

UNIVERSITY DEPARTMENTS

ANNA UNIVERSITY CHENNAI :: CHENNAI 600 025

REGULATIONS – 2008

CURRICULUM FROM III & IV SEMESTERS FOR B.E. AGRICULTURE AND IRRIGATION ENGINEERING

SEMESTER – III

| CODE NO. | COURSE TITLE | L | T | P | C |
|------------------|--|-----------|----------|----------|-----------|
| THEORY | | | | | |
| MA 92 11 | Mathematics – III | 3 | 1 | 0 | 4 |
| CE 92 01 | Strength of Materials-I | 3 | 1 | 0 | 4 |
| CE 92 02 | Fluid Mechanics | 3 | 1 | 0 | 4 |
| AI 92 01 | Surveying | 3 | 0 | 0 | 3 |
| AI 92 02 | Theory of Machines | 3 | 0 | 0 | 3 |
| AI 92 03 | Principles of Crop Production | 3 | 1 | 0 | 4 |
| PRACTICAL | | | | | |
| CE 92 04 | Strength of Materials Laboratory | 0 | 0 | 3 | 2 |
| AI 92 04 | Survey Laboratory | 0 | 0 | 4 | 2 |
| TOTAL | | 18 | 4 | 7 | 26 |

SEMESTER – IV

| CODE NO. | COURSE TITLE | L | T | P | C |
|------------------|---|-----------|----------|----------|-----------|
| THEORY | | | | | |
| MA 92 61 | Numerical Methods | 3 | 1 | 0 | 4 |
| CE 92 53 | Applied Hydraulics Engineering | 3 | 1 | 0 | 4 |
| AI 92 51 | Soil Science and Engineering | 3 | 1 | 0 | 4 |
| AI 92 52 | Hydrology and Water Resources Engineering | 3 | 0 | 0 | 3 |
| AI 92 53 | Food Science and Nutrition Technology | 3 | 0 | 0 | 3 |
| GE 90 21 | Environmental Science and Engineering | 3 | 0 | 0 | 3 |
| PRACTICAL | | | | | |
| AI 92 54 | Soil Science Laboratory | 0 | 0 | 3 | 2 |
| AI 92 55 | Fluid Mechanics and Machinery Laboratory | 0 | 0 | 3 | 2 |
| TOTAL | | 18 | 3 | 6 | 25 |

AIM:

To make available the basic concepts of engineering mathematics, to prepare the student for new concepts to be introduced in the subsequent semesters and to provide the necessary mathematical skills that are needed in modeling physical processes by an engineer.

OBJECTIVES:

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she his familiar with limitations of using infinite series approximations for solutions use in mathematical modeling
- To familiarize the student with functions of several variables which is needed in many branches of engineering
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions to be used in subsequent applications
- To acquaint the student with mathematical tools needed in evaluated multiple integrals and their usage

1. MATRICES**9 + 3**

Characteristic equation – Eigenvalues and Eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

2. INFINITE SERIES**9 + 3**

Sequences – Convergence of series – General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test, Comparison of ratios and D’Alembert’s ratio test) – Alternating series – Series of positive and negative terms – Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series.

3. FUNCTIONS OF SEVERAL VARIABLES**9 + 3**

Limit and Continuity – Partial derivatives – Homogeneous functions and Euler’s theorem – Total derivative – Differentiation of implicit functions – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor’s series for functions of two variables – Errors and approximations – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers.

4. IMPROPER INTEGRALS**9 + 3**

Improper integrals of the first and second kind and their convergence – Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions – Properties – Evaluation of integrals using Beta and Gamma functions – Error functions.

5. MULTIPLE INTEGRALS

9 + 3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of variables in double and triple integrals – Area of a curved surface.

L: 45 + T: 15 TOTAL = 60 PERIODS

TEXT BOOKS:

1. Grewal B.S., Higher Engineering Mathematics (40th Edition), Khanna Publishers, Delhi (2007).
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill Co. Ltd., New Delhi (2007).

REFERENCES:

1. Jain R.K. and Iyengar S.R.K., Advanced Engineering Mathematics (3rd Edition), Narosa Publications, Delhi (2007).
2. Bali N., Goyal M. and Watkins C., Advanced Engineering Mathematics (7th Edition), Firewall Media, New Delhi (2007).
3. Greenberg M.D., Advanced Engineering Mathematics (2nd Edition), Pearson Education, New Delhi (1998).

OBJECTIVE:

To introduce the basic physics concepts relevant to different branches of Engineering and Technology

1. PROPERTIES OF MATTER 9

Elasticity – Poisson’s ratio and relationship between moduli (qualitative) – Stress-strain diagram – factors affecting elasticity – bending of beams – cantilever – bending moment – theory and experiment of Young’s modulus determination – Uniform and non-uniform bending – I shaped girders – twisting couple – hollow cylinder – shaft – torsion pendulum – determination of rigidity modulus – moment of inertia of a body (regular and irregular).

2. ACOUSTICS AND ULTRASONICS 9

Classification of sound – loudness and intensity – Weber-Fechner Law – standard Intensity and Intensity level – decibel – reverberation – reverberation time — rate of growth and decay of sound intensity - derivation of Sabine’s formula – absorption coefficient and its determination – factors affecting acoustics of buildings : focussing, interference, echo, Echelon effect, resonance – noise and their remedies. Ultrasonics – production – magnetostriction and piezoelectric methods – detection of ultrasound – acoustic grating – Industrial applications – NDT - Ultrasonic method: scan modes and practice.

3. THERMAL PHYSICS 9

Thermal expansion - thermal stress – expansion joints – bimetallic strips - thermal conductivity – conductions in solids – Forbe’s and Lees’ disc methods – thermal insulation of buildings – Laws of thermodynamics – Otto and diesel engines and their efficiency – entropy – entropy of Carnot’s cycle – reverse Carnot’s cycle – refrigerator.

4. APPLIED OPTICS 9

Interference - Michelson interferometer: construction, working, determination of wave length and thickness – anti-reflection coating – air wedge and its application – Lasers – Einstein’s coefficients – CO₂, Nd:YAG and semiconductor lasers - construction and working – applications – Optical fibres – classification (index & mode based) – principle and propagation of light in optical fibres – acceptance angle and numerical aperture – fibre optic communication system - active and passive sensors.

5. SOLID STATE PHYSICS

9

Nature of bonding – growth of single crystals (qualitative) - crystal systems - crystal planes and directions – expressions for interplanar distance – coordination number and packing factor for simple structures: SC, BCC, FCC and HCP – structure and significance of NaCl, ZnS, diamond and graphite – crystal imperfections: point defects, dislocations and stacking faults.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Palanisamy, P.K., Engineering Physics, Scitech Publications (P) Lt, 2006.
2. Arumugam, M., Engineering Physics, Anuradha Publ., 2000.

REFERENCES:

1. Gaur R.K., and Gupta, S.L Engineering Physics, Dhanpat Raj Publ., 2003.
2. Sankar B.N., Pillai.S.O., Engineering Physics, New age International (P) Ltd, 2007

AIM:

To gain a sound knowledge of thermodynamics, phase rule, surface chemistry and catalysis, basic organic reaction mechanisms and principles and applications of spectroscopy and nanochemistry.

OBJECTIVES:

Student should be conversant with the

- Applications of second law of thermodynamics.
- Phase rule and various types of alloys
- Surface chemistry and its importance in adsorption and catalysis.
- Basic principles in organic reaction mechanisms and principles and applications of spectroscopy
- Nanochemistry and its applications

1. THERMODYNAMICS**9**

Statement of second law of thermodynamics – Clausius and Kelvin – definition of entropy – entropy change for a reversible process – entropy change for flow of heat in an irreversible process – entropy change for an isothermal expansion of an ideal gas – problems – entropy of phase transitions- problems – definition of free energy and work function – Gibbs Helmholtz equation – applications – problems – derivation of Maxwell relations – van't Hoff isotherm and isochore – applications – problems – chemical potential – variation of chemical potential with temperature and pressure - significance.

2. PHASE RULE**9**

Phase rule – statements and explanation of the terms involved – condensed phase rule – construction of phase diagram – water system – sulphur system – phase rule for two component alloy systems- thermal analysis – eutectic system - Lead-Silver system – simple eutectic formation – Zinc-Magnesium alloy system – Iron-Carbon alloy system- solved examples.

3. SURFACE CHEMISTRY AND CATALYSIS**9**

Adsorption – types of adsorption – adsorption of gases on solids – adsorption isotherm – Freundlich and Langmuir isotherms – adsorption of solutes from solutions – applications – role of adsorption in catalytic reactions – ion exchange adsorption – basic principles in adsorption chromatography – Catalysis – classification – characteristics of catalysis - auto catalysis – enzyme catalysis – Michaelis – Menton equation – solid acid catalysis.

4. ORGANIC REACTIONS AND SPECTROSCOPY

9

Electrophilic and nucleophilic, substitution and elimination reactions mechanisms – SN^1 , SN^2 , E^1 , E^2 reactions – Electromagnetic spectrum – absorption of radiation – electronic transition – vibrational transition – rotational transition – intensities of spectral lines – Beer-Lambert's law – type of instrument used for absorption measurements – UV & visible spectroscopy, IR spectroscopy – principles of instrumentation and applications.

5. NANOCHEMISTRY

9

Introduction to nanochemistry – preparations and properties of nanomaterials - nanorods – nanowires – nanotubes – carbon nanotubes and their applications – nanocomposites – sensors and electronic devices – nanochemistry in biology and medicines – nanocatalysis.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Puri B.R., Sharma L.R. and Madhan S. Pathania, Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co. Jalandar –2000.
2. Jain P.C. and Renuka Jain, Physical Chemistry for Engineers, Dhanpet Rai & Sons, New Delhi, 2001.

REFERENCES:

1. Bahl B.S., Tuli G.D., and Arun Bahl, Essentials of Physical Chemistry, S. Chand & Company Ltd., New Delhi, 2004.
2. Morrison R.T., & Boyd R.N., Organic chemistry, Prentice-Hall of India Private Limited, New Delhi, 1992
3. Sanyal S.N., Reactions, Rearrangements and Reagents Bharati Bhawan Publishers & Distributors New Delhi, 2006.
4. G. B. Sergeev, Nanochemistry, Elsevier Science, New York, 2006

GE 9111

ENGINEERING GRAPHICS
(Common to All branches of B.E / B.Tech Programmes)

L T P C
2 0 3 4

OBJECTIVES:

To develop in students the graphic skills that would enable them to communicate the concepts, ideas and design of engineering products.

To provide an exposure to the national/international standards related to technical drawings

INTRODUCTION

2

Importance of graphics in engineering applications – use of drafting instruments – BIS specifications and conventions – size, layout and folding of drawing sheets – lettering and dimensioning

UNIT-I Free hand sketching of engg objects and construction of Plane curves
(3 + 9 = 12)

Pictorial representation of engineering objects – representation of three dimensional objects in two dimensional media – need for multiple views – developing visualization skills through free hand sketching of three dimensional objects. Polygons & curves used in engineering practice– methods of construction– construction of ellipse, parabola and hyperbola by eccentricity method – Cycloidal and involute curves- construction - drawing of tangents to the above curves.

UNIT-II Orthographic Projection: Projection of points, lines and plane surfaces
(6 + 9 = 15)

General principles of orthographic projection – first angle projection – layout of views – projections of points , straight lines located in the first quadrant – determination of true lengths of lines and their inclinations to the planes of projection – traces – projection of polygonal surfaces and circular lamina inclined to both the planes of projection

UNIT-III Orthographic Projection: Projection of solids and sections of solids
(6 + 9 = 15)

Projection of simple solids like prism, pyramid, cylinder and cone when the axis is inclined to one plane of projection –change of position & auxiliary projection methods- sectioning of above solids in simple vertical positions by cutting plane inclined to one reference plane and perpendicular to the other and above solids in inclined position with cutting planes parallel to one reference plane – true shapes of sections

UNIT-IV Development of surfaces and intersection of solids**(6 + 9 = 15)**

Need for development of surfaces – development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones – development of lateral surfaces of the above solids with square and circular cutouts perpendicular to their axes. Intersection of solids and curves of intersection –prism with cylinder, cylinder & cylinder, cone & cylinder with normal intersection of axes and with no offset.

UNIT-V Isometric and perspective projections**(4 + 9 = 13)**

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones – principles of perspective projections – projection of prisms, pyramids and cylinders by visual ray and vanishing point methods.

Computer Aided Drafting (Demonstration only)**3**

Introduction to computer aided drafting software packages and demonstration of their use.

L = 30; P = 45**TOTAL: 75 PERIODS****TEXT BOOKS:**

1. Bhatt,N.D, "Engineering Drawing", Charotar Publishing House, 46th Edition-2003
2. Natarajan,K.V, "A Textbook of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2006.

REFERENCE BOOKS:

1. Shah,M.B and Rana,B.C., "Engineering Drawing", Pearson Education,2005.
2. Gopalakrishnan.K.R., "Engineering Drawing I & II", Subhas Publications 1998.
3. Dhananjay,A.J., "Engineering Drawing with Introduction to AutoCAD", Tata McGraw-Hill Publishing Company Ltd., 2008.
4. Venugopal,K. and Prabhu Raja, V., "Engineering Graphics", New Age International(P) Ltd., 2008.

CODES FROM BUREAU OF INDIAN STANDARDS

1. IS 10711-2001: Technical Products Documentation – Size and Layout of Drawing Sheets
2. IS 9609 (Parts 0 & 1)-2001: Technical Products Documentation – Lettering
3. IS 10714(Part 20)-2001 & SP 46 -2003: Lines for Technical Drawings
4. IS 11669-1986 & SP 46-2003: Dimensioning of Technical Drawings
5. IS 15021(Parts 1 to 4)-2001: Technical Drawings-Projection Methods

SPECIAL POINTS APPLICABLE TO UNIVERSITY EXAMINATIONS ON ENGINEERING GRAPHICS:

1. There will be five questions one from each unit covering all units of the syllabus
2. All questions will carry equal marks of 20 each making a total of 100
3. Answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solutions within A3 size
4. The examination will be conducted in appropriate sessions on the same day

GE 9112

FUNDAMENTALS OF COMPUTING
(Common to all branches of BE / B.Tech Programmes)

L T P C
3 0 0 3

AIM:

To introduce the basics of computing and the fundamentals of C programming.

OBJECTIVES:

- To introduce the fundamentals of computing systems.
- To introduce the concepts of internet and WWW.
- To teach programming in C.

UNIT I

9

Computer systems – Exploring computers – Inside the system – Processing data – CPUs – Types of storage devices - Operating systems basics – Networking basics.

UNIT II

9

The internet and the WWW – Internet services – connecting to the internet - Working with applications software – productivity software – graphics and multimedia – Data base Management systems – Creating computer program.

UNIT III

9

C programming fundamentals – compilation process – variables – Data types – Expressions – looping – decisions.

UNIT IV

9

Arrays - Working with functions – structures – character strings – pre processor.

UNIT V

9

Pointers – Dynamic memory allocation – linked list – Applications

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Peter Norton, "Introduction to Computers", Sixth Edition, Tata McGraw Hill, 2007.
2. Stephen G. Kochan, "Programming in C", Third Edition, Pearson Education, 2007.

REFERENCES:

1. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006
2. Ashok N. Kamthane, "Computer programming", Pearson Education, 2007.
3. Kenneth A. Reek, "Pointers on C", Pearson Education, 2007.
4. Dromey,R.G, "How to solve it by Computer", Pearson Education, 2007.

PH 9112

PHYSICS LABORATORY
(Common to ALL Branches of BE / B.Tech Programmes)

L T P C
0 0 2 1

- | | |
|--|---|
| 1. Torsional Pendulum- Inertia of disc. | Determination of rigidity modulus of wire and moment of |
| 2. Non-uniform bending - | Determination of Young's modulus. |
| 3. Lees' disc- | Determination of thermal conductivity of a bad conductor. |
| 4. Potentiometer - | Determination of thermo e.m.f of thermocouple |
| 5. Air wedge- | Determination of thickness of a thin sheet of paper. |
| 6. i. Optical fibre - angle | Determination of Numerical Aperture and acceptance |
| ii. Compact disc - | Determination of width of the groove using laser. |
| 7. Acoustic grating - | Determination of velocity of ultrasonic waves in liquids. |
| 8. Post office box - | Determination of Band gap |
| 9. Spectrometer - | Determination of wavelength using grating |
| 10. Viscosity of liquid- Poiseuille's flow. | Determination of co-efficient of viscosity of a liquid by |

1. WEIGHING AND PREPARATION OF STANDARD SOLUTIONS

- Preparation of molar and normal solutions of the following substances oxalic acid, sodium carbonate, sodium hydroxide, and hydrochloric acid.
- Preparation of buffer solutions: borate buffer, phosphate buffer using Henderson equation.

2. WATER ANALYSIS

- Determination of total hardness, temporary & permanent hardness of water by EDTA method.
- Determination of DO content by Winkler's method.
- Determination of alkalinity in a water sample.
- Determination of chloride content of water sample by argentometric method.

3. PH-METRY

To find out the strength of given hydrochloric acid by sodium hydroxide.

4. CONDUCTOMETRY

- Conductometric titration of mixture of acids
- Conductometric precipitation titration using BaCl_2 - Na_2SO_4

5. POTENTIOMETRY

- Redox titration – Iron Vs. dichromate

6. SPECTROPHOTOMETRY

- To determine λ_{max} of a colored solution such as potassium permanganate.
- To determine the iron content of an unknown solution (1,10- phenanthroline/ thiocyanate method)

7. FLAME PHOTOMETRY

- To determine sodium and potassium in water.

8. VISCOMETRY

- Determination of molecular weight of a polymer

9. WATER POLLUTION

- COD analysis of a waste water by dichromate method.

10. KINETICS

- i) Determination of reaction rate constant of acid catalyzed hydrolysis of ester.

11. ADSORPTION

- i) Adsorption of acetic acid on activated charcoal.

REFERENCE BOOKS:

1. A text of quantitative Inorganic Analysis, A. L. Vogel , ELBS London. 1995.
2. Experiments in physical chemistry, D.P. Shoemaker and C.W. Gardad, McGraw Hill, London, 2001.

GE 9113

ENGINEERING PRACTICES LABORATORY
(Common to all Branches of BE / B.Tech Programmes)

| | | | |
|----------|----------|----------|----------|
| L | T | P | C |
| 0 | 0 | 3 | 2 |

OBJECTIVE:

To provide exposure to the students with hands-on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICE

12

PLUMBING

Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.

Laying pipe connection to the suction side of a pump – inlet.

Laying pipe connection to the delivery side of a pump – out let.

Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK

Sawing, planing and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

Study

Study of joints in door panels, wooden furniture

Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICE

9

Basic household wiring using switches, fuse, indicator – lamp etc.,

Preparation of wiring diagrams

Stair case light wiring

Tube – light wiring

Study of iron-box, fan with regulator, emergency lamp

3. MECHANICAL ENGINEERING PRACTICE

WELDING

Arc welding of butt joints, lap joints, tee joints

Gas welding Practice.

Basic Machining

Simple turning, drilling and tapping operations.

Machine assembly Practice.

Study and assembling the following:
Centrifugal pump, mixies and air conditioners.

Demonstration on

(a) Smithy operations like the production of hexagonal bolt.

(b) Foundry operation like mould preparation for grooved pulley.

4. ELECTRONIC ENGINEERING PRACTICE

9

Soldering simple electronic circuits and checking continuity.

Assembling electronic components on a small PCB and testing.

Study of Telephone, FM radio, low-voltage power supplies.

TOTAL: 45 PERIODS

EXAMINATION PATTERN

The examination is to be conducted for both groups SA & B, allotting 1¹/₂ for each group.

List of equipments and components

For a Batch of 30 students

For Engineering Practices Laboratory

CIVIL

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings.
15 Sets
2. Carpentry vice(fitted to work bench) 15
Nos.
3. Standard wood working tools 15
Sets
4. Models of industrial trusses, door joints, furniture joints
5 Each

MECHANICAL

1. Arc welding transformer with cables and holders
5 Nos.
2. Welding booth with exhaust facility 5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush etc.
5 Nos.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit.
2 Nos.
5. Central lathe 2 Nos.
6. Hearth table, anvil and smithy tools 2 Sets.
7. Moulding table, foundry tools 2 sets
8. Study- purpose items : centrifugal pump, mixer, air –conditioner
One Each

ELECTRICAL

1. Assorted electrical components for house hold wiring
15 Sets
2. Electrical measuring instruments 10
Sets
3. Study purpose items: Iron box, fan and regulator
One Each

ELECTRONICS

1. Soldering guns
10 Nos.
2. Assorted electronic components for making circuits 750
Nos.
3. Small PCBs 10
Nos.
4. Multimeters 10
Nos.
5. Study purpose items: Telephone, FM radio, low-voltage power supply
2 Each

TEXT BOOK:

1. Jeyachandran. K and Natarajan.S, "Engineering Practices Laboratory Manual", Anuradha Agencies, 2004.

GE 9114

**COMPUTER PRACTICE
(Common to all branches of BE / B.Tech Programmes)**

| L | T | P | C |
|----------|----------|----------|----------|
| 0 | 0 | 3 | 2 |

AIM:

The aim is to teach the use of computer applications related to office automation and to teach implementation of C programs.

OBJECTIVES:

- To introduce office automation software packages.
 - To teach the fundamentals in C programming.
1. Simple OS commands and simple editors for file operations.
 2. Word processors for more complex operations, like formatting documents, creating tables and so on.
 3. Simple data base packages for creating and manipulating databases.
 4. Spread sheet packages for data preparation and analysis.
 5. Preparation of reports involving mathematical functions (Income Tax Statement, Mark sheets, Payroll etc.,)
 6. C Programs using one dimensional arrays.
 7. C Programs using multi-dimensional arrays and pointer data types.
 8. Programs using structures, nested structures and union.
 9. Programs using functions- recursive, non-recursive and Library functions.
 10. Programs for passing aggregate data types as parameters between functions.
 11. Programs for dynamic memory allocation / deallocation.
 12. Programs for self-referential structure – Implementing linked list.

HS 91 61

TECHNICAL ENGLISH II
(For all branches of B.E / B.Tech Programmes)

L T P C
2 0 2 3

AIM:

To help students specialising in the field of Engineering and Technology develop their proficiency in oral and written communication in Technical English.

OBJECTIVES:

1. To enable students develop their critical thinking skills.
2. To enable students develop higher order reading skills such as interpreting, evaluating and analysing.
3. To enable students develop their active listening skills.
4. To enable students participate successfully in Group Discussions.

UNIT-I

6

Word formation using prefixes 'self' – modified cloze – contextual meanings - Sequencing words - future simple passive form - Predicting content – Intensive reading – interpreting advertisements – Listening and completing table – Writing extended definition – describing a process using sequence words – developing ideas into paragraphs – writing about the future.

UNIT-II

6

Identifying objects and their use – word puzzles using words with suffixes – Prepositions – adverbs – structures that express purpose - adjectives – group discussion – Reading - skimming for content and analysis of style – modes of non verbal communication – Listening and categorising data in tables – Writing formal letter – writing paragraphs on various issues.

UNIT-III

6

Stress and intonation - Cause and effect expressions - Tense forms - simple past and past continuous - Different grammatical forms of the same word - Critical reading - guided note-making and evaluating content - Listening – guided note-taking – completing a table – Role-play – group discussion techniques - discussing an issue – offering suggestions – Sequencing jumbled sentences using coherence markers– Writing a report – Writing recommendations – Writing a letter of complaint.

UNIT-IV

6

Numerical adjectives - Prepositions – use of intensifying prefixes – phrasal verbs - different grammatical forms of the same words – cloze exercise - Reading a text and evaluating the content - advertisements – analysing style and language - Listening and entering classified information – Intensive listening and completing the steps of a process - Role-play - Group discussion expressing opinions and convincing (agreeing and disagreeing) - Giving oral instructions – Descriptive writing - writing based on hints – writing argumentative paragraphs – formal letter writing – letter of application with

biodata / CV Writing safety instructions - warnings and notices – preparing checklist – email communication.

UNIT-V **6**

Identifying problems, their causes and finding solutions using case studies – creative and critical thinking – levels of thinking – thinking strategies – brainstorming - analytical reasoning skills – evaluative essay – decision making – conflict resolution

ENGLISH LANGUAGE LAB

1. LISTENING: **10**

Recognising English sounds – accents - listening & answering questions - gap filling - listening & note making - listening to telephonic conversations - listening to speeches.

2. SPEAKING: **10**

Pronouncing words & sentences correctly - word stress - conversation practice.

3. READING: **5**

Cloze test - Reading and answering questions - sequencing of sentences.

4. WRITING: **5**

Correction of errors - Blogging.

L: 30 + P: 30

TOTAL = 60 PERIODS

TEXTBOOKS:

1. Department of Humanities & Social Sciences, Anna University. English for Engineers and Technologists, Combined edition Vols. I & II. Chennai: Orient Longman, Pvt. Ltd. 2006, Themes 5 to 8 (for Units 1 – 4)
2. Sunita Mishra & C. Muralikrishna, Communication Skills for Engineers, Pearson Education, Second Impression, 2007. (for Unit 5)

REFERENCES:

1. Ashraf, R.M, Effective Technical Communication, New Delhi: Tata McGraw Hill, 2007.
2. Thorpe, E & Thorpe, S, Objective English, New Delhi : Pearson Education, 2007.
3. Joan Van, Emden, A Handbook of writing for Engineers, Cambridge University Press, 1997
4. Website: www.englishclub.com

LAB REQUIREMENTS:

1. Teacher – Console and systems for students
2. English Language Lab Software
3. Tape Recorders

AIM:

To introduce the effective mathematical tools needed for solving engineering problems and to emphasize the underlying mathematical principles in specific situations confronting practicing engineers.

OBJECTIVES:

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated

1. DIFFERENTIAL EQUATIONS**9 + 3**

Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler's and Legendre's type – System of Simultaneous linear differential equations with constant coefficients.

2. VECTOR CALCULUS**9 + 3**

Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface Integral and Volume Integral - Green's, Gauss divergence and Stoke's theorems – Verification and Application in evaluating line, surface and volume integrals.

3. ANALYTIC FUNCTION**9 + 3**

Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal Mapping – Mapping by functions $w = z+c$, az , $\frac{1}{z}$, z^2 - Bilinear transformation.

4. COMPLEX INTEGRATION**9 + 3**

Line Integral - Cauchy's theorem and integral formula – Taylor's and Laurent's Series – Singularities – Residues – Residue theorem – Application of Residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

5. LAPLACE TRANSFORMS

9 + 3

Existence conditions – Transforms of elementary functions – Basic properties – Transforms of derivatives and integrals – Initial and Final value theorems – Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear ordinary differential equations with constant coefficients.

L: 45 + T: 15

TOTAL = 60 PERIODS

TEXT BOOKS:

1. Grewal, B.S. "Higher Engineering Mathematics", Khanna Publications, 2007.
2. Ramana, B.V. "Higher Engineering Mathematics" Tata McGraw Hill 2007.

REFERENCES:

1. Glyn James, "Advanced Modern Engineering Mathematics, Pearson Education (2007)
2. Jain R.K. and Iyengar S.R.K., Advanced Engineering Mathematics (3rd Edition) Narosa Publications, Delhi (2007).

AIM:

- To introduce fundamentals of science for agriculture and irrigation engineering applications
- To enhance students' knowledge of theoretical and modern technological aspects in role of Physics in agriculture and irrigation engineering
- To enable the students to correlate the theoretical principles with application oriented studies

OBJECTIVES:

At the end of the course the students would be exposed to fundamental knowledge in

- Soil physics, photosynthesis and biophysics
- Electromagnetic spectrum and apply it in Remote sensing for agricultural and irrigation applications.
- Ionizing radiation and apply it in food irradiation and preservation

1. SOIL PHYSICS**9**

Soil as a dispersion three-phase system - Volume and mass relationships of soil constituents - Solid Phase - Liquid phase - gaseous phase – soil heat flow - Soil Compaction and Consolidation - The Field Soil Water Regime - Solute Transport in Soil - Methods for Analyzing Spatial Variations of Soil Properties.

2. PHOTOSYNTHESIS**9**

Photosynthesis - Leaves and Leaf Structure - The Nature of Light - Chlorophyll and Accessory Pigments - The structure of the chloroplast and photosynthetic membranes - Stages of Photosynthesis - The Light Reactions - Dark Reaction - C-4 Pathway - The Carbon Cycle

3. BIOPHYSICS**9**

Biophysics – Biophysics methods applicable in agriculture- possibilities of application of new methods in agriculture – effects in agriculture with biophysical methods – effects of new methods applied in agriculture in protection of environment

4. REMOTE SENSING IN AGRICULTURE AND IRRIGATION**9**

Electromagnetic Spectrum: The Photon and Radiometric Quantities – radiant energy- radiant flux density – radiant intensity – transmittance – absorptance- reflectance – distribution of radiant energies- spectral signatures – sensor technology – sensor types- passive and active- spatial resolution- processing and classification of remote sensed data – pattern recognition – approaches to data/ image interpretation - use of remote sensing in agriculture and irrigation

5. FOOD IRRADIATION AND PRESERVATION

9

Effects of ionizing radiation on biological organisms – Effects of ionizing radiation on foods – applications of Food irradiation – low dose –medium dose and high dose – Food irradiation using electron beams, X-rays – nuclear radiation

TOTAL: 45 PERIODS

REFERENCES:

1. Elements of soil Physics, P. Koorevaar, G. Menelik , C. Dirksen , Elsevier Science & Technology, 1999.
2. Bulg. J. Plant Physiol., Special issue 2003.
3. Electronic radiation of foods - An introduction to Technology, R.B. Miller, Springer, 2005.

CY 91 61 CHEMISTRY FOR CIVIL ENGINEERING
(Common to Civil, Geo-informatics and Agricultural & Irrigation Engineering)

L T P C
3 0 0 3

AIM:

To impart knowledge on the Applied Chemistry topics important in Civil Engineering Practice.

OBJECTIVES:

The students should be conversant with

- Treatment of water for domestic and industrial purpose
- The formation of polymers and their compounding into different end-use products,
- Types and mechanism of corrosion and control measures
- The chemical nature of building materials and composites
- Chemistry of adhesives and their applications.

1. WATER TREATMENT

8

Disadvantages of hard water in industries – conditioning methods – external treatment methods –zeolite and ion exchange methods – internal treatment (colloidal, phosphate, calgon, carbonate methods) – desalination (reverse osmosis and electro-dialysis) – requisites of drinking water – treatment of domestic water (screening, sedimentation, coagulation, filtration, disinfection – by chlorination, UV treatment, ozonization).

2. POLYMER CHEMISTRY

9

Monomers – functionality – polymer – degree of polymerization – classification based on source and applications – effect of polymer structure on properties – addition, condensation, co-polymerization and co-ordination polymerization – mechanism of addition – polymerization (free-radical mechanism) thermosetting and thermoplastics resins – preparation, properties and applications of polythene, polypropylene, TEFLON, polystyrene, polyvinyl chloride, PMMA, polyamides, polyesters, bakelite, epoxy resins, vulcanization of rubber – rubber blended plastics – laminated plastics – laminated glass – thermocole.

3. CORROSION AND CORROSION INHIBITION

9

Corrosion – causes of corrosion – principles of chemical corrosion – Pilling – Bedworth rule – principles of electrochemical corrosion – difference between chemical and electrochemical corrosion – factors influencing corrosion – types of corrosion – galvanic corrosion – differential aeration corrosion – stress corrosion – soil corrosion – pitting corrosion, water line corrosion – corrosion control – cathodic protection – sacrificial anode – selection of materials and proper designing – corrosion inhibitors, protective

coatings – paints – constituents – functions – mechanism of drying – varnishes and lacquers – special paints – fire retardant, water repellent, temperature indicating and luminous paints.

4. CHEMISTRY OF BUILDING MATERIALS

10

Cement – chemical composition – setting and hardening – concrete – weathering of cement and concrete and its prevention- special cements – high alumina cement, sordel cement, white Portland cement, water proof cement – lime – classification – manufacture, setting and hardening – refractories – requisites –classification – common refractory bricks – preparation, properties and uses of silica bricks, high alumina bricks, magnesite bricks, carbon bricks, zirconia bricks and carborundum – composites – definition of composites – characteristics – constituents of composites – types – fibre reinforced plastic (FRP) – metal matrix composites (MMC) – ceramic matrix composites (CMC) – properties and applications.

5. ADHESIVES

9

Definition – adhesive action – development of adhesive strength – physical and chemical factors influencing adhesive action – bonding process of adhesives – adhesives for building & construction, animal glues, casein glues, phenol formaldehyde resins, polyurethane, epoxy resins, urea formaldehyde

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Jain P.C. and Monica Jain, Engineering Chemistry, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2002.
2. Dara.S.S., A Textbook of Engineering Chemistry, S.Chand & Company Ltd., New Delhi, 2003.

REFERENCES:

1. Nanjundan, S. and Sreekultan Unnithan, C., Applied Chemistry, Sree Lakshmi Publications, Chennai, 2001.
2. Sadasivam, V., Modern Engineering Chemistry – A Simplified Approach, Vol.I, Kamakya Publications, Coimbatore, 2003.

OBJECTIVE:

At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. The student should be able to understand the laws of motion, the kinematics of motion and the interrelationship. The student should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.

1. BASICS & STATICS**12**

Introduction - Units and Dimensions - Laws of Mechanics – Lamé's theorem, Parallelogram and triangular Law of forces – Vectors – Vectorial representation of forces and moments – Vector operations on forces, dot product and cross product - Coplanar Forces – Resolution and Composition of forces – Equilibrium of a forces – Forces in space - Equilibrium in space - Equivalent systems of forces – Principle of transmissibility – Single equivalent force

2. EQUILIBRIUM OF RIGID BODIES**12**

Free body diagram – Types of supports and their reactions – requirements of stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem - Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions – Examples

3. PROPERTIES OF SURFACES AND SOLIDS**12**

Determination of Areas and Volumes – First moment of area and the Centroid of standard sections – T section, I section, Angle section, Hollow section – second and product moments of plane area – Rectangle, triangle, circle - T section, I section, Angle section, Hollow section – Parallel axis theorem and perpendicular axis theorem – Polar moment of inertia – Principal moments of inertia of plane areas – Principal axes of inertia - Mass moment of inertia – Derivation of mass moment of inertia for rectangular solids, prism, rods, sphere from first principle – Relation to area moments of inertia.

4. DYNAMICS OF PARTICLES**12**

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion – Newton's law – Work Energy Equation of particles – Impulse and Momentum

5. CONTACT FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS

12

Frictional force – Laws of Coloumb friction – simple contact friction – Rolling friction – Belt friction Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion – Impact of elastic bodies

L: 45 + T: 15

TOTAL: 60 PERIODS

TEXT BOOK

1. Beer, F.P and Johnson Jr. E.R, "Vector Mechanics for Engineers", Vol. 1 Statics and Vol. 2 Dynamics, McGraw-Hill International Edition, 2007.

REFERENCES

1. Irving H. Shames, Engineering Mechanics - Statics and Dynamics, IV Edition – PHI / Pearson Education Asia Pvt. Ltd., 2003
2. Hibbeler, R.C., Engineering Mechanics, Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2000.
3. Ashok Gupta, Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM), Pearson Education Asia Pvt., Ltd., 2002
4. J.L. Meriam & L.G. Karige, Engineering Mechanics Vol. I & Vol. II, V edition, John Wiley & Sons, 2006.
5. P. Boresi & J. Schmidt, Engineering Mechanics Statics & Dynamics, Micro Print Pvt. Ltec., Chennai, 2004.

1. STONES – BRICKS – CONCRETE BLOCKS 9

Stone as building material – Criteria for selection – Tests on stones – Deterioration and Preservation of stone work – Bricks – Classification – Manufacture of clay bricks – Tests on bricks – Compressive Strength - Water Absorption – Efflorescence – Bricks for special use – Refractory bricks – Cement and Concrete hollow blocks – Light weight concrete blocks.

2. LIME – CEMENT – AGGREGATES - MORTAR 9

Lime – Preparation of lime mortar – Cement. Ingredients – Manufacturing process – Types and Grades – Properties of cement and Cement mortar – Hydration - Compressive strength – Tensile strength – Fineness- Soundness and consistency – Setting time – Aggregates – Natural stone aggregates – Industrial byproducts – Crushing strength – Impact strength – Flakiness – Abrasion Resistance – Grading – Sand – Bulking.

3. CONCRETE 9

Concrete – Ingredients – Manufacture – Batching plants – RMC – Properties of fresh concrete – Slump – Flow and compaction – Properties of hardened concrete – Compressive, Tensile and shear strength – Modulus of rupture – Tests – Mix specification – Mix proportioning – BIS method – High Strength Concrete and HPC – Other types of Concrete – Durability of Concrete.

4. TIMBER AND OTHER MATERIALS 9

Timber – Market forms – Industrial timber- Plywood - Veneer – Thermocole – Panels of laminates – Steel – Aluminum and Other Metallic Materials - Composition – uses – Market forms – Mechanical treatment – Paints – Varnishes – Distempers - Bitumens.

5. MODERN MATERIALS 9

Glass – Ceramics – Sealants for joints – Fibre glass reinforced plastic – Clay products – Refractories – Composite materials – Types – Applications of laminar composites – Fibre textiles – Geomembranes and Geotextiles for earth reinforcement.

TOTAL: 45 PERIODS

TEXT BOOKS

1. P.C.Varghese, "Construction Materials ", Prentice Hall, 2007
2. R. K. Rajput, Engineering Materials, S. Chand & Company Ltd., 2000.
3. M. S. Shetty, Concrete Technology (Theory and Practice), S. Chand & Company

REFERENCE:

1. Relevant Indian Standards

EE 91 61 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L T P C
3 0 0 3

1. ELECTRICAL CIRCUITS 9

Basic Principles involved in Power generation, transmission and use – Ohms Law – Kirchoff's Laws-steady state solution of D C circuits-Introduction to AC circuits-Waveforms and RMS value-power and power factor, single phase and 3 phase balanced circuits. House wiring, industrial wiring, materials of wiring.

2. ELECTRICAL MACHINES 15

Principles of operation and characteristics of DC machines. Transformers (single phase and three phase) – Synchronous machines- 3phase and single phase Induction motors – (op.principles)

3. SEMICONDUCTORS 5

Classification of solids as conductors and semiconductors – Intrinsic, Extrinsic semiconductors – P type and N type semiconductors- junction diode- Zener effect-Zener diode-VI Characteristics of junction and Zener diodes.

4. TRANSISTORS 5

Bipolar Junction Transistor – CB, CE, CC – Configurations- Simple treatment of characteristics and biasing. Elementary treatment of FET, MOSFET, UJT, DIAC and TRIAC.

5. TRANSDUCERS AND COMMUNICATION SYSTEM 11

Introduction to transducers, temperature measurement using thermistors. Piezo electric pressure sensors. Principles of AM, FM and PM modulation. Block diagram of AM, FM and PM Demodulators. Gunn diode and Microwave oscillators.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Mittle, V.N., "Basic Electrical Engineering ", TMH Edition, New Delhi, 1990.
2. Del Toro, "Electrical Engineering Fundamentals ", Prentice Hall of India Pvt.Ltd. New Delhi, Second Edition.

REFERENCES:

1. V.K.Mehta, Principle of Electronics, S.Chand and Company Limited, 1994.
2. Deshpande, N.V., "Electrical Machines "A.A.Wheeler and Co. Ltd., New Delhi, 1994.
3. Grob, B., and Schultz., M.E. Basic Electronics, Tata Mc Graw Hill, 2003
4. Thomas L.Floyd, Electronic Devices, Pearson Education, 2002
5. Malvino, Electronic Principles, Mc Graw Hill, 1993
6. Thomas L. Floyd, Digital Fundamentals, Pearson Education, 2003

GE 91 61

UNIX PROGRAMMING LAB

L T P C
0 0 3 2

1. UNIX FUNDAMENTALS

15

Files and common commands – directories – shell - using the shell – File system – basics – directories - permissions – Inodes – directory hierarchy – File operations – Editor commands - Filters – grep – sed – awk.

2. SHELL PROGRAMMING

15

Shell variables – while and until – trap – overwrite – zap – pick – news – get – put.

3. UNIX system calls

15

File system – processes – signal and interrupts – program development – document preparation.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Brain W. Kernighan and Rob Pike, "The programming Environment", PHI, 2002.

1. TEST ON STONES

Texture- Density - Compressive Strength-Modulus of Rupture-Abrasion Resistance-
Water Absorption

2. TEST ON BRICKS

Compressive Strength – Water Absorption – Efflorescence

3. TEST ON CEMENT

Specific gravity – Soundness – Consistency and Setting Times – Vicat – Le Chatelier's
and Blain's apparatus

4. TEST ON AGGREGATES

Grading of aggregates – Finess modulus- Loose and compacted bulk density – Specific
gravity – Crushing Strength – Impact Resistance – Abrasion – Flakiness Index and
Elongation Index

5. TEST ON CONCRETE

Slump cone – Flow table – Cube and cylinder strength – Modulus of Rupture, Ve bee
apparatus, Compaction factor

TOTAL: 45 PERIODS

AIM:

To facilitate the understanding of the principles and to cultivate the art of formulating physical problems in the language of mathematics.

OBJECTIVES:

- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
- To acquaint the student with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic
- To introduce the effective mathematical tools for the solutions of partial differential equations that model physical processes
- To develop Z- transform techniques which will perform the same task for discrete time systems as Laplace Transform, a valuable aid in analysis of continuous time systems

1. FOURIER SERIES**9 + 3**

Dirichlet's conditions – General Fourier series – Odd and even functions – Half-range Sine and Cosine series – Complex form of Fourier series – Parseval's identity – Harmonic Analysis.

2. FOURIER TRANSFORM**9 + 3**

Fourier integral theorem – Fourier transform pair-Sine and Cosine transforms – Properties – Transform of elementary functions – Convolution theorem – Parseval's identity.

3. PARTIAL DIFFERENTIAL EQUATIONS**9 + 3**

Formation – Solutions of first order equations – Standard types and Equations reducible to standard types – Singular solutions – Lagrange's Linear equation – Integral surface passing through a given curve – Solution of linear equations of higher order with constant coefficients.

4. APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS**9 + 3**

Method of separation of Variables – Solutions of one dimensional wave equation and one-dimensional heat equation – Steady state solution of two-dimensional heat equation – Fourier series solutions in Cartesian coordinates.

5. Z – TRANSFORM AND DIFFERENCE EQUATIONS

9 + 3

Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Initial and Final value theorems – Formation of difference equation – Solution of difference equation using Z-transform.

L: 45 + T: 15

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Grewal, B.S. "Higher Engineering Mathematics", Khanna Publications (2007)

REFERENCES:

1. Glyn James, "Advanced Modern Engineering Mathematics, Pearson Education (2007)
2. Ramana, B.V. "Higher Engineering Mathematics" Tata McGraw Hill (2007).
3. Bali, N.P. and Manish Goyal, "A Text Book of Engineering 7th Edition (2007) Lakshmi Publications (P) Limited, New Delhi.

OBJECTIVE:

Enable the student to understand the behaviour of deformable structural elements, subjected to different types of loadings

1. STRESS, STRAIN AND DEFORMATION OF SOLIDS 12

Rigid and deformable bodies – Stability, strength and stiffness - Axial and Shear Stresses – Deformation of simple and compound bars – Thermal stresses – Biaxial state of stress – Elastic Constants - Stresses and deformation of thin cylindrical and spherical shells – Stresses at a point – Stress tensor - Stresses on inclined planes – Principal stresses and principal planes – Mohr's circle of stress.

2. ANALYSIS OF PLANE TRUSSES 12

Stability and equilibrium of plane frames – perfect frames - types of trusses – Analysis of forces in truss members – Method of joints – Method of tension co-efficient – Method of sections.

3. BENDING OF BEAMS 12

Beams – types and transverse loading on beams – shear force and bending moment in beams – Cantilever beams – Simply supported beams and over-hanging beams - Theory of simple bending – bending stress distribution – Load carrying capacity – Proportioning of sections – Leaf springs – Flitched beams – Shear stress distribution.

4. TORSION 12

Theory of simple torsion - Stresses and deformation in circular and hollow shafts – Stepped shafts – Shafts fixed at both ends – Stresses and deflection in helical springs.

5. DEFLECTION OF BEAMS 12

Double Integration method – Macaulay's method – Area moment method – Conjugate beam method for computation of slopes and deflections in determinate beams.

L: 45 + T: 15

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Egor. P.Popov “ Engineering Mechanics of Solids” Prentice Hall of India, New Delhi 2001
2. Vazirani, N, Ratwani, M. “Analysis of Structures” Khanna Publishers, New Delhi 2001
3. Rajput, R.K “Strength of Materials”, S Chand & Company Ltd., New Delhi 2006

REFERENCES:

1. Irwing H.Shames, James M.Pitarresi, “Introduction to Solid Mechanics, Prentice Hall of India, New Delhi, 2002
2. Roger T.Fenner, “ Mechanics of Solids”, ELBS, Oseny Mead, Oxford, 1990
3. Malhotra, D.R. Gupta, H.C., “The Strength of Materials”, Satya Prakashan (Tech. India Publications), New Delhi, 1995.
4. Beer.F.P. & Johnston.E.R.“Mechanics of Materials”, Tata McGraw Hill, New Delhi 2004.
5. Elangovan.A., “Thinmavisaiyiyal” (Mechanics of Solids in Tamil), Anna University,1995.

OBJECTIVE:

The student is introduced to the mechanics of fluids through a thorough understanding of the properties of the fluids, behaviour of fluids under static conditions. The dynamics of fluids is introduced through the control volume approach which gives an integrated understanding of the transport of mass, momentum and energy. 2. The applications of the conservation laws to a) flow measurements b) flow through pipes (both laminar and turbulent) and c) forces on vanes is studied.

1. FLUIDS PROPERTIES AND FLUID STATICS**12**

Scope of fluid mechanics - Definitions of a fluid - Methods of analysis - Dimensions and units - viscosity, density, perfect gas, vapour pressure and surface tension - Basic equation of fluid statics - Pressure measurements - Manometers. - Forces on plane and curved surfaces - Buoyancy and floatation - Stability of floating bodies - Relative equilibrium.

2. BASIC CONCEPTS OF FLUID FLOW**12**

(a) Kinematics – Methods of describing fluid motion - Classification of flows - Streamline, streak-line and path-lines - Stream function and velocity potentials - Flow nets; (b) Dynamics - Dimensional Concepts of System and Control volume - Application of control volume to continuity, energy and momentum - Euler's equation of motion along a stream line - Bernoulli's equation - Applications to velocity and discharge measurements - Linear momentum equation and moment-of-momentum equations and their applications.

3. DIMENSIONAL ANALYSIS AND MODEL STUDIES**12**

Fundamental dimensions - dimensional homogeneity - Rayleigh's method and Buckingham Pi-Theorem - Dimensionless parameters - Similitude and model studies. Distorted Models.

4. INCOMPRESSIBLE VISCOUS FLOW**12**

Laminar flow between parallel plates, and pipes - Development of laminar and turbulent flows in pipes - Reynolds experiment - Darcy-Weisbach equation - Moody diagram - Major and minor losses of flow in pipes - Pipes in series and in parallel.

5. BOUNDARY LAYERS

12

Definition of boundary layers - Displacement, momentum and energy thickness - Laminar and turbulent boundary layers - Momentum integral equation - Separation of boundary layer. Drag and Lift. Lift characteristics of airfoils. Induced drag. Polar Diagram.

L: 45 + T: 15

TOTAL: 60 PERIODS

TEXT BOOKS

1. Streeter, V.L. and Wylie, E. B., *Fluid Mechanics*. McGraw Hill, New York, 1983
2. John F.Douglas, Janusz M. Gasiorek and John A.Swaffield, PEARSON Education, India, 2003

REFERENCES

1. Fox W.R. and McDonald A.T., *Introduction to Fluid Mechanics* John-Wiley and Sons, Singapore, 1995.
2. Modi P.N. and Seth S.M., *Hydraulics and Fluid Mechanics*. Standard Book House. New Delhi, 2000.
3. Roberson J.A and Crowe C.T., *Engineering Fluid Mechanics*. Jaico Books Mumbai, 2000.

OBJECTIVE: The objective of this course is to introduce to the students the various methods of surveying.

1. INTRODUCTION AND CHAIN SURVEYING 8

Definition – Principles – Classification – Field and office work – Scales – Conventional signs – Survey instruments – Ranging and chaining – Reciprocal ranging – Setting perpendiculars – well-conditioned triangles - Traversing – Plotting – Enlarging and reducing figures.

2. COMPASS SURVEYING AND PLANE TABLE SURVEYING 7

Prismatic compass – Surveyor’s compass – Bearing – System and conversions – Local attraction – Magnetic declination – Dip-Traversing – Plotting – Adjustment of error – Plane table instruments and accessories – Merits and demerits – Methods – Radiation – Intersection – Resection – Traversing.

3. LEVELLING AND APPLICATIONS 12

Level line – Horizontal line – Levels and staves – Spirit level – Sensitiveness – Bench marks – Temporary and permanent adjustments – Fly and check leveling – Booking – Reduction – Curvature and refraction – Reciprocal leveling – Longitudinal and cross sections – Plotting – Calculation of areas and volumes – Contouring – Methods – Characteristics and uses of contours – Plotting – Earth work volume – Capacity of Reservoirs.

4. THEODOLITE SURVEYING AND MODERN SYSTEMS 11

Theodolite – Vernier and microptic – Description and uses – Temporary and permanent adjustments of vernier transit – Horizontal angle – Vertical angles – Heights and distances – Traversing - Closing error and distribution – Gale’s tables – Omitted measurements – Electromagnetic distance measurements (EDM) – Total station instrument – Global Positioning System (GPS).

5. ENGINEERING SURVEYS

7

Reconnaissance, preliminary and location surveys for engineering projects – Layout – Setting out works – Route surveys for highways and waterways – Curve ranging – Horizontal and vertical curves – Simple curves – Setting with chain and tapes, tangential angles by theodolite, double theodolite – Compound and reverse curves – Transition curves – Functions and requirements – Setting out by offsets and angles – Vertical curves – Sight distances.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Kanethkar T.P., Surveying and Levelling, Vols. I and II, United Book Corporation, Pune, 1994.
2. Punmia B.C, Vols. I, II and III, Laxmi Publications, 1989.

REFERENCES

1. Bannister A. and Raymond S., Surveying, ELBS, Sixth Edition, 1992.
2. Heribert Kahmen and Wolfgang Faig, Surveying, Walter de Gruyter, 1995.
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.
5. Schofield, W., Engineering Surveying, Butterworth – Heinemann, London, Fifth Edition, 2001.

OBJECTIVE:

To introduce the students the theory of machines pertaining to agricultural engineering.

1. TERMINOLOGY 9

Definitions - Kinematic links - Pairs - Chain - Machines and mechanism - Types and uses - Velocity and acceleration in mechanisms - Vector polygon and instantaneous centre methods - Problems.

2. FRICTIONS IN BEARINGS 9

Friction - Bearings - Pivot and collar bearings - Antifriction bearings - Application - loss of power due to friction in bearings - viscosity - theory of lubrication.

3. BELT DRIVES AND CLUTCHES 9

Drives - belt - flat and V belts - tension ratio - centrifugal tension - creep. Chain Brakes - band - shoe. Clutches - types - single and multiple disc.

4. MOTION OF CAM AND FOLLOWER 9

Cam and follower - types - application - profiles for uniform velocity - acceleration - simple harmonic and cycloidal motion - uniform angular velocity.

5. GEARS AND GOVERNORS 9

Gears - classification - terminology -law of gearing - tooth profile - interference between rack and pinion. Gear trains - simple - compound reverted. Governors - Watt and Porter governor - sensitivity and hunting. Inertia - turning moment - flywheel - fluctuation of speed and energy. Balancing of masses in single and multiple planes.

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. Ballaney, P.L, Theory of machines, Khanna publishers,.1994
2. Khurmi, R.S. and Gupta, J.K, Theory of machines, Euarsia publication house, 1994.

REFERENCE

1. Thomas Beven. 1984. Theory of machines. CBS publishers and distributors.

OBJECTIVES:

1. To introduce the students to principles of field and horticultural crop production, and to provide a glimpse of their production practices.
2. To delineate the role of relate each of the crop production practices to the role of an agricultural / irrigation engineer, explicitly.

1. AGRICULTURE AND CROP PRODUCTION**9+3**

Introduction to agriculture and its crop production sub-sectors: agronomy and horticulture factors affecting crop growth and production – Principles of crop production: crop selection; systems of cropping; field preparation; plant spacing and arrangement; nutrient management; water management; crop protection.

2. SOIL AS A MEDIUM FOR PLANT GROWTH**9+3**

Soil physical and chemical properties of relevance to crop growth – Soil-water relations – Soil-nutrient relations –Soil and land degradation: physical constraints, chemical constraints, erosion and methods of their prevention and reclamation.

3. TILLAGE AND TILTH**9+3**

Objective and principles - Practices for application and management of organic manures, amendments, and chemical and bio-fertilizers – Plant protection chemicals and the methods of their application – Weed management practices – Harvest and post harvest processes.

4. FIELD CROPS**9+3**

Important groups of field crops in Tamil Nadu and the generalized cultivation practices for each group: cereal crops; grain legumes; oil seed crops; sugarcane; and fibre crops – Special purpose crops, such as green manures, and their management.

5. HORTICULTURAL CROPS

9+3

Important groups of horticultural crops in Tamil Nadu and the generalized cultivation practices for each group: vegetable crops; fruit crops; flower crops, plantation crops and others.

L: 45 + T: 15

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Rajendra Prasad , Text Book of Field Crop Production. Directorate of Information and Publication, Krishi Anusandhan Bhavan, Pusa, New Delhi, 2005.
2. Yellamanda Reddy, T. and Sankara Reddy, G.H., Principles of Agronomy. Kalyani Publishers, New Delhi, 1995.

REFERENCES:

1. Kumar, N., Introduction to Horticulture, Rajalakshmi Publications. Nagercoil, 1993
2. Kumar, N., Abdul Khader, M. Rangasawami, P. and Irulappan, I. Introduction to spices, plantation crops, medicinal and aromatic plants. Rajalakshmi Publications, Nagercoil. 1993
3. Shanmugavel, K.G. Production Technology of Vegetable Crops. Oxford India Publications, New Delhi. 1989
4. Bose T. K. and L.P.Yadav Commercial Flowers, Nayaprakash, Calcutta. 1989
5. Brady N.C. Nature and Properties of Soils, Prentice Hall of India Private Limited, New Delhi. 1995
6. Palaniappan, S.P. Systems in the Tropics- Principles and Management. Wiley Eastern Edition, New Delhi. 1985.

OBJECTIVE:

To study the properties of materials when subjected to different types of loading.

1. Tension test on mild steel / tor steel rod
2. Compression test on wood
3. Double shear test on metal
4. Torsion test on mild steel rod
5. Impact test on metal specimen
6. Hardness test on metals
7. Deflection test on metal beam
8. Compression test on helical spring
9. Deflection test on carriage spring
10. Tests on bricks, concrete cubes and tiles - Demonstration only

TOTAL: 45 PERIODS

OBJECTIVE:

The objective of this course is to train the students to acquire skill in operation of various survey instruments and to obtain accurate results.

| | |
|---|-----------|
| 1. CHAIN SURVEYING | 8 |
| i a) Study of chain and its accessories b) Ranging, chaining and pacing | |
| ii Chain surveying. | |
| 2. COMPASS SURVEYING | 8 |
| i Triangulation problems | |
| ii Compass traversing | |
| 3. PLANE TABLE SURVEYING | 12 |
| i a) Study of Plane table and its accessories b) Radiation | |
| ii Intersection – Triangulation problems | |
| iii Plane table traversing | |
| 4. LEVELLING | 16 |
| i Study of levels and leveling staves | |
| ii Fly leveling using dumpy level | |
| iii Fly leveling using tilting level | |
| iv Check leveling | |
| v Block contouring | |
| vi Radial contouring | |
| 5. THEODOLITE SURVEYING | 12 |
| i Study of Theodolites | |
| ii Measurements of Horizontal angles | |
| iii Measurements of Vertical angles | |
| iv Stadia Tacheometry | |
| 6. Experiment using Total station and GPS | 4 |

TOTAL: 60 PERIODS

AIM:

This course gives a complete procedure for solving different kinds of problems occur in engineering and technology numerically.

OBJECTIVES:

The students would be acquainted with the basic concepts in this course and their uses.

1. SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9 + 3

Solution of algebraic and transcendental equations – Fixed point iteration method – Newton-Raphson method – Solution of linear system of equations – Gauss Elimination method – Pivoting – Gauss-Jordan methods – Matrix Inversion by Gauss-Jordan method – Iterative methods of Gauss-Jacobi and Gauss-Seidel – Eigenvalues of a matrix by Power method and by Jacobi's method.

2. INTERPOLATION AND APPROXIMATION 9 + 3

Interpolation with unequal intervals – Lagrange interpolation – Newton's divided difference interpolation – Cubic Splines – Interpolation with equal intervals – Newton's forward and backward difference formulae.

3. NUMERICAL DIFFERENTIATION AND INTEGRATION 9 + 3

Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson's 1/3 and Simpson's 3/8 rules – Romberg's method – Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's rules.

4. INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9 + 3

Single step-methods – Taylor's series method – Euler's method – Fourth order Runge-Kutta method for solving first and second order equations – Multi-step methods – Milne's and Adams-Bashforth predictor-corrector methods for solving first order equations.

5. BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

9 + 3

Finite difference methods for solving two-point linear boundary value problems. Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain – One dimensional heat-flow equation by explicit and implicit (Crank Nicholson) methods - One dimensional wave equation by explicit method.

L: 45, T: 15

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Grewal, B.S. and Grewal, J.S., "Numerical methods in Engineering and Science", 6th Edition, Khanna Publishers, New Delhi, (2004).
2. Sankara Rao, K. "Numerical methods for Scientists and Engineers", 3rd Edition Prentice Hall of India Private Ltd., New Delhi, (2007).

REFERENCES:

1. Chapra, S. C and Canale, R. P. "Numerical Methods for Engineers", 5th Edition, Tata McGraw-Hill, New Delhi, (2007).
2. Gerald, C. F. and Wheatley, P. O., "Applied Numerical Analysis", 6th Edition, Pearson Education Asia, New Delhi, (2006).
3. Brian Bradie, "A friendly introduction to Numerical analysis", Pearson Education Asia, New Delhi, (2007).

OBJECTIVES:

1. The objectives of the course are to introduce the students to various hydraulic engineering problems like open channel flows and hydraulic machines.
2. At the completion of the course, the student should be able to relate the theory and practice of problems in hydraulic engineering.

1. Open Channel Flow**9+3**

Steady uniform flow - Best hydraulic sections for uniform flow - Specific energy and specific force.

2. Steady Gradually Varied Flows**10+3**

Dynamic equation - Water surface flow profile classifications - Profile determination by graphical method, direct step method and standard step methods.

3. Rapidly Varied Flows**8+2**

Hydraulic jumps - Types - Energy dissipation - Surges and surge through channel transitions.

4. Turbo Machines**10+4**

Turbines – Classification - Reaction turbines – Francis turbine, Radial flow turbines, draft tube and cavitation - Propeller and Kaplan turbines - Impulse turbines - Performance of turbines - Similarity laws; Centrifugal pumps - Minimum speed to start the pump – NPSH - Cavitation in pumps - Operating characteristics - Multistage pumps.

5. Positive Displacement Pumps**8+3**

Reciprocating pumps - Negative slip - Flow separation conditions - Air vessels, indicator diagrams and its variations - Savings in work done - Rotary pumps.

L: 45 + T:15**TOTAL: 60 PERIODS****TEXT BOOKS:**

1. Subramanya K., Flow in Open Channels. Tata McGraw Hill, New Delhi 1994.
2. Jain. A.K., Fluid Mechanics. Khanna Publishers, Delhi. 1996.

REFERENCES:

1. Ven Te Chow, Open Channel Hydraulics, McGraw Hill, New York, 1959.
2. Mays L. W., Water Resources Engineering. John Wiley and Sons (WSE), New York, 2004.
3. Modi P.N. and Seth S.M., Hydraulics and Fluid Mechanics, Standard Book House, New Delhi, 2000.

OBJECTIVES:

At the end of the course the students would be exposed to fundamental knowledge in

- i. Soil Physical parameters
- ii. Permeability- Compaction and compressibility
- iii. Types and methods of soil survey and interpretative groupings

1. INTRODUCTION AND PHYSICAL PROPERTIES**9 + 3**

Soil - definition - major components - soil forming processes- soil profile -Physical properties - texture – structure-absolute specific gravity - capillary and non-capillary porosity - soil colour - soil consistency - plasticity. Soil air - soil temperature - soil water - soil moisture constants – classification of soil water. Soil water movement. Soil colloids - organic – inorganic. Ion exchange- soil organic matter - pH - nutrient availability.

2. PHASE RELATIONSHIP**9 + 3**

Weight and Volume relationships- Gradation analysis- Atterberg Limits-Classification of soil based on the above- Compaction theory- Lab and field compaction study.

3. ENGINEERING PROPERTIES OF SOIL**9 + 3**

Shear strength-Mohr-Coloumb strength theory-Basic tests-Compressibility- Assessment of seepage through flow net construction-Permeability-Darcy's law-measurements-Consolidation-Coefficient of Compressibility-Earth pressure theory-Active and passive conditions

4. BEARING CAPACITY AND SLOPE STABILITY**9 + 3**

Bearing capacity of soils-Shallow foundation-Terzaghi's formula- BIS standards- Factors affecting Bearing Capacity- Slope stability-Analysis of infinite and finite slopes-Simple method.

5. SOIL CLASSIFICATION AND SURVEY

9+3

Soil classification -soil taxonomy – soils of Tamil Nadu and India. Soil survey - types and methods of soil survey - soil mapping units - base maps -preparation of survey reports. Soil survey interpretation - concepts and uses - interpretative groupings - land capability - irrigability - soil suitability- capability and productivity ratings (Storie and Reiquier indices). Problem soils - reclamation - land use planning - preparation of land use maps.

L:45+T:15

TOTAL = 60 PERIODS

TEXT BOOKS:

1. Nyle C. Brady, The nature and properties of soil (10th Edition) Macmillan Publishing company New York, 1992:
2. Punmia, B.C., Soil Mechanics and Foundation. Laxmi publishers, New Delhi. 1992.

REFERENCES:

1. Hillel, D., Introduction to soil physics, Academic press Inc., New York. 1982
2. Buol, S.W., Kole, F.D and Mc Cracken. R.J. Soil genesis and classification. Oxford and IBH publishing Co, New Delhi., 1975
3. Russel, E.J., Soil conditions and plant growth Tata - Mc Graw Hill, New Delhi. 1989
4. Bharat Singh, A text book of Soil Mechanics, Nem Chand and Bros, Roorkee. 1990.
5. Murthy, V.N.S. A textbook of Soil Mechanics and Foundation Engineering Sri Kripa Technical Consultants, Bangalore. 1993
6. Ghildyal, B.P. and Tripathi, R.P. Soil Physics, Wiley Eastern Limited. 1987

OBJECTIVE:

To introduce the student to the concept of hydrological aspects of water availability and requirements. At the completion of the course the student should be able to quantify, control and regulate the water resources.

1. PRECIPITATION AND ABSTRACTIONS **10**

Hydrological cycle- Meteorological measurements – Requirements, types and forms of precipitation-Rain gauges-Spatial analysis of rainfall data using Thiessen and Isohyetal methods- Interception- Evaporation. Horton’s equation, pan evaporation measurements and evaporation suppression- Infiltration-Horton’s equation-double ring infiltrometer, infiltration indices.

2. RUNOFF **8**

Watershed, catchment and basin-Catchment characteristics-factors affecting runoff-Runoff estimation using empirical-Strange’s table and SCS methods-Stage discharge relationships-flow measurements- Hydrograph- Unit Hydrograph

3. STORAGE AND DISTRIBUTION WORKS **10**

Classification of reservoirs, General principles of design, site selection, spillways, surface area Vs elevation Vs storage relationship, life of reservoirs-Canals-Canal alignment, Cross drainage works

4. GROUNDWATER AND RAIN WATER HARVESTING **10**

Origin- Classification and properties of aquifers-Groundwater potential-Darcy’s law-Importance- RWH in rural and urban areas- RWH from building roof and open areas-direct storage sumps- RWH structures.

6. FLOODS AND DROUGHTS **7**

Natural Disasters-Flood Estimation- Frequency analysis- Flood control- Definitions of droughts- Meteorological, hydrological and agricultural droughts- IMD method-NDVI analysis- Drought Prone Areas Program (DPAP).

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Subramanya .K. Engineering Hydrology- Tata McGraw Hill, 1999.
2. Jayarami Reddy .P. Hydrology, Tata McGraw Hill, 1999.
3. Raghunath .H.M., Hydrology, Wiley Eastern Ltd., 1998.

REFERENCES:

1. Linsley, R.K. and Franzini, J.B. Water Resources Engineering, McGraw Hill International Book Company, 1995
2. Ven Te Chow, Maidment, D.R. and Mays, L.W. Applied Hydrology, McGraw Hill International Book Company, 1998.

OBJECTIVES:

At the end of the course the students would be exposed to fundamental knowledge in

- i. Food groups, Energy from food and nutrition
- ii. Food processing
- iii. Food preservation

1. FOOD GROUP AND FOOD SCIENCE**9**

Food, Food groups and Food science – objectives - Quality attributes – size, shape, colour consistency, viscosity, texture, taste and flavour - Sensor evaluation of foods - Microorganisms in food spoilage - Food laws and standards PFA, FPO, Agmark, BIS International standards for export - Food adulteration, definition, common adulterants effect of food adulteration - Methods for detection of food adulterants - Nutrition definition characteristics of well and poorly nourished population, relation of nutrition to good health.

2. ENERGY FROM FOOD**9**

Energy – estimation of food energy, total energy needs of the body BMR - Carbohydrates, classification, functions, digestion Carbohydrates, absorption, Sources, requirements - Assessing the quality of protein AA score, BV, PER, NPR and NPU, Supplementary value of proteins and deficiency - Lipids, classification, function, digestion and absorption - Lipids, sources and requirements, saturated and Unsaturated fatty acids, rancidity.

3. NUTRITION**9**

Fat-soluble vitamins, vitamin A, D, E & K, importance, sources, deficiency and RDA - Mid semester examination - Vitamins, folic acid, Pyridoxine, pantothenic acid and B12, importance, sources, deficiency and RDA - Minerals, macronutrients importance, sources, deficiency and RDA - Minerals, micronutrients, importance, sources, deficiency and RDA - Germination technology, Preparation of Weaning foods.

4. FOOD PROCESSING**9**

Baking, Bread, Role of ingredients in baking, quality aspects, spoilage in bread – Preparation of cake, biscuits and cookies - Extrusion technology, development of Extruded products, vermicelli, macaroni, noodles and spaghetti - Confectionary - Role of raw ingredients - manufacture of crystalline and non, Crystalline candies - Processing of fruits and vegetables, principles and methods - Preservation by sugar, Jam, Jelly, Marmalade - Preservation by sugar, candies and preserve.

5. PRESERVATION OF FOOD

9

Preservation by chemicals, squash, Ready to serve beverage - Preservation by fermentation, wine, vinegar - Canning, spoilage - Drying and dehydration - Rules and regulations for setting up of fruit processing industry - Food packaging, Definition, functions, requirements and methods of package.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Potter, N.N and Joseph, H.H .Hotchkiss.,Food science. CBS Publishers and Distributors, New Delhi. 1996.
2. Desrosier, N.W., The technology of food preservation, CBS Publishers and Distributors, New Delhi. 1987.
3. Sri Lakshmi.B., Food Science, New Age International Publications, 4th Edition, New Delhi, 2007.

REFERENCE:

1. Lal and Siddappa, Food and vegetable preservation, ICMR. 1986.

AIM:

To create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.

OBJECTIVE :

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

Unit 1 ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY**14**

Definition, scope and importance of environment – need for public awareness - 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 – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds

Field study of simple ecosystems – pond, river, hill slopes, etc.

Unit 2 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 municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

Unit 3 NATURAL RESOURCES

10

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.
Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

Unit 4. SOCIAL ISSUES AND THE ENVIRONMENT

7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – 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 – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

Unit 5. 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.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education, 2004.
2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006.

REFERENCE BOOKS

1. R.K. Trivedi, "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. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.

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SOIL SCIENCE LABORATORY

L T P C
0 0 3 2

1. Identification of rocks and minerals
2. Collection and processing of soil samples
3. Determination of soil moisture, EC and pH
4. Bulk density determination by cylinder and wax coating method.
5. Textural analysis of soil by International Pipette method
6. Sedimentation and separation of different textural fractions
7. Preparation of HCl extract and assessment of soil colour
8. Estimation of CEC and exchangeable cations.
9. Organic carbon determination
10. Description of soil profile
11. Estimation of gypsum and lime requirements
12. Collection of irrigation water and analysis for EC and pH, and CO₃ and HCO₃
13. Computation of salts in irrigation water and classification.

TOTAL: 45 PERIODS

PRACTICAL SCHEDULE:

1. Flow measurement through venturimeter.
2. Determination of friction coefficient in pipes.
3. Flow measurement through V - notch and rectangular notch.
4. Flow measurement through circular orifice.
5. Flow measurement through Parshall flume, Cutthroat flume and Venture flume.
6. Determination of mean velocity by Pitot tube and current meter.
7. Characteristics of Centrifugal pumps.
8. Characteristics of Reciprocating pump.
9. Characteristics of Gear pump.
10. Characteristics of Submersible pump.

TOTAL: 45 PERIODS**REFERENCES:**

1. Hydraulic Laboratory Manual, Centre for Water Resources, Anna University, 2004.
2. Modi P.N. and Seth S.M., Hydraulics and Fluid Mechanics. Standard Book House. New Delhi, 2000.
3. Subramanya, K.. Flow in open channels, Tata McGraw - Hill pub. Co., 1992
4. Subramanya, K. Fluid mechanics, Tata McGraw- Hill pub. Co., New Delhi. 1992