wave rectifiers without and with capacitor filter. Record of waveforms, Measurement of Average and rms values.

5. V - I Characterstics of anpn or pnp transistor. DC Biasing and measurement of dc voltages and currents.

6. Gain - frequency response of JFET common source R-C coupled amplifier/BJT CE RC coupled Amplifier.

7. Op amp in Inverting, non inverting, Integrating and Differentiating configuration, Record of wave forms.

8. Truth Tables of logic gates.

9. Study and experiment using MUX - DEMUX ICs / Shift Register IC.

10. Study on CMOS logic Inverter.

BCSE 9202 COMPUTER (RDBMS) LAB. (0-0-3)
(10 Classes for 10 Different Programs)

1. Use of SQL syntax : Insertion, Deletion, Join), Updation using SQL. (1 class)

2. Program segments in embedded SQL using C as host language to find average grade point of a student, etc.. (1 class)

3. Program for Log based data recovery technique. (1 class)

4. Program on data recovery using check point technique. (1 class)

5. Concurrency control problem using lock operations. (1 class)

6. Use of package (ORACLE) for programming approaches(2 classes)

7. Use of package (DB2) for programming approaches(2 classes)

8. Programs on JDBC/ODBC to print employee's / student's information of a particular department. (1 class)

CPCE 9201 BUILDING DRAWING (0-0-3)

1. Plan, elevation, side view of residential/office building

2. Drawing of 2 bedroom/3 bedroom houses (single and two storied), ground and first floor plans, elevation and section for load bearing and framed structures.

3. Detailing of doors/windows

4. Drawing of several types of footing, bricks work, floor, staircases, masonry, arches and lintels.

5. Types of steel roof trusses

6. Detailing of floor and wall joints.

7. Project on establishment like Bank building/Post Office/Hostel/Library/Hospital/Auditorium/Factory building, etc.

BENG 9203 MECHANICAL ENGINEERING LAB. (0-0-3)

Group A (Mechanics / Material Testing Lab.

1. Determination of equilibrium of coplanar forces.

2. Determination of Moment of Intertia of Flywheel

3. Determination of tensile strength of materials by Universal Testing Machine.

Group B

4. Determination of Metacentric Height and application to stability of floating bodies.

5. Verification of Bernoulli's Theorem and its application to Venturimeter.

6. Determination of Cd and Cd of Orifices.

Group C

7.   Calibration of Bourden Type Pressure gauj and measurement pressure using manometers.
8.   Study of Cut-Sections of 2 stroke and 4 stroke Diesel Engine.
9.   Study of Cut-Sections of 2 stroke and 4 stroke Petrol Engine.

CPCE 9204 SURVEYING LAB. (0-0-3)

1.   Testing of chain and measurement of correct length of the line.
2.   Traversing by chain survey.
3.   Traversing by Compass survey.
4.   Intersection method of plane table survey.
5.   Traversing by plane table.
6.   Use of dumpy level and fly levelling.
7.   Longitudinal Section and Cross Section of Road.
8.   Contouring
9.   Measurement of horizontal and vertical angle of theodolite.
10.   Traversing by theodolite.

COURSE STRUCTURE
THIRD YEAR B.TECH PROGRAMME
CIVIL ENGINEEERING

5th Semester				6th Semester			
Theory		*Contact Hrs.*	*Credit*	*Theory*		*Contact Hrs.*	*Credit*
		L-T-P				**L-T-P**	
HSSM 4301	Optimisation in Engineering	3-0-0	3	HSSM 4302	Production & Operation Mgmt.	3-0-0	3
CPCE 8301	Concrete Structure - I	3-1-0	4	CPCE 8306	Steel Structure	3-1-0	4
CPCE 8302	Transportation Engineering -I	3-1-0	4	CPCE 8307	Surveying - II	3-0-0	3
CPCE 8303	Geotech Engineering - I	3-0-0	3	CPCE 8308	Irrigation Engineering	3-0-0	3
CPCE 8304	Building Material & Construction	3-0-0	3	CPCE 8309	Water Supply & Sanitary Engg.	3-0-0	3
CPCE 8305	Mechanics of Materials - II	3-0-0	3	CPCE 8310	Structural Analysis - II	3-0-0	3
	Total		**20**		**Total**		**19**
Practicals/Sessionals		*Contact Hrs.*	*Credit*	*Practicals/Sessionals*		*Contact Hrs.*	*Credit*
CPCE 9301	Geotech Engineering Lab.	0-0-3	2	CPCE 9304	Water Supply & Sanitary Engg. Design	0-0-3	2
CPCE 9302	Concrete Structure Design - I	0-0-3	2	CPCE 9305	Irrigation Engineering Design	0-0-3	2
CPCE 9303	Civil Engineering Lab. - II	0-0-3	2	CPCE 9306	Concrete Structure Design - II	0-0-3	2
			6				**6**
	Total		**26**		**Total**		**25**

L-Lecture   **T-Tutorial**   **P-Practical**

HSSM 4301 OPTIMIZATION IN ENGINEERING (3-0-0)

Course Objective : The course aims at acquainting the students to mathematical modeling of engineering design, operation and maintenance problems and their optimization algorithms.

Module – I   (10 hours)

Formulation of engineering optimization problems : Decision variables, objective function and constraints. Example of typical design, operation and maintenance problems in engineering : Design of a water tank, design of a truss, design of a network (electrical, communication sewerage and water supply networks), product mix problem, transportation and assignment problems, shift scheduling of employees, design of reliable devices, design of reactors, shortest route problem, set covering problem, traveling salesman problems. Only physical problems and their mathematical models to be discussed.

Linear Programming Problem : Formulation, Graphical solution, Simplex method, Duality theory, Dual simplex method, Formulation and solution of engineering problems of planning and scheduling.

Module – II   (10 hours)

Sensitivity Analysis, Transportation Problem, Assignment Problem, Network Models : Minimal Spanning Tree Problem, Maximal Flow Problem, Shortest Route Problem, Minimum Cost Flow Problem. Algorithms and applications to be covered.

Module – III   (10 hours)

Integer Linear Programming Problem. Branch and Bound and Cutting Plane Methods. Zero-one Programming Problem, Knapsack Problem, Set covering Problem, Set Partitioning Problem, Traveling Salesman Problem. Deterministic Dynamic Programming Problems. Applications and algorithms to be discussed.

Module – IV   (12 hours)

Queueing theory, Game theory, Simulation, Decission theory & Sequencing Problem

REFERENCES :

1.   H. A. Taha – Operations Research, Prentice Hall of India, 2004.

2.   D. T. Phillips, A Ravindran and J.J. Solaberg, Principles of Operation Research, John Wiley and Sons

3.   S. Kalavathi, Operations research, Vikash Publication.

4.   B.E Gillett, Introduction to operations research, TMH

CPCE 8301 CONCRETE STRUCTURE –I (3-1-0)

Module - I
Properties of Concrete and reinforcing steels, Introduction to limit state method : application to Rectangular, Tee and Ell beams, for flexure, shear and torsion.
Module – II
Doubly reinforced beams, columns with axial and biaxial loading,
Module III
One way and two way slabs. Isolated column footing, stair cases
Module IV

Design of water tanks, Footings, building portals

Reference Books :

1.   Reinforced Concrete- Limit State, A.K. Jain
2.   Composite R C C Design, B.C. Purnia etal , Laxmi Publication
3.   Limit State Design of Reinforced Concrete, P.C. Verghese, Prentice Hall India

CPCE 8302 TRANSPORTATION ENGINEERING-I (3-1-0)

Module – I

Introduction : Modes of Transportation, their importance and limitations, the importance of highway transportation.

Highway Planning : Principles of Highway planning, Road development and Financing, Privatization of Highways, Highways Alignment requirements, engineering surveys for Highway location.

Module – II

Geometric Design : Cross section elements, width camber, super elevation, Design speed, Sight distances, Requirements and design of horizontal and vertical alignment, Horizontal and Vertical curves.

Highway materials : Properties of sub grade and pavements component materials, Materials characterization, Tests on subgrade soil, aggregate and bituminous materials, Bituminous mix design.

Module – III

Design of flexible pavements, Design of low volume road and high volume roads, IRC design method for flexible pavements and rigid pavements.

Module - IV

Highway drainage : Surface drainage and subsoil drainage, Pavement failures, Maintenance and Strengthening.

Traffic Engineering : Fundamentals of Traffic flow, Traffic field studies and their uses, Traffic control devices, Traffic Management, Prevention of Road accidents, Elements of transport planning.

Bridge site selection, types of bridges, superstructure, detail bridge foundation.

Textbooks :

1.   Highway Engineering, S.K. Khanna and CEG Justo, Nem Chand & Bros, 1997
2.   Highway Engineering, L. R. Kadiyali, Khanna Publishers

CPCE 8303 GEOTECHNICAL ENGINEERING - I (3-0-0)

Module –I

Introduction : Basic terminology and inter-relations, index properties of soils.

Soil classification : Particle size distribution, use of particle size distribution curve, textural classification, HRB classification, Unified soil classification system, Indian standard soil classification system (I.S. 1498 – 1970)

Soil moisture : Adsorbed water, capillary water, effective stress, pore pressure and total stress.

Module – II

Permeability : Darcy's law, permeability, factors affecting permeability, determination of coefficient of permeability (laboratory and field methods), permeability of stratified soil deposits. Estimation of yield from wells. Seepage analysis : Seepage pressure, quick condition, Laplace equation for two-dimensional flow, flow net, properties and methods of construction of flow net, application of flow net, seepage through anisotropic soil, seepage through earth dam.

Soil compaction : Compaction mechanism, factors affecting compaction, effect of compaction on soil properties, density moisture content relationship in compaction test, standard and modified proctor compaction tests, field compaction methods.

Module – III

Soil consolidation : Introduction, spring analogy, one dimensional consolidation, Terzaghi's theory of one dimensional consolidation, consolidation test, determination of coefficient of consolidation.

Module – IV

Shear strength of soil : Mohr's stress circle, theory of failure for soils, determination of shear strength (direct shear test, tri axial compression test, unconfined compression test, vane shear test)

Shallow foundation : Introduction bearing capacity, methods and determination of bearing capacity, settlement of foundation.

Reference Books

1. Geotechnical Engineering, T.N. Ramamurthy & T.G. Sitharam, S. Chand & Co.

2. Geotechnical Engineering, C. Venkatramaiah, New Age International Publishers

3. Foundation Engineering, P. C. Verghese, Prentice Hall of India

4. Soil Mechanics, T.W Lambe & R.V. Whitman, Wiley Eastern Ltd, New Delhi.
5. Soil Mechanics and Foundations, B.C. Punmia, A. Sourav & Co, Chennai

CPCE 8304 BUILDING MATERIALS AND CONSTRUCTION (3-0-0)

Module – I

Bricks

Methods of bricks manufacture, testing of bricks

Cement. Classification, chemical composition, hydration, tests for cement.

Concrete :

Composition, water –cement ratio, workability, mix design.

Module – II

Masonry arches :Terms used, types of arches, stability, line of thrust, depth of arch at the crown.

Cavity Walls : Purpose, method of construction

Stairs :Terms used, types of stairs, essential requirements, wooden stairs, concrete stairs, metal stairs.

Module – III

Fire resistive construction : Fire resistive classification , fire resistance of common building materials, protection for girders and columns, fire fighting appliances.

Plastering : Materials for plastering, methods of plastering, defects in plastering and remedy.

Damp prevention : causes, effects, different methods of prevention of dampness.

Module – IV

Painting and decoration : oil painting and varnishing, enamel painting, washes and distemper, defects in painting.

Glazing : Varieties of glass, decorative glass, door and window glazing.

Repair of buildings:

Annual and special repair of buildings. Maintenance of buildings

REFERENCE BOOKS :

1. A Textbook of Building construction, A.P. Arora and S.P. Bindra, Dhanpat Rai & Sons
2. A Textbooks of Building Materials, C. J. Kulkarni

CPCE 8305 MECHANICS OF MATERIAL – II (3-0-0)

Module – I (8 hours)
1. Energy Method based on strain energy due to bending : strain energy due to axial load, bending moment and twisting moment, principle of virtual work, Castigliano's theorem, Maxwell's theorem of reciprocal relations, Unit load and couple method for determining deflection and slope, Rayleigh-Ritz method.

Module II (10 hours)

2. Thick Walled cylinders :

Thick cylinders subjected to internal and external pressures compound cylinders, Application of computer in analyzing stresses in thick cylinders.

3. Unsymmetrical bending :

Properties of beam cross selection, slope of neutral axis, stresses and deflection in unsymmetrical bending, shear centre.

Module III   (10 hours)

4. Curved Beam :

Bending of beam with large initial curvature, Stress distribution in beam with rectangular, circular and trapezoidal cross section, stresses in crane hooks, ring and chain links.

5. Elementary concept of elasticity, stresses in three dimensional, equation of equilibrium and compatibility, plane stress, computer analysis of two dimensional state of stress or strain at a point.

Module – IV   (12 hours)

Advanced topics in strength of materials

6. Repeated stresses and fatigue in metals, concept of stress, Concentration, notch and stress concentration factors.

7. Experimental stress analysis :

Resistance strain gauges, strain Rosettes, Two dimensional photoelastic methods of stress analysis, stress optic law, light and dark field in a polariscope, Isoclinic and Isochromatic fringe patterns, Computer Analysis of strain from strain rosette measurement.

Textbook :

1   Advanced Mechanics of Solids, L.S. Srinath, TMG,

2. Advanced Mechanics of Materials, Kumar & Ghai, Khanna Publisher

3. Advanced Mechanics of Materials : Seely and Smith, John Willey, New York

PRACTICALS
CPCE 9301 GEO-TECHNICAL ENGINEERING LAB. (0-0-3)
(Relevant I.S codes may be referred)

1. Determination of specific gravity of soil grains
2. Determination of grain size distribution of soil
     (a)Sieve test (b) Hydrometer/ pipette test
3. Determination of Atterberg limits of soil
     (a) Liquid limit (b) plastic limit (c) shrinkage limit
4. Measurement of soil compaction in the field
     (a) Core cutter method (b) Sand replacement method
5. Determination of Density – Water content relationship of soil.
     (a) Proctor compaction test (ii) Modified Proctor compaction test (c) Use of   Proctor penetration needle

6. Determination of relative density of granular soil

7. Determination of shear strength parameters of soil

8. (a) Shear Box test (b) Tri-axial compression test (c) Unconfined compression test (d) Vane shear test

9. Determination of consolidation characteristics of soil using fixed ring Oedometer

10. Determination of California Bearing Ratio (CBR) of soaked and un-soaked soil specimens

11. Determination of coefficient of permeability of soil
    (a) Constant head perameameter (b) Falling head permeameter

CPCE 9302 CONCRETE STRUCTURE DESIGN – I LAB. (0-0-3)
(IS 456: 2000 and SP 16 are to be used)

1. Design of rectangular, Tee Beam, and Ell beam for flexure, shear and torsion

2. Design of Double reinforced rectangular beam

3. Design of columns with axial, eccentric and biaxial loading

4. One way and two way slab, Isolated column footings

5. Stair case design, design of combine footing

CPCE 9303 CIVIL ENGINEERING LAB. - II (0-0-3)
(Relevant I.S codes may be referred)

A. Hydraulics Lab
1. Experiment on impact of jet
2. Experiment on centrifugal pump
3. Experiment on Francis turbine
4. Experiment on Pelton wheel

B. Concrete and structure lab
5. Failure of beam in bending
6. Failure of beam in shear
7. Design of concrete mix (Indian standard method)
8. Prism test

C. Environmental Engineering Lab
9. Determination of physical characteristics of water-taste, odour, turbidity, colour, pH value, dissolved and suspended solid.
10. Determination of hardness characteristics of water-total calcium and   magnesium. Break point chlorination.

D. Transportation Engineering Lab
11. Quality control tests on highway materials, bitumen, aggregate.
12. Roughness measurement of pavements.

6th Semester

HSSM 4302 PRODUCTION AND OPERATIONS MANAGEMENT (3-0-0)

Objective :   This course aims at acquainting all engineering graduates irrespective of their specializations the basic issues and tools of managing production and operation functions of an organization.

Module I   (11 hours)

1.   Operation Function in an Organization, Manufacturing Vrs Service Operation, System view of Operations, Strategic Role of Operations, Operations Strategies for Competitive Advantages, Operations Quality and Productivity Focus, Meeting Global Challenges of Production and Operations Imperatives.

2.   Designing Products, Services and Processes New Product Design : Product Life Cycle, Product Development Process, Product Quality and Reliability Design, Process Technology : Project , Jobshop, Batch, Assembly Line, Continuous Manufacturing, Process Technology Life Cycle, Process Technology Trends; FMS, CIM, CAD, CAM, GT, Design for Services, Services Process Technology, Services Automation. Value Engineering, Standardization, Make or buy Decision.

3.   Job Design and Work Measurement, Method Study : Techniques of Analysis, recording, improvement and standardization. Work Measurement : Work Measurement Principles using Stopwatch Time Study, Predetermined Motion Time Standards and Work Sampling, Standard Time Estimation.

Module II   (11 hours)

4.   Location and Layout Planning : Factor Influencing Plant and Warehouse Locations, Impact of Location on cost and revenues. Facility Location Procedure and Models : Qualitative Models, Breakeven Analysis, Single Facility, Location Model, Multi-facility Location Model, Mini max Location, Total and Partial Covering Model.

Layout Planning : Layout Types : Process Layout, Product Layout, Fixed Position Layout Planning, Systematic Layout Planning, CRAFT.

Group Technology and Cell Formation, Rank Order Clustering Method for Machine – Component Assignment,. Line Balancing : Basic concepts, General Procedure, Rank Positional Weight Method.

5.   Forecasting : Principles and Method, Moving Average, Double Moving Average, Exponential Smoothing, Double Exponential Smoothing, Winter's Method for Searonal Demand, Forecasting Error Analysis.

Module III   (12 hours)

6.   Manufacturing Planning and Control : The Framework and Components : Aggregate Planning, Master Production Scheduling, Rough-cut-Capacity Planning, Material Requirements Planning, Capacity Requirements Planning, Shop Order System and Purchase Order System. Transportation Method for Aggregate Production Planning, Material Requirement Planning, Scheduling and Dispatching Functions, Progress Monitoring and Control.

7.   Sequencing and Scheduling : Single Machine Sequencing : Basics and Performance Evaluation Criteria, Methods for Minimizing Mean Flow Time, Parallel Machines : Minimization

of Makespan, Flowshop sequencing : 2 and 3 machine cases : Johnson's Rule and CDS heuristic. Jobshop Scheduling : Priority dispatching Rules.

8.   Inventory Control : Relevant Costs, Basic EOQ Model, Model with Quantity discount, Economic Batch Quantity, Periodic and Continuous Review Systems for Stochastic Systems, Safety Stock, Reorder Point and Order Quantity Calculations. ABC Analysis.

Module – IV   (11 hours)

9.   Project Management : Project Management through PERT / CPM. Network Construction, CPM, Network Calculation, Crashing of Project Network, Project Scheduling with Limited Resources. Line of Balance.

10.   Modern Trends in Manufacturing : Just in Time (JIT) System; Shop Floor Control By Kanbans, Total Quality Management, Total Productive Maintenance, ISO 9000, Quality Circle, Kaizen, Poke Yoke, Supply Chain Management

Reference :

1.   J. L. Riggs : Production Systems : planning Analysis and Control, John Wiley.
2.   E. E Adam and R. J. Ebert " Production and Operation Management", Prentice Hall of India, 2004.
3.   S.N. Chary, " Production and Operations Management", Tata McGraw Hill.
4.   R. Paneerselvam, "Production and Operation Management, Prentice Hall of India, 2005.

CPCE 8306 STEEL STRUCTURE (3-1-0)

Module – I

Revetted and welded connections

Design of tension and compression members. Design of columns, Lacings, Battens,

Module – II

Column bases and foundations. Design of beams

Module – III

Plate Girders and gantry girders, Design of roof trusses

Module – IV

Rivetted and pressed elevated steel tanks and staging.

REFERENCE BOOKS :

1.   Arya & Ajmani, Design of Steel Structures
2.   Kazmi and Jindall, Design of steel Structures
3.   Punmia. BC etal , Design of Steel Structures
4.   Negi L.S., Design of Steel Structures

CPCE 8307 SURVEYING – II (3-0-0)

Module – I

Introduction, Horizontal distance measurements, electronic distance measurement theodolite,

Module –II

Triangular measurements. Traverse survey and computation.

Module – III

Total station instrument, vertical distance measurement, Trigonometric levelling, contouring, stadia tacheometry, different types of tacheometric measurements.

Module – IV

Introduction to photogrammetric surveying and mapping. Remote sensing and mapping Global positioning system.

REFERENCE BOOKS :

1.   Surveying and Levelling, Vol-II, T. P. Kanetkar and S.V. Kulkarni
2.   Surveying, Vol II and III, B,C. Punmia
3.   Plane and Geodetic Surveying, Vol-II, David Clark.

CPCE 8308 IRRIGATION ENGINEERING (3-0-0)

Module –I

Hydrology

Hydrologic Cycle, hydrograph, measurement and analysis of precipitation and run off, flood routing.

Water requirement of crops, factors affecting water requirement, crop season, crop period, base, delta and duty, consumptive use of water, frequency of irrigation, irrigation efficiency.

Module – II

Systems of irrigation, lift irrigation, flow irrigation, methods of distribution of water (brief description only)

Flow irrigation, selection of dam or barrage site, types of canals, alignment of canals, design of canal section, Kennedy and Lacey's theory, canal lining, canal head works.

Module - III

Weir and barrage, types of weirs and barrages and their components, Bligh's Creep theory, Khosla's theory.

Spillways, type, Energy dissipators, Cross drainage works.

Module – IV

Dams, Classification of dam, force acting on gravity dam, economical height of dam, stability analysis of dam. Earth dam, Causes of failure of earth dam.

Water logging, causes and effects, anti-water logging measures.

REFERENCE BOOKS :

1.   Irrigation Engineering, N.N. Basak, Tata McGraw Hill, New Delhi, 1999.

2.   A Text book of water Power Engineering, R.K. Sharma and T.K. Sharma, S. Chand & Co, New Delhi, 2003

CPCE 8309 WATER SUPPLY AND SANITARY ENGINEERING (3-0-0)

Module – I

General requirement for water supply, sources, quality of water, intake, pumping and transportation of water. Physical, chemical and biological characteristics of water and their significance, water quality criteria, water borne diseases, natural purification of water sources.

Module – II

Engineered systems for water treatment : aeration, sedimentation, softening coagulation, filtration, adsorption, ion exchange, and disinfection. Water distribution system.

Generation and collection of waste water, sanitary, storm and combined sewerage systems, quantities of sanitary waste and storm water, design of sewerage system

Primary, secondary and tertiary treatment of wastewater. Waste water disposal standards,

Module – III

Basic of microbiology. Biological wastewater treatment system : Aerobic processes activated sludge process and its modifications, trickling filter, RBC, Anaerobic Processes conventional anaerobic digester, High rate and hybrid anaerobic reactors, Sludge digestion and handling, Disposal of effluent and sludge

Module – IV

Design problems on water distribution, sewerage, water treatment units, wastewater treatment units and sludge digestion.

REFERENCE BOOKS :

1.   Water Supply and Sewerage, E.W. Steel
2.   Textbook of Water Supply Engineering, S.R. Kshira sagar
3.   Sewerage and Sewage Treatment, S.R. Kshira sagar

CPCE 8310 STRUCTURAL ANALYSIS -II (3-0-0)

Module – I

Analysis of continuous beams and plane frames by slope deflection method and moment distribution method.

Module - II

Analysis of Continuous beam and simple portals by Kani's method. Analysis of two pinned and fixed arches with dead and live loads, Suspension cables with two pinned stiffening girders.

Module – III

Analysis of redundant plane trusses, matrix, methods of analysis : Flexibility and stiffness, methods ; Application to simple trusses and beam

Module – IV

Plastic Analysis : Plastic modulus, shear factor, plastic moment of resistance, Load factor, Plastic analysis of continuous beam and simple rectangular portals, Application of upper bound and lower bound theorems.

REFERENCE BOOKS :

1.   Plastic Analysis, B.G. Neal, C.S Reddy, C.K. Wang
2.   Structural Analysis, V.S Prasad

PRACTICALS
CPCE 9304 WATER SUPPLY AND SANITARY ENGINEERING DESIGN (0-0-3)

1.   Design of City water supply system
2.   Design of water treatment plant
3.   Design of sewerage network
4.   Design of sewerage treatment plant

CPCE 9305 IRRIGATION ENGINEERING DESIGN (0-0-3)

1.   Design of different types of dams
2.   Design of different types of spillways
3.   Design of head regulator and cross head regulator
4.   Design of channel
5.   Design of cross drainage houses, fall and river training works.

CPCE 9306 CONCRETE STRUCTURE DESIGN –II (0-0-3)
(IS 456 : 2000 and SP :16 are to be used)

1.   Design of a multistoried building including slabs and footings
2.   Design of water tanks
3.   Design retaining walls
4.   Bridge design

COURSE STRUCTURE
FOURTH YEAR B.TECH PROGRAMME
CIVIL ENGINEERING

7th Semester				8th Semester			
Theory		*Contact Hrs.*	*Credit*	*Theory*		*Contact Hrs.*	*Credit*
		L-T-P				**L-T-P**	
HSSM 4403	Environmental Engineering	3-0-0	3	HSSM 4404	Marketing Management	3-0-0	3
CPCE 8401	Computer Aided Design	3-1-0	4	CPCE 8404	Prestressed Concrete	3-1-0	4
CPCE 8402	Transportation Engineering -II	3-1-0	4		**Electives (Any two)**	6-0-0	6
CPCE 8403	Concrete Structure - II	3-0-0	3	PECE 8407	Pollution Measurement & Control		
PECE 8401	Geotech Engineering - II	3-1-0	4	PECE 8408	Environmental Geotechnique		
	Electives (Any one)	3-0-0	3	PECE 8409	Water Resources Management		
PECE 8401	Environmental Impact Assessment			PECE 8410	Structural Dynamics		
PECE 8402	Ground Water Engineering			PECE 8411	Advanced Foundation Engineering		
PECE 8403	Ground Improvement Technique			PECE 8412	Plates and Shells		
PECE 8404	Construction Machinery & Mgmt.			PECE 8413	Traffic Engineering & Trasportation Planning		
PECE 8405	Finite Element Method						
PECE 8406	Quality Estimation and Project Mgt.						
	Total		**21**		**Total**		**13**
Practicals/Sessionals		*Contact Hrs.*	*Credit*	*Practicals/Sessionals*		*Contact Hrs.*	*Credit*
CPCE 9401	Project		3	CPCE 9405	Project		7
CPCE 9402	Steel Structure Design Lab.	0-0-3	2	CPCE 9406	Seminar		1
CPCE 9403	Computer Aided Design Lab.	0-0-3	2	CPCE 9407	Entrepreneurship Project	0-0-3	2
CPCE 9404	Seminar		1	CPCE 9408	Comprehensive Viva Voce		2
			8				**12**
	Total		**29**		**Total**		**25**

L-Lecture   **T-Tutorial**   **P-Practical**

HSSM 4403 ENVIRONMENTAL ENGINEERING (3-0-0)

Objective : This course introduces the students to the environmental consequences of Industries, development actions etc. and the methods of minimizing their impact through technology and legal systems.

Module – I   (10 hours)

Ecological Concepts and Natural Resources : Ecological perspective and value of environment. Environmental auditing, Biotic components, Ecosystem Process : Energy, Food Chain, Water cycle, Air cycle etc., Environmental gradients, Tolerance levels of environment factor, EU, US and Indian Environmental Law, Global Perspective.

Chemistry and Microbiology in Environmental Engineering : Physical and chemical properties of water, Atmospheric chemistry, Soil chemistry, Microbiology, Chemical and biochemical reactions, Material balances and Reactor configurations.

Concept in Hydrology : Hydrological cycle, Water balance, Energy budget, Precipitation, Infiltration, evaporation and evapotranspiration, Rainfall-runoff relationships, Urban hydrology, Ground water, Ground water chemistry, Water contamination and pollution prevention.

Module – II   (9 hours)

Water Pollution : water quality standards and parameters, Assessment of water quality, Aquatic pollution, Freshwater pollution, Estuarine water quality, Marine pollution, Organic content parameters, DO and BOD demand in streams, Transformation process in water bodies, Oxygen transfer by water bodies, Turbulent mixing, Water quality in lakes and preservers , Ground water quality.

Air Pollution : Air pollution and pollutants, criteria pollutants, Acid deposition, Global climate change – green house gases, non-criteria pollutants, emission standard form industrial sources, air pollution metereology, Atmospheric dispersion.

Noise Pollution : Physical Properties of sound, Noise criteria, Noise Standards, Noise measurement, Noise control.

Module – III   (15 hours)

Water Treatment : Water quality standards, Water sources and their quality, Water treatment processes, Pre-treatment of water, Conventional process, Advanced water treatment process.

Waste Water Treatment : Water flow rate and characteristics, Design of waste water network, Waste water treatment process, pretreatment, primary and secondary treatment of waste water, Activated sludge treatment : Anaerobic digestion and its microbiology, Reactor configurations and methane production. Application of anaerobic digestion. Bio-solids regulations, Characteristics and processing

of bio-solids, first and second stage processing of sludge. Sludge disposal,. Integrated sewage and sludge management.

Solid Waste Management :

Source classification and composition of MSW : properties and separation, storage and transportation, MSW Management, Waste minimization of MSW, Reuse and recycling, Biological treatment, Thermal treatment, Landfill, Integrated waste management.

Hazardous Waste Management, Hazardous waste and their generation, Medical hazardous waste, Household waste, Transportation and treatment of hazardous waste : Incinerators, Inorganic waste treatment, Treatment systems for hazardous waste, handling of treatment plant residue.

Industrial Air Emission Control :

Characterization of air stream, Equipment selection, Equipment design, Special Methods : Flue gas desulphurization, NOx removal, Fugitive emissions.

Module – IV   (8 hours)

Waste Minimization : Concept, Life Cycle Assessment, Elements of waste minimization strategy, Benefits of waste minimization, Elements of waste minimization programme, Waste reduction techniques.

Environment impact Assessment, Origin and procedure of EIA, Project Screening for EIA, Scope studies, Preparation and review of EIS.

REFERENCE :

1.   Environmental Engineering Irwin/ McGraw Hill International Edition, 1997, G. Kiely,

2.   Principles of Environmental Engineering and Science, M. L. Davis and S. J. Masen, McGraw Hill International Edition, 2004

3.   Environmental Science, Curringham & Saigo, TMH,

4.   Principles of Environmental Science, Curringhum

5.   Introduction to Environmental Science, Y. Anjaneyalu, B. S. Publication.

CPCE 8401 COMPUTER AIDED DESIGN (3-1-0)

Module – I

Introduction to CAD, Description of Computer hardware and software, use of graphic terminal, various commands Generation of points

Module – II

Various forms of lines including curved lines, 2D transformations, 3-D transformations, hidden line removal, Data base management, Application of graphics packages.

Module – III

Matrix methods of structural analysis and associated computer programmes, Introduction to interactive computer programmes for design and detailing of structural elements, RCC-slab, beams columns, isolated footing etc.

Module – IV

Steel – Typical members and connection

1.   Computer Aided Design, C.S. Krishnamoorthy

CPCE 8402 TRANSPORTATION ENGINEERING- II (3-1-0)

Module – I

History of Indian Railways, Component parts of railway track, Problems of multi gauge system, wheel and axle arrangements, Coning of wheels, various resistances and their evaluation, hauling capacity and tractive effort, stresses in rail, sleepers, ballast and formation.

Permanent way component parts : Types of rail section creep, wear and failure in rails, Rail joints, rail fittings, bearing plates, anti-creep devices, check and guard rails, Ballast requirements, Specifications, Formation, Cross section, drainage.

Module –II

Geometric design : Alignment, horizontal curves, super elevation, equilibrium cant and cant deficiency, Length of transition curves, Gradients and grade compensation, vertical curves.

Point and crossing : Design of simple run out, various types of track junction and their configurations.

Module – III

Signaling and Interlocking : Control of train movement and monitoring, types of signals, principles of interlocking

Air Transport Development : Airport scenario in India –Stages of development, Aircraft characteristics, airport planning, site selection, Obstruction and zoning laws, imaginary surfaces, Approach zones and turning zones.

Module IV

Runways and Taxiway Design : Elements of runway, orientation and configuration, Basic runway length and corrections, Geometric design elements, Taxiway design, Main and exit Taxiway, Separation clearance, Holding aprons, Typical airport layouts, Terminal building, gate position.

Visual Aids and Air Traffic Control : Airport marking and lighting, Airway and airport traffic control, Instrumental landing systems and Air navigation aids.

Textbooks :

1.   Railway Engineering, M.M. Agrawal, Prabha & Co, New Delhi

2.   A Text Book of Railway Engineering, Dhanpat Rai & Sons

3.   Railway Track Engineering, Tata McGraw Hill

CPCE 8403 CONCRETE STRUCTURE – II (3-0-0)

Module – I

Materials for pre-stressed concrete : Basic principles. Pre-stressing systems. Pre-tensioning and post tensioning losses in pre stress.

Module – II

Analysis of sections for failure, Design of simply supported beams and slabs.

Module – III

Principle of design of continuous beams for two equal spans.

Module – IV

Circular pre-stressing, Limit state method of design pre-stressed concrete beams.

REFERENCE BOOKS :

1.   Dayaratnam, P "Pre-stressed Concrete Structure" , Oxford and IBM

2.   Raju, N.K., Pre-structure Concrete – Tata McGraw Hill

PECE 8401 GEOTECHNICAL ENGINEERING – II (3-1-0)

Module – I

Stress distribution in soil : Boussinesq and Westergaard solution for point load, line load, strip load, uniformly loaded circular and rectangular areas. Stress isobar and pressure bulb concept. Pressure distribution on horizontal and vertical planes at various loading conditions. Use of New-mark's chart. Approximate methods equivalent point load methods and two-is-to one method. Contact pressure distribution due to loaded areas. Concept of active zone in soil.

Module – II

Lateral earth pressure and retaining structures : Earth pressure at rest, active and passive earth pressure. Earth pressure theories, Rankine's theory, Columb's Wedge theory. Rebhann's and Culmann's graphical methods, stability conditions for retaining walls.

Module – III

Stability of earth slopes : Stability of infinite slopes, stability analysis of finite slopes, Swedish method of slices, friction circle method, Bishop's method, Use of Taylor stability number. Fellenious method for locating centre of critical slip circle.

Subsoil exploration : Methods, direct (test pits, trenches), semi-indirect (borings), indirect (sounding, penetration tests and geophysical methods)

Planning of exploration programme, spacing and depth of boring, soil sampling, types of samples, standard penetration test, static and dynamic cone penetration test, in-situ vane shear tests. Geophysical methods, seismic refraction and electrical resistivity methods.

Module – IV

Deep foundation :

Classification of pile, pile driving methods, pile capacity (static analysis, dynamic analysis) pile-group analysis, load test on piles.

Rock mechanics :

Introduction, problems, defects in rock mass, joints, faults, folds, Methods of geophysical prospecting, seismic and electrical method.

Reference Books :

1.   Geotechnical Engineering, C. Venkatramaiah, New Age International

2.   Rock Mechanics for Engineering, B. P Verma, Khanna Publishers

3.   Geotechnical Engineering, T.N. Ramamurthy and T.G. Sitaram, S. Chand & Co.

4.   Foundation Engineering, R.B. Peck, W.E. Hansan and T.H. Thorn burn, John Wiley and Sons

PECE 8401 ENVIRONMENTAL IMPACT ASSESSMENT (3-0-0)

Module –I

Introduction : Environmental pollution and control, basic principles of management.

Environmental policies and legislation : Rule, Act, Code, standard, criteria, specification.

Module –II

Causes of environmental problems : Nature and scope of environmental problems, population and economic growth, energy growth, human environmental disturbance.

Module –III

Environmental impact : Environmental inventories, environmental assessment, evaluation.

Socio economic impact assessment, Financing of capital expenditure, increases in user charges, sociological impacts.

Module – IV

Role of environmental impact assessment in planning and decision making processes.

Environmental impact statement case studies.

Reference Books :

1.   Environmental Impact Analysis, R.K. Jain, Urban and G.S. Stacay, Van Nostrand Reinhold Co..

PECE 8402 GROUND WATER ENGINEERING (3-0-0)

Introduction, Hydrologic cycle and processes storage and conduit function of rocks, water bearing properties of rocks

Aquifers, storage coefficient of aquifers, recharge and discharge areas.

Ground water flow, properties of water in relation to flow, laminar and turbulent flow, Darcy's law, formation constants, transmissivity, Flow thorough aquifers.

Evaluation of aquifers properties, confined aquifers, unconfined and semi confined aquifers, transition from artesian to water table conditions.

Quality of ground water, bacteriological and chemical qualities, salinisation of ground water, quality criteria for ground water use. Ground water pollution, factors, sources and nature of pollution, pollution mechanism.

Saline water intrusion, ground water extraction and intrusion, prevention and control of saline water intrusion.

Construction, design and performance of wells, types of wells and method of construction, tube well design, well development, maintenance and revitalization of wells, well performance tests.

Artificial recharge, methods, Induced recharge method, Recharge well method. Waste water recharge.

Textbooks :

1.   Ground water Assessment, Development and Management, K.R. Karanth, Tata McGraw Hill

PECE 8403 GROUND IMPROVEMENT TECHNIQUES (3-0-0)

Module – I

Introduction, Necessity of ground improvement, Dewatering, methods, Analysis and design of dewatering systems.

Grouting types, Properties, Method of grouting, Ground selection and control.

Module – II

Compaction, Methods of compaction, Engineering prosperities of compacted soil, Field compaction and its control.

Module – III

Soil stabilization, Use of chemical additives, Stone columns, Principle, design and method of installation.

Module – IV

Reinforced earth, Concept, Materials, Application and design, Use of geo-synthetics and geo-cells in construction work.

Textbooks :

1.   Foundation Design and Construction, M.J. Tomlinson

2.   Foundation Engineering, G.A. Leonard, Tata McGraw Hill

3.   Modern Geotechnical Engineering, Alam Singh, IBT Publishers

PECE 8404 CONSTRUCTION MACHINERY AND MANAGEMENT (3-0-0)

Module – I

Construction equipments :

Different types of contruction equipments, earth moving, dewatering and pumping, grouting, pile driving equipments.

Conveyers, cranes, Concrete mixture, Vibrators, Rollers, Compactors and other raod construction equipments.

Factors affecting selection of construction equipments

Module – II

Equipments management, Productivity, Operational cost, Owning and hiring cost, Work motion study.

Objectives and functions of construction management. Finance and cost accounting, Quality control, safety and safety measures in construction works.

Module – III

Network techniques, Introduction to CPM/ PERT methods and their use in construction planning. Construction schedules for jobs, materials, equipments, labour and finance.

Module –IV

Contract Management :

Legal aspects, contract laws related to land acquisition, labour safety and welfare. Different types of contracts, their relative advantages and disadvantages. Elements of tender operation. Evaluation of tenders, Award of work, Disputes and arbitration.

Textbooks :

1.   Construction Planning, Equipments and Methods, R.L. Peurify, Tata McGraw Hill

2.   Construction Planning and Management, Mehesh Verma

3.   PERT & CPM, L.S. Sreenath, East West Press

PECE 8405 FINITE ELEMENT METHOD (3-0-0)

Module – I

Introduction to elasticity :

Energy, variational principles and Ritz technique,, coordinates and shape function, patch test for one dimensional elements : Local and global coordinate system, element stiffness matrix, global stiffness matrix, boundary conditions, load matrices, Inversion of global matrix and determination of displacement strains and stresses.

Module – II

Cst element, Axi-symmetric element

Module – III

Isoparametric element, 3D element

Module – IV

Vibration : eigen vectors, eigen value-eigen vector, evaluation, generalized Jacobi method, Tridiagonilization.

REFERENCE BOOKS :

1.   Finite Element Analysis, C.S. Krishna Murthy

2.   Introduction to Finite Elements in Engineering, T.P. Chandrupatla and A.D. Belegundu

3.   Finite Element Analysis in Engineering Design, S. Rajasekharan.

PECE 8406 QUALITY ESTIMATION AND PROJECT MANAGEMENT (3-0-0)

Module – I

Quality estimation :

Principles of estimation, methods and units, Estimation of materials in buildings, Culverts and bridges.

Module II

Principles of general and detailed specification for various types building works.

Module – III

Analysis of rates, description, Prime cost, Schedule rates, Analysis of rates for various types of works.

Module –IV

Network techniques, Introduction to CPM/ PERT methods and their use in project planning construction schedules for jobs, materials equipments, labour and finance.

Textbooks :

1.   Estimating and Costing in Civil Engineering Theory & Practice, B.N. Dutta, UBS Publishers

2.   PERT and CPM, L.S. Sreenath, East West Press

PRACTICALS
CPCE 9402 STEEL STRUCTURE DESIGN LAB. (0-0-3)

1.   Detailing of riveted, bolted and welded connections with shear and torsion; shear and bending

2.   Detailing of end connections of compression and tension members, detailing for lacing and battening

3.   Detailing of column bases and foundations, detailing of slab base, gusseted base and grillage foundation.

4.   Detailing of structural steel connections, seated and framed connections.

5.   Detailing of steel roof trusses/ industrial buildings

6.   Detailing of plate girders, vertical, and horizontal stiffeners bearing stiffeners, web splices.

CPCE 9403 COMPUTER AIDED DESIGN LAB. (0-0-3)

HSSM 4404 MARKETING MANAGEMENT (3-0-0)

Objective of the Course :   The course aims at introducing the basic concepts of marketing to the undergraduate students in engineering. The learning shall help the students in better designing, manufacturing and selling product/ service packages keeping competitive market, customers and cost in view.

Module – I   (9 hours)

Marketing Management : Concept, Process, Functions and relevance in the current context.

Marketing Environment : Socio-economic forces. Competition : national and global, Technology, Government Policy, Suppliers, Buyers, Consumer Resistance considerations. Environment scanning tools and techniques

Competition Analysis : Factors contributing to competition, Competition analysis tools, Competitive arena mapping, Segmentation matrix.

Market Planning : Exploring Opportunity, Product –market selection, Approaches to Market Planning, Market Planning Process.

Module II   (10 hours)

Market Research and Information Systems : Research Process, The Internet and World Wide Web based Information collection and processing, Database, Data Warehouses and Data Mining, Global Market Research, Competitive Intelligence.

Consumer Behaviour : Importance of buyer and his/ her role in purchasing. Influence of buyer behaviour, Buyer behaviour study tools. Organizational buying behaviour.

Market Segmentation, Targeting and Positioning : Definition, Bases and Methods of segmenting consumer and Industrial markets. Target Market strategies: Domestic and global perspective. Market Positioning.

Market Demand Forecasting : Key Terms, Forecasting Tools : Short term tools : Moving average and Exponential smoothing methods, Long-term forecasting Tools : Time series analysis, Econometrics methods, Qualitative tools : Buying Intention Survey, Sales Force Opinion and Delphi Techniques.

Module – III   (11 hours)

Product Planning : Product Life Cycle, Locating products in PLC, New Product Development Process, Branding Strategy, Positioning a Brand, Brand Equity, Packaging and Labeling, Product-mix and Product Line, Product-Mix strategies, Planned Obsolescence.

Pricing Decision : Objectives and Factors influencing pricing, Cost-Plus Pricing, Breakeven Analysis, Price Based on Marginal Analysis, Price Elasticity of Demand, Operating statement, Markups Analysis Ratios, Pricing Strategies : Market-Entry, Discounts and allowances, Geographic Pricing, Special Pricing.

Promotion Decisions : Marketing Communication and Promotion Process, Promotion Mix, Advertising : Media and Media selection process. Organising for advertising, sales promotion.

Module –IV   (10 hours)

Channels of Distributions : Designing Distribution Channels, Wholesaling and Physical Distribution, Retailing. Supply Chain Management (Basic only). Personal selling, Direct Marketing, Managing Sales Force.

Trends in Marketing : Global Marketing, Customer Services, Customer Relationship Management, Rural Marketing and Service Marketing.

References :

1.   M. J. Etazel , B. J. Walker and W. J. Stanton, Marketing, Tata McGraw Hill, 13th Edition, 2004.

2.   R. Saxena, "Marketing Management" Tata McGraw Hill, second Edition, 2003.

CPCE 8404 PRESTRESSED CONCRETE (3-1-0)

Module I

Prestressing system, materials and codes : Basic concept, Losses of prestress, analysis of prestress and bending stresses.

Module – II

Design of beams : Analysis and design of section for bending and shear, bending of cables, limit state analysis and design, anchorage zone stresses, design of end block, Application to bridges.

Selection of prestress concrete members, short term and long term deflections of uncracked members.

Module –III

Flexural strength of prestresed concrete sections

Continuous beams, Design concept concordancy of cables, Secondary design consideration.

Module – IV

Design pre-tensioned and post tensioned beam

Textbooks :

Prestressed Structure, Dayaratnam P., Oxford and IBH Publishing Co.

Prestressed Concrete, Raju,N.K., Tata McGraw Hill

PECE 8407 POLLUTION MEASUREMENT AND CONTROL (3-0-0)

Module – I

Introduction : Environmental pollution, air pollution

Environmental pollution : causes, nature and scope of environmental pollution, pollution and economic growth, energy growth, human environmental disturbances.

Module – II

Environmental policies and legislation : rule, act, code, standards, criteria, specification.

Air Pollution : Type of pollutants and sources, Natural and manmade sources, emission factors.

Module – III

Effect of air pollution : Plant damage, corrosion, human health-respiratory system, special diseases.

Air quality and emission standards : criteria and standards, pollution control laws.

Module – IV

Pollution control strategies : Dispersion and diffusion of pollutants in air and water, ground water pollution, leachete and gas movement in land fills.

Various pollution control devices/ measures

REFERENCE BOOKS :

1.   Introduction to environmental Engineering and Science, G.M. Masters, Prentice Hall of India

2.   Air Pollution, C. Henery, Prkins, Tatat McGraw Hill.

PECE 8408 ENVIRONMENTAL GEOTECHNIQUE (3-0-0)

Module – I

Introduction : Scope, importance, waste generation, subsurface contamination.

Geosynthetics : Types, manufacturing functions, applications and economics.

Module –II

Forms of Waste and their properties : Municipal waste, mineral waste, industrial waste, hazardous waste, index properties, strength, compressibility and permeability of municipal and mineral waste.

Module- III

Selection of waste disposal sites, Factors affecting site selection, siting criteria and siting rating method. Land fills for municipal and hazardous waste : components of land fills, layouts, daily cells, Basal lining systems, stability of slopes, constructing aspects.

Module IV

Ash ponds and mine tailing impoundments : slurry deposition of mine tailing and coal ash in impoundments. Layout, components, design of tailing dam/ ash dykes. Slope stability.

Remediation : Principle of remediation : Planning, source control, soil gas extraction, soil washing, bioremediation.

Reference Books :

1.   Geotechnology of Waste Management, I.S. Oweis and R.P. Khera, Butterwarths, London

2.   Engineering with Geosynthetics, Ed. G. V. Rao and G.V.S.S. Raju, Tata McGraw Hill

3.   Geotechnical Practice for waste Disposal, D.E, Daniel, Chapman and Hall, London.

PECE 8409 WATER RESOURCE MANAGEMENT (3-0-0)

Module – I

Introduction : Role of water in national development, assessment of water resources of country, scope of water resources development in context of environment.

Module – II

Water resources planning process, planning for single purpose and multipurpose projects, estimation of different water needs and project formulations, comparison of alternatives, cost benefit analysis. Introduction to optimization techniques and systems approach.

Module – III

Evaluation and monitoring of water quality and quality managing water distribution networks for irrigation, flood control and power generation, inter-basin transfer of water.

Module – IV

Conjuctive use of surface and ground water, water quality and quality modeling, evaluation of impacts of water resources projects on river regimes and environment, reservoir sedimentation and watershed management.

Reference Books :

1.   Principle of Water Resources Planning, A.S. Gordman, Prentice Hall

2.   Water Resources Engineering, R.K. Linsley and J.B. Franzini, McGraw Hill

PECE 8410 STRUCTURAL DYNAMICS (3-0-0)

Module I

Single degree of freedom systems. Steady state and transient motion, Damping, Free vibration.

Module II

Multi degree of freedom systems. Natural modes, Forced vibration problems, Continuous systems

Module III

Longitudinal flexural and torsional vibration of rods, Eigen values and eigen functions, Raleigeh's Principles, Ritz Method.

Module IV

Moving loads on beams, Lagrange's equation of motion and applications.

REFERENCE BOOKS :

1. Theory of Vibration with application, W.T. Thomson
2. Dynamics of Structures, W.C Hurdy and M.F. Rubinstein
3. Mechanical Vibration and Analysis, P. Srinivasan
4. Mechanical Vibration, Timeshenko

PECE 8411 ADVANCED FOUNDATION ENGINEERING (3-0-0)

Module – I

Foundation subjected to Vibration :

Introduction, type of machine foundation, single degree freedom system, free and forced vibration with and without damping. Parameters influencing the design of machine foundation. Measurement of dynamic soil parameters.

Module – II

Sheet pile walls : Cantilever and anchored sheet pile walls, methods of analysis, Vertical cuts and ditches, earth pressure analysis,

Module – III

Coffer dams :Types, description

Floating foundation : Introduction, type methods to prevent floatation, necessity of using raft for full floating foundation.

Module – IV

Foundation on expansive soil : Shrinkage and expansion of clays, identification of expansive soil, swelling pressure measurement, causes and type of damages in building on expansive clays, Principles of design of foundation in expansive soil deposits.

REFERENCE BOOKS :

1. Handbook of Machine Founadtion, P. Srinivasulu and C.V Vaidyanathan, TMH, New Delhi
2. Foundation Engineering, P.C. Verghese, Prentice Hall of India
3. Textbook of Geotechnical Engineering, I. Q. Khan, Prentice Hall

PECE 8412 PLATE AND SHELLS (3-0-0)

Module – I

Structural behaviour of beams, plate and shells, Pure bending of plates

Module – II

Circular plates

Module – III

Rectangular plates, (a) Levy's Solution (b) Navier's Sol

Module – IV

Membrane theory of shell

REFERENCE BOOK :

1. Element of Plate Analysis, Jaeger
2. Theory of Plates and Shells, Limoshank

PECE 8413 TRAFFIC ENGINEERING AND TRANSPORTATION PLANNING (3-0-0)

Module – I

Traffic Engineering Definition : Organisation of the traffic engineering department, importance under Indian conditions.

Road user characteristics, Human factors governing road user behaviour, Vehicle characteristics, Slow moving traffic characteristics in India.

Module –II

Speed, Journey time, Delay surveys, Traffic flow parameters, Speed,, diversity and volume relationships.

Module –III

Parking types, off street parking. Facilities, Traffic regulation, Traffic management measures.

High capacity analysis, Capacity of freeways and express ways in rural areas.

Module –IV

Design of rotary intersection and capacity of rotary intersection.

A transport planning morphology, Travel demand forecasting process, Hierachical and levels of urban transport planning, Trip generation analysis, Travel demand forecasting, Model split analysis, Trip distribution analysis.

Textbooks :

1.   Principles of Urban Transport System Planning, B.G. Hutchinson

2.   Traffic Engineering and Transport Planning, L.R. Kadiyali

CPCE 9407 ENTREPRENEURSHIP PROJECT (0-0-3)

1.   The project will be for 2 credits and 3 periods per week is to be devoted for the project.

2.   The teacher has to give elementary idea about entrepreneurship through classroom teaching before a project report is prepared by the student.

3.   The teacher will first cover the following topics through lecturer and exercises on motivation and games.

- Entrepreneurship concept, EDP in India, Indian middle class value.

- Entrepreneurial qualities, motivation perception, risk taking etc.

- Market survey, Business opportunity guidance

- Role of DIC, SFC, Bank etc.

- Working capital assessment, Balance Sheet, Costing, Book keeping.

- Decision making, Leadership, Communication skill

- Preliminary Project Report, preparation for a specific product and submission of the report.

4.   Evaluation

   (a) The teacher has to conduct tests/ motivational exercises to assess entrepreneurial capability of the student (20%)

   (b) The teacher has to test the knowledge of the student on the above topic through a written test. (20%)

(c) The teacher has to evaluate the report submitted by the student (i.e. Project report within 50 pages) (60%).

REFERENCE BOOKS :

1. Entrepreneurship of Small Industries, M. V. Deshpande, Deep and Deep Publication
2. Management of Small Scale Industry, Vasant Desai, Himalaya Pub. House