SCHEME AND SYLLABI FOR

THIRD & FOURTH SEMESTER

OF

BACHELOR OF

TECHNOLOGY IN

CIVIL ENGINEERING

FROM 2009 ADMISSION ONWARDS

CALICUT UNIVERSITY (P.O), THENHIPALAM

UNIVERSITY OF CALICUT
CIVIL ENGINEERING
SCHEME OF STUDIES AND EXAMINATION AND SYLLABUS FOR
B. TECH DEGREE (FULL-TIME)
III to VIII SEMESTERS 2009 SCHEME

3rd Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte-rnal	Sem-end		
1	EN09 301	Engineering Mathematics III	3	1	-	30	70	3	4
2	EN09 302	Humanities and Communication Skills	2	1	-	30	70	3	3
3	CE09 303	Mechanics of Solids	4	1	-	30	70	3	5
4	CE09 304	Building Technology I	3	1	-	30	70	3	4
5	CE09 305	Surveying I	3	1	-	30	70	3	4
6	CE09 306	Engineering Geology	3	1	-	30	70	3	4
7	*CE09 307(P)*	Surveying Lab I	-	-	3	50	50	3	2
8	*CE09 308(P)*	Materials Testing Lab I	-	-	3	50	50	3	2
		Total	**18**	**6**	**6**				**28**

4th Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte-rnal	S em-end		
1	EN09 401A	Engineering Mathematics IV	3	1	-	30	70	3	4
2	EN09 402	Environmental Studies	2	1	-	30	70	3	3
3	CE09 403	Fluid Mechanics	4	1	-	30	70	3	5
4	CE09 404	Structural Analysis I	3	1	-	30	70	3	4
5	CE09 405	Engineering Economics & Principles of Management	3	1	-	30	70	3	4
6	CE09 406	Surveying II	3	1	-	30	70	3	4
7	*CE09 407(P)*	Surveying Lab II	-	-	3	50	50	3	2
8	*CE09 408(P)*	Civil Engineering Drawing I	-	-	3	50	50	3	2
		Total	**18**	**6**	**6**				**28**

EN09 301: Engineering Mathematics III

(Common for all branches)

Teaching scheme **Credits:** 4

3 hours lecture and 1 hour tutorial per week

Objective

This course provides a quick overview of the concepts and results in complex analysis that may be useful in engineering. Also it gives an introduction to linear algebra and Fourier transform which are wealth of ideas and results with wide area of application.

Module I: Functions of a Complex Variable (13 hours)

Functions of a Complex Variable – Limit – Continuity – Derivative of a Complex function – Analytic functions – Cauchy-Riemann Equations – Laplace equation – Harmonic Functions – Conformal Mapping – Examples: Z^n, sinz, cosz, sinhz, coshz, $(z+{}^1/_z)$– Mobius Transformation.

Module II: Functions of a Complex Variable (14 hours)

Definition of Line integral in the complex plane – Cauchy's integral theorem (Proof of existence of indefinite integral to be omitted) – Independence of path – Cauchy's integral formula – Derivatives of analytic functions (Proof not required) – Taylor series – Laurent series – Singularities and Zeros – Residues – Residue Integration method – Residues and Residue theorem – Evaluation of real integrals.

Module III: Linear Algebra (13 hours) - Proofs not required

Vector spaces – Definition, Examples – Subspaces – Linear Span – Linear Independence – Linear Dependence – Basis – Dimension – Ordered Basis – Coordinate Vectors – Transition Matrix – Orthogonal and Orthonormal Sets – Orthogonal and Orthonormal Basis – Gram-Schmidt orthogonolisation process – Inner product spaces –Examples.

Module IV: Fourier Transforms (14 hours)

Fourier Integral theorem (Proof not required) – Fourier Sine and Cosine integral representations – Fourier Transforms – Fourier Sine and Cosine Transforms – Properties of Fourier Transforms.

Text Books

Module I:

Erwin Kreysig, *Advanced Engineering Mathematics, 8e,* John Wiley and Sons, Inc.
Sections: 12.3, 12.4, 12.5, 12.6, 12.7, 12.9

Module II:

Erwin Kreysig, *Advanced Engineering Mathematics, 8e,* John Wiley and Sons, Inc.
Sections: 13.1, 13.2, 13.3, 13.4, 14.4, 15.1, 15.2, 15.3, 15.4

Module III:

Bernaed Kolman, David R Hill, *Introductory Linear Algebra, An Applied First Course,* Pearson Education.
Sections: 6.1, 6.2, 6.3, 6.4, 6.7, 6.8, Appendix.B.1

Module IV:

Wylie C.R and L.C. Barrett, *Advanced Engineering Mathematics*, McGraw Hill.
Sections: 9.1, 9.3, 9.5

Reference books

1. H S Kasana, *Complex Variables, Theory and Applications*, 2e, Prentice Hall of India.
2. John M Howie, *Complex Analysis*, Springer International Edition.
3. Shahnaz bathul, *Text book of Engineering Mathematics, Special functions and Complex Variables*, Prentice Hall of India.
4. Gerald Dennis Mahan, *Applied mathematics*, Springer International Edition.
5. David Towers, *Guide to Linear Algebra*, MacMillan Mathematical Guides.
6. Howard Anton, Chris Rorres, *Elementary Linear Algebra, Applications Version, 9e*, John Wiley and Sons.
7. Anthony Croft, Robert Davison, Martin Hargreaves, *Engineering Mathematics*, 3e, Pearson Education.
8. H Parthasarathy, *Engineering Mathematics, A Project & Problem based approach*, Ane Books India.
9. B V Ramana, *Higher Engineering Mathematics*, McGrawHill.
10. Sarveswara Rao Koneru, *Engineering Mathematics*, Universities Press.
11. J K Sharma, *Business Mathematics, Theory and Applications*, Ane Books India.
12. John bird, *Higher Engineering Mathematics*, Elsevier, Newnes.
13. M Chandra Mohan, Vargheese Philip, *Engineering Mathematics-Vol. I, II, III & IV.*, Sanguine Technical Publishers.
14. N Bali, M Goyal, C Watkins, *Advanced Engineering Mathematics, A Computer Approach, 7e*, Infinity Science Press, Fire Wall Media.
15. V R Lakshmy Gorty, *Advanced Engineering Mathematics-Vol. I, II.*, Ane Books India.
16. Sastry S.S., *Advanced Engineering Mathematics-Vol. I and II*., Prentice Hall of India.
17. Lary C Andrews, Bhimsen K Shivamoggi, *Integral Transforms for Engineers*, Prentice Hall of India.

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)

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

10% - Regularity in the class

University Examination Pattern

PART A: *Short answer questions (one/two sentences)* *5 x 2 marks=10 marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical/Problem solving questions* *4 x 5 marks=20 marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical/Problem solving questions* *4 x 10 marks=40 marks*

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

Maximum Total Marks: 70

EN 09 302: Humanities and Communication Skills

(Common for all branches)

Teaching scheme **Credits:** 3

2 hours lecture and 1 hour tutorial per week

Objectives

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

Module I (14 hours)

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

Module II (16 hours)

Concept of communication: The speaker/writer and the listener/reader, medium of communication, barriers to communication, accuracy, brevity, clarity and appropriateness
Reading comprehension: Reading at various speeds, different kinds of text for different purposes, reading between lines.
Listening comprehension: Comprehending material delivered at fast speed and spoken material, intelligent listening in interviews
Speaking: Achieving desired clarity and fluency, manipulating paralinguistic features of speaking, task oriented, interpersonal, informal and semi formal speaking, making a short classroom presentation.
Group discussion: Use of persuasive strategies, being polite and firm, handling questions and taking in criticisms on self, turn-taking strategies and effective intervention, use of body language.

Module III (16 hours)

Written Communication : Note making and taking, summarizing, notes and memos, developing notes into text, organization of ideas, cohesion and coherence, paragraph writing, ordering information in space and time, description and argument, comparison and contrast, narrating events chronologically. Writing a rough draft, editing, proof reading, final draft and styling text.
Technical report writing: Synopsis writing, formats for reports. Introductory report, Progress report, Incident report, Feasibility report, Marketing report, Field report and Laboratory test report
Project report: Reference work, General objective, specific objective, introduction, body, illustrations using graphs, tables, charts, diagrams and flow charts. Conclusion and references
Preparation of leaflets, brochure and C.V.

Module IV (14 hours)

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

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

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

Reference Books

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

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)

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

10% - Regularity in the class

University Examination Pattern

PART A:	*Short answer questions (one/two sentences)* All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.	*5 x 2 marks=10 marks*
PART B:	*Analytical/Problem solving questions* Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.	*4 x 5 marks=20 marks*
PART C:	*Descriptive/Analytical/Problem solving questions* Two questions from each module with choice to answer one question.	*4 x 10 marks=40 marks*

Maximum Total Marks: 70

CE09 303: MECHANICS OF SOLIDS

Teaching scheme **Credits: 5**

4 hours lecture and 1 hour tutorial per week

Objectives

- *To study the internal effects produced and deformations of bodies caused by externally applied forces.*
- *To understand the strength characteristics of different materials and structural members subjected to shear, torsion and bending.*

Module I (18 Hours)

Tension, compression & shear **:** Types of external loads - internal stresses - normal and shear stresses - strain - Hooke's law - Poisson's ratio - relationship between elastic constants – working stress - stress strain diagrams - elongation of bars of constant and varying sections – statically indeterminate problems in tension and compression –Temperature and Prestrain effects – strain energy and complementary energy-strain energy due to tension, compression and shear.

Analysis of stress and strain on oblique sections:

Stress on inclined planes for axial and biaxial stress fields - principal stresses - Mohr's circle of stress - principal strains - strain rosette

Module II (20 Hours)

Bending Moment & Shear force**:** Different types of beams- various types of loading –

Relationship connecting intensity of loading , shearing force and bending moment- shear force and bending moment diagrams for cantilever beams, Simply supported and overhanging beams for different types of loading.

Stresses in beams of symmetrical cross sections:

Theory of simple bending –assumptions and limitations – Normal stresses in beams – Stresses in nonprismatic beams-moment of resistance - beams of uniform strength - beams of two materials – strain energy due to bending - shearing stresses in beams.

Unsymmetrical bending and shear centre .

Doubly symmetric beams with skew loads- pure bending of unsymmetrical beams-Generalized theory of pure bending-Deflections in unsymmetrical bending-shear centre of thin walled open cross sections.

Module III (16 hours)

Deflection of beams**:** Differential equation of the elastic curve - Method of successive integration, Macaulay's method, Method of superposition, moment area method ,conjugate beam method, strain energy method, Castigliano's method, and unit load method.

Module IV (18 hours)

Theory of columns**:** Direct and bending stresses in short columns- Kern of a section. Buckling and stability-Euler's buckling/crippling load for columns with different end conditions-Rankine's formula - Eccentric loads and the Secant formula-Imperfections in columns.

Torsion: Torsion of solid and hollow circular shafts.-Pure shear- strain energy in pure shear and torsion.

Springs: Close coiled and open coiled helical springs.

Thin and Thick Cylinders**:** Stresses in thin cylinders – thick cylinders - Lame's equation – stresses in thick cylinders due to internal and external pressures - Wire wound pipes and cylinders -compound cylinders - shrink fit.

Text Books

1. Timoshenko , *Strength of Materials Vol. I & Vol. II* , CBS Publishers & Distributers, New Delhi
2. James M Gere & Stephen P Timoshenko , *Mechanics of Materials* , CBS Publishers & Distributers, New Delhi
3. Egor P Popov , *Mechanics of solids*, Prentice Hall of India, New Delhi.
4. S.S Bhavikatti , *Structural analysis Vol I* , Vikas Publications (P) Ltd.
5. S.B Junnarkar & H.J Shah, *Mechanics of Structures Vol II* ,Charotar publishing House.

Reference books

1. Hearn E.J., *Mechanics of Materials*, Pergamon Press, Oxford
2. Warnock F.V., *Strength of Materials*, Isaac Pitman
3. Nash W.A., *Strength of Materials*, Schaum's Outline Series, McGraw Hill
4. Wang C.K., *Statically Intermediate Structures*, McGraw Hill
5. D.K. Singh, Strength of Materials, Ane Books.

Internal work assessment *(Maximum Marks – 30)*

60%- Tests(minimum 2)
30%- Assignments (minimum2) such as home work, quiz, literature survey, seminar, term-project..
10%- Regularity in the class.

University Examination pattern

PART A: *Short answer questions* *5×2 marks=10 Marks*
All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.
PART B: *Analytical / Problem solving questions* *4×5 marks=20 Marks*
Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.
PART C: *Descriptive/Analytical / Problem solving questions.* *4×10 marks= 40 Marks*
Two questions from each module with choice to answer one question.

Maximum Total marks: 70

CE09 304: BUILDING TECHNOLOGY I

Credits:4

Teaching scheme

3 hours lecture and 1 hour tutorial per week

Objectives:

To study (i) Details regarding properties and testing of building materials, (ii) Details regarding the construction of building components (iii) Properties of concrete and concrete mix design. (iv) Basic concepts in planning of buildings

Module I (14 hours)

General Requirements of Construction Materials – factors considered during selection. **Building stones** – Classification of rocks – Quarrying of stones. Dressing – Properties and uses of common stones – Tests conducted on stones. **Timber** – Classification – seasoning -defects in Timber — decay – preservation – Manufacture, properties and uses of plywood, fibre board, particle board. **Clay** products – Bricks and tiles – manufacture – BIS specifications properties and testing.

Lime – BIS Classification – manufacture – properties and uses. **Cement** – Manufacture – types of cement – uses – Properties and testing. **Mortar** – Types – Sand – properties – uses. **Iron and Steel** – Reinforcing steel – types – specifications. **Structural steel** – specifications – **Miscallaneous materials** (only properties, classifications and their use in construction industry): Glass, Plastics, A.C.Sheets, Bitumen, Adhesives, Aluminium

Module II (15 hours)

Concrete – Aggregates – Mechanical & Physical properties and tests – Grading requirements – Water quality for concrete –Admixtures – types and uses – plasticizers – accelerators – retarders – water reducing agents – batching – mixing – types of mixers – transportation – placing – compacting – curing.

Properties of concrete – fresh concrete – workability – segregation and bleeding - factors affecting workability & strength – tests on workability – tests for strength of concrete in compression, tension & flexure – stress –strain characteristics and elastic properties – shrinkage and creep.

Durability of concrete – permeability – sulphate attack - alkali aggregate reaction – exposure to marine environment. Concrete quality control – statistical analysis of results – standard deviation – acceptance criteria – mix proportioning (B.I.S method) – nominal mixes.

Module III (16hours)

Building construction - Preliminary considerations – site clearing and drainage – Excavation – Timbering – Function and requirements of foundations Bearing capacity of soils-methods of improving bearing capacity – Settlement of foundations and precautions – shallow and deep foundations – description of spread, grillage, raft and pile foundation.

Masonry – Types of stone masonry – Bonds in brickwork – advantages and limitations of masonry construction - corbels, cornice and copings – composite walls - cavity walls and partition walls – construction details and features – scaffoldings.

Lintels and arches – types and construction details. Floors and flooring – different types of floors and floor coverings. Roofs and roof coverings – different types of roofs – suitability – types and uses of roofing materials. Doors, windows and ventilators – Types and construction details.

Stairs – types - layout and planning. Finishing works – Plastering, pointing, white washing, colour washing, distempering, painting. Methods of providing DPC. Termite proofing.

Module IV (9 hours)

Functional planning of buildings - occupancy classification of buildings - building codes and rules - functional requirements of residential and public buildings as per the relevant building rules and NBC- Planning principles - checking for circulation, ventilation, structural requirements and other constraints - sketch plans, working drawings and site plan.

Text books

1.Rangwala S C., Engineering Materialals, Charotar Publishers
2.Shetty M.S., Concrete Technology, S. Chand & company.
3.Arora and Bindra, Building construction, Dhanpath Rai and Sons.

Reference Books

1. Punmia B.C. Building Construction, Laxmi Publications.
2. Gambhir M L, Concrete Technology, Tata McGrawHill.
3. Krishna Raju N, Design of Concrete Mixes, CBS publishers.
4. Neville A.M.and Brooks.J.J, Concrete Technolgy, Pearson Education.
5. Akroyd T.N.W, Concrete: Properties & Manufacture, Pergamon Press.
6. Huntington W.C., Building Construction, John Wiley
7. National Building Code.
8. Kerala Building Rules

Internal work assessment ***(Maximum Marks – 30)***
60%- Tests(minimum 2)
30%- Assignments (minimum2) such as home work, quiz, literature survey, seminar, term-project..
10%- Regularity in the class.

University Examination pattern
PART A: *Short answer questions* *5×2 marks=10 Marks*
All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.
PART B: *Analytical / Problem solving questions* *4×5 marks=20 Marks*
Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.
PART C: *Descriptive/Analytical / Problem solving questions.* *4×10 marks= 40 Marks*
Two questions from each module with choice to answer one question.
Maximum Total marks: 70

CE09 305: SURVEYING – I

Teaching Scheme **Credit : 4**

3 hours lecture and 1 hour tutorial per weak

Objective: To acquaint with basic principles & basic instruments related with surveying & leveling.

Module I (13 hours)

Introduction - classification of surveys - reconnaissance - principle of working from whole to part - provision of control - conventional signs - chain survey - instruments - principles of chain survey - field book - plotting - tie line and check line - chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey - uses of cross staff and optical square

Module II (12 hours)

Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing - true and magnetic bearing - dip and declination - local attraction - traversing - plotting - error of closure - graphical and analytical adjustments - plane table survey - instruments and accessories - different methods - orientation - advantages and disadvantages of plane tabling - two point problem - three point problem - errors in plane tabling

Module III (14 hours)

Levelling - definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary and permanent adjustments - fly leveling - booking - reduction of levels - corrections for refraction and curvature - reciprocal leveling - longitudinal levelling and cross sectioning - contour survey - definition - characteristics of contour - uses of contour - methods of contouring - direct and indirect interpolation - plotting - areas and volumes - trapezoidal rule - simpson's rule - area from latitude and departure - uses of planimeter - volumes - trapezoidal and prismoidal formula

Module IV (15 hours)

Minor instruments - hand levels - clinometer - ceylon ghat tracer - hypsometer - pantagraph -ediograph - box sextant - telescopic alidade. Theodolite surveying - study of theodolite - temporary and permanent adjustments - measurement of horizontal angles - method of repetition

and reiteration - measurement of vertical angles - theodolite traverse - calculation of co ordinates - corrections - traverse table - omitted measurements.

Curves – Types of curves – elements of a curve – simple curves – diff: methods of setting out compound curve – reverse curves – transition curves – vertical curves

Text Book

Kanetkar T.P. & Kulkarni S.V., Surveying Vol. I &II, Vidyarthigriha Prakasan

Reference books

1. Punmia B.C., Surveying Vol. I &II, Laxmi Publishers
2. Arora K.R., Surveying Vol. I & II, Standard Book House

Internal work assessment *(Maximum Marks – 30)*

60%- Tests(minimum 2)

30%- Assignments (minimum2) such as home work, quiz, literature survey, seminar, term-project..

10%- Regularity in the class.

University Examination pattern

PART A: *Short answer questions* *5×2 marks=10 Marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical / Problem solving questions* *4×5 marks=20 Marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical / Problem solving questions.* *4×10 marks= 40 Marks*

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

Maximum Total marks: 70

CE09 306: ENGINEERING GEOLOGY

Teaching scheme **Credits:** 4
3 hours lecture and 1 hour tutorial per week

Objectives: To make the students familiar with physical and structural geology as well as the basics of mineralogy and petrology.

Module I (18 hrs)

Physical Geology and Environmental Geology

The Earth Science and its sub divisions- scope of Engineering Geology

Geological works of rivers, oceans and wind

Weathering of rocks: products of weathering - influence of climate and lithology on weathering. Volcanoes: types and causes of volcanism - volcanic products - types of volcanic eruptions and their distribution.

Elements of Engineering Seismology:

Causes of earthquakes - plate tectonics - earthquake mechanism

Earthquake phenomenon – focus, epicentre, seismic waves, magnitude, intensity, intensity scale, and its correlation with ground acceleration - characteristics of strong ground motions and attenuation

Earthquake recording instruments

Secondary effects – land and rock slides, liquefaction, fires, tsunamis, floods, release of poisonous gases and radiation.

Earthquake occurrence - seismic zoning map of India and its use – case studies of important Indian earthquakes - major world earthquakes - earthquake catalogue - assessment of damage - measures for protection of life and property – earthquake resistant structures

Landslides : terminology - classification - causes and controls of landslides

Geology and environment - Geology and health-geological factors in environmental health hazards

Module II (12 hrs)

Mineralogy and Petrology

Megascopic characters of the important rock forming mineral groups - quartz, feldspar, pyroxene, amphibole, mica and carbonates only

Classification and distinguishing features of igneous, sedimentary and metamorphic rocks- brief description of granite, basalt, dolerite, gabbro, sandstone, shale, limestone, slate, phyllite, schist, gneiss, quartzite and marbles only

Engineering properties of rocks - rocks as construction materials – qualities required for building, dimensional and decorative/ ornamental stones.

Module III (12 hrs)

Structural Geology, Hydrogeology and Exploration Geology

Geological structures and their significance in Civil Engineering projects - folds, faults, joints and unconformities

Origin and occurrence of groundwater – geological formations as aquifer, aquicludes, aquitards and aquifuges - artificial recharge of ground water - quality of ground water – saline water intrusion in coastal aquifers

Importance of ground water investigation in civil engineering projects – ground water exploration – electrical, electromagnetic, gravimetric, radioactive and seismic exploration techniques.

Module IV (12 hrs)

Geoinformatics and Engineering Geology

Remote sensing: Basic principles - role of remote sensing in Civil Engineering - various interpretation techniques in remote sensing

Geographical Information Systems.
Applications of geological knowledge in Civil Engineering projects - dams, bridges, roads, tunnels and multi-storied buildings - geological factors in the design of buildings.

Text books:

1. Kueffer and Lillesand : Remote sensing and Image interpretation
2. Read H.H. : Rutleys Elements of Mineralogy, CBS Publishers
3. Singh. P : Engineering and General Geology. S.K. Kataria
4. Todd, D.K : Ground water Hydrology. John Wiley
5. Tyrrel .G.W. : Petrology
6. Understanding GIS : ISRI Publications.

Reference books:

1. Billings.M.P. : Structural Geology. Asia Publishing House.
2. Holmes, A :Principles of Physical Geology. Thomas Nelson
3. Judds, W.R : Principles of Engineering Geology and Geotechniques. Mc Graw Hill
4. Keshavalu, C.N. :Text book of Engineering Geology. Mc Millan India Ltd.
5. Pandey,S.N. :Principles and Applications of Photogeology Wiley Eastern
6. Reddy. V :Engineering Geology for Civil Engineers. Oxford &IBH
7. Sabins F.F. :Remote Sensing – Principles and Interpretation.W Freeman & Co., SanFranscisco
8. Sathya Narayanaswami.B.S: Engineering Geology, Dhanpat Rai & Co (P) Ltd
9. Strahler :Environmental Geology
10. Valdiya K.S :Environmental Geology in Indian Context –Tata Mc Graw Hill

Internal work assessment *(Maximum Marks – 30)*

60%- Tests(minimum 2)
30%- Assignments (minimum2) such as home work, group discussions, quiz, literature survey, seminar, term-project..
10%- Regularity in the class.

University Examination pattern

PART A: *Short answer questions* *5×2 marks=10 Marks*
All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.
PART B: *Analytical / Problem solving questions* *4×5 marks=20 Marks*
Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.
PART C: *Descriptive/Analytical / Problem solving questions.* *4×10 marks= 40 Marks*
Two questions from each module with choice to answer one question.
Maximum Total marks: 70

CE09 307(P) SURVEYING LAB – I

Teaching Scheme **Credits : 2**

3 hours practical per weak

Objective: To impart training in Chain, Compass, Plane table surveying & Leveling.

List of exercises

1. Chain Survey — Traversing and plotting of details
2. Compass Survey — Traversing with compass and plotting
3. Plane table Survey — Method of Radiation and intersection
4. Plane table Survey — Solving Two Point Problem
5. Plane table Survey — Solving Three Point Problem
6. Plane table Survey — Traverse
7. Leveling — Fly leveling- plane of collimation method
8. Leveling — Fly leveling- rise and fall method
9. Leveling — Longitudinal and cross sectioning
10. Leveling — Contour surveying
11. Setting out of building plans
12. Study of Minor instruments: Planimeter, pantagraph, clinometer, hand levels, Quick setting level, Cylon Ghat Tracer, sextent
13. Theodolite : study of instrument, temporary adjustments, measurement of horizontal and vertical angles.

Internal Continuous Assessment *(Maximum Marks-50)*

60%-Laboratory practical and record
30%- Test/s
10%- Regularity in the class

Semester End Examination *(Maximum Marks-50)*

70% - Procedure, conducting experiment, results, tabulation, and inference
20% - Viva voce
10% - Fair record

CE09 308(P): MATERIALS TESTING LAB I

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

Objective:
To study various properties of building materials
List of experiments
1.Tests on cement
a) Fineness b) Normal consistency and Setting time c) Soundness d) Compressive strength
2.Test on bricks -
a) Water absorption b) Efflorescence c) Compressive strength
3.Tests on aggregate for concrete
a) Physical Properties
i) Grain size distribution ii) Specific gravity iii) Density iv) Void ratio
v) Bulking of sand
b) Aggregate crushing value
4.Properties of fresh concrete – workability tests
a) Flow & vee- bee tests
b)Slump & Compaction factor test
5.Tests on Timber
a) Compressive strength –parallel to grain & perpendicular to grain
b) Bending tests
4.Test on tiles
(i) Transverse strength, (ii) Water Absorption of
a) Flooring tiles
b) Roofing tiles.

Internal Continuous Assessment *(Maximum Marks-50)*

60%-Laboratory practical and record
30%- Test/s
10%- Regularity in the class

Semester End Examination *(Maximum Marks-50)*

70% - Procedure, conducting experiment, results, tabulation, and inference
20% - Viva voce
10% - Fair record

UNIVERSITY OF CALICUT
CIVIL ENGINEERING
SCHEME OF STUDIES AND EXAMINATION AND SYLLABUS FOR
B. TECH DEGREE (FULL-TIME)
III to VIII SEMESTERS 2009 SCHEME

3rd Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte-rnal	Sem-end		
1	EN09 301	Engineering Mathematics III	3	1	-	30	70	3	4
2	EN09 302	Humanities and Communication Skills	2	1	-	30	70	3	3
3	CE09 303	Mechanics of Solids	4	1	-	30	70	3	5
4	CE09 304	Building Technology I	3	1	-	30	70	3	4
5	CE09 305	Surveying I	3	1	-	30	70	3	4
6	CE09 306	Engineering Geology	3	1	-	30	70	3	4
7	*CE09 307(P)*	Surveying Lab I	-	-	3	50	50	3	2
8	*CE09 308(P)*	Materials Testing Lab I	-	-	3	50	50	3	2
		Total	**18**	**6**	**6**				**28**

4th Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte-rnal	S em-end		
1	EN09 401A	Engineering Mathematics IV	3	1	-	30	70	3	4
2	EN09 402	Environmental Studies	2	1	-	30	70	3	3
3	CE09 403	Fluid Mechanics	4	1	-	30	70	3	5
4	CE09 404	Structural Analysis I	3	1	-	30	70	3	4
5	CE09 405	Engineering Economics & Principles of Management	3	1	-	30	70	3	4
6	CE09 406	Surveying II	3	1	-	30	70	3	4
7	*CE09 407(P)*	Surveying Lab II	-	-	3	50	50	3	2
8	*CE09 408(P)*	Civil Engineering Drawing I	-	-	3	50	50	3	2
		Total	**18**	**6**	**6**				**28**

5th Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte-rnal	Sem-end		
1	CE09 501	Transportation Engineering I	4	1	-	30	70	3	5
2	CE09 502	Structural Design I	3	1	-	30	70	3	4
3	CE09 503	Open Channel Hydraulics & Hydraulic Machinery	3	1	-	30	70	3	4
4	CE09 504	Geotechnical Engineering I	3	1	-	30	70	3	4
5	CE09 505	Structural Analysis II	3	1	-	30	70	3	4
6	CE09 506	Building Technology II	2	1	-	30	70	3	3
7	*CE09507(P)*	Civil Engineering Drawing II	-	-	3	50	50	3	2
8	*CE09 508(P)*	Fluid Mechanics Lab	-	-	3	50	50	3	2
		Total	**18**	**6**	**6**				**28**

EN09 401A: Engineering Mathematics IV

(Common for ME, CE, PE, CH, BT, PT, AM, and AN)

Teaching scheme **Credits:** 4

3 hours lecture and 1 hour tutorial per week

Objective

The use of probability models and statistical methods for analyzing data has become common practice in virtually all scientific disciplines. Two modules of this course attempt to provide a comprehensive introduction to those models and methods most likely to be encountered and used by students in their careers in engineering. A broad introduction to some important partial differential equations is also included to make the student get acquainted with the basics of PDE.

Module I: Probability Distributions (13 hours)

Random variables – Mean and Variance of probability distributions – Binomial Distribution – Poisson Distribution – Poisson approximation to Binomial distribution – Hyper Geometric Distribution – Geometric Distribution – Probability densities – Normal Distribution – Uniform Distribution – Gamma Distribution.

Module II: Theory of Inference (14 hours)

Population and Samples – Sampling Distribution – Sampling distribution of Mean (σ known) – Sampling distribution of Mean (σ unknown) – Sampling distribution of Variance – Interval Estimation – Confidence interval for Mean – Null Hypothesis and Tests of Hypotheses – Hypotheses concerning one mean – Hypotheses concerning two means – Estimation of Variances – Hypotheses concerning one variance – Hypotheses concerning two variances – Test of Goodness of fit.

Module III: Series Solutions of Differential Equations (14 hours)

Power series method for solving ordinary differential equations – Legendre's equation – Legendre polynomials – Rodrigue's formula – Generating functions – Relation between Legendre polynomials – Orthogonality property of Legendre polynomials (Proof not required) – Frobenius method for solving ordinary differential equations – Bessel's equation – Bessel functions – Generating functions – Relation between Bessel functions – Orthogonality property of Bessel functions (Proof not required).

Module IV: Partial Differential Equations (13 hours)

Introduction – Formation of PDE – Complete Solution – Equations solvable by direct integration – Linear PDE of First order, Legrange's Equation: $Pp + Qq = R$ – Non-Linear PDE of First Order, $F(p,q) = 0$, Clairaut's Form: $z = px + qv + F(p,q)$, $F(z,p,q) = 0$, $F_1(x,q) = F_2(y,q)$ – Classification of Linear PDE's – Derivation of one dimensional wave equation and one dimensional heat equation – Solution of these equation by the method of separation of variables – D'Alembert's solution of one dimensional wave equation.

Text Books

Module I:
Richard A Johnson, CB Gupta, *Miller and Freund's Probability and statistics for Engineers, 7e*, Pearson Education- Sections: 4.1, 4.2, 4.3, 4.4, 4.6, 4.8, 5.1, 5.2, 5.5, 5.7

Module II:
Richard A Johnson, CB Gupta, *Miller and Freund's Probability and statistics for Engineers, 7e*, Pearson Education- Sections: 6.1, 6.2, 6.3, 6.4, 7.2, 7.4, 7.5, 7.8, 8.1, 8.2, 8.3, 9.5

Module III:
Erwin Kreysig, *Advanced Engineering Mathematics, 8e,* John Wiley and Sons, Inc.-
Sections: 4.1, 4.3, 4.4, 4.5

Module IV:
N Bali, M Goyal, C Watkins, *Advanced Engineering Mathematics, A Computer Approach, 7e,* Infinity Science Press, Fire Wall Media- Sections: 16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.9
Erwin Kreysig, *Advanced Engineering Mathematics, 8e,* John Wiley and Sons, Inc.
Sections: 11.2, 11.3, 11.4, 9.8 Ex.3, 11.5

Reference books

1. William Hines, Douglas Montgomery, avid Goldman, Connie Borror, *Probability and Statistics in Engineering*, 4e, John Wiley and Sons, Inc.
2. Sheldon M Ross, *Introduction to Probability and Statistics for Engineers and Scientists*, 3e, Elsevier, Academic Press.
3. Anthony Croft, Robert Davison, Martin Hargreaves, *Engineering Mathematics*, 3e, Pearson Education.
4. H Parthasarathy, *Engineering Mathematics, A Project & Problem based approach*, Ane Books India.
5. B V Ramana, *Higher Engineering Mathematics*, McGrawHill.
6. Sarveswara Rao Koneru, *Engineering Mathematics*, Universities Press.
7. J K Sharma, *Business Mathematics, Theory and Applications*, Ane Books India.
8. John bird, *Higher Engineering Mathematics*, Elsevier, Newnes.
9. M Chandra Mohan, Vargheese Philip, *Engineering Mathematics-Vol. I, II, III & IV.*, Sanguine Technical Publishers.
10. Wylie C.R and L.C. Barret, *Advanced Engineering Mathematics*, McGraw Hill.
11. V R Lakshmy Gorty, *Advanced Engineering Mathematics-Vol. I, II.*, Ane Books India.
12. Sastry S.S., *Advanced Engineering Mathematics-Vol. I and II.*, Prentice Hall of India.

Internal Continuous Assessment *(Maximum Marks-30)*

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

University Examination Pattern

PART A:	*Short answer questions (one/two sentences)* All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.	*5 x 2 marks=10 marks*
PART B:	*Analytical/Problem solving questions* Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.	*4 x 5 marks=20 marks*
PART C:	*Descriptive/Analytical/Problem solving questions* Two questions from each module with choice to answer one question.	*4 x 10 marks=40 marks*

Maximum Total Marks: 70

EN09 402: ENVIRONMENTAL SCIENCE

(Common for all branches)

Teaching scheme **Credits:** 3

2 hours lecture and 1 hour tutorial per week

Objectives

- To understand the problems of pollution, loss of forest, solid waste disposal, degradation of environment, loss of biodiversity and other environmental issues and create awareness among the students to address these issues and conserve the environment in a better way.

Module I (8 hours)

The Multidisciplinary nature of environmental science

Definition-scope and importance-need for public awareness.

Natural resources

Renewable and non-renewable resources:

Natural resources and associated problems-forest resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their defects 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 over grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.-Energy resources: Growing energy needs, renewable and non-renewable energy resources, use of alternate energy resources, Land resources: Land as a resource, land degradation, man induced land slides, soil erosion and desertification.

Module II (8 hours)

Ecosystems-Concept of an ecosystem-structure and function of an ecosystem – producers, consumers, decomposers-energy flow in the ecosystem-Ecological succession- Food chains, food webs and Ecological pyramids-Introduction, types, characteristics features, structure and function of the following ecosystem-Forest ecosystem- Grassland ecosystem –Desert ecosystem-Aquatic ecosystem(ponds, streams, lakes, rivers, oceans , estuaries)

Biodiversity and its consideration

Introduction- 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 level-India at mega – diversity nation- Hot spot of biodiversity-Threats to biodiversity: habitat loss, poaching of wild life, man , wild life conflicts –Endangered and endemic species of India-Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Module III (10 hours)

Environmental pollution

Definition-Causes, effects and control measures of Air pollution-m Water pollution – soil pollution-Marine pollution-Noise pollution-Thermal pollution-Nuclear hazards-Solid 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 , earth quake, cyclone and landslides-Environmental impact assessment

Module IV (10 hours)

Environment and sustainable development-Sustainable use of natural resources-Conversion of renewable energy resources into other forms-case studies-Problems related to energy and Energy auditing-Water conservation, rain water harvesting, water shed management-case studies-Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust-Waste land reclamation-

Consumerism and waste products-Reduce, reuse and recycling of products-Value education.

Text Books

1. Clark,R.S., Marine pollution, Clanderson Press Oxford.
2. Mhaskar A. K. Matter Hazrdous, Techno-science Publications.
3. Miller T. G. Jr., Environmental Science, Wadsworth Publishing Co.
4. Townsend C., Harper J, Michael Begon, Essential of Ecology, Blackwell Science
5. Trivedi R. K., Goel P. K., Introduction to Air Pollution, Techno-Science Publications.

Reference Books.

1.Raghavan Nambiar,K, Text book of Environmental Studies, Nalpat Publishers Kochi
2.Bharucha Erach, Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email: mapin@icenet.net
3. Cunningham, W.P., Cooper, T.H., Gorhani, E & Hepworth, M.T. 2001Environmental encyclopedia Jaico publ. House Mumbai 1196p
4.Down to Earth, Centre for Science and Environment

5.Hawkins, R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay

6. Mckinney, M.L. & School, R.M. 1996. Environmental Science system & Solutions, Web enhanced edition, 639p.

7. Odum, E.P. 1971. Fundamentals of Ecology. W.B.Saunders Co. USA, 574p
8. Rao, M.N. & Datta, A.K 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd., 345p

9. Survey of the Environment, The Hindu (M)
10..Wagner.K.D. 1998. Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p
*M Magazine

Internal Continuous Assessment *(Maximum Marks-30)*

60% - Tests (minimum 2)
30% - Assignments (minimum 2) such as Report of field work, literature survey, seminar etc.
10% - Regularity in the class

Note: Field work can be Visit to a local area to document environmental assets-river/forest/grass land/mountain or Visit to local polluted site-urban/rural/industrial/agricultural etc. or Study of common plants, insects, birds etc. or Study of simple ecosystems-pond, river, hill slopes etc. or mini project work on renewable energy and other natural resources , management of wastes etc.

University Examination pattern

PART A: *Short answer questions* *5×2 marks=10 Marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical / Problem solving questions* *4×5 marks=20 Marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical / Problem solving questions.* *4×10 marks= 40 Marks*

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

The weightage for numerical questions may be modified

Maximum Total marks: 70

CE09 403: FLUID MECHANICS

Teaching scheme **Credits:** 5
4 hours lecture and 1 hour tutorial per week

Objective:

- *This course gives an introduction to the fundamentals of fluid flow and its behavior so as to equip the students to learn related subjects and their applications in the higher semesters.*

Module I (19hours)

Fluid - definition - types of fluids - fluids as a continuum - fluid properties - density – specific gravity - surface tension and capillarity - vapour pressure - viscosity and compressibility - classification of fluids - fluid statics - fluid pressure - absolute and gauge pressure – measurement of pressure - fluid static force on immersed surfaces - buoyant forces - stability of floating and submerged bodies - hydraulic press, cranes, lifts - fluid kinetics - methods of describing fluid flow - Lagrangian and Eulerian approaches - types of fluid flow - rotational and irrotational flows - vorticity and circulation - velocity and acceleration - local and convective acceleration - potential flows - velocity potential and stream function - laplace equation - flownets - uses and limitations - methods of analysis of flow net

Module II (18 hours)

Fluid dynamics - forces influencing fluid motion - types of forces - body and surface forces - energy and head - equations of fluid dynamics - Euler equation and application - integration of Euler equation to get Bernoullis' equation - momentum equation - vortex motion - free and forced vortex - application of Bernoullis' equation in measurement of flows - stagnation pressure - pitot tube, prandtl tube, venturi meter, orifice plate - flow nozzles, orifices, mouthpieces, notches and weirs.

Module III (18 hours)

Pipe flow - transition from laminar flow to turbulent flow - problems in pipe flow - losses in pipe flow - major and minor losses - losses in transition - losses in fittings and valves - friction loss in pipe - coefficient of friction - commercial pipes in use - different arrangements of pipes – pipes open to atmosphere - pipe connecting reservoirs - branching pipes - pipes in parallel and series - equivalent lengths – power transmission in pipes - waterhammer - cavitation - syphons – laminar flow in pipes - Hagen Poisuille's equation.

Module IV (17 hours)

Forces around submerged bodies – Introduction to boundary layer- Dimensional analysis – scope of dimensional analysis - dimensions - dimensional homogeneity - dimensional groups - dimensional analysis using Buckingham's π theorem method - examples of drag on immersed bodies - pipe flow - flow over weirs and orifices - model testing - similitude - special model laws - Froude, Reynold, Weber, Cauchy and Mach.laws - problem solution using Froude and Reynold laws.

Text books:

1. Modi P.N. & Seth S.M., *Hydraulics & Fluid Mechanics*, Standard Book House
2.Bensal R K A Text Book of Fluid Mechanics and Hydraulic Machines, Laxmi Publications

Reference books:

1. Streeter V.L., Fluid Mechanics, McGraw Hill
2. Garde R.J., Fluid Mechanics Through Problems, Wiley eastern
3. Subramanya K., Theory and Applications of Fluid Mechanics, Tata McGraw Hill
4. Duncan, Tom & Young, Fluid Mechanics, ELBS

Internal Continuous Assessment *(Maximum Marks-30)*

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

Note: Students shall be encouraged to solve problems using software like spreadsheet, MATLAB etc.)

University Examination pattern

PART A: *Short answer questions* *5×2 marks=10 Marks*
All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.
PART B: *Analytical / Problem solving questions* *4×5 marks=20 Marks*
Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.
PART C: *Descriptive/Analytical / Problem solving questions.* *4×10 marks= 40 Marks*
Two questions from each module with choice to answer one question.
The weightage for numerical questions may be modified
Maximum Total marks: 70

CE09 404: STRUCTURAL ANALYSIS - I

Teaching scheme **Credits:** 4

3 hours lecture and 1 hour tutorial per week

Objectives

- *To equip the students with the comprehensive methods of structural analysis with emphasis on analysis of elementary structures.*

Module 1 (14 hours)

Elastic theorems and energy principles. Strain energy due to axial load, bending moment, shear and torsion- principle of superposition

Principle of virtual work-Castigliano's theorem for deflection-theorem of complementary energy- Betti's theorem-Maxwell's law of reciprocal deflections-principle of least work-application of unit load method and strain energy method for determination of deflection of statically determinate frames -pin jointed trusses -temperature effects, lack of fit.

Statically indeterminate structures-degree of static and kinematic indeterminacies. Analysis of fixed beams by strain energy method.

Module II (14 hours)

Fixed and continuous beams.

Brief introduction to force and displacement methods-analysis of beams and rigid frames of different geometry by consistent deformation method-settlement effects- -analysis of pin jointed trusses by consistent deformation method-external and internal redundant trusses-effect of settlement and prestrain.

Beams curved in plan-Analysis of cantilever beam curved in plan - analysis of circular beams over simple supports.

Module III (13 hours)

Moving loads and influence lines .

Introduction to moving loads-concept of influence lines-influence lines for reaction, shear force and bending moment in simply supported beams and over hanging beams-Muller Breslau principle-Application to propped cantilevers -influence lines for forces in beams and trusses analysis for different types of moving loads-single concentrated load-several concentrated loads uniformly distributed load shorter and longer than the span.

Module IV (13 hours)

Cables, suspension bridges and arches.

Analysis of forces in cables-temperature effects-suspension bridges with three hinged and two hinged stiffening girders-theory of arches-Eddy's theorem-analysis of three hinged and two hinged arches -settlement and temperature effects.

Text books:

1. Gere and Timoshenko, Mechanics of materials, CBS. Publishers
2. Wilbur J.B. and Norris C.H., Elementary structural Analysis, McGraw Hill
3. Wang C.K., Intermediate Structural Analysis, McGraw Hill
4. Hibbeler., Structural Analysis, Pearson Education
5. Daniel L Schodak, Structures, Pearson Education/Prentice Hall India

References:

1. Kinney S., Indeterminate Structural Analysis, Oxford & IBH
2. Coates, Coutie and Kong , Structural Analysis, ELBS Publishers
3. Reddy C.S., Indeterminate Structural Analysis, Tata McGraw Hill
4. Timoshenko S.P.& Young D.H., Theory of Structures, McGraw Hill

Internal Continuous Assessment *(Maximum Marks-30)*

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

University Examination pattern

PART A: *Short answer questions* *5×2 marks=10 Marks*
All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.
PART B: *Analytical / Problem solving questions* *4×5 marks=20 Marks*
Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.
PART C: *Analytical / Problem solving questions* *.4×10 marks= 40 Marks*
Two questions from each module with choice to answer one question.
Maximum Total marks: 70

CE09 405: ENGINEERING ECONOMICS AND PRINCIPLES OF MANAGEMENT

Credits: 4

Section 1 ENGINEERING ECONOMICS

Teaching scheme: 2 hours lecture per week

Objective:

- Impart fundamental economic principles that can assist engineers to make more efficient and economical decisions.

Pre-requisite: NIL

Module1 (14 Hrs.)
Economic reasoning, Circular Flow in an economy, Law of supply and demand, Economic efficiency. Element of costs, Marginal cost, Marginal Revenue, Sunk cost, Private and Social cost, Opportunity cost. Functions of Money and commercial Banking. Inflation and deflation: concepts and regulatory measures. Economic Policy Reforms in India since 1991: Industrial policy, Foreign Trade policy, Monetary and fiscal policy, Impact on industry.

Module II. (13 Hrs).
Value Analysis – Function, aims, procedure.–Time value of money, Single payment compound amount factor, Single payment present worth factor, Equal payment series sinking fund factor, Equal payment series payment Present worth factor- equal payment series capital recovery factor-Uniform gradient series annual equivalent factor. Methods of project analysis (pay back, ARR, NPV, IRR and Benefit -Cost ratio) Break-even analysis-, Process planning.

Text books

1 Panneer Selvam, R, Engineering economics, Prentice Hall of India, New Delhi, 2002.
2. Wheeler R(Ed) Engineering economic analysis, Oxford University Press, 2004.

Internal Continuous assessment
Maximum marks15
One Series test (9marks),
One assignment (4 marks)
Regularity in attendance (2marks).

University question pattern (35marks)

Part A: 3 Analytical questions of five marks from the two modules with not less than one from each (3 x 5 = 15)

Part B: 2 questions of ten marks from the two modules with equal number of choices (2 x 10 = 20)

Section 1I PRINCIPLES OF MANAGEMENT

Teaching scheme: 2 hours per week

Objective:

- *To provide knowledge on principles of management, decision making techniques, accounting principles and basic management streams*

Module III (18 hours)

Principles of management – Evolution of management theory and functions of management
Organizational structure – Principle and types
Decision making – Strategic, tactical & operational decisions, decision making under certainty, risk & uncertainty and multistage decisions & decision tree
Human resource management – Basic concepts of job analysis, job evaluation, merit rating, wages, incentives, recruitment, training and industrial relations

Module IV (18 hours)

Financial management – Time value of money and comparison of alternative methods
Costing – Elements & components of cost, allocation of overheads, preparation of cost sheet, break even analysis
Basics of accounting – Principles of accounting, basic concepts of journal, ledger, trade, profit &loss account and balance sheet
Marketing management – Basic concepts of marketing environment, marketing mix, advertising and sales promotion
Project management – Phases, organisation, planning, estimating, planning using PERT & CPM

References

1. F. Mazda, *Engineering management*, Addison Wesley, Longman Ltd., 1998
2. Lucy C Morse and Daniel L Babcock, *Managing engineering and technology*, Pearson Prentice Hall
3. O. P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai and Sons, Delhi, 2003.
4. P. Kotler, *Marketing Management: Analysis, Planning, Implementation and Control*, Prentice Hall, New Jersey, 2001
5. Venkata Ratnam C.S & Srivastva B.K, *Personnel Management and Human Resources*, Tata McGraw Hill.
6. Prasanna Chandra, *Financial Management: Theory and Practice*, Tata McGraw Hill.
7. Bhattacharya A.K., *Principles and Practice of Cost Accounting*, Wheeler Publishing
8. Weist and Levy, *A Management guide to PERT and CPM*, Prantice Hall of India
9. Koontz H, O'Donnel C & Weihrich H, *Essentials of Management*, McGraw Hill.
10. Ramaswamy V.S & Namakumari S, *Marketing Management : Planning, Implementation and Control*, MacMillan

Internal Continuous assessment

Maximum marks15

One Series test (9marks),

One assignment (4 marks)

Regularity in attendance (2marks).

University question pattern (35marks)

Part A: 3 Analytical questions of five marks from the two modules with not less than one from each (3 x 5 = 15)

Part B: 2 questions of ten marks from the two modules with equal number of choices (2 x 10 = 20)

Note: University question paper shall have separate sections I and II for Engineering Economics and Principles of Management respectively and students shall answer in two separate answer books

CE09 406: SURVEYING II

Teaching Scheme **Credits: 4**

3 hours lecture and 1 hour tutorial per weak

Objective:

- To understand advanced concepts of surveying by using basic instruments to study modern trends in surveying.

Module I (13 hours)
Tacheometric surveying – stadia system – fixed and movable hair methods – staff held vertical & normal –
instrument constants – analytic lens – tangential system – subtense bar
Hydrographic survey – scope – shoreline survey - soundings - sounding equipment - methods - ranges – locating sounding - plotting - three point problem

Module II (14 hours)
Triangulation - principle - reconnaissance - selection of site for base line - selection of stations - orders of
triangulation - triangulation figures - scaffolds and signals - marking of stations - intervisibility and heights of stations - satellite stations - base line measurement - equipment and corrections. Adjustment of observations - laws of weight - probable error - most probable value - station adjustment – figure adjustment - adjustment of geodetic quadrilateral - adjustments of a level network - adjustment of a closed traverse

Module III (14 hours)
Field astronomy - definitions - solution of an astronomical triangle - co-ordinate systems - time - solar, siderial and standard equation of time - sundial - determination of time, azimuth, latitude and longitude

Module IV (13 hours)
Trigonometric levelling - various methods - photogrammetry - fundamental principles of ground and aerial photogrammetry - analytical and graphical methods - field work - phototheodolite and its use - methods of aerial surveying - interpretation of air photographs - introduction of modern instruments - electronic distance measuring – total station – types, working principles, measurement techniques and error corrections - automatic levels

Reference books:
1. Kanetkar T.P. & Kulkarni S.V., *Surveying Vol. I &II*, Vidyarthigriha Prakasan
2. Punmia B.C., *Surveying Vol. I &II*, Laxmi Pub
3. Arora K.R., *Surveying Vol. I & II*, Standard Book House

Internal Continuous Assessment *(Maximum Marks-30)*

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

University Examination pattern

PART A: *Short answer questions* *5×2 marks=10 Marks*

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: *Analytical / Problem solving questions* *4×5 marks=20 Marks*

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: *Descriptive/Analytical / Problem solving questions.* *4×10 marks= 40 Marks*

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

Maximum Total marks: 70

CE09 407(P): SURVEYING LAB II

Teaching Scheme **Credits: 2**
3 hours practical per week

Objective
• *To give a practical knowledge in different aspects of Theodolite Surveying & Tacheometry*

List of exercises
1. Theodolite surveying - horizontal angle by repetition & reiteration methods.
2. Determination of tacheometric constants
3. Heights and distances by stadia tacheometry
4. Heights and distances by tangential tacheometry
5. Heights and distances by solution of triangles
6. Setting out of simple curves - linear methods
7. Setting out of simple curves - angular method
8. Setting out of transition curve
9. Theodolite traversing
10. Study of modern instruments - Automatic levels, Total station and Electronic theodolite
11. Total station – Horizontal and vertical angles, Horizontal distance, Level difference, traversing & Area calculation.

Internal Continuous Assessment *(Maximum Marks-50)*

60%-Laboratory practical and record
30%- Test/s
10%- Regularity in the class

Note: A term project, like an application oriented field survey, is to be completed as part of this practical subject.

Semester End Examination *(Maximum Marks-50)*

70% - Procedure, conducting experiment, results, tabulation, and inference
20% - Viva voce
10% - Fair record

CE09 408(P): CIVIL ENGINEERING DRAWING I

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

Objectives
- *To make the students aware about the basic principles of Building Drawing*
- *To make the students to know Basic commands of a popular drafting package*
- *Make the students to draw plan, elevation and section of buildings*

Module 0: Introduction of a Popular Drafting Package (6 Hours)
- Basic Commands and simple drawings

Module 1: Detailed drawing of Components (21 Hours)
- Panelled doors, glazed windows and ventilators in wood (2 Sheets)
- Steel windows (1 Sheet)
- Roof truss in structural steel sections (2 sheets)
- Reinforced Concrete staircase (2 sheets)

Module –II: From given line sketch and specification, develop Working drawings (plan, elevation and section) of the following buildings (27 Hours)
- Single storied residential building with flat and tiled roof (4 Sheets)
- Public buildings like office, dispensary, post office, bank etc. (3 sheets)
- Factory building with trusses supported on Brick walls and pillars (2 sheets)

Assignment: preparing drawings in any popular drafting package.

Reference Books:
Balagopal T.S. Prabhu, Building drawing and detailing, Spades Publishers
Shah & Kale ,Building Drawing, Tata McGraw Hill
B.P. Verma, Civil Engineering Drawing and housing Planning, Khanna Publishers

Internal Continuous Assessment *(Maximum Marks-50)*

Any 5 sheets in Module 1- 5 x 2 = 10 marks
Any 6 sheets in Module II –6 x 2 = 12 Marks
Assignment - 8 marks
Test - 20 marks
Total - 50 marks

University Examination pattern:
1) No Questions from Module 0
2) 3 Questions of 10 marks each from Module I with Choice to answer any two (2 x 10 = 20 marks)
3) One compulsory question of 30 marks from Module II (1 x 30=30 marks)
Total - 50 marks