



**B.E – CIVIL ENGINEERING
 (FOUR YEAR FULL TIME)
 CURRICULUM 2008
 SEMESTER I**

Code No.	Course Title	L	T	P	C
THEORY					
XCE101	Technical English	3	1	0	4
XCE102	Mathematics - I	3	1	0	4
XCE103	Applied Physics	3	1	0	4
XCE104	Applied Chemistry	3	1	0	4
XCE105	Engineering Graphics	2	0	3	4
XCE106	Engineering Mechanics	3	1	0	4
PRACTICAL					
XCE107	Applied Physics Lab	0	0	3	2
XCE108	Applied Chemistry Lab	0	0	3	2
XCE109	Basic Workshop Practice	0	0	3	2
	NCC/NSS/NSO / YRC	0	0	0	0

Total Hours:34

Total Credits:30

SEMESTER II

Code No.	Course Title	L	T	P	C
THEORY					
XCE201	Mathematics – II	3	1	0	4
XCE202	Computer Programming	3	0	0	3
XCE203	Basic Engineering (Mechanical and Electrical)	3	0	0	3
XCE204	Building Materials and Geology	3	0	0	3
XCE205	Construction Technology	3	0	0	3
XCE206	Architecture for Civil Engineering	3	0	0	3
PRACTICAL					
XCE207	Computer Programming Lab	0	0	3	2
XCE208	Communication Skills and Enhancement	1	0	2	2
XCE209	Construction Practice and Materials Lab	0	0	3	2

Total Hours:28

Total Credits:25

SEMESTER III

Code No.	Course Title	L	T	P	C
	THEORY				
XCE301	Numerical Methods	3	1	0	4
XCE302	Professional Ethics and Human Values (CE)	3	0	0	3
XCE303	Mechanics of Solids-I	3	1	0	4
XCE304	Mechanics of Fluids-I	3	1	0	4
XCE305	Surveying – I	3	1	0	4
XCE306	Concrete Technology	3	0	0	3
	PRACTICAL				
XCE307	Surveying Practical – I	0	0	3	2
XCE308	Concrete and Strength of Materials Lab	0	0	3	2

Total Hours:28

Total Credits:26

SEMESTER IV

Code No.	Course Title	L	T	P	C
	THEORY				
XCE401	Environmental Science and Engineering	3	1	0	4
XCE402	Mechanics of solids – II	3	1	0	4
XCE403	Mechanics of Fluids – II	3	1	0	4
XCE404	Surveying –II	3	1	0	4
XCE405	Geotechnical Engineering-I	3	1	0	4
XCE406	Water Resources Planning and Management	3	0	0	3
	PRACTICAL				
XCE407	Surveying Practical – II	0	0	3	2
XCE408	Hydraulic Engineering Lab	0	0	3	2

Total Hours:29

Total Credits:27

SEMESTER V

Code No.	Course Title	L	T	P	C
THEORY					
XCE501	Environmental Engineering-I	3	0	0	3
XCE502	Structural Analysis - I	3	1	0	4
XCE503	Design and Detailing of Steel Structures	3	1	0	4
XCE504	Design and Detailing of RCC Structures - I	3	1	0	4
XCE505	Transportation Engineering - I	3	0	0	3
XCE506	Geotechnical Engineering - II	3	1	0	4
PRACTICAL					
XCE507	Design and Drawing - I (RCC & Steel)	0	0	4	2
XCE508	Geotechnical Lab	0	0	3	2
Total		18	4	7	26

Total Hours:29

Total Credits:26

SEMESTER VI

Code No.	Course Title	L	T	P	C
THEORY					
XCE601	Total Quality Management	3	0	0	3
XCE602	Environmental Engineering – II	3	1	0	4
XCE603	Structural Analysis – II	3	1	0	4
XCE604	Design and Detailing of RCC Structures – II	3	1	0	4
XCE605	Transportation Engineering - II	3	0	0	3
XCE606*	Elective - I	3	0	0	3
PRACTICAL					
XCE607	Design and Drawing – II (Irrigation and Environmental Engg.)	0	0	4	2
XCE608	Environmental Engineering Lab	0	0	3	2
Total		18	4	7	25

Total Hours:29

Total Credits:25

* Denotes A, B, C, D and E

SEMESTER VII

Code No.	Course Title	L	T	P	C
THEORY					
XCE701	Social Engineering	3	0	0	3
XCE702	Estimation, Costing and Valuation	3	1	0	4
XCE703	Basics of Earthquake Engineering and Seismic Design	3	1	0	4
XCE704	Geo Spatial Information Technology	3	0	0	3
XCE705*	Elective – II	3	0	0	3
XCE706*	Elective – III	3	0	0	3
PRACTICAL					
XCE707	Computer Aided Structural Design and Detailing	0	0	4	2
XCE708	Survey Camp	0	0	8	4
XCE709	Mini Project	0	0	8	4
Total		18	2	20	30

Total Hours:40

Total Credits:30

* Denotes A, B, C, D and E

SEMESTER VIII

Code No.	Course Title	L	T	P	C
THEORY					
XCE801	Entrepreneurial Development Management	3	0	0	3
XCE802*	Elective – IV #	3	0	0	3
XCE803*	Elective – V #	3	0	0	3
PRACTICAL					
XCE804	Main Project	0	0	24	12
Total		9	0	24	21

Total Hours:33

Total Credits:21

* Denotes A, B, C, D and E

Over all Credits:210

**LIST OF ELECTIVES
ELECTIVE - I**

Code No.	Course Title	L	T	P	C
XCE606A	Building Planning and Drawing	3	0	0	3
XCE606B	Ground Water Hydrology	3	0	0	3
XCE606C	Smart Material and Structures	3	0	0	3
XCE606D	Repair and Rehabilitation of Structures	3	0	0	3
XCE606E	Advanced Foundation Engineering	3	0	0	3

ELECTIVE - II

Code No.	Course Title	L	T	P	C
XCE705A	Experimental Stress Analysis	3	0	0	3
XCE705B	Industrial and Tall Structure	3	0	0	3
XCE705C	Prestressed Concrete Structure	3	0	0	3
XCE705D	Design of Plate and Shell Structures	3	0	0	3
XCE705E	Advanced Concrete Design	3	0	0	3

ELECTIVE - III

Code No.	Course Title	L	T	P	C
XCE706A	Air Pollution Control and Management	3	0	0	3
XCE706B	Solid and Hazardous Waste Management	3	0	0	3
XCE706C	Industrial Waste Water Management	3	0	0	3
XCE706D	Environmental Impact Assessment	3	0	0	3
XCE706E	Unit Operations and Processes in Environmental Engineering	3	0	0	3

ELECTIVE - IV

Code No.	Course Title	L	T	P	C
XCE802A	Earth and Water Retaining Structures	3	0	0	3
XCE802B	GIS for Disaster Management	3	0	0	3
XCE802C	Soil Structure Interaction	3	0	0	3
XCE802D	Geo Environmental Engineering	3	0	0	3
XCE802E	Finite Element Method	3	0	0	3

ELECTIVE - V

Code No.	Course Title	L	T	P	C
XCE803A	Prefabricated Structures	3	0	0	3
XCE803B	Building Services	3	0	0	3
XCE803C	Advanced Pavement Design	3	0	0	3
XCE803D	Traffic Engineering and Management	3	0	0	3
XCE803E	Urban and Regional Planning	3	0	0	3

**B.E – CIVIL ENGINEERING
(4 Years)
SYLLABUS 2008**

XCE101	TECHNICAL ENGLISH	3 1 0 4
UNIT – I	FOCUS ON LANGUAGE	15

Word formation with prefixes and suffixes - synonyms and antonyms - nominal compounds , prepositions, homonyms, homophones and hyponyms, Part of speech, use of words as nouns and verbs, phrasal verbs, connectives, sentences patterns.

Suggested Activities

- Using prefixes and suffixes to change the grammatical functions of words – giving synonyms and antonyms, using the same words and its derivatives of different forms
- Expansion of noun + noun phrases - correction of errors in the given sentences.
- Using comparative forms of adjectives in sentences giving a pair of purpose and function statements to be linked with expressions like to in order to so as to (Eg: He used the ignition key. He started the engine. He used the ignition key in order to start the engine)
- Identification of content words in the given text.
- Learning multi functional words that can serve both nouns and verbs
- Analyzing sentences into S,V,O, C and A.

Note: All examples pertaining to this unit should preferably be related to science and technology.

UNIT – II	FUNCTIONAL GRAMMAR	15
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Tense forms and voice forms, concord, degrees of comparison, conditional clause, definition of technical terms, Sentences expressing purpose and function, comparison and contrast, cause and effect constructions, imperatives, reported speeches, Modal verbs, infinitives, gerund, participles

Suggested Activities

Giving pairs of cause and effect statements to be linked with expressions like *as / since / because*. Rewriting imperative sentences using assertive form '*should*' (Store energy and tap it when required energy should be and tapped when it is required)

- Rewriting infinitive forms as gerunds (e.g., To modernize the administrative office with computers is expensive, Modernizing the administrative office with computers is expensive) Fill in the blanks with appropriate prepositions.
- Choosing sentences in a given text that use different tense forms
- Subject-verb agreement of the sentences given practical
- Providing a context for the use of the tense forms - rewriting the sentences in the impersonal passive form
- Rewriting the sentences in the reported speeches

UNIT III READING

10

Techniques of Reading – Technical articles on invention and discoveries, Reading comprehension on biographies of eminent scientists, engineers and successful entrepreneurs, Practicing - skimming and scanning, Rhetorical functions (narrative, descriptive and argumentative) sequencing of sentences. Connective adverbs. Idioms and phrases, phrasal verbs and cloze test.

Suggested Activities

- Taking a quick glance at the text to predict the content – reading to identify the main theme.
- Identifying the topic sentence in a paragraph – providing suitable titles for paragraphs – matching the titles with the paragraphs.
- Guessing the contextual meaning of words – comprehending a passage and answering questions of varied kinds.
- Transferring of information from a text to graphical representations like tree diagram / flow chart / bar chart / pie chart/ tables.
- Filling the gaps with appropriate missing words from the given list.
- Making notes based on a passage in the format given.
- Using an appropriate format to make notes from a given passage.
- Providing a suitable title after reading the passage.
- Identifying main and supporting ideas by scanning.
- Sequencing of jumbled sentences using linguistic clues (e.g.: reference words).

UNIT IV WRITING I

10

Framing questions and answering, (“Wh” type and “Yes or No”) type note making, (guided and open) making lists, stating problems and proposing solutions, recommendations, instructions, check lists, technical report writing, decoding from graphical representation (flow chart, pie chart, tree diagram) numerical expressions.

Suggested Activities

- Identifying the phrases used for making recommendations in given texts and employing them in making recommendations.
- Writing checklists in the appropriate format.
- Writing instructions for performing tasks at home or at work (use of imperatives).
- Summarizing the discussions and other oral practice activities like role play in the prescribed textbooks.
- Essay writing based on discussion of scientific and technical topics given in the prescribed textbooks.

UNIT V WRITING II

10

Paragraph writing, essay writing, technical report writing, letter writing, (personal, business, letter of application, letter to the editor) resume writing, drafting e-mails, minutes of meeting, memorandum, creative writing.

Suggested Activities

- Using appropriate expressions to define a concept / describe an object / device / process.
- Writing paragraphs on different scientific discourse patterns like classification, comparison and problem / solution – identifying the topic sentence.
- Using unity, cohesion and coherence in paragraph writing.
- Writing formal and business letters using the appropriate format.
- Note – making (guided and open).
- Summarizing and writing paragraphs based on listening tasks in the prescribed textbooks.
- Making recommendations by using modal auxiliary verbs like *should*, *must*, *ought to* etc.

L: 45; T:15; Total:60

TEXT BOOKS:

1. Department of Humanities and Social Sciences, Anna University, English for Engineers and Technologists. Vols. I & II (Combined Edition), Orient Longman Pvt. Ltd., 2006.

REFERENCES:

1. V.R. Narayanaswami, Strengthen Your Writing, 3rd Edition, Orient Longman, 2005.
2. Andrea J. Rutherford, Basic Communication Skills for Technology, 1st Edition, Pearson Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001.
3. Nell Ann Pickett, Ann A. Laster, Katherine E. Staples, Technical English (Writing, Reading and Speaking), 8th Edition, Pearson Education, USA, Addison Wesley Longman Inc., 2001.
4. "Power words in Pairs". Emerald publishers - Chennai

UNIT I MATRICES 9

Eigen values and Eigenvectors of a real matrix – Characteristic equation Properties of Eigen values and Eigen vectors - Cayley - Hamilton theorem (excluding proof) - Similarity transformation (Concept only) – Orthogonal matrix - Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to Canonical form by Orthogonal transformation.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 9

Direction Cosine and Ratios – Angle between two lines – Equation of plane – Equation of Straight line – Coplanar lines – shortest distance between skew lines – Sphere – Tangent plane – Plane section of a sphere

UNIT III GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS 9

Curvature – Cartesian and polar co – ordinates – Centre and radius of curvature – Circle of curvature – Involutives and evolutes – Envelopes – Properties of envelopes and evolutes .

UNIT IV FUNCTION OF SEVERAL VARIABLES 9

Functions of two variables – Partial derivatives – Total differential – Taylor's expansion – Maxima and Minima – Constrained maxima and minima – Lagrange's Multiplier method – Jacobians .

UNIT V ORDINARY DIFFERENTIAL EQUATIONS (ODE) AND APPLICATIONS 9

Linear equations of second order with constant and variable coefficients - Simultaneous first order linear equations with constant coefficients – Method of variation of parameters.

L: 45; T:15; Total:60

TEXT BOOKS:

1. Grewal .B.S., "Higher Engineering Mathematics", 38th Edition- Khanna Publication – Delhi, 2004.
2. Kreyszi.E., "Advance Engineering Mathematics", 8th Edition-John Wiley & Son (Asia) Ltd, Singapore,. 2001.

REFERENCES:

1. Bali. N.P., Narayana Iyengar, and Chand.N., "Engineering Mathematics" Laxmi Publication Pvt. Ltd-New Delhi, 2003.
2. Veerarajan.T., "Engineering Mathematics (For First Year)", 4th Edition , John Wiley & Son -Hill Publishing company Ltd, New Delhi, 2005.
3. Kandasamy. P., Thilagavathy. K, and Gunavathy. K., "Engineering Mathematics"- Volume I &II, S. Chand & Co, New Delhi, 2005.
4. Venkataraman. M. K., "Engineering Mathematics"-Volume I &II, Revised enlarged 4th Edition, The National Publishing Company-Chennai, 2004.

TEXT BOOKS:

1. Avadhanulu M.N. and Kshirsagar P.G., "A Text Book of Engineering Physics", S.Chand & Company Ltd., 7th Enlarged Revised Ed., 2005.
2. Gaur R. K. and Gupta S. L., "Engineering Physics", Dhanpat Rai Publishers, New Delhi, 2001.

REFERENCES:

1. Pillai S. O., "Solid State Physics", New Age International Publication, New Delhi, Fifth Edition, 2003.
2. Rajendran V. and Marikani A., "Materials Science", Tata McGraw Hill Publishing Company Ltd, New Delhi, 2004.

XCE104 APPLIED CHEMISTRY 3 1 0 4

UNIT I WATER TECHNOLOGY 9

Source and types of water – water quality parameters – definition and expression – hard water – estimation of hardness (EDTA method) and alkalinity – boiler feed water – requirements – disadvantages of using hard water in boilers – internal conditioning (phosphate, calgon and carbonate conditioning methods) – external conditioning – demineralization process – desalination (RO method) – domestic water treatment.

UNIT II ELECTROCHEMISTRY 9

Electrode potentials – difference between electrolytic cells and electrochemical cells – Standard electrodes (H_2 and calomel electrodes) – Determination of pH using glass electrodes – Nernst equation – problems – electrochemical series – emf – measurements and its applications – Galvanic cells – Concentration cell – problems – reversible and irreversible cells – conductometric titrations.

UNIT III CORROSION AND ITS INHIBITION 9

Corrosion – principles of chemical corrosion – Pilling – Bedworth rule – principles of electrochemical corrosion – difference between chemical and electrochemical corrosion – types of corrosion – factors influencing corrosion – corrosion control methods – pre-treatment of metal surface – electroplating and electroless plating.

UNIT IV NUCLEAR ENERGY AND ENERGY STORAGE DEVICES 9

Nuclear fission process – definition, mechanism and characteristics – chain reactions – nuclear energy and its calculations – types of nuclear fission reaction – atom bomb – light water nuclear power plant – breeder reactor – batteries – introduction – types of batteries – primary and secondary batteries – dry cell – lead acid, Ni-Cd and Li batteries – alkaline batteries – principles and applications of solar cells.

UNIT V POLYMERS 9

Monomers and polymers – types of polymerization reaction – mechanism of polymerization (free radical) – engineering plastics – PVC, teflon, polycarbonate, polyurethane and thermocole – properties – applications – compounding of plastics, moulding methods – injection, compression moulding and blow moulding – polymer blends and alloys.

L: 45; T:15; Total:60

TEXT BOOKS:

1. P.C. Jain and Monicka Jain, Engineering Chemistry, Dhanpat Raj Publishing Company (P) Ltd, New Delhi – 2002.
2. S.S. Dara. A Text book of Engineering Chemistry, S. Chand & Company Ltd, New Delhi – 2003.

REFERENCES:

1. B.K. Sharma, Engineering Chemistry, Krishna Prakasam Media (P) Ltd., Meerut, 2001.
2. Mars G. Fontana, Corrosion Engineering, Tata McGraw Hill Publishing Co., New Delhi, 2005.

PHYSICS LABORATORY
(Common to all branches of B.E. / B.Tech)
Semester I

XCE107 APPLIED PHYSICS LAB

0 0 3 2

LIST OF EXPERIMENTS

1. Torsional Pendulum – Determination of moment of inertia of disc and rigidity modulus of the material of a wire.
2. Non -Uniform Bending – Determination of Young’s Modulus.
3. Viscosity – Determination of Co-efficient of Viscosity of a liquid by Poiseuille’s flow.
4. Spectrometer – Dispersive power of a prism.
5. Air wedge - Determination of thickness of thin wire.
6. Lee’s Disc – Determination of thermal conductivity of a bad conductor.
7. Spectrometer – Determination of wavelength of Hg source using Grating.
8. Band gap determination of a semiconductor.
9. Spectrometer – id curve.
10. Semiconductor laser –
 - i. Determination of wavelength of Laser using grating.
 - ii. Particle size determination.
 - iii. Determination of numerical aperture and acceptance angle of an optical fibre.

LIST OF EXPERIMENTS (Any 10 Experiments)

- 1) Determination of total hardness, temporary & permanent hardness of water by EDTA method.
- 2) Determination of alkalinity of water sample.
- 3) Determination of chloride content of water sample by argentometric method.
- 4) Determination of DO content by Winkler's method.
- 5) Estimation of copper in brass.
- 6) Determination of strength of Hydrochloric acid by pH metric method.
- 7) Conductometric titration between strong acid and strong base.
- 8) Conductometric titration of mixture of acids.
- 9) Conductometric precipitation titration using barium chloride and sodium sulphate.
- 10) Determination of strength of iron by potentiometric method using dichromate.
- 11) Estimation of iron (1,10 – phenanthroline / thiocyanate method) or Ni (DMG) in the given solution by spectrometric method
- 12) Determination of sodium and potassium ions in water sample by flame photometric method.
- 13) Determination of molecular weight of a polymer by viscometry method.
- 14) Determination of percentage of calcium in limestone by EDTA method.

References for Chemistry Laboratory

- (1) J. Mendham, R.C. Denney, J.D. Barnes and N.J.K. Thomas, Vogel's Textbook of Quantitative Chemical Analysis, 6th Edition, Pearson Education, 2004.
- (2) D.P. Shoemaker and C.W. Garland, Experiments in Physical Chemistry, McGraw Hill, London.

XCE109 BASIC WORKSHOP PRACTICES

0 0 3 2

- A) WOOD WORK** : Sawing, Planning and making common joints like TEE, Half lap and dovetail (any two)
- B) PLUMBING** : Basic pipe connection using valves, taps, couplings, unions, reducers, elbows in household fitting - Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances Preparation of line sketches for (i) water supply lines (ii) sewage lines.
- C) DEMONSTRATION (CIVIL ENGINEERING)** : Study of pipe connections on the suction and delivery pipe layouts.
Study of joints in door panels, wooden furniture.
Bar bending -Straightening of rods and cutting- 90°, 130° bend formation - 45°, 30° crank formation- Stirrups fabrication-Binding and placing of steel reinforcement
- D) FITTING** : Square, dovetail and hemisphere fitting of metal plate of 3mm
- E) WELDING** : (i) Preparation of arc welding of butt joints, lap joints and tee joints.
(ii) Gas welding practice.

XCE201 MATHEMATICS II**3 1 0 4****UNIT I MULTIPLE INTEGRALS****9+3**

Double integration-Cartesian and polar coordinates-change of order of integration-area as a double integral-change of variables between Cartesian and polar coordinates-triple integration.

UNIT II VECTOR CALCULUS**9+3**

Gradient, divergence and curl-directional derivative-irrotational and solenoidal vector fields-Line, Surface and Volume Integral - Greens theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proof)-simple applications.

UNIT III ANALYTICAL FUNCTIONS**9+3**

Function of a complex variable-analytic function -necessary and sufficient condition (excluding proof)-Cauchy - Riemann equation - properties of analytical function-harmonic conjugate-construction of analytic function.

UNIT IV COMPLEX INTEGRATION**9+3**

Statement and application of Cauchy's integral theorem and integral formula-Taylor and Laurent expansion -residues-cauchy residue theorem. Contour integration over unit circle and semicircular contours (excluding poles on boundaries)

UNIT V LAPLACE TRANSFORM**9+3**

Transform of elementary functions- properties-derivatives and integrals of transforms-Transform of derivatives and integrals -Transforms of unit step function and impulse function-Transform of periodic functions – Convolution Theorem – Inverse transforms – Application to solution of linear ordinary differential equations up to second order with constant coefficients.

L:45; T:15; Total:60**TEXT BOOK:**

1. Grewal .B.S. Higher Engineering Mathematics, Thirty eighth Edition, Khann Publication , Delhi 2004.
2. Kreyszig, E , Advance Engineering Mathematics, Eighth Edition, John Wiley and Son (Asia) Ltd Singapore 2001.

REFERENCES:

1. Bali N.P and Narayana Iyengar, N.Chand, Engineering Mathematics Laxman Publication Pvt, Ltd, New Delhi, 2003.
2. Veerarajan. T., Engineering Mathematics Fourth Edition , John Wiley and Son Hill Publishing company Ltd, New Delhi, 2005.
3. Kandasamy. P., Thilagavathy. K, and Gunavathy. K Engineering Mathematics Volume I , II and III S. Chand & Co, New Delhi, 2005.4. Venkataraman. M. K., Engineering Mathematics, Volume I and II Revised enlarge Fourth Edition, The National Publishing Company, Chennai, 2004.

UNIT I BASICS OF COMPUTER AND PROGRAMMING 9

Digital Computer Fundamentals –Block diagram of a computer–Component of a computer system–Hardware and Software–Categories of Software–Booting–Installing and uninstalling Software–Software piracy–Software terminologies–Applications of Computers–Algorithm – Design - Flow chart –History of Internet–Internet Services.

UNIT IIBASIC ELEMENTS OF C 9

Introduction to C – Lexical elements of C – Operators and expressions – Operator precedence and associativity of operators – Input and Output Functions – Simple computational problems - Program Control Structures- Control statements – Branching, looping, nested control structures, switch, break, continue, goto statements – Problems using control structures.

UNIT III FUNCTIONS AND PROGRAM STRUCTURES 9

Prototypes and Functions–Declaring, defining and accessing functions–Parameter passing methods–Recursion–Storage classes–auto, extern, static and register–Library functions- Programs using functions.**Arrays:**Defining and processing arrays–Passing arrays to functions–Multi-dimensional arrays–Strings and basic operations on strings–Enumerated data types–Programs using simple sorting, searching and merging of arrays.

UNIT IV POINTERS 9

Pointer concept–Declaration–Accessing variable through pointer–Initializing pointer variable–Pointers and Functions–Pointers and Arrays–Pointers and Structures–Example programs using pointers with function, arrays and structures–Command line arguments – Dynamic memory allocation–Operations on pointers.

UNIT V STRUCTURES, UNIONS AND FILE HANDLING 9

Structures–User defined data types–Union–Nested structure, passing structures to functions - Self referential structures - File pointer–High level File operations–Opening and closing of file–Creating, Processing and Updation on files–Simple file handling programs.

L: 45; Total:45

TEXT BOOKS:

1. Byron Gottfried, "Programming with C", II Edition, (Indian Adapted Edition), TMH publications, 2006. Yeshwant Kanethker, "Let us C", BPB Publications, 2004

REFERENCES:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Pearson Education Inc. (2005).
2. Behrouz A. Forouzan and Richard. F. Gilberg, "A Structured Programming Approach Using C", II Edition, Brooks–Cole Thomson Learning Publications, 2001.
3. Johnsonbaugh R. and Kalin M., "Applications Programming in ANSI C", III Edition, Pearson Education India, 2003.

XCE203 BASIC ENGINEERING (MECHANICAL & ELECTRICAL) 3 0 0 3

UNIT I SOURCE AND POWER PLANTS 9

Renewable And Non renewable resources – thermal power plant – hydroelectric power plant – nuclear power plant – solar power plant – wind power plant – Conservation of energy.

UNIT II THERMAL SYSTEM AND FURNACE 9

Working principle of Petrol and Diesel engines – Four stroke and Two stroke cycle - Fuel system in a Petrol Engine – Single Jet Carburetor – Coil Ignition System – Spark Plug – Fuel system for Diesel Engine – Fuel Injector – Cooling system in I.C – Functions and types of Furnace.

ELECTRICAL ENGINEERING
UNIT III CONCEPT OF ELECTRICITY 9

Introduction – Electron theory – Charge – Electric Current – Electric Potential – Potential Difference – Concept of EMF and potential difference – Power – Energy – Resistance – Factors related to resistance – Specific resisting – Temperature co-efficient of resistance – Heating effect of electric current – Ohm’s Law. Concept of DC : Series circuit – Parallel Circuits – Kirchoff’s Laws. Concept of AC : AC Voltage – Current – Peak Value – RMS Value – Average Value – Phase – Phase difference – Single Phase – Three Phase concepts.

UNIT IV ELECTRICAL SYSTEMS IN BUILDINGS 9

Symbols for electrical wiring – Specifications – Single and Three phase supply – Protections in electrical circuits – Fuses - Earthings – Types of wires – Wiring methods and choice – Supply mains, Main board and distribution boards – Planning and estimation of wiring in a building.

UNIT V LIGHTING AND DESIGN 9

Concepts of light and colour – Synthesis of colour – Additive and subtractive synthesis – Luminous flux – Candle power – Candles – Plane and solid angle – Utilization factor – Depreciation factor – Visual tasks – Factors affecting visual tasks – MSCP – MHCP – Laws of illuminations – Lighting types – Artificial light sources – Colour temperature – Spectral energy distribution. Design of lighting – Lighting for stores, offices, schools, hospitals and houses – Special features required and minimum illumination level required for physically handicapped and elderly in buildings.

L: 45; Total: 45

TEXT BOOKS:

1. M.S. Palanichamy, C. Shanmugham, “Basic Civil Engineering and Basic Mechanical Engineering”, Tata McGraw–Hill Publishing Company Ltd., 2000.
2. Del Toro, “Principles of Electrical Engineering”, Second Edition, Printice Hall.

REFERENCE:

1. K. Venugopal and V. Prabhu Raja, “Basic Mechanical Engineering”, 6th Edition, Anuradha Agencies, 2005.
2. R. Rudramoorthy, “Thermal Engineering”, Tata McGraw – Hill Publishing Company Ltd, 2005.
3. K. Murugesh Kumar, “Basic Electrical Science and Technology”, Vikas Publishing House PVT Ltd. First Edition, 2002.

XCE204 BUILDING MATERIALS & GEOLOGY 3 0 0 3

UNIT I INTRODUCTION TO GEOLOGY 9

General Geology : Solar System. The Earth : its origin, age and internal constitution. Volcanoes-types, distribution geological effects and products. Earthquakes-intensity, magnitude, distribution, causes and effects. Elementary ideas about isostasy, geosynclines, mountain building, continental drift, sea floor spreading and plate tectonics. Geomorphology Basic concepts. External and internal processes. Rock weathering. Cycle of erosion. Fluvial landforms and drainage patterns. Landforms of aeolian, marine, glacial and 'Karst' landscapes.

UNIT II STONES, BRICKS &TIMBER 9

Stones - Classification of Rocks – General Characteristics of Rocks – Quarrying of stones – Methods of Quarrying – Sorting of stones – Dressing of stones – Preservation of stones – Identification, Availability and uses of stones – Artificial Stones Bricks – Raw materials of bricks – Manufacture of bricks – Classification of bricks – Testing of bricks – Refractory bricks – Types and Uses – Properties – Defects in bricks
Timber: Classification and identification of timber - Properties of timber- Test on timber - Defects in timber- Methods of treatment - Factors affecting strength of timber, seasoning and preservation of timber. Wood based products.

UNIT III BINDING MATERIALS 8

Lime: Manufacturing process – classification and properties –Gypsum : Forms of gypsum Cement –Manufacture of cement, types of cement, properties of cement.
Pozzolona : Natural and Artificial fly ash, Surkhi (burnt clay pozzolona), rice husk and ash pozzolona, properties and specifications for use in construction.

UNIT IV METALS 9

Metals - Ferrous metals, Desirable characteristics of reinforcing steel. Principles of cold working. Detailed Discussion on reinforcing steel mechanical and physical properties chemical composition. Brief discussion on properties and uses of Aluminum and lead. Glass and Insulating Materials -Glass : Ingredients, properties types and use in construction - Insulating Materials - Thermal and sound insulating material desirable properties and type.

UNIT V MISCELLANEOUS MATERIALS 10

Asphalt, Bitumen and Tar -Terminology, specifications and uses, Bituminous materials – TypesPolymers, Plastic, Paints and Varnishes - Chemistry of Plastics manufacturing process, classification, advantages of plastics, Mechanical properties and their use in construction. Paints varnishes and distempers, Common constituents, types and desirable properties, Cement paints.

L:45; Total:45

TEXT BOOKS:

1. "Civil Engineering Materials "Technical Teachers" Training Institute Chandigarh, Tata McGraw Hill Publishing Company Ltd., New Delhi.
2. Engineering Materials, S.C. Rangwala, Charator Publishers, Roorkee
3. Parbin Singh, "Engineering and General Geology", Katson Publication House, 1987.
4. Krynine and Judd, "Engineering Geology and Geotechniques", McGraw-Hill Book Company, 1990

REFERENCES:

1. Duggal, "Engineering Materials", Tata McGraw-Hill book, Newdelhi
2. Legeet, "Geology and Engineering", McGraw-Hill Book Company 1998
3. Blyth, "Geology for Engineers", ELBS, 1995
4. S.K. Sharma : A Text Book of Building Construction, S. Chand & Company Ltd.

XCE205 CONSTRUCTION TECHNOLOGY

3 0 0 3

UNIT I BRICK AND STONE MASONRY

9

Mortar : Cement, Lime

Brick Masonry: Bonding - Types (Double Flemish, Rat-trap) - Principles of brick masonry - Design of walls, Pillars, Pilasters as per BIS code - Reinforcement in brickwork - Construction methods.

Stone Masonry : Random and Coarse, Rubble , Ashlar masonry - Construction methods.

Joints : Expansion - Contraction and Construction Joints.

Hollow Block Masonry : Construction - Plain & Reinforced.

UNIT II PLASTERING AND DAMP PROOFING

9

Plastering: Types - Lime, Cement, Stucco

Finishes : Various types of finishes

Damp Proofing: Introduction - Causes for dampness - Effects - Methods of damp proofing - Water and Weather Proofing.

UNIT III FLOORS AND ROOFS

9

Floors : Construction methods of flooring – Ellis Pattern, Granolithic, Mosaic, and Marble .

Roofs : R.C.C, Filler slab - Construction techniques for Jack-arch roof - Madras terrace, Pitched roof.

UNIT IV STAIRS, DOORS AND WINDOWS

9

Stairs : Introduction - Terms used - Requirements - Classification - Types

Doors and Windows : Introduction - Location and Size - Terms used – Types

Fixture and Fastenings - Grills - Steel and R.C.C. (Prefabricated frames) as per BIS Specification.

UNIT V FIRE, SOUND AND HEAT PROOFING

9

Fire Resisting Construction: Materials - Guidelines for fire resisting - Methods of fire proofing.

Sound Insulation : Acoustics - General principles. Acoustical design of auditorium, class rooms, library - Sound Insulation - Walls & Floors.

Heat Insulation : Heat transference - Insulating materials- Method of application.

L:45; Total: 45

TEXT BOOKS:

1. Building Construction, B.C. Punmia, Laxmi Publications (p) Ltd, New Delhi, 2005
2. Building Construction – S. C. Rangwala, Chartor Publishing, New Delhi
Bindra and Arora

REFERENCES:

1. Building Construction - Sharma and Kaul,
2. Construction and Foundation Engineering Vol 1- Y.S.Save

WORD

Spreadsheet

Power Point

'C' PROGRAMMING

1. Programs using Operators and Expressions
2. Programs using IO Formatting
3. Programs using Control Structures
4. Programs using Looping Structures
5. Programs using Arrays and String manipulations
6. Programs using Functions and Recursion
7. Programs using Structures and Unions
8. Programs using Pointers
9. Programs using Files
10. Programs using Command line arguments

REFERENCES

1. Byron Gottfried, "Programming with C", II Edition, (Indian Adapted Edition), TMH publications, 2006. Yeshwant Kanethker, "Let us C", BPB Publications, 2004
2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Pearson Education Inc. (2005).
3. Behrouz A. Forouzan and Richard. F. Gilberg, "A Structured Programming Approach Using C", II Edition, Brooks–Cole Thomson Learning Publications, 2001.

UNIT I EXTENSIVE LISTENING**12**

Listening and typing –Listening and sequencing of information – Filling in the blanks – Listening and answering the question. Cloze Exercises- Vocabulary building – Dictionary habits a brief note on Thesaurus.

Listening to specific speeches, discussions, interviews, debates, lectures. (Instructional Aids: Audio cassettes, Tape recorders, Language Software.

Suggested Activities

- Gap filling activities while listening to a text
- Listening and identifying the missing words in a given text
- Listening to a brief conversation and answering questions orally
- Listening to commentaries on television or radio to improve listening skills

Paying attention to speaker's appearance, expressions, body movements and posture that convey meaning to his/her words.

UNIT II INTENSIVE LISTENING**12**

Listening for specific information – note taking-guided and open – listening comprehension-listening to specific speeches-interviews –debates lectures.

Suggested Activities

- Taking notes during lectures.
- Listening to a discourse and filling up gaps in a work sheet.
- Informational comprehension and literal comprehension tasks based on listening-post listening quiz.
- Listening to a passage preferably technical and answering questions choosing appropriate options (multiple choice)

Note : These listening activities can be done using a work sheet in a language laboratory or in the class room using a tape recorder.

UNIT III SPEAKING**12**

Oral practice –developing confidence-introducing oneself-asking for or eliciting information-offering suggestions and recommendations.

Analyzing problems and providing solutions- expressing opinions (agreement and disagreement) Role of idioms in Spoken Communication Pronunciation Practice-Stress intonation, accent, questions for oral discussions, describing objects, presenting information, Process description, narrating events, giving introduction, welcome speech and proposing a vote of thanks.

Suggested Activities

- Introducing oneself and others
- Role play activities based on real –life situations
- Discussing travel plan / industrial visit
- Giving oral instructions for performing tasks at home, at class-room and at work place
(use of imperatives)
- Participating in a short classroom-discussion on a controversial topic (eg. For and against reservation policy in educational institutions)
- Oral presentation on topics related to science and technology.

UNIT IV CONVERSATION 12

Face-to-Face conversation- Telephonic conversation- Role-play activities (Students take on roles and engage in conversation) participating in an interview situational dialogues.

Suggested Activities

Making either telephonic conversations or face to face conversation- making request- Asking questions-making recommendations using modal verbs-Giving instructions using imperatives – Expressing purpose and function-obligation and preference- Accepting and offering counseling.

UNIT V LABORATORY PRACTICE 12

Resume/ Report preparation / Letter writing

Structure the resume/ report letter writing/ E-mail communication samples

Presentation skills

Elements of an effective presentation – structure of presentation- presentation tools- voice modulation- audience analysis – body language- video samples.

Soft skills

The management- articulation – assertiveness – psychometrics- innovation and creative – stress management and poise- video samples

Group discussion

Why is GD part of selection process?- Structure of GD- moderator – led and other GDs – Strategies in GD- Team spirit- Body language(gestures)- Mock GD- Video samples.

Interview skills

Kinds of interviews- required key skills – corporate culture – mock interview- video samples.

L:30; P: 30; Total: 60

TEXT BOOKS:

1. Meenakshi Raman, Sangeetha Sharma: Technical Communication Principles and Practice, Oxford University Press.

REFERENCES:

1. Jeremy Comfort, Pamela Rogerson, Trish Stott and Derek Utley: Speaking Effectively, Cambridge University Press.
2. Jayashree Balan; Spoken English, Vijay Nicole Imprints Private Ltd., Chennai.
3. Jean Naterop and Rod Revell (1988) Telephoning in English (Cambridge University Press David Martur (1994), Tough Talking, University Press, Hyderabad.

1. Test on burnt clay bricks (a) Compressive strength (b) Water absorption test and (c) Efflorescence test.
2. Determination of the impact strength of steel specimens by Charpy (U notch) test and Izod (V notch) test.
3. Brinell hardness test on metals and their alloys.
4. Hardness test on metals and their alloys by Rockwell hardness tester using B and C scales.
5. Vicker's hardness test for light metals and their alloys.
6. TESTS ON CEMENT
Specific gravity, fineness, Soundness, Consistency, initial and final setting time.
7. TESTS ON FINE AGGREGATE
Tests to Size distribution of particles, Specific gravity/ Voids ratio, Bulking of sand.
8. TESTS ON COARSE AGGREGATE
Flakiness index, elongation index, sieve analysis, Specific gravity, Density, Impact strength, and Abrasion tests.
9. SETTING VARIOUS BONDS USING BRICKS
10. PIPE FITTINGS AND FIXTURES IN FIELD

REFERENCES

1. Concrete Technology - M.S.Shetty, S.Chand and Company Limited.
2. Highway Material Testing, Laboratory Manual - Khanna and Justo
3. The testing of Engineering materials - H.F.Davis, Troxell.G.E. and Hanck.G.R.H., Mc Graw Hill International Book Co.,
4. Relevant IS codes on testing of metals, timber, bricks and concrete, BIS New Delhi.

XCE301	NUMERICAL METHODS	3 1 0 4
UNIT I	SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS	9
Newton's method- Fixed point iteration $x = g(x)$ method – Solution of Linear system of Gaussian elimination and Gauss Jordan methods – Iterative method: Gauss Jacobi and Gauss Jordan method .		
UNIT II	INTERPOLATIONS AND APPROXIMATION	9
Lagrangian Polynomials – Divided difference –Newton's forward and backward difference formulae		
UNIT III	NUMERICAL DIFFERENTIATION AND INTEGRATION	9
Derivatives from difference table – divided difference and finite difference – Numerical differentiation by Trapezoidal and Simpson's 1/3 and 3/8 rule Romberg's method .		
UNIT IV	INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS	9
Single Step method: Taylor series method – Euler and modified Euler method – fourth order Runge – kutta method for solving first and second order equations – Multistep methods – Milne's and Adam's predictor and corrector methods.		
UNIT V	BOUNDARY VALUE PROBLEMS	9
Finite difference solution for the second order differential equations – finite difference solution for one dimensional heat equation by implicit and explicit methods – One dimensional wave equation.		

L:45;T:15; Total: 60

TEXT BOOKS:

1. Gerald, C.F, and Wheatley, P.O, “ Applied Numerical Analysis”, Sixth Edition, Pearson Education Asia, New Delhi , 2002.
2. “Numerical Methods Scientific and Engineering Computation ”Jain M.K., Iyengar. New Age International (P) Ltd, Publishers, 2003

REFERENCES:

1. Kandasamy P, Thilakavathy K and Gunavathy K, Numerical methods” S. Chand and Co. New Delhi,1999.
2. Venkatraman M. K., “ Numerical Methods” National Pub. Company, Chennai 1991.

XCE302 PROFESSIONAL ETHICS AND HUMAN VALUES 3 0 0 3
(Civil Engineering)

UNIT – I HUMAN VALUES 10

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality

UNIT – II ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy – respect for authority - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - uses of ethical theories.

UNIT – III ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger and other case studies in Civil Engg.

UNIT – IV SAFETY, RESPONSIBILITIES AND RIGHTS 9

Safety and risk in Civil Engg. Construction - assessment of safety and risk - risk benefit analysis and reducing risk - professional rights - employee rights -Collegiality and loyalty - confidentiality - conflicts of interest - occupational crime - Intellectual Property Rights (IPR) - discrimination.

UNIT – V GLOBAL ISSUES 8

Multinational corporations - Environmental ethics - computer ethics - Engineers as Managers- Consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics like ASCE, IRC, ICI, Institution of Engineers (India), Indian Institute of Materials Management,. etc.

L:45; Total : 45

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, “Ethics in engineering”, McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

REFERENCES

1. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education/ Prentice Hall, New Jersey, 2004 (Indian Reprint)
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics – Concepts and Cases”, Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001

XCE304 MECHANICS OF FLUIDS – I 3 1 0 4

UNIT – I FLUID PROPERTIES 9

Introduction to Fluid statics, Kinematics and Dynamics, Properties of fluids, Classification of fluids, Concepts of pressure, Pressure measurement with Manometers, Buoyancy and equilibrium of floating bodies.

UNIT-II FLUID KINEMATICS 9

Classification of fluid flow, Path lines, Streamlines, streak lines and stream tubes, Stream function and Velocity Potential function, Continuity equation for one, two and three dimensional flow, Flow nets, Acceleration of fluids.

UNIT-III FLUID DYNAMICS 9

Bernoulli's equation, Energy and Momentum equation, Energy loss due to pipe friction, Moody's diagram, Energy loss due to sudden transitions, Flow measurement through pipes, Flow through orifice and mouthpiece, Venturimeter, orifice meter and Notches.

UNIT –IV BOUNDARY LAYER 9

Laminar boundary layer, turbulent boundary layer – Combined drag due to laminar and turbulent boundary layer – Displacement thickness –Laminar sub layer- Boundary layer separation

UNIT – V MODEL ANALYSIS 9

Dimensional analysis, dimensional homogeneity, use of Buckingham - pie theorem, dimensionless numbers, similarity laws, Model investigations both submerged and partially submerged bodies.

L:45; T:15; Total:60

TEXT BOOKS

1. Dr. R.K.Bansal, " Fluid Mechanics and Machinery", Laxmi Publications Pvt Ltd, New Delhi, 8th Edition
2. Kumar, K.L., "Engineering Fluid Mechanics", Eurasia Publishing House (P) Ltd., New Delhi, 1995.
3. Garde, R.J. and Mirajgaoker, A.G., "Engineering Fluid Mechanics", Nem Chand Bros., Roorkee

REFERENCES

1. Streeter, Victor, L. and Wylie, Benjamin E., "Fluid Mechanics", McGraw-Hill Ltd., 1998.
2. E.John Finnemore and Joseph B.Franzini, "Fluid Mechanics with Engineering Applications", McGraw-Hill International Edition.
3. Pernard Messay, "Mechanics of Fluids" 7th Edition, Nelson Thornes Ltd. U. K. 1998.

XCE305 SURVEYING –I 3 1 0 4

UNIT – I CHAIN SURVEYING 9

Introduction to Plane and Geodetic Surveying, Chain surveying, Instruments used in chain surveying, Ranging and chaining lines, Chaining past obstacles, Chaining on sloping ground, Corrections applied, Field book, Trapezoidal and Simpson's rule for computation of areas with irregular boundaries.

UNIT –II COMPASS SURVEYING 9

Compass Instrument, Measurement of angles and directions, Bearing, WCB & RB, Magnetic declination and its variation, Local attraction, Plotting of compass traverse, Latitude and departure

UNIT –III PLANE TABLE SURVEYING 9

Plane Table Surveying: Principle, equipment, methods, orientation, two point and three point problem and their solutions, errors & precautions, advantages and disadvantages of plane tabling.

UNIT –IV LEVELING 9

Leveling, terms and definitions, Instruments and its parts, Temporary and permanent adjustments, Reduction of level, Height of collimation and Rise and fall methods, Inverted levels, Reciprocal leveling, Longitudinal and cross sectioning, Capacity of reservoirs, Contouring

UNIT V THEODOLITE 9

Description of theodolite, Measurement of horizontal angles and vertical angles, Methods of repetition and reiteration, Problems of heights and distances by single plane and double plane method.

L:45; Total:45

TEXT BOOKS:

1. Punmia B.C. Surveying, Vols. I, II and III, Laxmi Publications, 1989
2. Bannister A. and Raymond S., Surveying, ELBS, Sixth Edition, 1992.
3. Kanitkar T.P., Surveying and Levelling, Vols. I and II, United Book Corporation, Pune, 1994.

REFERENCES:

1. Clark D., Plane and Geodetic Surveying, Vols. I and II, C.B.S. Publishers and Distributors, Delhi, Sixth Edition, 1971.
2. James M. Anderson and Edward M. Mikhail, Introduction to Surveying, McGraw-Hill Book Company, 1985.
3. Heribert Kahmen and Wolfgang Faig, Surveying, Walter de Gruyter, 1995.

XCE306 CONCRETE TECHNOLOGY 3 0 0 3

UNIT – I CONCRETE AND CONCRETE MATERIALS 9

Introduction – specification for concrete – constituent materials of concrete – their properties and testing – Portland cement – aggregates – admixtures – water. Properties of fresh and hardened concrete – Workability – Strength (uniaxial – biaxial)-elasticity creep – thermal properties – Nondestructive testing.

UNIT – II CONCRETE MIXES 9

Introduction – selection of properties – factors influencing the choice of mix design – methods of concrete mix design – BIS mix design method – ACI mix design method – BS mix design method – IRC mix design method – design problems – acceptance criteria for concrete – recent trends in concrete mix design.

UNIT – III CONCRETE MANUFACTURING 9

Introduction – batching of materials – control facilities for normal and large concrete jobs – mixing of concrete materials – transportation of concrete – buckets, tucks, chutes, belt conveyers, pneumatic methods and pumping – ready mix concrete placing of concrete – curing methods – removal of forms and finishing.

UNIT – IV SPECIAL TYPES OF CONCRETE AND CONCRETING UNDER SEVERE WEATHER CONDITION 9

Mass concrete – light weight concrete – heavy weight concrete – shotcrete – grouting – polymer concrete – fibre reinforces concrete – concreting in extreme weathers like hot weather, cold weather and under water concreting.

UNIT – V DURABILITY OF CONCRETE, REPAIR AND STRENGTHENING OF CONCRETE STRUCTURES 9

Effect of weathering on concrete – freezing and thawing – sulphate attack – effect of acids on concrete – alkali aggregate reaction – effect of sea water on concrete – concrete cracking – determination of concrete through corrosion of steel reinforcement. Repair and strengthening of concrete structures general requirements for quality repair – methods of repair – selection of repair techniques typical examples of concrete – repairs for cracks, corrosion etc.

UNIT - VI TEST ON FRESH AND HARDENED CONCRETE : 9

Slump test, Vee-Bee- Test, Compaction factor test. Tests on cube and cylinders - Determination of Young's modulus, compressive strength, tensile strength (Beam and Cylinder).

L:45; Total: 45

TEXT BOOKS:

1. Concrete technology, ML Gambhir, Tata McGraw Hill Publishing Ltd., India.
2. Concrete technology, M.S Shetty, S.Chand and company, India

REFERENCE:

1. Concrete for construction: Facts and Practice, V. K. Raina, Tata McGraw Hill Publishing company limited, India
2. Concrete manual, US department of interior water and power resources service, CBS Publishers, India
3. Properties of concrete, A.M. Neville, Pitman Publishing company, London, latest edition
4. IS: 10262 – 1982 – Recommended guidelines for concrete mixes
5. Deterioration, maintenance and repair of structures, Johnson SM McGraw Hill International Publishers, New York.
6. SP 23 – 1982, Handbook on concrete mixes, Bureau of Indian Standards, New Delhi, 1982

Chain Surveying

1. Determination of area and plotting of a given site (Park, building, Road)
2. Overcoming obstacles in chaining and ranging

Compass Surveying

3. Measurement of bearing of survey lines by prismatic compass
4. Running closed and open traverses
5. Plotting and adjustments of traverse.

Plane Table Surveying

6. Plotting of the given site by method of Radiation
7. Plotting of the given site by method of intersection
8. Two point problem
9. Three point problem

Levelling

10. Reduction of levels by Rise and fall method and Height of instrument method
11. Longitudinal sectioning and Cross sectioning of the given Road
12. Radial and Square contouring

Theodolite :

13. Study of Theodolite

REFERENCES

1. Bannister A. and Raymond S., Surveying, ELBS, Sixth Edition, 1992.
2. Punmia B.C., Surveying, Vols. I, II and III, Laxmi Publications, 1989.
Clark D., Plane and Geodetic Surveying, Vols. I and II, C.B.S. Publishers and Distributors, Delhi, Sixth Edition, 1971.

1. Test on small clear specimens of timber (a) Compressive strength parallel and perpendicular to the grain (b) tensile strength (c) Shear strength and (d) Static bending test to determine modulus of rupture and modulus of elasticity.
2. Tension test on MS Rod / HYSD bars / MS wire and determination yield strength, ultimate tensile strength, percentage elongation, percentage reduction in area and modulus of elasticity.
3. Determination of Young's Modulus and verification of Maxwell Reciprocal theorem by deflection test on MS flat.
4. Mixing of Mortar – Testing of Mortar Cubes
5. Mixing of concrete – Testing of Fresh Concrete – slump Cone – Flow Table- Compaction Factor Test – Strength of concrete cubes

REFERENCE:

1. The testing of Engineering materials - H.F.Davis, Troxell.G.E. and Hanck.G.R.H., Mc Graw Hill International Book Co.,
2. Relevant IS codes on testing of metals, timber, bricks and concrete, BIS New Delhi.
3. Strength of materials, Timoshako,, S.P. , and yound, Mc Graw Hill Int. Engineering materials, Sushil kumar, Metropolitan book Co. Pvt.

UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND ENERGY 12

Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

UNIT II ECOSYSTEMS AND BIODIVERSITY 12

Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III ENVIRONMENTAL POLLUTION 8

Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Soil waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation – Consumerism and waste products – Environment Production Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – Population explosion – Family Welfare Programme – Environment and human health – Human Rights – Value Education - HIV / AIDS – Women and Child Welfare – Role of Information Technology in Environment and human health – Case studies.

L:45; Total: 45

TEXT BOOKS:

1. Gilbert M.Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition, ISBN 81-297-0277-0, 2004.
2. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co.
3. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Science.
4. Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publications.

REFERENCES:

1. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media.
2. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.
3. Wager K.D., Environmental Management, W.B. Saunders Co., Philadelphia, USA, 1998.
4. S.K.Dhameja, Environmental Engineering and Management, S. K. Kataria and Sons, New Delhi, 1999.

UNIT – I OPEN CHANNEL FLOW**8**

Open channel flow – Types and regimes of flow – Velocity distribution in open channel – Wide open channel – Specific energy – Critical flow and its computation – Flow measurement by current meter and cross masonry works

UNIT – II UNIFORM FLOW**8**

Uniform flow – Velocity measurement – Manning’s and Chezy’s formula – Determination of roughness coefficients – Determination of normal depth and velocity – Most economical sections – Non-erodible channels

UNIT – III VARIED FLOW**8**

Dynamic equations of gradually varied flow – Assumptions – Characteristics of flow profiles – Draw down and back water curves – Profile determination – Graphical integration, direct step and standard step method – Flow through transitions - Hydraulic jump – Types – Energy dissipation – Surges – Surge channel transitions.

UNIT – IV PUMPS**9**

Centrifugal pump - minimum speed to start the pump – multistage Pumps – Jet and submersible pumps - Positive displacement pumps - reciprocating pump - negative slip - flow separation conditions - air vessels -indicator diagram and its variation - savings in work done - rotary pumps.

UNIT – V TURBINES**10**

Turbines - draft tube and cavitations – Application of momentum principle – Impact of jets on plane and curved plates - turbines - classification - radial flow turbines - axial flow turbines – Impulse and Reaction

L:45; T:15; Total:60**TEXT BOOKS:**

1. Subramanya K., "Flow in Open channels", Tata McGraw-Hill Publishing Company, 1994.
2. Kumar K.L., "Engineering Fluid Mechanics", Eurasia Publishing House (P) Ltd., New Delhi, (7th Edition), 1995.
3. Jain A.K., "Fluid Mechanics (including Hydraulic Machines)", Khanna Publishers, 8th edition, 1995.
4. Ranga Raju, K.G., "Flow through Open Channels", Tata McGraw-Hill, 1985

REFERENCES:

1. Streeter, Victor, L. and Wylie, Benjamin E., "Fluid Mechanics", McGraw-Hill Ltd., 1998.
2. E.John Finnemore and Joseph B.Franzini, "Fluid Mechanics with Engineering Applications", McGraw-Hill International Edition.
3. Pernard Messay, "Mechanics of Fluids" 7th Edition, Nelson Thornes Ltd. U. K. 1998.

XCE404 SURVEYING –II 3 1 0 4

UNIT –I TACHEOMETRY 9

Tachometry, Tachometric systems and principles of stadia and tangential methods, Determination of Instrument constants, Theory of anallactic lens, Subtense method

UNIT –II TRIANGULATION 9

Triangulation system, Requirements for selection of triangulation stations, Intervisibility of stations, Satellite station, Problems, signals, Phase of signal, Trigonometrical leveling Both base of object accessible and inaccessible, problems.

UNIT –III THEORY OF ERRORS AND ADJUSTMENTS 9

Errors, Most probable values, weights of observations, Determination of most probable values of angles, Normal equations, Principle of least squares, Method of correlates, Method of differences, Station Adjustment and Figure adjustment, Adjustment of level net work.

UNIT –IV ASTRONOMY 9

Introduction to astronomy, terms and definitions, Properties of spherical triangle, Coordinate systems, Correction to observed altitudes, Time systems, Determination of Azimuth of sun

UNIT –V ENGINEERING SURVEYS 9

Types of curves, Simple, compound, reverse and transition curves , Rankine' s method of deflection angles - Hydrographic surveying - Methods of observation and location of soundings, Three point problems, Introduction to photogrammetry, Types of photographs, Stereoscopes - EDM

L:45; T:15; Total:60

TEXT BOOKS

1. Bannister A. and Raymond S., Surveying, ELBS, Sixth Edition, 1992.
2. Punmia B.C., Surveying, Vols. I, II and III, Laxmi Publications, 1989.
3. Kanetkar T.P., Surveying and Levelling, Vols. I and II, United Book Corporation, Pune,1994.

REFERENCES

1. Clark D., Plane and Geodetic Surveying, Vols. I and II, C.B.S. Publishers and Distributors, Delhi, Sixth Edition, 1971.
2. James M.Anderson and Edward M.Mikhail, Introduction to Surveying, McGraw-Hill Book Company, 1985.
3. Wolf P.R., Elements of Photogrammetry, McGraw-Hill Book Company, Second Edition, 1986.
4. Robinson A.H., Sale R.D. Morrison J.L. and Muehrche P.C., Elements of Cartography, John Wiley and Sons, New York, Fifth Edition, 1984

UNIT – I : INTRODUCTION**9**

Soil problems in civil Engineering – soil structure and clay minerals water – air void relationship – soil grain and soil aggregate properties. Index properties including consistency limits and grain size distribution – identification and classification of soil – textural HRB and BIS specification – Field identification.

UNIT – II : SOIL PROPERTIES**9**

Soil water – Concept effective and neutral stresses – Permeability – Field and Laboratory permeability tests – Factors affecting Permeability – Effect of stratification – Capillary phenomena – Seepage flow, seepage pressure, exit gradient – significance of laplace equation – quick sand condition, liquefaction - Introduction - Flownet, properties, application and construction methods – piping – Design of filters

UNIT – III : STRESS DISTRIBUTION**9**

Vertical stress distribution in soil - Boussinesq's and Westerguard's equations – Newmark's influence chart – Principle, Construction and use - Equivalent point load and other approximate procedures, stress isobars & pressure bulbs.

UNIT – IV : COMPRESSIBILITY AND CONSOLIDATION**9**

Compaction – Factors affecting compaction – proctor test – Field compaction – Field compaction controls, CBR value and CBR test.

Compressibility of soils – Terzaghi's one dimensional consolidation theory – pressure void ratio relationship – prediction of preconsolidation pressure – Total settlement and time rate settlement – secondary compression – coefficient of consolidation – Curve fitting methods.

UNIT – V : SHEAR STRENGTH**9**

Shear Strength; Mohr – Coulomb failure criterion – laboratory and field tests – Pore pressure coefficients – Different drainage conditions- shear properties of cohesionless and cohesive soils - Shear Strength. Parameters for under consolidated, normally consolidated and over consolidated clays.

LECTURE: 45 TUTORIAL: 15 TOTAL: 60**TEXT BOOKS:**

1. Punmia P.C., "Soil Mechanics and Foundations", Laximi Publications Pvt. Ltd., New Delhi, 1995.
2. Venkatramaiah, C. "Geotechnical Engineering", New Age International Publishers, New Delhi, 1995
3. Murthy, V.N.S. Soil mechanics and foundation Engineering, Dhanpat Raj

REFERENCE:

1. Alam singh "Soil Mechanics and Foundation Engineering" asia Publishing.
2. Purushothamaraj. P. Geotechnical Engineering, Tata MCGraw Hill, 1994.
3. Khan I.H., "A text book of Geotechnical Engineering", Prentice Hall of India, New Delhi, 1999.
4. McCarthy D.F., "Essentials of Soil Mechanics and Foundations Basic Geotechniques", Sixth Edition, Prentice-Hall, New Jersey, 2002.
5. Das, B.M., "Principles of Geotechnical Engineering", (fifth edition), Thomas Books/ cole, 2002

UNIT – I PRECIPITATION 9

Hydrologic cycle – Types of precipitation – Forms of precipitation – Measurement of Rainfall – Spatial measurement methods – Temporal measurement methods – Frequency analysis of point rainfall – Intensity, duration, frequency relationship – Probable maximum precipitation.

Losses from precipitation – Evaporation process – Reservoir evaporation – Infiltration process – Infiltration capacity – Measurement of infiltration – Infiltration indices – Effective rainfall.

UNIT – II HYDROGRAPHS 9

Factors affecting Hydrograph – Baseflow separation – Unit hydrograph – Derivation of unit hydrograph – S curve hydrograph – Unit hydrograph of different deviations - Synthetic Unit Hydrograph

UNIT-III IRRIGATION METHODS 9

Irrigation – Need and mode of irrigation – Merits and demerits of irrigation – Crop and crop seasons – consumptive use of water – Duty – Factors affecting duty – Irrigation efficiencies – Planning and Development of irrigation projects.

Canal irrigation – Lift irrigation – Tank irrigation – Flooding methods – Merits and demerits – Sprinkler irrigation – Drip irrigation.

UNIT – IV DIVERSION AND IMPOUNDING STRUCTURES 9

Weirs – elementary profile of a weir – weirs on pervious foundations - Types of impounding structures - Tanks, Sluices and Weirs – Gravity dams – Earth dams – Arch dams – Spillways – Factors affecting location and type of dams – Forces on a dam – Hydraulic design of dams.

UNIT – V CANAL IRRIGATION AND WATER MANAGEMENT 9

Alignment of canals – Classification of canals – Canal drops – Hydraulic design of drops – Cross drainage works – Hydraulic design of cross drainage works – Canal Head works – Canal regulators – River Training works.

Need for optimisation of water use – Minimising irrigation water losses – On farm development works – Percolation ponds – Participatory irrigation management – Water users associations – Changing paradigms in water management – Performance evaluation.

L:45; Total: 45

TEXT BOOKS:

1. Subramanya, K., “Engineering Hydrology”, Tata McGraw-Hill Publishing Co., Ltd., 2000
2. Raghunath, H.M., “Hydrology”, Wiley Eastern Ltd., 2000
3. Asawa, G.L., “Irrigation Engineering”, New Age International Publishers
4. Sharma R.K., and Sharma T.K., “Irrigation Engineering”, S. Chand and company, New Delhi
5. Gupta, B.L, & Amir Gupta, “Irrigation Engineering”, Satya Praheshan, New Delhi

REFERENCES:

1. Chaturvedi M.C., “Water Resources Systems Planning and Management”, Tata McGraw-Hill Inc., New Delhi, 1997.
2. Goodman Alvin S., “Principles of Water Resources Planning”, Prentice-Hall, 1984.
3. Maass et al. Design of Water Resources Systems, Macmillan, 1968.
4. Chow, V.T. and Maidment, “Hydrology for Engineers”, McGraw-Hill Inc., Ltd., 2000
5. Singh, V.P., “Hydrology”, McGraw-Hill Inc., Ltd., 2000

1. Measurement of horizontal angles by reiteration and repetition and vertical angles
2. Heights and distances - Single plane method – Double Plane Method
3. Tachometry – Determination of Constants of Techometer
4. Stadia Tachometry – Staff held Vertical (Angle of Elevation and Depression)
5. Tangential Tachometry – Both angles of Elevation and Depression
6. Horizontal Subtense Method
7. Setting out simple circular curve
8. Field observation for and Calculation of azimuth for sun
9. Study of Electronic Survey Station

REFERENCES:

1. Punmia B.C., Surveying, Vols. I, II and III, Laxmi Publications, 1989.
2. Kanetkar T.P., Surveying and Levelling, Vols. I and II, United Book Corporation, Pune, 1994.
3. Clark D., Plane and Geodetic Surveying, Vols. I and II, C.B.S. Publishers and Distributors, Delhi, Sixth Edition, 1971.
4. James M.Anderson and Edward M.Mikhail, Introduction to Surveying, McGraw-Hill Book Company, 1985.

Flow experiments

1. Determination of Coefficient of Discharge, Coefficient of velocity for Orifice, Mouthpiece, Orificemeter, Venturimeter, Notches.
2. Determination of Friction factor for pipes
3. Verification of Bernouli's theorem
4. Impact of jet on vanes
5. Reynold's experiments on flow visualization

Study on performance characteristics of Pumps

1. Centrifugal pump
2. Reciprocating pump
3. Jet pump
4. Submersible pump
5. Gear Pump
6. Vane pump

Study on performance characteristics of Turbines

1. Impulse turbine (Pelton turbine)
2. Reaction turbine (Francis Turbine)

REFERENCES:

1. Subramanya K., "Flow in Open channels", Tata McGraw-Hill Publishing Company, 1994.
2. Kumar K.L., "Engineering Fluid Mechanics", Eurasia Publishing House (P) Ltd., New Delhi, (7th Edition), 1995.
3. Jain A.K., "Fluid Mechanics (including Hydraulic Machines)", Khanna Publishers, 8th edition, 1995.
4. Ranga Raju, K.G., "Flow through Open Channels", Tata McGraw-Hill, 1985