# JK Lakshmipat University

Laliya Ka Vas, P.O. Mahapura, Ajmer Road, Jaipur 302 026

Ph.: +91-141-2168272/330/387/393

## INSTITUTE OF ENGINEERING AND TECHNOLOGY

**4 Year B. Tech Programme**

**(Branch: Civil Engineering)**

**Batch 2012-16**

**SEMESTER – I - VIII**

# Curriculum, Detailed Syllabus

# &

# Scheme of Examination

# INSTITUTE OF ENGINEERING AND TECHNOLOGY

VC, JKLU - Jaipur : The First Semester Courses of 4-year B Tech Programme have been thoroughly discussed and deliberated upon in the Faculty Council of Institute of Engineering and Technology of JKLU - Jaipur for the B.Tech Batch of 2012-16. Recommended and Forwarded for Approval.

20/07/2012

Director - IET
Academic Section

Approved
20/7/12
Vice Chancellor

# HANDOUTS

## B. Tech. First Semester-2012


## JK Lakshmipat University

Laliya Ka Vas, P.O. Mahapura, Ajmer Road, Jaipur 302 026

Ph.: +91-141-2168272/330/387/393

## Teaching and Examination Scheme for 4- Year B. Tech Programme (Batch: 2012-2016)

### I & II Semesters (Common to all Branches of Engineering)

| Year | Code | Semester I | L T P | C | Code | Semester II | L T P | C |
|---|---|---|---|---|---|---|---|---|
| I | LA101 | English Communication Skills | 2 0 0 | 2 | LA201 | Professional Communication Skills | 2 0 2 | 3 |
| | MA101 | Engineering Mathematics - I | 3 1 0 | 3 | MA201 | Engineering Mathematics - II | 3 1 0 | 3 |
| | PH101 | Engineering Physics – I | 3 1 2 | 4 | PH201 | Engineering Physics – II | 3 1 2 | 4 |
| | CH101 | Engineering Chemistry - I | 3 1 2 | 4 | CH201 | Engineering Chemistry -II | 3 1 2 | 4 |
| | CSE101 | Computer Programming & IT | 3 0 2 | 4 | EE201 | Electrical & Electronics Engineering | 3 1 2 | 4 |
| | ID101 | Environmental Studies | 3 0 0 | 2 | ME201 | Engineering Mechanics | 3 1 0 | 3 |
| | ME102 | Workshop Practice | 0 0 3 | 2 | ME241 | Machine Drawing | 0 0 3 | 3 |
| | CE101 | Engineering Graphics | 0 0 3 | 2 | | | | |

L = Lectures; T = Tutorials; P = Practicals; C = Credits; W = Weeks; A = Audit

## Teaching and Examination Scheme for 4-Year B. Tech Programme (Batch: 2012-2016)

### In Civil Engineering

| Year | Code | Semester I | L T P | C | Code | Semester II | L T P | C |
|---|---|---|---|---|---|---|---|---|
| II | CE301 | Strength of Materials & Mechanics of Structures – I | 3 1 0 | 5.5 | CE401 | Strength of Materials & Mechanics of Structures – II | 3 1 0 | 5.5 |
| | | | | | CE402 | Concrete & Construction Technology | 3 0 3 | 6 |
| | CE302 | Fluid Mechanics & Applications | 3 1 2 | 7 | CE403 | Surveying - I | 3 0 3 | 6 |
| | CE303 | Building Material & Construction | 3 0 2 | 5.5 | CE404 | Building Construction Technology | 3 0 0 | 4 |
| | CE304 | Engineering Geology | 3 0 2 | 5.5 | MA402 | Numerical & Statistical Analysis | 3 0 2 | 5.5 |
| | MA301 | Engineering Mathematics – III | 3 1 0 | 5.5 | HS401 | Principles of Economics | 3 0 0 | 4 |
| | HS301 | Principles of Management | 3 0 0 | 4 | | | | |
| **Summer Term** | | | **PS501** | | **Practice School - I** | | **6 W** | **4** |
| III | CE501 | Theory of Structure | 3 1 0 | 5.5 | CE601 | Concrete Structures – II | 3 0 2 | 5.5 |
| | CE502 | Concrete Structures – I | 3 0 2 | 5.5 | CE602 | Steel Structures – II | 3 0 2 | 5.5 |
| | CE503 | Steel Structures – I | 3 0 2 | 5.5 | CE603 | Water Resource & Irrigation Engineering | 3 0 0 | 4 |
| | CE504 | Surveying - II | 3 0 3 | 6 | CE604 | Transportation Engineering | 3 0 2 | 5.5 |
| | CE505 | Environmental Engineering | 3 0 2 | 5.5 | CE605 | Estimating and Costing | 2 1 0 | 4 |
| | CE506 | Geotechnical Engineering | 3 0 2 | 5.5 | CE606 | Construction Project Management | 3 0 0 | 4 |
| | | | | | MA601 | Optimization Techniques | 3 1 0 | 5.5 |
| IV | | Elective – I | 3 0 0 | 4 | PS801 | Practice School – II / Thesis | ------ | 16 |
| | | Elective – II | 3 0 0 | 4 | | | | |
| | | Elective – III | 3 0 0 | 4 | | | | |
| | | Elective – IV | 3 0 0 | 4 | | | | |
| | | Elective – V | 3 0 0 | 4 | | | | |
| | SEM701 | Seminar | 0 0 4 | 2.5 | | | | |

L = Lectures; T = Tutorials; P = Practicals; C = Credits; W = Weeks

## List of Electives Courses offered in B. Tech (Civil Engineering)

| Semester | Elective | Code | Course |
|---|---|---|---|
| VII | Electives – I/II/III/IV/IV/V | CE 721 | Hydraulics |
| | | CE 722 | Engineering Rock Mechanics |
| | | CE 723 | Geographical Information System |
| | | CE 724 | Solid Waste Management |
| | | CE 725 | Repair & Rehabilitation of Structures |
| | | CE 726 | Finite Element Analysis |
| | | CE 727 | Disaster Management |
| | | CE 728 | Design of Pre-stressed Concrete Structures |
| | | CE 729 | Advanced Transportation Engineering |
| | | CE 730 | Earthquake Engineering |
| | | CE 731 | Design of Bridge Structures |
| | | CE 732 | Water Power Engineering |
| | | CE 733 | Rural Water Supply & Sanitation |
| | | CE 734 | Earthquake Resistant Design & Techniques |

# CONTENTS

# ENGLISH COMMUNICATION SKILLS

| | | |
|---|---|---|
| **Course Code.** | : | **LA 101** |
| **Course Title** | : | **English Communication Skills** |
| **Course Credits** | : | **02** |
| **Total Hours Per Week** | : | **2+0+0** |
| **Instructor (s)** | : | **Dr Sanjay Kumar** |

**Course Description:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence in students. The prescribed books and the exercises are meant to provide students an extensive exposure into the variegated subtleties and nuances of English discovering and practicing which will help students improve their proficiency in the language.

**Scope & Objective:**

By focusing on all the four language skills such as listening, speaking, reading and writing (LSRW), the course intends to achieve the following specific objectives:

a. To improve the language proficiency of students in English with emphasis on LSRW skills.
b. To strengthen the skills required to speak with confidence, to read with comprehension, and to write with clarity and precision.
c. To help students employ the study skills and communication skills in formal and informal situations.

**Text Books:**

Sanjay Kumar and Pushp Lata, *Communication Skills*, New Delhi: OUP, 2011

**Reference Books:**

R1 Meenakshi Raman and Sangeeta Sharma, *Technical Communication: Principles and Practice*, Second Edition, New Delhi: OUP, 2011.

R2 Krishna Mohan and Meenakshi Raman, *Effective English Communication,* New Delhi: Tata-McGraw Hill, 2000.

R3 Krishna Mohan and N.P.Singh, *Speaking English Effectively,* New Delhi: Macmillan,1994.

R4 V. Sasikumar and P.V. Dhamija, *Spoken English*: A Self-Learning Guide to Conversation Practice, Tata-McGraw Hill, 2007.

R5 Norman Lewis, *Word Power Made Easy*, Delhi: GoyalSaab Publishers and Distributors, 1994.

R6 A.J.Thomson and A.V.Martinet, *A Practical English Grammar,* 4th Edition, New Delhi: OUP, 1999.

R7 Asha Kaul, *Business Communication,* Second Edition, New Delhi: PHI, 2010.

R8 Edgar Thorpe and Showick Thorpe, *Objective English,* 2nd Edition, New Delhi: Pearson Education, 2008.

**Course Plan:**

| Lecture No. | Learning Objectives | Topics to be covered | Reference Chap./ Sec. (Book) |
|---|---|---|---|
| 1 | Defining Communication with emphasis on various stages and skills in language acquisition | Introduction to the course. | - |
| 2 | Introducing students to characteristic features of effective communication; acquainting them with the barriers to communication and suggesting ways to overcome such barriers | Characteristic Features of Effective Communication and Ways to Overcome Barriers to Communication | Chapter 1 |
| 3-4 | Introducing students to the Basic Etymological Structure of words in English; Discussing various Roots, Prefixes and Suffixes in the class | Vocabulary Extension: Roots, Prefixes and Suffixes | Chapter 8 |
| 5 | Introducing students to innovative strategies in developing vocabulary. Discussing ways to adding new words through Synonyms, Antonyms, Homophones, One Word Substitution, Situations, etc | Vocabulary Extension: Synonyms, Antonyms, Homophones, One Word Substitution | Chapter 8 |

| | | | |
|---|---|---|---|
| 6-7 | Helping students create situations and use new words added to the vocabulary | Vocabulary Extension: Learning words through Situations | Chapter 8 |
| 8 | Introduction to Grammar: Revising Basics of English Grammar such as Nouns, Pronouns, Verbs, Adverbs, Adjectives, Conjunctions, Prepositions, Articles, etc. | Basics of English Grammar | Chapter 2 & 3 |
| 9-10 | Helping students attain more familiarity with Applied English Grammar through concepts such as Tense, Voice, Narration, Non-Finite Verbs, Moods of Verbs, Clauses, Tag Questions, etc | Applied English Grammar | Chapter 2 & 3 |
| 11-12 | Introduction to Standard English Usage: Avoiding Common Errors, Maintaining Subject-Verb Concord, Placing Dangling Modifiers Appropriately, Avoiding Indianisms, etc. | Standard English Usage | Chapter 3, 4 & 6 |
| 13 | Giving students an exposure in Listening Skills; Introducing Effective Listening Techniques | Listening Skills | Chapter 9 and the DVD accompanying the book |
| 14 | Helping students develop effective listening skills for Listening for General Content; Listening to fill up Information; Intensive Listening; Listening for Specific Information etc | Listening Skills | Chapter 9 and the DVD accompanying the book |
| 15-16 | Introducing students to the 20 Vowel Sounds of English. Distinguishing 12 Pure Vowel and 08 Diphthongal glides. Discussing words containing these sounds of English. Giving practice through examples in the class | Phonetics and Spoken English: Sounds of English | Chapter 7 |
| 17-18 | Introducing students to the24 Consonant Sounds of English. Discussing words containing these sounds of English. | Phonetics and Spoken English: Sounds of | Chapter 7 |

| | | | |
|---|---|---|---|
| | Giving practice through examples in the class | English | |
| 19-20 | Introducing students to the rules of Word Accent and Weak Forms in English | Introducing students to the rules of Word Accent and Weak Forms in English | Chapter 7 |
| 21 | Telling students different ways of reading with a purpose. Helping students employ different reading skills such as Skimming, Scanning, Intensive Reading and Extensive Reading; Discussing Tones and Styles; Discourse Features; Developing in students Inferential, Analytical Skills | Reading Comprehension | Chapter 16 & 17 |
| 22 | Giving students adequate practice in attempting RC Passages by discussing passages of variegated types such as Informative Passages, Analytical Passages, Point of View Passages, Narrative Passages, Abstract Passages, Literary Passages, etc | Reading Comprehension | Chapter 16 & 17 |
| 23-24 | Introducing students to the basics of Paragraph Writing such as Structure, Unity, Coherence, Emphasis, Expansion in a paragraph | Paragraph Writing | Chapter 5 & 20 |
| 25 | Helping students inculcate effective paragraph writing techniques by working on a variety of paragraphs such as Descriptive Paragraphs, Argumentative Paragraphs, Abstract Paragraphs, etc | Paragraph Writing | Chapter 20 |
| 26 | Introducing students to the principles and steps in developing the Art of Condensation; Helping them distinguish between Summary, Abstract, Précis and Synopsis | Art of Condensation | Chapter 18 |

| | | | |
|---|---|---|---|
| 27 | Helping students use principles of Effective Condensation by giving them practice through examples | Art of Condensation | Chapter 18 |
| 28 | Discussing with students the techniques used for writing effective essays of various types | Essay Writing | Chapter 21 |

**Evaluation Scheme:**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Open Book |
| 3. | End Term Test / Comprehensive | 3 hour | 40 | Closed Book |
| 4. | Assignments such a Role Play, JAM, Extempore, Paragraph Writing, Vocabulary Exercises, etc. | | 15 | Open/Closed Book |
| 5. | Quiz | 20 min. | 05 | Closed Book |

**Chamber Consultation Hour:** Thursday 3-4 PM

**Notices:** All notices concerning this course will be displayed on the Notice Board

**Make-up policy:** Make-up is granted only for genuine cases with valid justification and prior permission from the Instructors.

**(Instructor)**

# ENGINEERING MATHEMATICS-I

| | | |
|---|---|---|
| **Course Code** | : | **MA101** |
| **Course Title** | : | **Engineering Mathematics – I** |
| **Course Credits** | : | **03** |
| **Total Hours per week (L+T+P)** | : | **3+1+0** |
| **Instructor(s)** | : | **Dr. Umesh Gupta, Dr. Ritu Agrawal** |

**Course Description**

Partial derivative and its applications, Maxima minima of functions of two variables, Vector calculus

**Scope & Objective**

The objective of this course is to give the students, an understanding of basic calculus and its applications in real world. This serves as a basic course in calculus of several variables and ordinary differential equations. Differential Equation is a natural goal of Calculus and is the most important part of mathematics for understanding Physical sciences and Engineering applications.

**Text books**

T1 G.B. Thomas, Jr., *Thomas' calculus*, 11th edition (Indian), Pearson education, Delhi, 2008

T2 Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Fourth Edition (Student Edition), Jones & Barlett, Viba, New Delhi, 2011

**Reference Books**

R1 Rober Wrede, Spiegel M. R., *Schaum's outline of advanced calculus*, 3rd edition, Tata Mc-GrawHill, NewYork, 2011

R2 Peter V. O'Neil, *Advanced Engineering Mathematics*, Seventh Indian Reprint, Cengage Learning, New Delhi, 2011.

R3 Kreyszig, E., *Advanced Engineering Mathematics*, John Willey, Delhi (2011).

R4 Potter M.C., Goldberg J.L., Edward F.A., *Advanced Engineering Mathematics*, 3rd Edition, Oxford University Press, 2005.

**Course Plan**

| Lecture No. | Learning Objectives | Topics to be covered | Reference (Ch. of Text Book) |
|---|---|---|---|
| 0 | Recall the concepts | | |
| 1 | Calculus of several variables | Functions of two or more variables, Partial Derivatives | Chapter 14, T1 |

| | | | |
|---|---|---|---|
| 2-3 | | Total derivative, Chain Rule | |
| 4 | | Euler's Theorem | |
| 5 | | Jacobian and transformation | Chapter 6, R1 |
| 6 | | Applications to errors | Chapter 14, T1 |
| 7 | Optimization using derivatives, Curve sketching | Maxima-Minima of functions of two variables | Chapter 14, T1 |
| 8-9 | | Lagrange's method | |
| 10-13 | | Curve tracing: Cartesian, parametric and polar coordinates | Chapter 4, T1 |
| 14 | Vector function and its derivatives | Vector functions, their derivatives and integration | Chapter 9, T2 |
| 15 | | Arc length and unit tangent vector, | Chapter 13, T1 |
| 16 | | Curvature and unit normal vector | |
| 17 | | Torsion and unit binormal vector | |
| 18-19 | Operations on vector functions | Directional derivative and gradient vectors, Tangent plane | §14.5, T1 |
| 20 | | Divergence and curl of a vector field | Chapter 9, T2 |
| 21 | Definite Integrals | Integral calculus, Line integral, Arc length | Chapter 6, T1 |
| 22-24 | Multiple Integrals | Double integral: Area, change of order of integration, changing to polar coordinate | Chapter 15, T1 |
| 25 | | Triple integral: Volume integral | |
| 26-27 | Vector Integrals | Vector integration: Line integral, flux, work done, circulation | Chapter 9, T2 |
| 28 | | Path independence, potential function and conservative fields | |
| 29 | | Surface area and integral | |
| 30 | Theorems on Vector Integrals | Green's theorem in the plane | |
| 31 | | Stoke's theorem | |
| 32 | | Divergence theorem | |
| 33 | Special Integrals | Gamma and beta function | Chapter 15, R1 |
| 34-36 | Sequence and Series | Sequence and series | Chapter 11, T1 |
| 37 | Special Trigonometric Series | Orthogonal function | Chapter 12, T2 |
| 38-40 | | Fourier Series | |

**Evaluation Scheme:**

| EC No. | Evaluation Component (EC) | Duration | Weightage | Nature | Scope (No. of Lectures) |
|---|---|---|---|---|---|
| 1 | First Test | 60 Min. | 20 | Closed Book | 1 - 10 |
| 2 | Second Test | 60 Min. | 20 | Open Book | 11 – 25 |
| 3 | Quiz / Assignment / Attendance | To be decided by Instructors | 10* | Open/Closed Book | To be decided by Instructors |
| 4 | Comprehensive | 3 Hrs. | 40 | Closed Book | 1 - 40 |

* EC No.3 will be based on the weightage of Quiz, Assignment and Attendance.

**Chamber Consultation Hour:** To be announced in the class.

**Make-up Policy:** Make-up is granted only for genuine cases with valid justification and prior permission from the Instructor-in-charge.

**(Instructor)**

# ENGINEERING PHYSICS-I

| | | |
|---|---|---|
| **Course Code** | : | **PH101** |
| **Course Title** | : | **Engineering Physics-I** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **3+1+2** |
| **Instructor (s)** | : | **Dr. Kanad Ray, Dr. Vipin Kumar Jain** |

**Course Description:**

**Theory:** The subject matter of the present course can be divided into two parts namely 'Optics' and 'Modern Physics". The first part covers Interference, Diffraction and Polarization. The second part deals with Wave Mechanics, Nanotechnology and Solar Cell.

**Practical:** The contents of the present course can be divided into Optics, Electrical & Electronics based experiments.

**Scope & Objective:**

In the context of this course, the subject Engineering Physics has been treated as an applied science from which a majority of engineering technologies have evolved. The thorough knowledge of the basic principles will help students to understand and apply many aspects of technology more effectively. Engineering Physics Lab exposes the students to experimental methods of Physics and integrates theoretical knowledge and concepts to practical experience.

**Text Books:**

T1. G.D. Ladiwala and S. S. Sharma, "Engineering Physics-I" New Age International Publication, New Delhi, I edn. 2010.

T2. G.D. Ladiwala and S. S. Sharma, "Engineering Physics-II" New Age International Publication, New Delhi, I edn. 2010.

T3: Lab Manuals for Physics

**Reference Books:**


R1 Arther Beiser, "Concept of Modern Physics" Tata McGrawHill, New Delhi, 5th edn. 1997.

R2 Ajoy Ghatak, "Optics", Tata McGraw Hill, 4th edn

R3 Eyvind H Wichman, "Quantum Physics" Tata McGraw Hill, Volume 4

R4 Neeraj Mehta, "Applied Physics for Engineers", PHI, I edn. 2011

R5: Dattu R Joshi, "Engineering Physics", Tata McGraw Hill Education Pvt. Ltd. New Delhi, I edn. 2010


**Course Plan (Theory):**

| Lecture No. | Learning Objectives | Topics to be covered | Reference Chap./ Sec. (Book) |
|---|---|---|---|
| 1 | What is light? | Introduction to optics | Ch-1 of T1<br>Ch-2 of R2 |
| 2-3 | Coherence | Spatial Coherence, Temporal coherence, Coherence length, Coherence time and 'Q' factor for light | Ch-3 of T2<br>Ch-2 of R2 |
| 4-5 | Newton's rings | Formation of Newton's rings, Measurement of wavelength of light, Diameter of Newton's rings | Ch-1 of T1<br>Ch-15 of R2 |
| 6-7 | Michelson's Interferometer | Michelson's Interferometer: Production of circular & straight line fringes | Ch-1 of T1<br>Ch-15 of R2 |
| 8 | Application of Michelson's Interferometer | Determination of wavelength of light, Determination of wavelength separation of two nearby wavelengths | Ch-1 of T1<br>Ch-15 of R2 |

| | | | |
|---|---|---|---|
| 9-10 | Antireflecting films and intereference filters | Elementary idea of anti-reflection coating and interference filters | Ch-1 of T1<br>Ch-15 of R2<br>Ch-16 of R2 |
| 11-12 | Fraunhofer diffraction | Single slit diffraction, position of maxima / minima and width of central maximum, intensity variation. | Ch-3 of T1<br>Ch-18 of R2 |
| 13-14 | Grating spectra | Construction and theory. Formation of spectra by plane transmission grating, Determination of wavelength of light using plane transmission grating | Ch-3 of T1<br>Ch-18 of R2 |
| 15-16 | Resolving Power | Introduction, Raleigh criterion, Resolving power of diffraction grating. | Ch-3 of T1<br>Ch-18 of R2 |
| 17-18 | Polarization | Plane, circular and elliptically polarized light on the basis of electric (light) vector, Malus law. | Ch-2 of T1<br>Ch-22 of R2 |
| 19 | Double refraction | Qualitative description of double refraction | Ch-2 of T1<br>Ch-22 of R2 |
| 20-22 | Analysis of polarized light | Quarter and half wave plates, construction, working and use of these in production and detection of plane, circular and elliptically polarized light. | Ch-2 of T1<br>Ch-22 of R2 |
| 23-25 | Optical activity | Introduction and law of optical rotation, specific rotation and its measurement using the half-shade and bi-quartz device. | Ch-2 of T1<br>Ch-19 of R2 |
| 26-27 | Concept of Quantum Mechanics | Heisenberg's Uncertainty Principle, Wave and Particle Duality of Radiation, De-Broglie's Concept of Matter waves, Quantum Nature of Light | Ch-4 of T1<br>Ch 2 of R4 |
| 28-29 | Experimental proof of Quantum Mechanics | Photoelectric Effect and Compton Effect | Ch-4 of T1 |
| 30 | Concept of Wave | Concept of Wave Function, Physical | Ch-4 of T1 |

| | | | |
|---|---|---|---|
| | Function | interpretation of wave function and its properties | |
| 31-32 | Schrödinger's wave equation | Schrödinger's Wave Equation: Time dependent and time independent cases | Ch-4 of T1 |
| 33 | Application of Schrödinger Equation | Particle in one-dimensional box | Ch-4 of T1 |
| 34-35 | Nanotechnology and physical properties at Nano scale | Introduction of Nanotechnology, Effect on physical properties due to Nano scale | Ch-22 of R5<br>Ch-18 of R4 |
| 36-37 | Methods and Applications | Methods of Nano material construction, Applications | Ch-22 of R5<br>Ch-18 of R4 |
| 38 | What is Solar Cell and properties | Introduction to Photovoltaic Cell/Solar Cell and It's Principles | Ch-22 of R5 |
| 39-40 | Theory, Types and Applications | Theory of Solar Cells, Types of Solar Cells, and Applications | Ch-22 of R5 |

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Closed Book |
| 3. | End Term Test / Comprehensive | 3 hour | 40 | Closed Book |
| 4. | Assignment(s)/ Quizzes | 30 min. | 20 | Open/Closed Book |

**Course Plan (Practical):**

| Lecture No. | Learning Objectives | Reference Book |
|---|---|---|
| 1-10 | To determine the wave length of monochromatic light with the help of Fresnel's Biprism | T1 & T3 |
| | To determine the wave length of sodium light by Newton's Ring | T1 & T3 |
| | To determine the specific rotation of Glucose (Sugar) solution using a Polarimeter | T1 & T3 |
| | To measure the Numerical Aperture of an Optical Fibre. | T1 & T3 |
| | To convert a Galvanometer in to an ammeter of range 1.5/3 amp and calibrate it. | T1 & T3 |
| | To convert a Galvanometer in to a Volt of range 1.5/3 volt and calibrate it. | T1 & T3 |
| | To study the variation of semiconductor resistance with temperature and hence determine the Band Gap of semiconductor in the form of reverse biased P-N junction diode | T1 & T3 |
| | To study the variation of thermo e. m. f. of iron copper thermo couple with temperature | T1 & T3 |
| | To determine the wavelength of sodium light by Michelson Interferometer | T1 & T3 |
| | To determine coherent length and coherent time of laser using He-Ne Laser | T1 & T3 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 hour | 10 | Closed Book |

| | | | | |
|---|---|---|---|---|
| 2. | Mid Term Test-II | 2 hour | 20 | Closed Book |
| 3. | End Term Test/Comprehensive | 2 hour | 40 | Closed Book |
| 4. | Attendance | Day to day | 10 | ..... |
| 5. | Continuous evaluation, Discipline, Punctuality, Assignment & Viva Voce | Day to day | 20 | ..... |

**Chamber Consultation Hour:** To be announced in the class.

**Notices:** All notices concerning this course will be displayed on the Notice Board.

**Make-up policy:** Make-up is granted only for genuine cases with valid justification and prior permission from the Instructors.

**Instructors**

# ENGINEERING CHEMISTRY-I

| | | |
|---|---|---|
| **Course Code** | : | **CH101** |
| **Course Title** | : | **Engg. Chemistry-I** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **(2+1+2)** |
| **Instructor (s)** | : | **Dr.Mohd. Shahnawaz Khan, Dr. S. K. Tomar** |

**Course Description:**

This first level course is offered in the first semester for the students of all branches of engineering. It provides a comprehensive survey of underlying physical principles, this course divided into five major independents areas of chemistry such as **Water, Polymers, Lubricants, Organic Chemistry (Names Reactions Mechanism & Stereochemistry), Engineering Materials (Cement & Glass).**

**Scope & Objective:**

The contents of the present course can be divided into five units based on experiments. This course will helpful to students to learn direct commercial industrial application of chemistry as well as experimental methods & instrumental techniques. This course also impart the integrate theoretical knowledge and practical experience into students.

**Text Books:**

1. Engineering Chemistry by Jain & Jain, **Dhanpatrai publication**

**Reference Books:**

1- Engineering Chemistry by B Sivasankar, (Mc-Graw Hill publication).
2- Engineering Chemistry by O.G. Palanna, (Mc-Graw Hill publication).
3- Organic Chemistry by Smith, (Mc-Graw Hill publication).
4- Organic Chemistry by IL Finar, (Pearson)
5- Engineering Chemistry (Wiely India publication).

**Course Plan (Theory):**

| Lecture No. | Learning Objective | Topic to be covered | Reference / Text Books |
|---|---|---|---|
| 1 | Common impurities of water. | Introduction of water impurities | Ch-1; Text |

| | | | |
|---|---|---|---|
| 2-4 | Hardness of water | Methods for hardness determination | Ch-1; Text |
| 5-8 | Municipal water supply | Purification of water | Ch-1; Text |
| 9-12 | Softening of water | Method for softening | Ch-1; Text |
| 13-16 | Boiler trouble | Boiler problems | Ch-1; Text |
| 17-19 | Classification and constituents of polymers | Types of polymers | Ch-3; Text |
| 20-21 | Plastics | Plastics | Ch-3; Text |
| 22-24 | Rubber | Synthetic & natural rubber | Ch-3; Text |
| 25-26 | Introduction of lubricants | General idea of lubricants | Ch-3; Text |
| 27-28 | Types of lubricants | Types of lubricants | Ch-10; Text |
| 29-31 | Properties of lubricants | Properties | Ch-10; Text |
| 32 | Types of silicates & their uses | Types of glass | Ch-10; Text |
| 33 | Annealing | Process involve in formation of glass | Ch-14; Ref-5 |
| 34-35 | Manufacturing of cements | Formation &properties of cement | Ch-14; Ref-5 |
| 36 | Setting and hardening of cement and role of gypsum. | Chemistry of cement | Ch-14; Ref-5 |
| 37-39 | Organic Reactions | mechanism | Ch-9; Ref-5<br>Ch-26; Text |
| 40-42 | Stereochemistry | 3D configuration of compounds | Ch-27; Text |

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Closed Book |
| 3. | End Term Test / Comprehensive | 3 hour | 40 | Closed Book |
| 4. | Assignment(s)/ Presentations/ Quizzes | 30 min. | 20 | Open/Closed Book |

**COURSE PLAN (PRACTICAL)**

**Text Books:**

T1. Jain and Jain, "Engineering Chemistry Book- Dhanpat Rai Publication, New Delhi.

T2. Lab Manuals for chemistry.

**Reference Books:**

**R1** Experimental Chemistry by Vogal

| Exp. No. | Learning Objectives | Books |
|---|---|---|
| 1-10 | To determine the hardness of water by complex metric method using EDTA. | T1 & T2 |
| | To determine the hardness of water by HCl method. | T1 & T2 |
| | To determine the amount of free chlorine in given sample. | T1 & T2 |
| | Determination of total residual chlorine in a water sample. | T1& T2 |
| | Determination of free carbon dioxide in a given sample. | T1 & T2 |
| | To determine the viscosity of a given sample of lubricant oil at various temperature. | T1 & T2 |
| | To determine flash and fire point of a given lubricant using Pensky-Martin's apparatus. | T1 & T2 |
| | To determine cloud and pour point of a given sample of lubricating oil using Cloud and Pour point apparatus. | T1 & T2 |
| | Measurement of Nitrate in water sample. | T2 & T2 |
| | Measurement of Oxygen in water sample. | T1& T2 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 hour | 15 | Closed Book |
| 2. | Mid Term Test-II | 2 hour | 15 | Closed Book |
| 3. | End Term Test | 2 hour | 40 | Closed Book |
| 4. | Attendance | Day to day | 10 | ..... |
| 5. | Continuous evaluation, Discipline, Punctuality, Assignment & Viva Voce | Day to day | 20 | ..... |

**Chamber Consultation Hour:** To be announced in the class.

**Notices:** All notices concerning this course will be displayed on the Notice Board.

**Make-up policy:** Make-up is granted only for genuine cases with valid justification and prior permission from the Instructors.

**(Instructor)**

# COMPUTER PROGRAMMING & IT

| | | |
|---|---|---|
| **Course Code** | : | **CSE101** |
| **Course Title** | : | **Computer Programing & IT** |
| **Course Credits** | : | **4** |
| **Total Hours Per Week (L+T+P)** | : | **3 + 0 + 2** |
| **Instructor (s)** | : | **Prof. Devendra Bhavsar, Prof. Alok Agrawal** |

**Course Description (Theory):**

**Unit I :** Introduction: Stored Program Architecture of Computers, Evolution of Processors (In terms of word length & Speed only), Storage Device- Primary Memory and Secondary Storage, Working Principle of Primary Storage devices- RAM, ROM, PROM, EPROM, EEPROM, Random, Direct, Sequential access methods. Language Translators – Concept of High-Level, Assembly and Low Level programming languages. Working of Assembler, Interpreter and compiler. Representing Algorithms through flow chart, pseudo code, step by step etc.

**Unit II :** Number System: Data Representation, Concept of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to radix r2. R's and (r-1)'s complement. Representation of Integer in sign-magnitude, signed 1's and 2's complement, Floating point representation. Concept of bias and normalization. Representation of alphabets, Binary Codes: Binary arithmetic, Addition and subtraction of Integers and floating point Numbers. Multiplication of Integers. Gray code, BCD 8421 and 2421, Excess-3 and Excess-3 gray codes.

**Unit III :** Programming in C: Structure of C Program, Concept of Preprocessor, Macro Substitution, Intermediate code, Object Code, Executable Code. Compilation Process, Basic Data types, Importance of braces ({ }) in C Program, enumerated data type, Identifiers, Scope of Variable, Storage Class, Constants, Expressions in C, Type Casting, Control Statements, printf( ), scanf ( ), reading single character, Command Line arguments.

**Unit IV :** Arrays in C, Pointers, Using pointers to represent arrays, Dynamic Memory allocation, structures, using typedef, Arrays of Structures & pointers, File Handling (Opening in different modes & closing of file, fscanf & fprintf only).

**Unit V :** Functions in C, Passing Parameters (By value & Reference), using returned data, Passing arrays, structures, array of structures, pointer to structures etc., passing characters and strings, The void pointer.

## Scope & Objective

This course is offered as a technical art subject to engineering students. It focuses on training the students rigorously in the skills of a structured programming language, particularly in C and application of such language in problem solving.

## Text Books:

T1. Reema Thareja "*Computer Fundamentals and Programming in C*" Oxford Education, first.2012

T2. Balagurusamy, "*Programming in ANSI C*" Tata Mcgraw Hill, sixth, 2012.

## Reference Books:

R1 Yashwant Kanetkar, "Let us C" BPB publication, fifth, 2012.

## Course Plan (Theory):

| Lecture No. | Learning Objectives | Topics to be covered | Reference Chap./ Sec. (Book) |
|---|---|---|---|
| 1-2 | Introduction | Introduction: Stored Program Architecture of Computers, Evolution of Processors (In terms of word length & Speed only) | CH-1 of T1 |
| 3 | Storage Devices | Storage Device- Primary Memory and Secondary Storage, Working Principle of Primary Storage devices | CH-4 of T1 |
| 4 | Memory | RAM, ROM, PROM, EPROM, EEPROM, Random, Direct, Sequential access methods | CH-4 of T1 |
| 5-7 | Number System | Number System: Data Representation, Concept of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to radix r2. r's and (r-1)'s complement | CH-3 of T1 |
| 8-9 | Number Systems | Representation of Integer in sign-magnitude, signed 1's and 2's complement. Floating point representation | CH-3 of T1 |
| 10-11 | Binary Codes | Binary Codes: Binary arithmetic, Addition and subtraction of Integers and floating point Numbers | CH-3 of T1 |
| 12 | Different Number Systems | Multiplication of Integers. Gray code, BCD 8421 and 2421, Excess-3 and Excess-3 gray codes | CH-3 of T1 |
| 13 | Programing Languages | Language Translators – Concept of High-Level, Assembly and Low Level | CH-7 of T1 |

| | | | |
|---|---|---|---|
| | | programming languages | |
| 14 | Programing Languages | Working of Assembler, Interpreter and compiler | CH-7 of T1 |
| 15 | Algorithms | Representing Algorithms through flow chart, pseudo code, step by step etc. | CH-7 of T1 |
| 16 | Programming in C | Programming in C: Structure of C Program, Concept of Preprocessor | CH-8 of T1<br>CH-1 of T2 |
| 17 | Programming in C | Macro Substitution, Intermediate code, Object Code, Executable Code. Compilation Process | CH-8 of T1 |
| 18-20 | Basic Data types | Basic Data types, Importance of braces ({ }) in C Program, enumerated data type | CH-8 of T1<br>CH-2 of T2 |
| 21-22 | Identifiers | Identifiers, Scope of Variable, Storage Class, Constants, Expressions in C, Type Casting, | CH-8 of T1 |
| 23-24 | printf ( ), scanf () | Control Statements, printf ( ), scanf ( ), reading single character. Command Line arguments | CH-8 of T1 |
| 25-27 | Decision Makin and Looping | For Loop, While Loop, Do While Loop | Ch-9 of T1<br>Ch-6 of T2 |
| 28 | Arrays in C | Arrays in C, Pointers, Using pointers to represent arrays | CH-11 of T1 |
| 29-32 | Dynamic Memory allocation | Dynamic Memory allocation | CH-13 of T1 |
| 33-35 | Functions in C | Functions in C, Passing Parameters (By value & Reference) using Return Data | CH-10 of T1 |
| 36 | Passing arrays | Passing arrays, structures, array of structures, | CH-13 of T1 |
| 37-38 | pointers | Pointer Basics, The void pointer, pointer to structures etc., passing characters and strings | CH-11 of T2<br>CH-13 of T1 |
| 39-40 | File Handling | File Handling (Opening in different modes & closing of file, fscanf & fprintf only) | CH-15 of T1<br>Ch-10 of R1 |
| 41-43 | Structures | structures, using typedef, Arrays of Structures & pointers | CH-14 of T1<br>Ch-12 of R1 |

**Evaluation Scheme (Theory):**

| Sr. No. | Evaluation Component | Duration (Hours) | Marks (100) | Nature of Component |
|---|---|---|---|---|
| 1. | Midterm test-I | 1 | 20 | Closed Book |
| 2. | Midterm test-II | 1 | 20 | Closed Book |
| 3. | Assignment | Continuous | 10 | Open Book |
| 4. | Quiz | Continuous | 10 | Closed Book |
| 5. | End Term | 3 | 40 | Closed Book |

**Course Description (Practical):**

**List of Experiments:**

1. Simple OS Commands, compiling program, compiler options, linking libraries.
2. Simple input output program integer, real character and string. (Formatted & Unformatted)
3. Conditional statement programs (if, if-else-if, switch-case)
4. Looping Program. (for, while, do-while)
5. Program based on array (one, two and three dimensions)
6. Program using Function (with and without recursion)
7. Simple programs using pointers.
8. File handling.
9. Program using Structure and Union.

**Course Plan (Practical)**

The lab is to be conducted on Linux platform or Windows using Turbo Compiler. The said experiments have to be performed week wise

**Evaluation Scheme (Practical):**

| Sr. No. | Evaluation Component | Duration (Hours) | Marks (100) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 | 20 | Closed Book |
| 2. | Mid Term Test-II | 2 | 20 | Closed Book |
| 3. | Viva voce evaluation | Day to Day | 10 | Closed Book |
| 4. | Attendance | Day to Day | 10 | |
| 5. | End Term Examination | 2 | 40 | Closed Book |

**Chamber Consultation Hour:** To be announced in the class.

**Notices:** All notices concerning this course will be displayed on the Notice Board.

**Make-up policy:** Make-up is granted only for genuine cases with valid justification and prior permission from the Instructors.

**(Instructor)**

# ENVIRONMENTAL STUDIES

| | | |
|---|---|---|
| **Course Code** | : | **ID 101** |
| **Course Title** | : | **Environmental Studies** |
| **Course Credits** | : | **2** |
| **Total Hours per Week (L+T+P)** | : | **2 + 0 + 0** |
| **Instructor (s)** | : | **Dr. S. K. Tomar** |

**Course Description:**

This course is designed as a compulsory course on Environmental Studies for undergraduate students of all disciplines. Assuming limited background in mathematics and science, it gives a balanced presentation of the major issues and concerns related to the environment.

**Scope & Objective:**

Environmental studies is considered as one of the basic subjects for all graduate students irrespective of branch as it develops thinking and imaginative capacity of the students. Especially, engineers who can successfully cope with new problems in the field must have a sound understanding of fundamental principles. The present course is designed to prepare the students in this direction. The contents of the syllabus have been developed keeping this in mind, so that students are exposed to a variety of situations that will test their understanding of the subject both at the concepted and analytical skills. This course covers the major environmental problems we face today: runaway growth, imperiled ecosystems, disappearing forests, endangered species, dwindling natural resources, dangerous toxic wastes, green laws, and other such issues.

**Text Books:**

T-1. Rajagopalan, R., "Environmental Studies: From Crisis to Cure", Oxford University Press, New Delhi, 2e, 2011

**Reference Books:**

R1 Ranjit Daniels & J. Krishnaswamy "Environmental Studies", Wiley India

R2 Davis & Cornwell "Environmental Engineering", Mc Graw Hill

**Course Plan:**

| Lecture No. | Learning Objectives | Topics to be covered | Reference Chap./ Sec. |
|---|---|---|---|
| 1 – 2 | The Global Environmental Crisis | Understanding environment | Chap. 1 T-1 |
| 3 – 4 | | The global crisis | |
| 5 – 6 | Ecosystems | Basic Concepts | Chap. 2 T-1 |
| 7 – 8 | | Forest and Grassland ecosystems | Chap. 3 T-1 |
| 9 | | Desert Ecosystems | Chap. 3 T-1 |
| 10 | | Aquatic Ecosystems | Chap. 4 T-1 |
| 11 – 12 | Biodiversity | Introduction to Biodiversity | Chap. 5 T-1 |
| 13 – 14 | | Biodiversity Conservation | Chap. 6 T-1 |
| 15 | Renewable and Non-Renewable Natural Resources | Introduction | Chap. 7 T-1 |
| 16 | | Water Resources | |
| 17 | | Energy Resources | Chap. 8 T-1 |
| 18 | | Forest Resources | Chap. 9 T-1 |
| 19 – 20 | | Land, Food, and Mineral Resources | Chap. 10 T-1 |
| 21 | Environmental Pollution | Introduction | Chap. 11 T-1 |
| 22 – 25 | | Air and Noise Pollution | |
| 26 – 28 | | Water, Soil, and Marine Pollution | Chap. 12 T-1 |
| 29 – 32 | | Solid Waste Management and Disaster Management | Chap. 13, 14 T-1 |
| 33 – 34 | Human Population and The Environment | Population Growth | Chap. 15 T-1 |
| 35 | | Environment and Human Health | Chap. 16 T-1 |
| 36 | Social Issues and The Environment | Sustainable Development | Chap. 18 T-1 |
| 37 – 39 | | Global Warming, Acid Rain, and | Chap. 19 T-1 |

| | | | |
|---|---|---|---|
| | | Ozone Depletion | |
| 40 | Environmental Laws and Regulations | Different types of laws and regulations | Chap. 20 T-1 |

**Evaluation Scheme:**

| S. No. | Evaluation Component | Duration | Weightage | Date | Nature | Scope (No. of Lectures) |
|---|---|---|---|---|---|---|
| 1 | First Test | 55 Min. | 20 | | Closed Book | 1 – 10 |
| 2 | Second Test | 55 Min. | 20 | | Closed Book | 11 – 25 |
| 3 | Quizzes /Assignments (Class room) | To be decided by Instructors | 20 | | Open/Closed Book | To be decided by Instructors |
| 4 | Comprehensive | 3 Hrs. | 40 | | Closed Book | 1 – 40 |

**Chamber Consultation Hour:** To be announced in the class.

**Make-up Policy:** Make-up is granted only for genuine cases with valid justification and prior permission from the Instructor-in-charge.

**(Instructor)**

# WORKSHOP PRACTICE

| | | |
|---|---|---|
| **Course Code** | : | **ME141** |
| **Course Title** | : | **Workshop Practice** |
| **Course Credits** | : | **2** |
| **Total Hours per Week (L+T+P)** | : | **0+0+3** |
| **Instructor (s)** | : | **Er. Kapender Singh Phogat** |

**Course Description:**

The subject Work-Shop Practice is the most important among all the courses in engineering; it is the heart of all engineering activities. The course is intended to be offered in the first year of engineering to all the discipline students. The course is a basic course and can be studied without any prerequisites though knowledge of materials helps.

After designing a product, it is important to be aware of the manufacturing methods to be able to realize the conceived design in the form of a real product. Also a number of products are an assembly of a number of components and one needs to understand how individual components can be brought together to get the desired product.

The Broad Aim of the course is to enable the student know how products used in day to day life are manufactured. The course also aims at providing students with hands on experience on manufacturing processes that include Machining operations like drilling and grinding, Sheet metal working like bending, shearing & blanking, joining processes like arc welding, gas welding and soldering.

The course aims shall be met through, Class room lectures using electronic media (Power point presentations, Videos), Practical hands on practice in the laboratory, Demonstrations of various machine tool operations in the laboratory.

**Scope & Objective:**

The Broad Aim of the course is to enable the student know how products used in day to day life are manufactured. This course provides an overview of the basic production techniques and allied/supporting techniques used to produce finished products from raw materials. The course also aims at providing students with hands on experience on manufacturing processes that include Machining operations like drilling and grinding, Sheet metal working like bending, blanking, piercing and beading, joining processes like arc welding and soldering, forging,

casting, and other joining techniques using common machine tools, hand tools and other equipments. Various joining and fitting skills will also be imparted in the practical classes.

**Text Books:**


T1. H S Bawa, "Workshop Practice", TMH, New Delhi, 2nd Edition, 2011

T2. B S Nagendra Parashar and R K Mittal, "Elements of Manufacturing Process", Prentice Hall of India, New Delhi, 2010 print

T3. B S Raghuwanshi, "A Course in Workshop Technology", Dhanpat Rai & Co., New Delhi, Volume I & II, 2011 reprint,

T4. Serope Kalpakjian and Steven R. Schmid, "Manufactuirng Engineering and Technology," Pearson Education (Low Cost Indian Edition), New Delhi, 4th Edition, 2005


**Reference Books:**


R1 K. Venkata Reddy, "Workshop Practice Manual", BS Publications, Hyderabad,6th Edition, 2011 print

R2 P. kannaiah and K. L. Narayana, "Engineering Practices Laboratory", SciTech Publications, Chennai, 2006


**COURSE PLAN (PRACTICAL)**

Course plan is meant as a guideline and there may be minor deviations while covering the syllabus.

| Week/ LabNo. | Learning Objectives | Topics to be covered | Reference Chap./ Sec. (Book)/Manual |
|---|---|---|---|
| 1 | Introduction to course | Basics of manufacturing, types of production systems, ethics, safety in workshop. | T1- Ch. 1-Art. 1.1-1.10 Ch.14, Art. 14.1-14.11 |
| | Role of measurements and quality in manufacturing. | Metrology, quality, Least Count of a measuring Instrument, measurement with Varnier Caliper or Micrometer. | T1- Ch. 3 Art. 3.1 – 3.32 |
| 2 | Understand the salient construction details of machine tools including Lathe, and Grinding machine. | Machining – Demonstration of Turning, Step Turning, | T3- Vol. II Ch. 6-Article 6.2-5, 6.30 Ch. 13- Articles |

| | | | |
|---|---|---|---|
| | Demonstrate turning, facing, and grinding operations. Distinguish between single point and multi-point cutting tools. | Facing, etc. | 13.29 |
| 3 | Understand principles of producing components/products by casting process. Demonstrate steps in sand casting process. | Casting – Demonstration of sand casting process | T3- Vol. I<br>Ch. 13- Article 13.1-3<br>Ch. 14- Articles 14.1-2, 14.4 – 5, 14.7- 11, 14.22-24<br>Ch. 15-Articles 15.2, 15.8, 15.11-12, 15.14<br>Ch. 18 - Table 18.1 |
| 4 | Understand principles of producing components/products by forging process. Demonstrate forging process. | Forging – Demonstration of forging operations | T1-Ch.5, Art.5.1– 5.17,<br>T3- Vol. I Ch. 20 Article 20.4, 20.6-9, 20.20, 20.39, |
| 5 | Prepare engineering drawing of the development of funnel. Prepare a process sequence diagram. Use hand tools and cut sheet metal as per the development drawing. Prepare the plane pipe. | Sheet metal working applications.<br>Hands on practice of Sheet metal working operations using hand tools- Preparation of Funnel. | T1- Ch. 6, Article 6.1 – 6.12,<br>T3- Vol. I<br>Ch. 26-Article 26.2-10, 26.15-16, 26.23<br>Ex. 8 on page 791 |
| 6 | Understand the principle of GAS welding. Sketch and label a typical gas welding setup. Sketch the different types of flames used in gas welding. Identify practical applications of gas welding.<br>Observe and Understand the process of GAS welding. Observe and Understand the operation of the equipment required for performing Gas welding. Distinguish between different flame types. | Gas Welding<br>Demonstration of Gas Welding | T1- Ch. 9, Article 9.1 – 9.33,<br>T3- Vol. I<br>Ch. 24-Article 24.16-24, 24.27-28,<br>Ex. 4 on Page 729 |
| 7 | Understand the principle of Arc welding. Sketch and label a typical Arc welding setup. Sketch the different types of Welding Joints. Identify practical applications of Arc welding.<br>Prepare a process sequence diagram. Marking on metal plates as per given drawing. Use hacksaw to cut raw material to required size. | Hands on practice of Joining of metal parts by Arc Welding- Preparation of a Lap Joint model. | T1- Ch. 9, Article 9.11-9.17,<br>T3- Vol. I<br>Ch. 24-Article 24.33-34, 24.36, 24.41-42, 24.71-72<br>Table 24.5<br>Ex. 1 on page 724 |

| | | | |
|---|---|---|---|
| | Perform filing operation to prepare the two pieces to be joined. Select suitable electrode for striking the ARC. Perform ARC welding to produce Lap joint model. | | |
| 8 | **Demonstrate the skills acquired.** | **Internal Examination** | |
| 9 | Understand the importance of joining processes and Identify their applications, Classify different joining processes, Understand the principle of arc welding, Identify different types of welded joints, Understand the purpose of edge preparation, Distinguish between different welding techniques.<br>Prepare a process sequence diagram. Marking on metal plates as per given drawing. Use hacksaw to cut raw material to required size. Perform filing operation to prepare the two pieces to be joined. Select suitable electrode for striking the ARC. Perform ARC welding to produce Butt joint model. | Mechanical joining processes, Arc Welding<br>Hands on practice of Joining of metal parts by Arc Welding- Preparation of a Butt Joint model. | T1- Ch. 9, 9.11-9.9.14, T3- Vol. I Ch. 24<br>Article 24.33-34, 24.36, 24.41-42, 24.71-72<br>Table 24.5<br>Ex. 2 on page 725 |
| 10 | Identify tools used in carpentry section. Demonstrate the correct holding and use of carpentry tools including hand saw, C-clamp, Bench wise, Chisels, and Mallets. Classify different types of wood used in carpentry works, Identify common types of joints.<br>Read and interpret given drawing of Lap Tee joint model. Prepare a process sequence diagram. Perform marking on the raw material. Prepare the required parts of Lap Tee joint. Produce the Lap Tee joint. Check for flatness and squareness of the parts prepared. Measure the dimensions of individual parts as well as the completed Lap Tee joint. | Introduction to wood working, Wood working Tools, Types of wood, Types of joints.<br>Hands on practice of Wood working operations using hand tools- preparation of Lap Tee Joint. | T1- Ch. 7, Article 7.1-7.32, T3- Vol. I Table 9.1<br>Ch. 10<br>Article 10.2-8, 10.12, 10.23, 10.25 |
| 11 | Define Brazing and Soldering processes, Differentiate between Welding, Brazing and Soldering, Identify practical examples of | Mechanical joining processes, Soldering, Brazing. | T1- Ch. 8, Article 8.1 – 8.25, T3- Vol. I Ch. 24-Article 24.65-66 |

| | | | |
|---|---|---|---|
| | Brazing and soldering. | | |
| 12 | Understand the salient construction details of machine tool like Shaping machine. Demonstrate shaping operations. | Machining – Demonstration of Shaping operations | T3- Vol. II Ch. 10-Article 10.2-4, 10.9, 10.29-34, |
| 13 | Prepare engineering drawing of Male & Female Joint. Prepare a process sequence diagram. Use hand tools and cut MS Flat as per the drawing. | Hands on practice of Fitting operations using hand tools- Prepare a job in fitting shop. | T1- Ch. 4, Article 4.1 – 4.27, T3- Vol. I Ch. 23-Article 23.2-5, 23.8, 23.11-17, 23.21 |
| **14** | **Demonstrate the skills acquired** | **Internal Examination** | |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 hour | 15 | Open Book |
| 2. | Mid Term Test-II | 2 hour | 15 | Closed Book |
| 3. | End Term Test | 2 hour | 40 | Closed Book |
| 4. | Attendance | Day to day | 10 | ..... |
| 5. | Continuous evaluation, Discipline, Punctuality, Assignment & Viva Voce | Day to day | 20 | ..... |

**Chamber Consultation Hour:** I operate an open door policy - if I am in, I will be glad to talk to you. However, I also have formal office hours so that you know when you can find me in: Thursday and Friday at 14:00 pm - 18:00 pm, or by appointment.

**Notices:** All notices concerning this course will be displayed on the Notice Board.

**Make-up policy:** Make-up is granted only for genuine cases with valid justification and prior permission from the Instructors.

**(Instructor)**

# ENGINEERING GRAPHICS

| | | |
|---|---|---|
| **Course Code** | : | **CE101** |
| **Course Title** | : | **Engineering Graphics** |
| **Course Credits** | : | **2** |
| **Total Hours per Week (L+T+P)** | : | **0 + 0 + 3** |
| **Instructor (s)** | : | **Prof. Pradeep K. Gupta** |

**Course Description:**

One hour lecture on various features of AutoCAD shall be dealt with in the theory hours on which the practice shall be performed in the last 2 hours of practical during a continuous 3 hours session every week. Hands-on practice shall be performed by each student on the individual PC assigned to him using the licensed AutoCAD 2012 installed on the PCs.

**Scope & Objective:**

Engineering drawing, drafting and graphics is the language of the engineers and technicians. Therefore, it is the intent of this course to equip students with the fundamentals of this unique language and to give them the skills necessary to prepare complete, concise, and accurate communications through engineering drawings using AutoCAD. The aim of this course is to introduce students the basic concepts and the use of engineering drawing with the help of AutoCAD. The students will develop an understanding of 2D computer aided drafting using AutoCAD.

**Text Books:**

T1. Kulkarni D M, Rastogi A P, Sarkar A K, Engineering Graphics with AutoCAD, PHI Learning Pvt. Ltd., New Delhi, India, Fourth Printing (Revised Edition), 2012.

T2. Bhatt N D, Engineering Drawing, Charotar Book Stall, Anand, India.

**Reference Books:**

R1 Jolhe D A, Engineering Drawing with an introduction to AutoCAD, TMH, New Delhi, India.

R2 Gill P S, Engineering Drawing (Geometrical Drawing), S K Kataria & Sons, Delhi, India.

**Course Plan:**

| Week/ L. No | Learning Objectives | Topics to be covered | Reference Chap./ Sec. (Book)/Manual |
|---|---|---|---|
| 1 | Introduction to Engineering Drawing, AutoCAD and Its advantages | Introduction to Engineering Drawing & AutoCAD | T1 Ch1,2 |
| 2 | Description of the Drawing screen and setting up Drawing, Getting Started with AutoCAD and initial setup commands | Drawing Setup, formatting | T1 Ch2 |
| 3 | Introduction of the Draw toolbar like ARC, POLYLINE,ELLIPSE, RECTANGLE, POINTS, HATCH, TEXT Introduction to Modify Toolbar: MOVE,COPY,ROTATE,STRETCH ,TRIM,BREAK, EDIT POLYLINE,CHAMFER,EXPLODE Drawing different figure using above mentioned command | Basic Commands, Draw Toolbar | T1 Ch2 T2 Ch26 |
| 4 | Practice on the modify and Draw toolbar | Advanced Command, Object & Modify toolbar | T1 Ch2 T2 Ch26 |
| 5 | Introduction to different types of Planes of Projection, Practice of Projection of Simple objects like cube, rectangle etc. Introduction, terminology, dimension style, linear dimension, aligned dimension, angular dimension, radius & diameter dimension, angular dimension, base line dimension, Practice on the dimensioning | Orthographic Projection-I, Dimensioning | T1 Ch5 T2 Ch8 |

| | | | |
|---|---|---|---|
| 6 | More examples for practice purpose is to be taken and the same must be done in AutoCAD | Orthographic Projection-II | T1 Ch5<br>T2 Ch8 |
| 7 | Different views of the complex objects to be drawn using AutoCAD | Orthographic Projection-III | T1 Ch2<br>T2 Ch26 |
| 8 | Drawing a given 3D view into isometric Projection, Practicing 2D view of basic figures in AutoCAD | Isometric Projection-I | T1 Ch6<br>T2 Ch17<br>T1 Ch2<br>T2 Ch26 |
| 9 | Drawing Isometric Projection From Orthographic Projection, Drawing 3D isometric view in AutoCAD | Isometric Projection-II | T1 Ch6<br>T2 Ch17 |
| 10 | Practicing Isometric view in AutoCAD | Isometric Projection-III | T1 Ch2<br>T2 Ch26 |

**Evaluation Scheme:**

| EC No. | Evaluation Component | Duration | Marks | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Closed Book |
| 3. | End Term Test / Comprehensive | 3 hour | 40 | Closed Book |
| 4. | Assignment(s)/ Quizzes | 30 min. | 20 | Open Book |

**Note:** A total of 3 quizzes will be conducted. Out of these, the best performance will be considered for final evaluation.

**Chamber Consultation Hour:** 1 PM to 3 PM, All Mondays

**Notices:** All notices concerning this course will be displayed on the Notice Board.

**Make-up policy:** Make-up is granted only for genuine cases with valid justification and prior permission from the Instructors.

**Instructors**

# INSTITUTE OF ENGINEERING AND TECHNOLOGY

of JKLU - Jaipur: The Second Semester courses of 4-year B.Tech Programme (Common to all branches) have been thoroughly discussed and deliberated upon in the Faculty Council of Institute of Engineering and Technology of JKLU - Jaipur for B Tech Batch of (2012-14) → 2012-16 Recommended and Forwarded for Approval.

20/7/2012

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# Syllabus

## B. Tech. Second Semester-2013

## (COMMON TO ALL BRANCHES)

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Approved for the Batch 2012-16.

Director - IET
Academic Section

21.7.2012
Vice Chancellor

# JK Lakshmipat University

Laliya Ka Vas, P.O. Mahapura, Ajmer Road, Jaipur 302 026

Ph.: +91-141-2168272/330/387/393

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# PROFESSIONAL COMMUNICATION SKILLS

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|---|---|---|
| **Course Code** | : | **LA 201** |
| **Course Title** | : | **Professional Communication Skills** |
| **Course Credits** | : | **03** |
| **Total Hours per Week** | : | **2+0+2** |

**Course Syllabi (Theory):**

- Introduction to the course. Characteristic Features of Effective Communication and Ways to Overcome Barriers to Communication.
- Importance of Non-Verbal Communication. Importance of Paralinguistic Features and Vocal Cues.
- Group Discussion. Job Interviews.
- Public Speaking.
- Business Letters and Resume.
- Business Reports, Technical Proposals.
- E-mail Writing, Other Business Writings.
- Editing and Proofreading.

**Text Book:** Sanjay Kumar and Pushp Lata, Communication Skills, New Delhi: OUP, 2011.

**Reference Books:**


1. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Second Edition, New Delhi: OUP, 2011.
2. Krishna Mohan and Meenakshi Raman, Effective English Communication, New Delhi: Tata-McGraw Hill, 2000.
3. Krishna Mohan and N.P.Singh, Speaking English Effectively, New Delhi: Macmillan,1994.
4. V. Sasikumar and P.V. Dhamija, Spoken English: A Self-Learning Guide to Conversation Practice, Tata-McGraw Hill, 2007.

5. Norman Lewis, Word Power Made Easy, Delhi: GoyalSaab Publishers and Distributors, 1994.
6. A.J.Thomson and A.V.Martinet, A Practical English Grammar, 4th Edition, New Delhi: OUP, 1999.
7. Asha Kaul, Business Communication, Second Edition, New Delhi: PHI, 2010.
8. Edgar Thorpe and Showick Thorpe, Objective English, 2nd Edition, New Delhi: Pearson Education, 2008.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Open Book |
| 3. | End Term Test / Comprehensive Exam | 3 hour | 40 | Closed Book |
| 4. | Quiz, Assignments, Mock Interviews, GDs, Presentations, etc | ..... | 20 | Open/Closed Book |

**Course Syllabi (Practical):**

- Sounds of English
- Accent and Intonation
- Listening Skills
- Reading Comprehension
- Vocabulary Extension
- Professional Presentations
- Group Discussions
- Job Interviews

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 hour | 10 | Closed Book |
| 2. | Mid Term Test-II | 2 hour | 20 | Closed Book |
| 3. | End Term Test/Comprehensive Exam | 2 hour | 40 | Closed Book |
| 4. | Attendance | Day to day | 10 | ..... |
| 5. | Continuous evaluation, Discipline, Punctuality, Assignment & Viva Voce | Day to day | 20 | ..... |

# ENGINEERING MATHEMATICS-II

| | | |
|---|---|---|
| **Course Code** | : | **MA201** |
| **Course Title** | : | **Engineering Mathematics - II** |
| **Course Credits** | : | **03** |
| **Total Hours per Week (L+T+P)** | : | **3+1+0** |

**Course Syllabi (Theory):**

- **Ordinary Differential equation**: Differential equation of first order, Differential equation of higher order with constant coefficients, Differential equation of second order with variable coefficients, Solution in series
- **Partial differential equation**: Partial Differential Equations of First Order, Heat equation, wave equation, Laplace equation, Variable separable technique for solving PDE, Boundary value problems
- **Matrix Algebra**: Matrices, Rank of a Matrix, System of Linear Algebraic Equations, Linear Independence and Dependence, Eigen Values and Eigen Vectors, Diagonalization, Cayley Hamilton Theorem
- **Linear Algebra**: Unit Vector Space, Subspaces, Bases and Dimensions, Coordinates, Row Equivalence and Computations concerning Subspaces, Linear Transformations, The Algebra of Linear Transformations, Representation by matrices
- **3-Dimensional Geometry**: Equation of a sphere, Intersection of a sphere and a plane, tangent plane, Intersection of two spheres, orthogonality of two spheres, Right circular cone. Right circular cylinder

## TEXT AND REFERENCE BOOKS


1. Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Fourth Edition (Student Edition), Jones & Barlett, Viba, New Delhi, 2011
2. Peter V. O'Neil, *Advanced Engineering Mathematics*, Seventh Indian Reprint, Cengage Learning, New Delhi, 2011.
3. G.B. Thomas, Jr., *Thomas' calculus*, 11th edition (Indian), Pearson education, Delhi, 2008
4. Erwin Kreyszig, *Advanced Engineering Mathematics*, Wiley 9th Edition.
5. B.V.Ramana, *Higher Engineering Mathematics*, Tata Mcgra Hill.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Open Book |
| 3. | End Term Test / Comprehensive Exam | 3 hour | 40 | Closed Book |
| 4. | Quiz, Assignments, Mock Interviews, GDs, Presentations, etc | ..... | 20 | Open/Closed Book |

# ENGINEERING PHYSICS-II

| | | |
|---|---|---|
| **Course Code** | : | **PH201** |
| **Course Title** | : | **Engineering Physics - II** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **3+1+2** |

**Course Syllabi (Theory):**

**Application of Schrodinger Equations and Band Theory of Solids**

- Particle in three-dimensional boxes, Degeneracy.
- Barrier penetration and tunnel effect, Tunneling probability, Alpha Decay.
- Kronig-Penny Model, Brillouin Zones, Effective Mass of Electrons, Distinction between Insulators, Semiconductors and Conductors, Intrinsic and Extrinsic Semiconductors.

**Statistical Mechanics**

- Introduction, Macroscopic and Microscopic Systems, Phase Space.
- Maxwell-Boltzman Statistics, Bose-Einstein Statistics, Fermi-Dirac Statistics.
- Sommerfeld Free Electron Gas Model of Solids.

**Laser and Fibre Optics**

- Theory of Laser Action, Einstein's Coefficients, Threshold Conditions for Laser Action.
- Theory, Design, and Applications of He-Ne Laser.
- Theory of Semiconductor Lasers.
- Optical Fibre, Numerical Aperture, and Maximum Angle of Acceptance.

**Special Theory of Relativity**

- Postulates of Special Theory of Relativity, Lorentz Transformations, Relativistic Velocity Addition.
- Relativity of Length, Mass, and Time, Mass-Energy Relation, Relativistic Energy and Momentum.

**Nuclear Radiation Detectors**

- Characteristics of Gas Filled Detectors, Constructions, Working, and Properties of Ionization Chamber.

- Proportional Counter, G.M. Counter, Paralysis Time, Quenching.
- Scintillation Counter.

**Electro Dynamics**

- Scalar and Vector fields, Definitions of Gradient, Divergence and Curl.
- Maxwell's Equations, Wave equation and its solution for free space, Poynting vector.

**Text Books:**

T1. G.D. Ladiwala and S. S. Sharma, "Engineering Physics-I" New Age International Publication, New Delhi, I edn. 2010.

T2. G.D. Ladiwala and S. S. Sharma, "Engineering Physics-II" New Age International Publication, New Delhi, I edn. 2010.

**Reference Books:**

R1 Arther Beiser, "Concept of Modern Physics" Tata McGrawHill, New Delhi, 5th edn. 1997.

R2 Ajoy Ghatak, "Optics", Tata McGraw Hill, 4th edn

R3 Eyvind H Wichman, "Quantum Physics" Tata McGraw Hill, Volume 4

R4 Neeraj Mehta, "Applied Physics for Engineers", PHI, I edn. 2011

R5: Dattu R Joshi, "Engineering Physics", Tata McGraw Hill, New Delhi, I edn. 2010

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Closed Book |
| 3. | End Term Test / Comprehensive | 3 hour | 40 | Closed Book |
| 4. | Assignment(s)/ Quizzes | 30 min. | 20 | Open/Closed Book |

**Course Syllabi (Practical):**

- To determine the height of water tank with the help of a Sextant.
- To determine the dispersive power of material of a Prism for Violet Red and Yellow colours of Mercury light with the help of a spectrometer.
- To determine the wave length of prominent lines of mercury by plane diffraction Grating with the help of spectrometer.
- To determine the ferromagnetic constants retentivity, permeability and susceptibility by tracing I-H curve using C.R.O.
- To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted).
- To determine the high resistance by method of leakage, using a Ballistic Galvanometer.
- To determine dielectric constant of a liquid using moving coil Ballistic Galvanometer.
- To study characteristics of G.M. Counting System.
- To determine the absorption coefficient of lead using lead sheet by G.M. Counting System.
- To verify the expression for the resolving power of a Telescope.
- To determine the specific resistance of the material of a wire by Carey Fosters Bridge.

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 hour | 10 | Closed Book |
| 2. | Mid Term Test-II | 2 hour | 20 | Closed Book |
| 3. | End Term Test/Comprehensive Exam | 2 hour | 40 | Closed Book |
| 4. | Attendance | Day to day | 10 | ..... |
| 5. | Continuous evaluation, Discipline, Punctuality, Assignment & Viva Voce | Day to day | 20 | ..... |

# ENGINEERING CHEMISTRY-I

| | | |
|---|---|---|
| **Course Code** | : | **CH 201** |
| **Course Title** | : | **Engineering Chemistry- II** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **(2 + 1 + 2)** |
| **Total Hours per Week (L+T+P)** | : | **3+1+2** |

**Course Syllabi (Theory):**

- Methods & introduction of Coal
- Introduction of Solid state and structure of solids, Cubic system & Bragg's law
- Structure and properties of graphite, Liquid Crystal
- Introduction of Kinetics, Arrhenius theory, Gibbs law
- One component system
- Corrosion, Mechanism of corrosion
- Introduction of Nanotechnology
- Introduction of Optical fiber
- Introduction of Fuel

**Text Books:**

1. Engineering Chemistry by Jain & Jain, **Dhanpatrai publication**

**Reference Books:**


1- Engineering Chemistry by B Sivasankar, (Mc-Graw Hill publication).
2- Engineering Chemistry by O.G. Palanna, (Mc-Graw Hill publication).
3- Organic Chemistry by Smith, (Mc-Graw Hill publication).
4- Organic Chemistry by IL Finar, (Pearson)
5- Engineering Chemistry (Wiely India publication).

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Closed Book |
| 3. | End Term Test / Comprehensive | 3 hour | 40 | Closed Book |
| 4. | Assignment(s)/ Quizzes | 30 min. | 20 | Open/Closed Book |

**Course Syllabi (Practical):**

- Proximate analysis of solid fuel.
- Determination of calorific value of solid fuels.
- Measurement of pH of given sample by pH meter.
- Measurement of conductivity of given sample by conductivity meter.
- Measurement of Fluoride in water sample.
- To determine the strength of copper sulphate with the help of Hypo solution.
- To determine the strength of Ferrous Ammonium sulphate solution
- To determine the strength of NaOH and $Na_2CO_3$ in given alkali mixture
- Determination of Barium as barium sulphate gravimetrically.
- Determination of Na/K/Ca by Flame photometer in a given sample.

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 hour | 15 | Closed Book |
| 2. | Mid Term Test-II | 2 hour | 15 | Closed Book |
| 3. | End Term Test | 2 hour | 40 | Closed Book |

| | | | | |
|---|---|---|---|---|
| 4. | Attendance | Day to day | 10 | ..... |
| 5. | Continuous evaluation, Discipline, Punctuality, Assignment & Viva Voce | Day to day | 20 | ..... |

# ELECTRICAL & ELECTRONICS ENGINEERING

| | | |
|---|---|---|
| **Course Code** | : | **EE201** |
| **Course Title** | : | **Electrical & Electronics Engineering** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **3+1+2** |

**Course Syllabi (Theory):**

- Introduction to electrical circuits, Loop analysis, Node-voltage analysis
- Wye (Y) – Delta (Δ) and Delta (Δ) – Wye (Y) transformations
- Superposition theorem, Thevenin theorem
- Fundamental aspects of single phase ac supply, Phasor representation
- Steady state analysis of series circuits, Apparent, active and reactive power, power factor
- Three-phase supply and network, Measurement of three-phase power
- Basics of transformer, Practical single phase transformer, Auto transformer
- Rotating Electrical Machines, Introduction to Semiconductor
- Diode and its working, Applications of diodes
- Bipolar Junction Transistor, Transistor configuration

**Text Books:**


$T_1$: S.N.Singh "Basic Electrical Engineering", Prentice-Hall of India Pvt. Ltd, 2011.

$T_2$ J. Millman and C. Halkias, Integrated Electronics, McGraw Hill,2th Edition, 6th Indian Reprint, 2011


**Reference Books:**


$R_1$ T.K.Nagsarkar,M.S. Sukhija,"Basic Electrical Engineering", Oxford University press, 2nd edition, 2011.

$R_2$ A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Closed Book |
| 3. | End Term Test / Comprehensive | 3 hour | 40 | Closed Book |
| 4. | Assignment(s)/ Quizzes | 30 min. | 20 | Open/Closed Book |

**Course Syllabi (Theory):**

ELECTRICAL LAB

1. Single line diagram of a power system and a distribution sub-station and basic functional study of main components used in power systems.
2. Make house wiring including earthing for 1-phase energy meter, MCB, ceiling fan, tube light,three pin socket and a lamp operated from two different positions. Basic functional study of components used in house wiring
3. Study the construction and basic working of ceiling fan, single phase induction motor and three phase squirrel cage induction motor. Connect ceiling fan along with regulator and single phase induction motor through auto-transformer to run and vary speed.
4. (a) Basic functional study and connection of moving coil & moving iron ammeters and voltmeters, dynamometer, wattmeter and energy meter.
   (b) Run a 3-phase squirrel cage induction motor at no load and measure its voltage, current,power and power factor. Reverse the direction of rotation.
5. Study the construction, circuit, working and application of the following lamps:
   (i) Fluorescent lamp, (ii) Sodium vapour lamp, (iii) Mercury vapour lamp, (iv) Halogen lamp and (v) Neon lamp
6. (a) Study the construction and connection of single phase transformer and auto-transformer.Measure input and output voltage and fin turn ratio.
   (b) Study the construction of a core type three phase transformer. Perform star and delta connection on a 3-phase transformer and find relation between line and phase voltage.

ELECTRONICS LAB

7. Identification, testing and applications of resistors, inductors, capacitors, PN-diode, Zener diode,LED, LCD, BJT, FET, UJT, SCR, Photo diode and Photo transistor.
8. (a) Functional study of CRO, analog & digital multi-meters and function / signal

generator.
(b) Study the single phase half wave and bridge rectifier and effects of filters on waveform.

9. Study the BJT amplifier in common emitter configuration. Measure voltage gain, plot gain frequency response and calculate its bandwidth.
10. (a) Study the construction and basic working of SCR.
(b) Study the single phase half wave and bridge controlled rectifier and observe the effect of firing angle on waveform.

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 hour | 10 | Closed Book |
| 2. | Mid Term Test-II | 2 hour | 20 | Closed Book |
| 3. | End Term Test/Comprehensive Exam | 2 hour | 40 | Closed Book |
| 4. | Attendance | Day to day | 10 | ..... |
| 5. | Continuous evaluation, Discipline, Punctuality, Assignment & Viva Voce | Day to day | 20 | ..... |

# ENGINEERING MECHANICS

| | | |
|---|---|---|
| **Course Code** | : | **ME 201** |
| **Course Title** | : | **Engineering Mechanics** |
| **Course Credits** | : | **3** |
| **Total Hours per Week (L+T+P)** | : | **3+1+0** |

**Course Syllabi (Theory):**

- Fundamentals of engineering mechanics, Laws of Motion, Equilibrium, Conditions for equilibrium, Equations of equilibrium.
- Statics of Particles and Rigid Bodies: System of forces, Resultant force, Resolution of force, Moment and Couples.
- Trusses: Truss analysis, analysis of frames and machines.
- Friction: Types of Friction, Laws of friction, Angle of friction, Angle of repose, Applications of Friction.
- Lifting Machines: Mechanical advantage, Velocity Ratio, Efficiency of machine, Ideal machine, Ideal effort and ideal load, Reversibility of machine, Law of machine, Lifting machines; System of Pulleys, Simple wheel and axle, Wheel and differential axle, Weston's differential pulley block, Worm and worm wheel.
- Properties of Plane Surfaces: Centroids & Centre of Mass, area of moments, principle moments of inertia, Second moment of mass.
- Virtual work: Principle of Virtual Work, Active forces and active force diagram.
- Kinematics of Particles and Rigid Bodies: Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity and Angular acceleration, Radial and transverse velocities and accelerations, Projectiles motion on plane and Inclined Plane, Relative Motion.
- Kinetics of Particles and Rigid Bodies: Equation of motion in rectangular coordinate, radial and transverse components, Equation of motion in plane for a rigid body.
- Work, Energy and Power: Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Non-conservative Force, Conservation of energy.
- Impulse and Momentum: Linear and angular momentum, Linear and angular impulse, Principle of momentum for a particle and rigid body, Principle of linear impulse and momentum for a particle and rigid body, Principle of angular momentum and Impulse, Conservation of angular momentum, Angular momentum of rigid body.

**Reference Books:**

R1. Vector Mechanics for Engineers, Beer and Johnston, Tata McGraw-Hill.

R2. Engineering Mechanics, Hibbeler, Pearson Education.

R3. Engineering Mechanics, Meriam and Kraige, John Wiley & Sons.

R4. Engineering Mechanics, Timoshenko and Young, Tata McGraw-Hill.

R5. Engineering Mechanics, Shames, Pearson Education.

R6. Engineering Mechanics, Boresi and Schmidt, CL-Engineering.

R7. Engineering Mechanics, Andrew Pytel & Kiusalas, Cengage Learning.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 | Closed Book |
| 2. | Mid Term Test-II | 1 hour | 20 | Closed Book |
| 3. | End Term Test / Comprehensive | 3 hour | 40 | Closed Book |
| 4. | Assignment(s)/ Quizzes | 30 min. | 20 | Open/Closed Book |

# MACHINE DRAWING

| | | |
|---|---|---|
| **Course Code** | : | **ME 241** |
| **Course Title** | : | **Machine Drawing** |
| **Course Credits** | : | **2** |
| **Total Hours per Week (L+T+P)** | : | **0+0+3** |

**Course Syllabi (Practical):**

- **SECTIONAL VIEWS:** Conversion of pictorial view into sectional orthographic projections, sectional views with different types of sections such as revolved, broken aligned section missing views. Representation of those views with Auto-CAD
- **ADVANCE ISOMETRIC VIEWS:** Isometric view of complex objects and Machine Parts "Sectional Isometric Views" with AutoCAD
- Introduction to Oblique views and perspective projection and exploded views of an assembly using AutoCAD
- **INTERSECTION OF SURFACE:** Interpenetration of solids, prism and prism, cylinder and cylinder, cylinder and prism, cone and cylinder, cone and prism.
- **LATEST ISI CONVENTIONS:** Conventions covering the standard practice in machine drawing. Conventions for various components like bearing, gears, springs, key and key ways, threads, tap holes and materials. Working drawing for welded joints, Use of specifications for limits, fits and tolerances, Conventions used for surface roughness i.e. Machined surface, rough surface, etc. Bearing and bearing mountings, Engine and machine tool components.

**Text Books:**


T1. Yarwood, Alf. **"Introduction to Auto – CAD 2011 2D and 3D Design",** Elsevier, 1st edition, 2010

T2. Ellen Finkelstein, **"Auto-CAD 2011 & Auto-CAD LT 2011 Bible,"** Wiley India Edition

T3. Ajeet Singh, **"Machine Drawing: Includes AutoCAD,"** TMH, 2nd edition


**Reference Books:**


R1 Bhatt, N.D. "**Machine Drawing**", Charotar Pulisher, 38th edition, 2003.

R2 James E Fuller, **"Using Auto-CAD,"** Denmark Publishing Co.

R3 Dhawan, R.K. "**Machine Drawing**", S. Chand and Co, 2005

R4 Radhakrishnan, P., **"Computer Graphics and Design**", Dhanpatrai and Sons.

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (%) | Nature of Component |
|---|---|---|---|---|
| 1. | Mid Term Test-I | 2 hour | 10 | Closed Book |
| 2. | Mid Term Test-II | 2 hour | 20 | Closed Book |
| 3. | End Term Test/Comprehensive Exam | 2 hour | 40 | Closed Book |
| 4. | Attendance | Day to day | 10 | ..... |
| 5. | Continuous evaluation, Discipline, Punctuality, Assignment & Viva Voce | Day to day | 20 | ..... |

Having been recommended by BOS and approved by Academic Council, the Syllabus and Scheme of Examination are approved for implementation.

24/4/13
Vice Chancellor

# JK Lakshmipat University

Laliya Ka Vas, P.O. Mahapura, Ajmer Road, Jaipur 302 026

Ph.: +91-141-2168272/330/387/393

## INSTITUTE OF ENGINEERING AND TECHNOLOGY

**4 Year B. Tech Program**

**Branch: Civil Engineering**

**Batch 2012-16**

**SEMESTER – III to VIII**

# Detailed Syllabus

# &

# Scheme of Examination

**Academic Council Meeting (20.04.13)**


# JK Lakshmipat University

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## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## 4 Year B. Tech Programme

## (Branch: Civil Engineering)

## Batch 2012-2016

## SEMESTER-THIRD

# Detailed Syllabus

# &

# Scheme of Examination

## Academic Council (20.04.2013)

# STRENGTH OF MATERIALS & MECHANICS OF STRUCTURES

| | | |
|---|---|---|
| **Course Code** | : | **CE 301** |
| **Course Title** | : | **Strength of Materials & Mechanics of Structures–I** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+1+0** |

**Course Syllabi (Theory):**

- **Basics of Strength of Materials** - Types of stresses and strains, Definition of determinate and indeterminate structure, Degree of Freedom, Free Body Diagram, Concept of stress and strain, Mohr's circle of stress and strain, Principle stress and strain examples, Strain – strain relationship, Hook's law, Elastic constants & relation between them, Concept of Principle Axes, Moment of Inertia & Centre of Gravity, Compound and composite bars
- **Bending Moment and Shear Force** – Introduction to bending moment and shear force diagram in beam, Simply supported beams, Overhanging beams, Beam with varying distributed load, Bending Moment and Shear Force for inclined loading
- **Concept of Bending & Shear Stresses** – Flexural formula, Stress – Strain diagram for beam, Shear stress in beam, Shear stress in beam with different cross-section
- **Concept of Torsion** - Torsion in circular shaft, Torsion Equation, Shear stress in shaft due to torsion, Combined Bending & Torsion
- **Concept of Slope and Deflection** – Introduction to slope and deflection in beam by differential equation, Double Integration method, Moment area method (Mohr's Theorems), Conjugate beam method, Strain Energy Method, Macaulay's method, Maxwell's reciprocal deflection theorem, Betti's theorem of reciprocal deflections, Examples
- **Combined Direct & Bending Stresses**

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


T1. Pytel, A., and Jaan Kiusalaas, ***"Mechanics of Materials",*** CL Engineering, 2nd edition, 2011

T2. Hibbeler, R.C., ***"Mechanics of Materials SI",*** 6th SI edition, Prentice Hall

T3. Ryder, G.H., ***"Strength of Materials",*** Palgrave Macmillan, 1969

T4. Junarkar ----------


**Reference Books:**


R1 Beer, F.P., Johnston, E.R., DeWolf, J.T., "***Mechanics of Materials***", McGraw Hill, 4th edition,

R2 Craig, R.R., "***Mechanics of Materials***", John Wiley and Sons, 2nd edition, 1999

R3 Singh, Sadhu, "***Strength of Materials - I***", Khanna Book Publishing, Latest edition

R4 Rattan, S.S., ***"Strength of Materials***", McGraw Hill, New Delhi, 2nd edition,

R5 Norris & Wilburr ----------

# FLUID MECHANICS & APPLICATIONS

| | | |
|---|---|---|
| **Course Code** | : | **CE 302** |
| **Course Title** | : | **Fluid Mechanics & Applications** |
| **Course Credits** | : | **7** |
| **Total Hours Per Week (L+T+P)** | : | **3+1+2** |

**Course Syllabi (Theory):**

- **Introduction to Fluids:** Fluids and continum, Physical properties of fluids, Ideal and real fluids, Newtonian and non-Newtonian fluids, Surface tension of liquids
- **Hydrostatics:** Pressure-density-height relationship, manometers, pressure on plane and curved surfaces, center of pressure, buoyancy, stability of immersed and floating bodies, fluid masses subjected to uniform accelerations, measurement of pressure
- **Kinematics of Fluid Flow:** Steady and unsteady, uniform and non-uniform, laminar and turbulent flow, One, two and three-dimensional flows, streamlines, streak lines and path lines, Continuity equation, rotation and circulation, elementary explanation of stream function and velocity potential, Drawing flow nets
- **Hydrodynamics –Basics:** Euler's Equation of motion along a streamline and its integration, Bernoulli's equation and its applications- Pitot tube, flow through orifices, mouthpieces, nozzles, weirs, sluice gates under free and submerged flow conditions, momentum equation and its application to stationary and moving vanes, Pelton Wheel, Problems related to combined application of energy and momentum equations, Pumps and Cavitation.
- **Hydrodynamics -Flow in Pipes:** Laminar Flow, Hagen-Poiseuille Equation, Turbulent Flow, Boundary Layer Theory, Pipe Friction Factor: Blasius Equation, Nikurade's Experiments, Moody, Pipe Design: Local Head Loss, Sudden Enlargement, Sudden Contraction

- **Hydrodynamics -Flow in Open Channels:** Basics of Channel Flow, Moody Diagram for Channel Flow, Friction Formula for Channels, Manning's n, Varying Flow in Open Channels, Flow Characteristics
- **Dimensional Analysis and Hydraulic similitude:** Dimensional analysis, Buckingham's theorem, important dimensional numbers and their significance, geometric, Kinematic and dynamic similarity, model studies.

**Course Syllabi (Practical):**

1. Metacentric Height Apparatus
2. Apparatus for Orifice Experiments
3. V-Notch
4. Bernoulli's Theorem
5. Venturimeter
6. Orificemeter
7. Friction Factor of pipe
8. Reynolds experiment
9. Study of centrifugal pump
10. Pelton wheel test rig

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**

T1. Cengel Y.A., Cimbala J.M., Fluid Mechanics, TMH, New Delhi, 2012

T2. Kundu P.K., Cohen I.M., Fluid Mechanics, Elsevier, Haryana, 2009

**Reference Books:**

R1. Subramanya K., Fluid Mechanics and Hydraulics Machines, TMH, New Delhi, 2011

R2. Modi P.N., Seth S.M., Hydraulics and Fluid Mechanics including Hydraulics Machines, Standard Book House, New Delhi, 2011

R3. Wylie & Bedford ----------

# BUILDING MATERIAL & CONSTRUCTION

| | | |
|---|---|---|
| **Course Code** | : | **CE 303** |
| **Course Title** | : | **Building Material & Construction** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

**Course Syllabi (Theory):**

- Introduction, Types of Building Materials: Stone, Bricks, Cement, Mortar, Concrete, Timber, Steel, Paints & Adhesives, Tiles
- Masonry work – Brick & Stone. Types of bonds in masonary
- DPC; Plastering & Pointing; Flooring

**Course Syllabi (Practical):**

- Identification of materials and study of relevant I.S. codes
- Visits of manufacturing units,
- Preparation of study reports and presentation of seminars
- Preparation of detailed drawings on above topics

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**


T1. Dr B C Punmia, Ashok & Arun Jain, *Building Construction*, Laxmi Publications (P), LTD, New Delhi, 10 th Edition 2008.

T2. S C Rangwala, *Building Materials*, Charotar Publishing House Pvt, Ltd, 13 th Edition, 2012


**Reference Books:**


R1 The Handbook of Building Construction by MM Goyal.

R2 National Building Code of India, 2005, Bureau of Indian Standards, Delhi

# ENGINEERING GEOLOGY

| | | |
|---|---|---|
| **Course Code** | : | **CE 304** |
| **Course Title** | : | **Engineering Geology** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

**Course Syllabi (Theory):**

- **Earth Sciences:** Introduction
- **Basics of Engineering Geology:** Scope of Engineering Geology for a Civil Engineer
- **Types of Geology:** Physical geology and mineralogy
- **Petrology:** Classification of rocks and their uses as building and road materials
- **Failures in Earth crust:** Historical geology; Structural geology: Folds, faults, unconformity etc.
- **Investigation in Geology:** Engineering geology: Geological investigations at dam, tunnel and bridge sites and influence of various structures
- **Precautions in different earth planes:** Precautions against faulting, folding, bedding planes, joints, cracks, fissures, permeability and ground water condition

**Course Syllabi (Practical):**

- Identification of Rocks
- Identification of Minerals

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |

| | | | |
|---|---|---|---|
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**

T1. Prof Parbin Singh, 'Engineering & General Geology" S K Kataria & Sons, 8 th edition, 2008

T2. Principles of Engineering Geology, Bangar,

**Reference Books:**

R1 Structural Geology by Billings

R2 Petrology by Tyrll.

# ENGINEERING MATHEMATICS - III

| | | |
|---|---|---|
| **Course Code** | : | **MA301** |
| **Course Title** | : | **Engineering Mathematics – III** |
| **Course Credits** | : | **5.5** |
| **Total Hours per week (L+T+P)** | : | **3+1+0** |

**Course Syllabus:**

- **Integral Transforms**: Laplace transform and its properties, Fourier Transform, Integral transform method for solving differential equations, Systems of Linear Differential Equations, Discrete Fourier transform, Fast Fourier Transform
- **Special Functions**: Legendre and Bessel functions, series representations and recurrence relations
- **Calculus of variations**: Extremal function, Euler Equation, Isoperimetric problems
- **Complex Analysis**: Functions of complex variables and its derivatives, Integration in complex planes, Series, Singularities and Residues, Evaluation of Real Integrals, Conformal mappings, Schwarz-Christoffel Transformations.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | --- | 10 |

**Text and Reference Books**


1. Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Fourth Edition (Student Edition), Jones & Barlett, Viba, New Delhi, 2011
2. Peter V. O'Neil, *Advanced Engineering Mathematics*, Seventh Indian Reprint, Cengage Learning, New Delhi, 2011.
3. Erwin Kreyszig, *Advanced Engineering Mathematics*, Wiley 9th Edition.
4. B. S. Grewal, Higher Engineering Mathematics, 41st Ed., Khanna Publishers, Delhi, 2011.
5. B. V. Ramana, *Higher Engineering Mathematics*, Tata Mcgraw Hill.
6. Potter M.C., Goldberg J.L., Edward F.A., *Advanced Engineering Mathematics*, 3rd Edition, Oxford University Press, 2005

# FOUNDAIONS OF MANAGEMENT

| | | |
|---|---|---|
| **Course Code** | : | **HS301** |
| **Course Title** | : | **Principles of Management** |
| **Course Credits** | : | **4** |
| **Total Hours Per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- **Concepts of management:** Functions and Responsibilities of managers, Principles of management and visiting various, Schools of management Thoughts in developing, Excellent managers
- **Planning:** Nature and purpose of planning, Planning process and principles, Types of planning, Advantages and disadvantages of planning, Concept of objectives and types of objectives, Case analysis
- **Organizing:** Nature and purpose of organizing, Process of organizing, Span of management and determination of span of management, Principles of organizing, Departmentalization, delegation and, Decentralization. Case analysis
- **Directing and leading:** Requirements of Effective directions, Giving orders, motivation, Nature of leadership, leadership and management, Recapitulation and case discussion
- **Controlling:** concept and process, Need for controlling and types of control methods, Essentials of effective control, Benefits and problems in control systems. Case analysis
- Social responsibilities of business: Meaning, Social responsibility of business towards different groups, Social performance of business in India, Social audit, Business ethics and corporate governance

**Evaluation Scheme (Theory):**

| Sr. No. | Evaluation Component | Duration | Marks (100) (%) |
|---|---|---|---|
| 1. | Mid Term Exam | 2 hours | 20% |
| 2. | End Term Exam | 3 hours | 50% |
| 3. | Continuous Evaluation (Quizzes, Assignments, Presentations, Class Participation) | - | 30% |

**Text Books:**

T1. Tripathy, P.C. and Reddy, P. N. "Principles of Management". . McGraw Hill, New Delhi. 4th ed. 2008.

**Reference Books:**

R1 Koontz, Herold and Weihrich, Heinz. "Management". McGraw Hill, New York. 9th ed. 1988.

R2 Stoner, James A. F. and Freeman, R Edward. "Management". Prentice Hall of India, New Delhi. 6th e, 1989.

R3 Bateman, T. S. and Snell, S. A. "Management: Leading and Collaborating in a Competitive World", McGraw Hill Irwin. 8th edition,2009.

R3 Draft, R. L. "Principles of Management". Cengage learning.2009

R4 Schermerhron, J. R. "Introduction to Management", 10th edition, Wiley India. 2009

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## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## 4 Year B. Tech Programme

## (Branch: Civil Engineering)

## Batch 2012-2016

## SEMESTER-FOURTH

# Detailed Syllabus

# &

# Scheme of Examination

## Academic Council (20.04.2013)

# STRENGTH OF MATERIALS & MECHANICS OF STRUCTURES - II

| | | |
|---|---|---|
| **Course Code** | : | **CE401** |
| **Course Title** | : | **Strength of Materials & Mechanics of Structures - II** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+1+0** |

**Course Syllabi (Theory):**

- Static determinacy and indeterminacy, Analysis of Fixed Beams, Continuous Beams & Propped Cantilever Force Method, Three Moment Theorem, Column Analogy Method, Muller Breslau's Principle.
- **Thin Cylinder and Sphere** - Classification of pressure vessels, Stresses in thin cylindrical shell due to internal pressure, Circumferential or Hoop stress, Longitudinal stress, Effect of internal pressure on dimensions of thin cylindrical shell, Spherical shell subjected to an internal pressure, Change in dimensions of thin Spherical shell due to internal pressure, Examples
- **Columns and Struts** - Definitions, Classifications, Assumptions made in the Euler's Column Theory, Expressions for crippling load of different cases like both the ends are hinged or pinned, one end is fixed and other is free, both ends are fixed, one end is fixed other is hinged, Effective length of column, Slenderness ratio, Crippling stress in terms of Effective length and radius of gyration, limitations of Euler's Formula, Rankine's Formula, Eccentric loading, Johnson's Formula for Columns, both straight line and parabolic formula for columns, Examples.
- **Curved Beam** – Stresses in Curved Beams (Winkler – Bach Theory), Position of Neutral Axis, Values of $h^2$ for rectangular, circular, I, T and trapezoidal cross-section, Examples. Stresses in a ring, stresses in a chain link, Examples.

- **Spring** – Definitions, Types, Closely-coiled Helical spring, Open – coiled Helical Springs, Examples. Strain energy in the spring, Springs under impact load, Springs in series, Springs in parallel, Examples. Leaf springs or Carriage springs like semi-elliptical spring, and Quarter-elliptical spring, Examples.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


T1. S.B. Junarkar & H.V., "Mechanics of Strucutres", Vol. II

T2. Hibbeler, R.C., ***"Mechanics of Materials SI",*** 6th SI edition, Prentice Hall

T3. Ryder, G.H., ***"Strength of Materials",*** Palgrave Macmillan, 1969

T4. Srivastava, A.K., and P.C. Gope, ***"Strength of Materials",*** PHI, 2nd edition, 2012


**Reference Books:**


R1 Beer, F.P., Johnston, E.R., DeWolf, J.T., "***Mechanics of Materials***", McGraw Hill, 4th edition,

R2 Craig, R.R., "***Mechanics of Materials***", John Wiley and Sons, 2nd edition, 1999

R3 Singh, Sadhu, "***Strength of Materials - I***", Khanna Book Publishing, Latest edition

R4 Rattan, S.S., ***"Strength of Materials***", McGraw Hill, New Delhi, 2nd edition,

R5 C. K. Wang, "Structural Analysis"

# CONCRETE & CONSTRUCTION TECHNOLOGY

| | | |
|---|---|---|
| **Course Code** | : | **CE402** |
| **Course Title** | : | **Concrete & Construction Technology** |
| **Course Credits** | : | **06** |
| **Total Hours per Week (L+T+P)** | : | **3+0+3** |

**Course Syllabi (Theory):**

- Review of constituent materials – Cement, Aggregates and mix design, admixtures,
- Properties of concrete in fresh and hardened state, special concretes, durability of concrete subjected to extreme environment,
- Deterioration mechanisms, assessment and control of corrosion in concrete structures,
- In-situ assessment of concrete structures,
- Various NDT techniques and their applications,
- Repair of concrete structures.

**Course Syllabi (Practical):**

1. Tests on cement – specific gravity, fineness, soundness, normal consistency, setting time, compressive strength on cement mortar cubes
2. Tests on fine aggregate – specific gravity, bulking, sieve analysis, fineness modules, moisture content, bulk density and deleterious materials.
3. Tests on coarse aggregate - specific gravity, sieve analysis, fineness modulus, bulk density.
4. Tests on Fresh Concrete: Workability : Slump, Compaction factor tests
5. Hardened Concrete: Compressive strength on Cubes, Static modulus of elasticity, Flexure tests , Non destructive testing
6. Mix Design of Concrete.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**References:**


1. Neville, A.M. and Brooks, J.J.," CONCRETE TECHNOLOGY", ELBS .1990.
2. Mehta, P.K., "CONCRETE Structure, Material and Properties" Prantice Hall Inc.1986.
3. Newman, K., "CONCRETE SYSTEMS in COMPOSITE MATERIALS".EDT BY L.Holliday. Elsevier Publishing Company. 1966.
4. Powers, T.C., "THE PROPERTIES OF FRESH CONCRETE".JOHN WILEY & SONS, INC. 1968.

# SURVEYING – I

| | | |
|---|---|---|
| **Course Code** | : | **CE403** |
| **Course Title** | : | **Surveying - I** |
| **Course Credits** | : | **06** |
| **Total Hours per Week (L+T+P)** | : | **3+0+3** |

**Course Syllabi (Theory):**

- Basic principles, Maps,
- Topographic Sheets, their scales and uses;
- Level, Theodolite, Tacheometer, Compass and other instruments;
- Introduction to Total Station; Temporary adjustments; Measurement of distances and directions;
- Levelling; Contouring; Traversing;
- Adjustment of survey data; Computation of coordinates; Plane Table survey.
- Setting out works for lines and buildings, horizontal and vertical control

**Course Syllabi (Practical):**

- Chain Surveying
- Compass Surveying
- Plane Table Surveying
- Levelling & Dumpy levels
- Theodolite Surveying

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**References:**


1. Surveying Vol. I & II by K.R. Arora.
2. Surveying Vol. I & II by B.C. Punmia.
3. Surveying Instruments by Cledenning & Oliver

# BUILDING CONSTRUCTION TECHNOLOGY

| | | |
|---|---|---|
| **Course Code** | : | **CE404** |
| **Course Title** | : | **Building Construction Technology** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- Foundations: Different types of shallow & deep foundations, Causes of failure of foundation
- Safe Bearing Capacity of soil, Expansion, Construction joints, Doors & Windows, Lintels & Arches, Sill & Jamb Details, Stairs, Floors, Roof – Flat & Pitched and Formwork.
- Exterior & Interior Wall Sections

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**References:**

1 The Handbook of Building Construction by MM Goyal

2 Building construction by SP Arora, & S P Bindra

3 National Building Code of India, 2005, Bureau of Indian Standards, Delhi.

4 Engineering materials S C Rangwala

# NUMERICAL & STATISTICAL ANALYSIS

| | | |
|---|---|---|
| **Course Code** | : | **MA 402** |
| **Course Title** | : | **Numerical & Statistical Analysis** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3 + 0 + 2** |

**Course Syllabi (Theory):**

- **Modeling, Computers, and Error Analysis**: Mathematical Modeling and solution using Programming and Software, Computer Arithmetic and Errors: Approximations and Round-Off Errors, Truncation Errors and the Taylor Series
- **Transcendental and polynomial equation**: Solution of non-linear Equations: Bracketing Methods, Open Methods, Roots of Polynomials
- **Linear Algebraic Equations**: LU Decomposition and Matrix Inversion, Iterative methods for solving system of linear equations.
- **Interpolation and approximation**: Interpolation for equally and unequally spaced points, Lagrangian Polynomial, Curve Fitting: Least-Squares Regression
- **Numerical Differentiation and Integration**: Numerical Differentiation and Integration, Newton-Cotes Integration Formulae.
- **Ordinary Differential Equations**: Single step methods for solving first order ordinary differential equation
- **Random Variables and probability distributions**: Introduction to probability, Discrete and continuous random variables, probability mass, probability density and cumulative distribution functions, Mathematical expectation, Chebyshev's inequality, Discrete and continuous probability distributions
- **Sampling distributions**: Sampling, Types of sampling, sampling errors, sampling distribution of means, variance and proportions for normal population, The Central Limit Theorem, Chi-Square, t and F distributions
- **Estimation**: Estimators, Point and interval estimation, confidence intervals for parameters in one sample and two sample problems of normal populations, confidence intervals for proportions
- **Testing of Hypotheses**: Null and alternative hypotheses, the critical and acceptance regions, two types of error, Parametric and Non-parametric tests, Chi-square goodness of fit test, Contingency tables.

- **Correlation and regression**: Types of Relationships, Scatter Diagrams, Regression Line, Coefficients of Determination and Correlation.
- **Analysis of variance**: One way analysis of variance, experimental design, two way analysis of variance without interaction

**Course Syllabus (Practical):**

Computer Programming in C and Matlab; Introduction to SPSS for solving statistical techniques.

List of experiments:

1. To find the solution of Non-linear equations.
2. To find solution of system of equations.
3. To find the best fitted curve for a given set of points.
4. To differentiate a function numerically.
5. To integrate a functions numerically.
6. To find solution of a differential equation numerically.
7. Working on SPSS

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | --- | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |

| | | | |
|---|---|---|---|
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

**Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text and Reference books:**


1. K. E. Atkinson, *Introduction to Numerical Analysis*, John Wiley and Sons.
2. M.K. Jain, S. R. K. Iyengar, R. K. Jain, *Numerical Methods For Scientific And Engineering Computation*, New age International publishers, New Delhi.
3. Steven C Chapra, Raymond P Canale, *Numerical Methods for Engineers*, 6/e, Mc Graw Hill
4. Srimanta Pal, *Numerical Methods: Principles, Analyses and Algorithms*, Oxford University Press, New Delhi.
5. Cheney and Kincaid, *Numerical Methods and Applications*, Cengage Publications, New Delhi.
6. Cleve B. Moler, *Numerical Computing with MATLAB*, Prentice Hall of India, New Delhi
7. Rishard A. Johnson, *Miller and Freund's probability and Statistics for Engineers*, PHI, 8th Ed.
8. Ravichandran J., Probaility and statistics for Engineers, Wiley India, New Delhi.
9. Douglas C. Montgomery and George C. Runger, *Applied Statistics and Probability for Engineers*, John Wiley & Sons, Inc., 3rd Edition (2004).
10. Prem S. Mann, *Introductory Statistics*, Wiley publication, 7th edition.

# PRINCIPLES OF ECONOMICS

| | | |
|---|---|---|
| **Course Code** | : | **HS401** |
| **Course Title** | : | **Principles of Economics** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3 + 0 + 0** |

**Course Syllabi (Theory):**

- Definition of Economics and role of economics in Engineering and Technology; Basic economic terms; The economy, working of an economy, kinds of an economy and its basic problems; Laws of Demand and Supply and market Equilibrium; Elasticity of demand its measurements and application, Production function and law of Variable Proportion and Law of Returns to Scale; Concepts of cost and revenue, short run and long run cost function; Profit maximization hypothesis, Price and output determination under Perfect Competition, Monopolistic competition and Monopoly.
- Measurement of macroeconomic aggregates, National Income, Consumption, saving and investment function; Macroeconomic issues: Inflation, Unemployment and Economic growth International aspects of macro economics; Foreign Exchange rate and Balance of payments.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Book:**

T.R. Jain and M.L. Grover, "Economics for Engineers", V. K. (India) Enterprises

**Reference Books:**

- D N Dwivedi "Principles of Economics", Vikas Publishing House Pvt Ltd.
- G. Mankiew. Economics Principles and Applications. Cengage Learning


# JK Lakshmipat University

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## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## 4-Year B. Tech Programme

## (Branch: Civil Engineering)

## Batch 2012-2016

## SEMESTER-FIFTH

# Detailed Syllabus

# &

# Scheme of Examination

## Academic Council (20.04.2013)

# THEORY OF STRUCTURES

| | | |
|---|---|---|
| **Course Code** | : | **CE501** |
| **Course Title** | : | **Theory of Structure** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+1+0** |

**Course Syllabi (Theory):**

- **Statically Indeterminate Structures-**Introduction, Static and Kinematic Indeterminacies, Castigliano`s theorems, Strain energy method, Analysis of frames with one or two redundant members using Castigliano`s 2nd theorem. Concept of rolling load,design of maximum bending moment,shear force due to rolling load,concept of influence lines in beams, I.L diagram for shear force ,B.M., deflection etc.
- **Slope deflection and moment Distribution Methods-** Analysis of continuous beams & portal frames, Portal frames with inclined members.
- ***Three hinged arch-horizontal thrust;*** shear force and bending moment diagrams. Unit-IV Bending moment and shear force in determinate beams and frames, definition and signs, conventions, axial force ,shear force and B.M diagrams.
- ***Unsymmetrical Bending***: Introduction, Centroidal principal axes of sections, Bending stresses in beams subjected to unsymmetrical bending, shear centre, shear centre for channel, Angles and Z sections.
- ***Cable and suspension Bridges -*** Introduction, uniformly loaded cables, Temperature stresses, and three hinged stiffening Girder and two hinged stiffening Girder.
- ***Analysis of statically determinate trusses-***Introduction, various types, stability, analysis of plane trusses by method of joints and method of sections, analysis of space trusses using tension coefficient method.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |

| | | | |
|---|---|---|---|
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


1. Statically Indeterminate Structures, C.K. Wang, McGraw Hill Book Co., New York.
2. Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.


**Reference Books:**


1. Indeterminate Structures, R.L. Jindal, S. Chand & Co., New Delhi.
2. Theory of Structures, Vol. I, S.P. Gupta & G.S.Pandit, Tata McGraw Hill, New Delhi.

# CONCRETE STRUCTURES – I

| | | |
|---|---|---|
| **Course Code** | : | **CE502** |
| **Course Title** | : | **Concrete Structures – I** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

**Course Syllabi (Theory):**

- ***Design Philosophies in Reinforced Concrete:*** Working stress and limit state methods, Limit state v/s working stress method, Building code, Normal distribution curve, characteristic strength and characteristics loads, design values, Partial safety factors and factored loads, stress -strain relationship for concrete and steel.
- ***Beam Design:*** Basic assumptions, Analysis and design of singly and doubly reinforced rectangular flanged beams, minimum and maximum reinforcement requirement, design examples.
- ***Analysis and Design of Sections in shear, bond and torsion*** -Diagonal tension, shear reinforcement, development length, Anchorage and flexural bond, Torsional, stiffness, equivalent shear, Torsional reinforcement, Design examples.
- ***Concrete Reinforcement and Detailing***-Requirements of good detailing, cover to reinforcement, spacing of reinforcement, reinforcement splicing, Anchoring reinforcing bars in flexure and shear, curtailment of reinforcement.
- ***Serviceability Limit State*** -Control of deflection, cracking, slenderness and vibrations, deflection and moment relationship for limiting values of span to depth, limit state of crack width, Design examples.

- ***One way and Two Ways Slabs*** -General considerations, Design of one way and two ways slabs for distributed and concentrated loads, Non-rectangular slabs, openings in slabs, Design Examples
- ***Columns and Footings***-Effective length, Minimum eccentricity, short columns under axial compression, Uniaxial and biaxial bending, slender columns, Isolated and wall footings, Design examples.
- ***Staircase Design***
- ***Retaining Walls***-Classification, Forces on retaining walls, design criteria, stability requirements, Proportioning of cantilever retaining walls, counterfort retaining walls, criteria for design of counterforts, design examples.

**Course Syllabi (Practical):**

- Design of Members i.e. Beams, Columns, Footings, Retaining Wall, Staircase etc.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |

| | | | |
|---|---|---|---|
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

*Note: **The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**

1. Design of Reinforced Concrete Structures,P.Dayaratnam,Oxford & IBH Pub.,N.Delhi.
2. Reinforced Concrete-Limit State Design, A.K.Jain, Nem Chand & Bros.,Roorkee.

**Reference Books:**

1. Reinforced Concrete, I.C.Syal & A,K,Goel, A.H,Wheeler & Co.Delhi.
2. Reinforced Concrete Design, S.N.Sinha, TMH Pub.,N.Delhi.
3. SP-16(S&T)-1980, Design Aids for Reinforced Concrete to IS:456, BIS, N.Delhi.
4. SP-34(S&T)-1987 Handbook on Concrete Reinforcement and Detailing`, BIS, N.Delhi.
5. Relevant IS codes on Aggregates, Cement & Concrete (269, 383, 2386, 10262, SP23)
6. Laboratory manual of concrete testing by V.V. Sastry and M. L. Gambhir

# STEEL STRUCTURES – I

| | | |
|---|---|---|
| **Course Code** | : | **CE503** |
| **Course Title** | : | **Steel Structures – I** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

**Course Syllabi (Theory):**

***Introduction:*** Properties of structural steel. I.S.Rolled sections and I.S. specifications.

***Connections:*** Importance, various types of connections, simple and moment resistant, riveted, bolted and welded connections.

***Design of Tension Members:*** Introduction, types of tension members, net sectional areas, design of tension members, lug angles and splices.

***Design of Compression Members:*** Introduction, effective length and slenderness ratio, various types of sections used for columns, built up columns, necessity, design of built up columns, laced and battened columns including the design of lacing and battens, design of eccentrically loaded compression members.

***Column Bases and Footings:*** Introduction, types of column bases, design of slab base and gusseted base, design of gusseted base subjected to eccentrically loading, design of grillage foundations.

***Design of Beams:*** Introduction, types of sections, general design criteria for beams, design of laterally supported and unsupported beams, design of built up beams, web buckling, web crippling and diagonal buckling.

***Design of Trusses:***

***Gantry Girders:*** Introduction, various loads, specifications, design of gantry girder.

***Plate Girder:*** Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (brief introduction), Curtailment of flange plates, design beam to column connections: Introduction, design of framed and seat connection.

**Course Syllabi (Practical):**

1. To verify the Betti's law.
2. Study of a three hinged arch experimentally for a given set of loading and to compare the results with those obtained analytically.
3. To obtain experimentally the influence line diagram for horizontal thrust in a three hinged arch and to compare the same with the theoretical value.
4. To determine the flexural rigidity of a given beam.
5. To study the behavior of different type of struts.
6. To verify moment area theorem for slopes and deflection of a beams.
7. To find the deflection of a pin□connected truss and to verify the results by calculation and graphically.
8. To determine the carry over factors for beam with rigid connections.
9. To determine the rotational stiffness of a beam when far end is (a) fixed (b) pinned.
10. Determine experimentally the horizontal displacement of the roller end of a two hinged arch for a given set of a loading and to compare the results with those obtained analytically.
11. To obtain experimentally the influence line diagram for horizontal thrust in a two hinged arch and to compare the same with the theoretical value.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**

1. Design of steel structures, A.S.Arya & J.L.Ajmani, Nem chand & Bros., Roorkee.
2. Design of steel structures, M.Raghupati, TMH Pub., New Delhi.

**Reference Books:**

1. Design of steel structures, S.M.A.Kazmi & S.K.Jindal, Prentice Hall, New Delhi.
2. Design of steel structures, S.K.Duggal, TMH Pub, New Delhi.

# SURVEYING - II

| | | |
|---|---|---|
| **Course Code** | : | **CE504** |
| **Course Title** | : | **Surveying - II** |
| **Course Credits** | : | **6** |
| **Total Hours per Week (L+T+P)** | : | **3+0+3** |

**Course Syllabi (Theory):**

- ***Trigonometrically Leveling:*** Introduction, height and distances -base of the object accessible, base of object inaccessible, geodetical observation, refraction and curvature, axis signal correction, difference in elevation between two points.
- ***Triangulation:*** Triangulation systems, classification, strength of figure, selection of triangulation stations, grade of triangulation, field work of triangulation, triangulation computations, introduction to E.D.M. instruments.
- ***Survey Adjustment and Treatment of Observations:*** Definite weight of an observation, most probable values, type of error, principle of least squares, and adjustment of triangulation figures by method of least squares.
- ***Astronomy:*** Definitions of astronomical terms, star at elongation, star at prime vertical star at horizon, star at culmination, celestial coordinate systems, Napier`s rule of circular parts, various time systems: sidereal, apparent, solar and mean solar time, equation of time-its cause, effect, determination of longitude, inter-conversion of time, determination of time, azimuth and latitude by astronomical observations.
- ***Elements of Photogrammetry:*** Introduction: types of photographs, Terrestrial and aerial photographs aerial camera and height displacements in vertical photographs, stereoscopic vision and stereoscopies, height determination from parallax measurement, flight planning, plotting by radiline method, principle of photo interpretation and photogram metric monitoring in Civil Engineering.

- Introduction of remote sensing and its systems, Analysis /measurements on remote sensing analysis. And interpretation of data
- ***Concept of G.I.S and G.P.S***-Basic Components, data input, storage & output.

**Course Syllabi (Practical):**

1. Ranging and chaining of a line AB and taking offsets.
2. Traversing with compass and error adjustment to local attraction.
3. To determine the difference in elevation of two given points.
4. Profile levelling and cross sectioning of a given route.
5. To measure the horizontal angle by the method of reiteration and repetition.
6. Theodolite traversing.
7. To prepare the contour map of an area by the method of radial lines.
8. Plane tabling by the method of radiation and intersection.
9. To point problem in plane tabling.
10. Three point problem by mechanical method.
11. Setting out of simple circular curve by offsets from long chord
12. Setting out of simple circular curve by successive bisection.
13. Setting out of simple circular curve by radial and perpendicular offsets.
14. Setting out of simple circular curve by chord produced.
15. Setting out of simple circular curve by one theodolite method.
16. Setting out of simple circular curve by two theodolite method.
17. Setting out of compound curve.
18. Setting out of transition curve.
19. Techometric constant.
20. Use of total station.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**

1. Surveying Vol.2 by B.C.Punmia
2. Surveying Vol.3 by B.C.Punmia
3. Surveying Vol.2 by T.P.Kanitkar

# ENVIRONMENTAL ENGINEERING

| | | |
|---|---|---|
| **Course Code** | : | **CE505** |
| **Course Title** | : | **Environmental Engineering** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

**Course Syllabi (Theory):**

Water supply; Demand; Sources; Quality standards; Water treatment: Method of purification of water; Screens, plain and coagulant aided sedimentation; Filtration-slow sand and rapid sand, disinfection; Water softening; Iron, Manganese, Fluoride, and Nitrate removal; Electrodialysis, R.O. and Ion exchange process desalination. Different type of pipes and pipe joints, Water distribution system design and storage, Long distance water transmission, Pumping stations, Rural water supply management.Sewage disposal; Sewerage system; Layout and design; Characteristics of municipal wastewater; Wastewater Treatment: Treatment scheme; Screening; Grit removal; Sedimentation; Floatation; Activated sludge process; Extended aeration; Trickling filters; RBC, UASB; Stabilization ponds and lagoons; Septic tank; Sludge handling and disposal. Introduction to tertiary treatment. Rural wastewater management.

**Course Syllabi (Practical):**

1. To find the turbidity and colour of a given sample of water.
2. To determine the pH value of a given sample of water.
3. To determine the carbonate, bicarbonate, and hydroxide alkalinity of a sample.
4. To find out the concentration of chlorides in the given sample of water.
5. To estimate the hardness of the given sample of water by standard EDTA method.
6. To determine residual chlorine in a given sample of water.
7. To find out total dissolved solid, settleable solids and suspended solids of the given sample.
8. To find the quantity of dissolved oxygen (DO) present in the given sample.
9. To determine biochemical oxygen demand (BOD) exerted by the given waste water sample.
10. To find the optimum amount of coagulant required to treat the turbid water by Jar Test.
11. To find out total bacterial count present in a given sample (SPCT).
12. To determine MPN of coliforms of the given sample.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**


1. Davis M.L. & Cornwell D.A. Introduction to Environmental Engineering, Mc GrawHill, 1991.
2. Peary H.S., Rowe D.R. and Tchobanoglous G. Environmental Engineering, Mc GrawHill, 1995.


**Reference Books:**


1. Standard Methods for the Examination of Water and Wastewater: APHA, AWWA, WPCF.
2. Chemistry for Environmental Engg and Science: C.N. Sawyer, P.L. McCarty & G.F. Parkin

# GEOTECHNICAL ENGINEERING

| | | |
|---|---|---|
| **Course Code** | : | **CE506** |
| **Course Title** | : | **Geotechnical Engineering** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

**Course Syllabi (Theory):**

Soil and soil mass constituents; and weight volume relationships, index properties, classification of soils, soil structure and clay minerals. Capillarity, permeability and seepage through soils, shearing strength of soils, determination of parameters by direct shear box, triaxial and unconfined compression test, vane shear test, typical stress strain curves for soils; stress path concept, determination of pore pressure coefficients. Liquefaction of soils, Soil compaction, laboratory tests and field control, Engineering properties of rocks and classification system. Testing of rocks; laboratory and field tests. Ground improvement techniques: mechanical stabilization, cement lime and bitumen stabilization.

**Course Syllabi (Practical):**

List of Experiments:

1. Grain size distribution by sieving.
2. Determination of water content by Pycnometer.
3. Determination of specific Gravity by Pycnometer.
4. Determination of liquid limit by Casagrande's apparatus.
5. Determination of liquid limit by cone penetrometer.
6. Determination of plastic limit
7. Determination of shrinkage limit
8. Determination of field density by core-cutter
9. Determination of field density by sand replacement method
10. Determination of compaction properties by standard Proctor Test Apparatus
11. Determination of C-Ø values by Direct Shear Test Apparatus
12. Determination of unconfined compressive strength by unconfined compression Test Apparatus

**Design as per syllabus of theory.**

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**


1. Acar, Y.B. and Daniel, D.E., "Geoenvironmental 2000: Characterization, "Containment, Remediation & Performance in Environmental Geotechnics," ASCE, NY.
2. Hari, D.S. and Krishna R.R., "Geoenvironmental Engineering: Site Remediation, "Waste Containment, and Emerging Waste Management Technologies," Wiley. USA
3. Oweis, I.S. and Khera, R.P., "Geotechnology of Waste Management," 2nd Ed, PSW Publishing Company, USA.
4. Rees, J.F., "Contaminated Land Treatment Technologies," SCI, Elsevier Applied Science, NY, USA.

**Reference Books:**


1. Analysis and Design of Sub Structures by Swami Saran, IBH Oxford
2. Basic and Applied Soil Mechanics by Gopal Ranjan and ASR Rao, Newage Int.Pub.
3. Soil Dynamic by Shamsher Prakash, McGraw Hill
4. Foundation Design by Teng, Prentice Hall
5. Soil Mechanics & Foundation Engineering by Bharat Singh, Shamsher Prakash, Nem Chand & Bros, Roorkee.
6. Analysis and Design of Foundation and Retaining Structure by S.Prakash, Gopal Ranjan S.Saran, Sarita Prakashan.

# PRACTICE SCHOOL – I

| | | |
|---|---|---|
| **Course Code** | : | **PS501** |
| **Course Title** | : | **Practice School – I** |
| **Course Credits** | : | **4** |
| **Duration** | : | **6 Weeks** |

**Course Syllabi:**

This course is for 6 weeks at the end of 4th semester during summer term of 4 year full time B. Tech. and 5 year Integrated Dual degree (B.Tech + M.Tech, B.Tech + MBA) programs in all the engineering disciplines. The objective of this programme is to provide the students an understanding of working of corporate world in various functions associated with an Industry/Organization. During this programme, they will observe and learn various real world applications of their curricula and develop an understanding of vast engineering operations and its various facets such as inventory, productivity, management, information systems, human resource development, data analysis etc. The general nature of PS-1 assignments is of study and orientation.

**Evaluation Scheme:**

| S. No. | Evaluation Component | Marks (100) (Weightage %) |
|---|---|---|
| 1 | Quiz-I | 4 |
| 2 | Quiz-II | 4 |
| 3 | Group Discussion-I | 4 |
| 4 | Group Discussion-II | 4 |
| 5 | Seminar-I | 4 |
| 6 | Seminar-II | 4 |
| 7 | Diary-I | 4 |
| 8 | Diary-II | 4 |
| 9 | Observation-I | 4 |
| 10 | Observation- II | 4 |
| 11 | Mid Term Evaluation (Project Report and Presentation/Viva) | 20 |
| 12 | Final Evaluation (Project Report and Presentation/Viva) | 40 |

# JK Lakshmipat University

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## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## 4-Year B. Tech Programme

## (Branch: Civil Engineering)

## Batch 2012-16

## SEMESTER-SIXTH

# Detailed Syllabus

# &

# Scheme of Examination

## Academic Council (20.04.2013)

# CONCRETE STRUCTURES – II

| | | |
|---|---|---|
| **Course Code** | : | **CE601** |
| **Course Title** | : | **Concrete Structures – II** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

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**Course Syllabi (Theory):**

- ***Continuous Beams***-Basic assumptions, Moment of inertia, settlements, Modification of moments, maximum moments and shear, beams curved in plan-analysis for torsion, redistribution of moments for single and multi-span beams, design examples.
- ***Flat slabs and staircases***-Advantages of flat slabs, general design considerations, approximate direct design method, design of flat slabs, openings in flat slab, design of various types of staircases, design examples.
- ***Adv. Foundations***-Combined footings, raft foundation, design of pile cap and piles, underreamed piles, design examples.
- ***Water Tanks, Silos and Bunkers***-Estimation of Wind and earthquake forces, design requirements, rectangular and cylindrical underground and overhead tanks, Intze tanks, design considerations, design examples.
- ***Silos and Bunkers***-Various theories, Bunkers with sloping bottoms and with high sidewalls, battery of bunkers, design examples. '
- ***Pre-stressed Concrete*** - Basic principles, classification of pre-stressed members, various prestressing systems, losses in pre-stress, initial and final stress conditions, analysis and design of sections for flexure and shear, load balancing concept, IS Specifications.
- ***End blocks***- An lysis of stresses, Magnel's method, Guyon's method, Bursting and spalling stresses, design examples.
- ***Building Frames***-Introduction, Member stiffnesses, Loads, Analysis for vertical and lateral loads, Torsion in buildings, Ductibility of beams, design and detailing for ductility, design examples.
- ***Yield Line Theory***-Basic assumptions, Methods of analysis, yield line patterns and failure mechanisms, analysis of one way and two way rectangular and non-rectangular slabs, effect of top corner steel in square slabs, design examples.

**Course Syllabi (Practical):**

- Design of Members.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**

1. Plain and Reinforced Concrete, Vol.2, Jai Krishna & O.P.Jain, Nem Chand & Bros.,Roorkee.
2. Pre-Stressed Concrete, N.Krishna Raju, TMH Pub.,N,.Delhi.
3. Design of Prestressed Concrete Structure^, T.Y.Lin, John Wiley & Sons., N.Delhi.
4. Reinforced Concrete-Limit Stage Design, A.K.Jain, Nem Chand & Bros.,Roorkee.

**Reference Books:**

1. IS 1343-1980.IS Code of Practice for Pre-stressed Concrete.
2. IS 3370-1976(Part 1 to IV), Indian Standard Code of Practice for Liquid Retaining Structures.
3. IS 456-2000, Indian Standard of Practice for Plain and Reinforced Concrete.
4. IS 1893, 4326 & 13920 Indian Standard Code of Practice for Earthquake Resistant Design of Structures.
5. Mechanics of Materials, Ferdinand P. Beer and E. Russel Johnston Jr., Mc GrawHill, 1992.
6. Mechanics of Materials, vol. 1 and 2, 2nd edition, E.J. Hearn, Pergamon Press, 1988.
7. W. Weaver & J.M. Gere, Matrix analysis of Framed Structures, VNR, 1980.
8. Tung Au & Paul Christiano, Fundamentals of Structural Analysis, Prentice Hall, 1993.
9. T.J. MacGinley & B.S. Choo, "Reinforced Concrete - Design Theory and Examples", 2nd. Edition, E & F.N. Spon, Chapman & Hall, London.
10. W.H. Mosley & Bungey, "Reinforced Concrete Design", 4th Edition, Newnes Butterworth.
11. C.J. Mettem, Structural Timber Design and Technology, Longman Scientific & Technical, 1985.

# STEEL STRUCTURES – II

| | | |
|---|---|---|
| **Course Code** | : | **CE602** |
| **Course Title** | : | **Steel Structures – II** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

**Course Syllabi (Theory):**

- ***Elementary Plastic Analysis and Design:*** Introduction, Scope of plastic analysis, ultimate load carrying capacity of tension members and compression members, flexural members, shape factor, mechanisms, plastic collapse, analysis, plastic analysis applied to steel beams and simple portal frames and design.
- ***Industrial Buildings:*** Loads, general arrangement and stability, design considerations, design of purlins, design of roof trusses, industrial building frames, bracings and stepped columns.
- ***Design of Water Tanks:*** Introduction, permissible stresses, design of circular, rectangular and pressed steel tanks including staging.
- ***Design of Steel Stacks:*** Introduction, various loads to be considered for the design of steel stacks, design of steel stacks including foundation.
- ***Towers:*** Transmission line towers, microwave towers, Design loads, classification, design procedure and specification.

- ***Cold Formed Sections:*** Introduction and brief description of various type of cold-formed sections, local buckling, concepts of effective width and effective sections, elements with stiffeners, design of compression and bending elements.

**Course Syllabi (Practical):**

1. Introduction: Building Byelaws, Orientation and Principles of planning, introduction of structural drawing.
2. Different types of bonds in walls and junctions in brick masonry, details of masonry columns, Drawings of partition walls, cavity walls.
3. Structural Drawing of RCC Structures, foundations, stair cases, retaining walls, water tanks.
4. Structural Drawing of steel structures, connections, beams, columns, trusses.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation | Day to day | 25 |

| | | | |
|---|---|---|---|
| | (Assignments, Discipline, Punctuality, & Viva Voce) | | |

**Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**

1. Design of Steel Structures, A.S.Arya & J.L.Ajmani, Nem Chand & Bros., Roorkee.
2. Design of Steel Structures, P.Dayartnam, Wheeler Pub. Allahabad

**Reference Books:**

1. Design of Steel Structures, Gaylord & Gaylord, McGraw Hill, New York/International Students
2. IS: 800-1984, Indian Standard Code of Practice for General Construction in Steel.
3. IS-801-1975, Indian Standard Code of Practice for Use of cold-formed light gauge steel structural members in general building construction.

# WATER RESOURCES & IRRIGATION ENGINEERING

| | | |
|---|---|---|
| **Course Code** | : | **CE603** |
| **Course Title** | : | **Water Resources & Irrigation Engineering** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

Introduction, need for harnessing water resources; Water resources projects and their planning; Irrigation practices; Irrigation-its importance and impact on environmental, assessment of water requirements for crops; Methods of irrigation; canal and well irrigation; canal irrigation; canal alignment; Design principles of irrigation canal management of canal irrigation; Design principle of hydraulic structures; Surface and surface considerations including energy dissipation; salient features of diversion head works; Falls; Regulators and cross drainage structures; Reservoir and flood routing through reservoir; basic principles for design of dams and spillway; Hydropower; General features and components of a hydropower station.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


1. Hydro Power Structures – R. S. Varshney (ISBN 8185240787)
2. Water Power Engineering – M. M. Dandekar, Vikas Pub. House Pvt. Ltd.
3. Water Power Engineering – P. K. Bhattacharya, Khanna Pub., Delhi
4. Water Power Engineering – M. M. Deshmukh, Dhanpat Rai and Sons
5. Textbook Of Water Power Engineering- Shrma R. K. , Sharma T. K, S Chand & Company Ltd.


**Reference Books:**


1. Water Power Development – E. Mosonvi, Vol. I & II
2. Hydro-electric Engineering Practice – G. Brown, Vol. I, II & III
3. Hydro – Electric Hand Book – Creager and Justin

# TRANSPORTATION ENGINEERING

| | | |
|---|---|---|
| **Course Code** | : | **CE604** |
| **Course Title** | : | **Transportation Engineering** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3+0+2** |

**Course Syllabi (Theory):**

**Introduction to Transportation Systems**

Transportation Systems Engineering-Definition and Objectives of Transportation Systems - Various fields of transportation engineering; Role of transportation in society - economical, social, political and environmental significance; Different modes of travel and their coordination with respect to Indian conditions; Introduction to transportation planning process - planning models and mass transit systems;

**Highway Engineering**

Highway planning - basic principles, road development and planning in India; Highway alignment; Geometric design of highways - design of cross-section, horizontal and vertical elements, IRC specifications;

**Highway Pavements**

Pavement materials; Requirements and tests on pavement materials; Classification of pavements and design factors; Design of flexible pavements - traffic factors, failure criteria, empirical mechanistic method of design, IRC-CBR design method, Asphalt institute method and AASHTO method; Design of rigid pavements - stresses in plain CC pavements, IRC method of plain CC pavement design, Joints in CC pavement, joint spacing and reinforcement across joints, tie bars and dowel bars; Pavement construction and maintenance; Stabilised roads; Drainage.

**Traffic Engineering**

Traffic characteristics; Traffic studies and their use; Traffic control devices; Intersections.

**Course Syllabi (Practical):**

1. Aggregate impact test
2. Angularity number test
3. To determine fineness modulus of a given sample of coarse aggregate.
4. Los angles abrasion test

5. Aggregate crushing value test
6. Standard tar viscometer test
7. Specific gravity and water absorption test
8. To determine the elongation index for given sample of aggregate.
9. To determine the flakiness index of given sample of aggregate.
10. Ductility test
11. To determine the softening point for give sample of bitumen.
12. Marshell stability test
13. Float test

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Evaluation Scheme (Practical):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test | 2 hour | 20 |
| 2. | End Term Test | 2 hour | 40 |
| 3. | Class Participation and/or Attendance | Day to day | 15 |
| 4. | Additional Continuous Evaluation (Assignments, Discipline, Punctuality, & Viva Voce) | Day to day | 25 |

***Note: The ratio of weightage between Theory and Practical content will be (60%: 40% respectively)**

**Text Books:**


1. Morlok, E. R. (1970). An Introduction to Transportation Engineering and Planning, McGraw Hill Kagakusha, International Student Edition.
2. Hay, W. W. (1988). 2nd Ed. Introduction to Transportation, Engineering. John Wiley and Sons, New York.
3. Papacostas, C. S. (1987). Fundamentals of Transportation, Engineering, Prentice Hall of India, New Delhi.
4. Hutchinson, B. G. (1974). Principles of Urban transportation Planning, McGraw Hill Book Company.


**Reference Books:**


1. Khanna, S. K. and Justo, C. e. G. (1991). Highway Engineering, Nemchand Bros., Roorkee.
2. Wright, P. H. (1996). Highway Engineering, John Wiley and Sons, New York.
3. Kadiyali, L. R. (1987). Traffic Engineering and Transportation Planning. Khanna Publishers, New Delhi.
4. Huang, Y. H. (1993). Pavement analysis and Design. Prentice Hall, Englewood Cliffs, New Jersey.

# ESTIMATING & COSTING

| | | |
|---|---|---|
| **Course Code** | : | **CE605** |
| **Course Title** | : | **Estimating & Costing** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **2+1+0** |

**Course Syllabi (Theory):**

Estimation for quantities for various types of construction, like building construction, road construction, railways etc. Preparation of bill of quantities, Rate Analysis. Detailed specifications of various items. Preparation of Tender & contract documents Layout of Civil engineering structures. Techniques of construction (including field visits). Various types of brick masonry bonds

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**

1. Estimating & Costing by B.N. Dutta

# CONSTRUCTION PROJECT MANAGEMENT

| | | |
|---|---|---|
| **Course Code** | : | **CE606** |
| **Course Title** | : | **Construction Project Management** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- **FINANCIAL EVALUATION OF PROJECTS AND PROJECT PLANNING:** Capital investment proposals, criterions to judge the worthwhileness of capital projects viz. net present value, benefit cost ratio, internal rate of return, Risk cost management, main causes of project failure.
- Categories of construction projects, objectives, project development process, Functions of project management, Project management organization and staffing, Stages and steps involved in project planning, Plan development process, objectives of construction project management.

- **PROJECT SCHEDULING:** Importance of project scheduling, project work breakdown process – determining activities involved, work breakdown structure, assessing activity duration, duration estimate procedure, Project work scheduling, Project management techniques – CPM and PERT networks analysis, concept of precedence network analysis.

- **PROJECT COST AND TIME CONTROL:** Monitoring the time progress and cost controlling measures in a construction project, Time cost trade-off process: direct and indirect project costs, cost slope, Process of crashing of activities, determination of the optimum duration of a project, updating of project networks, resources allocation.

- **CONTRACT MANAGEMENT:** Elements of tender operation, Types of tenders and contracts, Contract document, Legal aspects of contracts, Contract negotiation & award of work, breach of contract, determination of a contract, arbitration.

- **SAFETY AND OTHER ASPECTS OF CONSTRUCTION MANAGEMENT:** Causes and prevention of accidents at construction sites, Safety measures to be followed in various construction works like excavation, demolition of structures, explosive handling, hot bitumen work. Project Management Information System – Concept, frame work, benefits of computerized information system. Environmental and social aspects of various types of construction projects.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |

| | | | |
|---|---|---|---|
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text /Reference Books:**

1. PERT & CPM by B.C. Punmia.

# OPTIMIZATION TECHNIQUES

| | | |
|---|---|---|
| **Course Code** | : | **MA 601** |
| **Course Title** | : | **Optimization Techniques** |
| **Course Credits** | : | **5.5** |
| **Total Hours per Week (L+T+P)** | : | **3 + 1 + 0** |

**Course Syllabus:**

- **Introduction:** Introduction to Optimization and its scope, Formulating a Mathematical Model, Deriving Solutions from the Model
- **Linear Programming Problems:** Introduction to Linear Programming, Linear Programming Model, Solving L.P.P - Simplex Method, Revised Simplex Method, Duality Theory and Sensitivity Analysis, Dual Simplex Method, Transportation Problem and transportation problem paradox, Assignment Problem
- **Non-linear Programming**: Introduction, Single variable and multi variable optimization, Constrained and unconstrained problems, Kuhn-Tucker conditions
- **Network Optimization Models:** The Terminology of Networks, Shortest-Path Problem, Minimum Spanning Tree Problem, Project Management with CPM/ PERT
- **Other Optimization Models:** Dynamic Programming, Integer Programming, Game Theory,
- **Simulations:** Simulation V/s mathematical modeling, Monte Carlo simulation, simulation language, ARENA, Example & cases.
- **Multi-objective optimization**: Introduction to various multi-objective optimization techniques and its scope, Linear Goal Programming and Its Solution

**Evaluation Scheme:**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | --- | 10 |

**Text & Reference Books**


1. Hillier F.S. and Lieberman G.J., *Introduction to Operations Research: Concepts and Cases*, Tata Mc Graw Hill, 8th Ed., (Indian Adapted Edition), 2005.
2. Taha. H. A, *Operations Research: An Introduction*, Pearson Education, 7th ed., 2003.
3. Ronald L. Rardin, *Optimization in Operations Research*. Pearson Education, First Indian Reprint 2002.
4. Pant.J.C., *Introduction to Optimization: Operations Research*, Jain Brothers, 5th Ed., 2000.
5. Sharma. S. D., *Operations Research*, Kedarnath Ramnath & Co., 15th Edition, 2006.
6. Kalyanmoy Deb, Optimization for Engineering Design: Algorithms and Examples, PHI.
7. Kasana H.S. and Kumar K.D., Introductory Operations Research: Theory and Applications, Springer.

# JK Lakshmipat University

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## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## 4-Year B. Tech Programme

## (Branch: Chemical Engineering)

## Batch 2012-2016

## SEMESTER-SEVENTH

# Detailed Syllabus

# &

# Scheme of Examination

## Academic Council (20.04.2013)

# HYDRAULICS & HYDRAULIC MACHINES

| | | |
|---|---|---|
| **Course Code** | : | **CE721 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Hydraulics** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- Difference between pipe and channel flows; types of open channels and their characteristics i.e rigid bed and erodible bed channels, types of flow
- Sediment properties, initiation of sediment motion, bed forms , resistance to flow and sediment transport relationships i.e. bed load, suspended load and total load.
- Uniform flow; resistance relationships, normal depth, section factor for uniform computation and efficient channel cross section. Concepts of specific energy and specific force. Gradually varied flow, governing equations, water surface profiles their characteristics and methods of computations
- Hydrulic jump and its characteristics, free and forced jump, use of hydraulic jump as energy dissipator
- Weirs and notches, types of weirs- sharp crested, broad crested and side weirs, flow through sluice gates.
- Flow characteristics in turbines and pumps, types of turbines and pumps and their selection, hydraulic power transmission – hydraulic press

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**

T1. R.J. Garde and A.G. Mirajgaokar, "Engineering Fluid Mechanics ( including Hydraulic Machines )", Nem Chand & Bros, Roorkee, Second Edn. 1983.

T2. K. G. Ranga Raju , " Flow through open Channels" , Second Ed. Tata McGraw- Hill Publishing Company Limited , New Delhi, 2003.

**Reference Books:**

R1 K. Subramanya, "Flow in Open Channels", Second Ed. Tata McGraw- Hill Publishing Company Limited , New Delhi, 1997.

R2 P.N. Modi and S.M. Seth , " Hydraulics and Fluid Mechanics , Standard Book House, New Delhi , 2011.

# ENGINEERING ROCK MECHANICS

| | | |
|---|---|---|
| **Course Code** | : | **CE722 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Engineering Rock Mechanics** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- Classification of Rocks and Rock masses, Laboratory and in-situ testing of rock, insitu stresses and their measurement
- Analysis and design of underground openings, Failure criteria for rock and rock masses.
- Strength and deformability of jointed rock mass, Stability of rock slopes, Foundation on rocks.
- Methods to improve rock mass responses, numerical modeling of rock and rock masses.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**References:**


1. Introduction to Rock Mechanics by R.E.Goodman, John Wiley & Sons.
2. Engineering in Rocks for Slopes, Foundation and Tunnels, Editor T.Ramamurthy, Prentice Hall India Pvt. Ltd.
3. Fundamentals of Rock Mechanics, Fourth Edition, by Jaeger, Cook and Zimmerman, Blackwell Publishing.
4. R 2 Rock mechanics and the design of structures in rock, L. Obert and Wilbur I. Duvall, John Wiley & Sons, Inc

# GEOGRAPHICAL INFORMATION SYSTEM

| | | |
|---|---|---|
| **Course Code** | : | **CE 723 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Geographical Information System** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- Introduction to geospatial information systems (GIS) and geographic information science; Representations of geospatial data (vector and raster), data structures and topology; Data modeling and managing data in databases.
- Introduction to query languages; Vector and raster data exploration, analysis and processing; Map as a presentation tool and types of maps; Cartographic design principles, presentations, thematic mapping and map generalization; Introductory visualization and graphic communications; Introduction to spatial modeling and analysis; Network representation and analysis; Spatial interpolation, surface modelling and analysis; Introduction to 3D GIS.
- Data quality analysis, errors and natural variations; Geospatial data integration, metadata and standardization issues; Web GIS, mapping services and geospatial information dissemination; Access to information, privacy, security, and organizational structures (human resources, budget, institutional aspects); GIS project design and implementation.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


1. Lo, C.P. and A.K.W., Yeung. [2007]. Concepts and Techniques in Geographic Information Systems. 2nd, Upper Saddle River, Prentice Hall (ISBN 0-13-149502-X)
2. Longley, P.A., M.F. Goodchild, D.J. Maguire and D.W. Rhind. [2007]. Geographic Information Systems and Science. 2nd, John Wiley & Sons (ISBN 978-0-470-87001-3)


**Reference Books:**


1. Roche, S. and C. Caron (editors). [2009]. Organizational Aspects of GIS. Wiley & Sons
2. Chang, K.T. [2008]. Introduction to Geographic Information Systems. 5th, McGraw Hill (ISNB 978-0-07-749436-6 )

# SOLID WASTE MANAGEMENT

| | | |
|---|---|---|
| **Course Code** | : | **CE 724 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Solid Waste Management** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- ***Introduction to Environment:*** Ecosystem –meaning- Types -Components- Structure – Functions, Levels of organization in nature- Food chain and Trophic structure, Biogeochemical Cycles, Energy flow.
- ***Municipal solid waste***: Definition - Sources and types of solid waste- composition and its determinants of Solid waste-factors influencing generation-quantity assessment of solid wastes-methods of sampling and characterization.
- ***Collection:*** Collection of Solid waste – collection services – collection system, equipments – time and frequency of collection – labour requirement – factors affecting collection – analysis of collection system – collection routes – preparation of master schedules.
- ***Transfer and Transport:*** Need for transfer operation – transfer stations – types – transport means and methods – location of transport stations - Manpower requirement – collection routes: Transfer stations – selection of location, types & design requirements, operation & maintenance.
- ***Processing techniques*** – purposes mechanical volume reduction – necessary equipments – chemical volume reduction – incinerators – mechanical size reduction selection of equipments – components separation – methods – drying and dewatering. Recovery of Resources, conversion products and energy recovery – recoverable materials – processing and recovery systems – incineration with heat recovery.
- ***Refuse disposal*** – various methods – incinerations – principle features of an incinerator – site selection and plant layout of an incinerator - sanitary landfill- methods of operation – advantages and disadvantages of sanitary land fill - site selection – reactions accruing in completed landfills – gas and leachate movement and control – equipments necessary.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


1. PERT & CPM by B.C. Punmia. George Techobanoglous et al,"Integrated Solid Waste Management" McGraw - Hill, 1993.
2. Techobanoglous Thiesen Ellasen; Solid Waste Engineering Principles and Management, McGraw - Hill 1997.
3. R.E.Landrefh and P.A.Rebers," Municipal Solid Wastes-Problems & Solutions" ,Lewis, 1997.


**Reference Books:**


1. Manual on Municipal 1 Solid waste Management, CPHEEO, Ministry of Urban Development, Govt. Of. India, New Delhi, 2000.
2. Blide A.D.& Sundaresan, B.B,"Solid Waste Management in Developing Countries", INSDOC, 1993.
3. Ecology Science and Practice; Claude Fourie, Christian Ferra, Paul Medori, Tean Devaux, Oxford and IBH Publishing Co (Pvt) LTD, special Indian edition.
4. Principles of Ecology- P.S.Verma, V.K.Agarwal.S.Chand & Company (Pvt) LTD 1989.

# REPAIR & REHABILITATION OF STRUCTURES

| | | |
|---|---|---|
| **Course Code** | : | **CE 725 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Repair & Rehabilitation of Structures** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- ***Introduction:*** Deterioration of structures with aging; Need for rehabilitation
- ***Distress in concrete /steel structures*** Types of damages; Sources or causes for damages; effects of damages; Case studies
- ***Damage assessment and evaluation models:*** Damage testing methods; Non-destructive testing methods
- ***Rehabilitation methods:*** Grouting; Detailing; Imbalance of structural stability; Case studies
- ***Methods of Repair:*** Shortcreting; Grouting; Epoxy-cement mortar injection; Crack ceiling
- ***Seismic Retrofitting of reinforced concrete buildings***

  Introduction; Considerations in retrofitting of structures; Source of weakness in RC frame building – Structural damage due to discontinuous load path; Structural damage due to lack of deformation; Quality of workmanship and materials; Classification of retrofitting techniques; Retrofitting strategies for RC buildings – Structural level (global) retrofit methods; Member level (local) retrofit methods; Comparative analysis of methods of retrofitting

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |

| | | | |
|---|---|---|---|
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**

1. Diagnosis and treatment of structures in distress by R.N.Raikar, Published by R&D Centre of Structural Designers & Consultants Pvt.Ltd., Mumbai, 1994.
2. Handbook on Repair and Rehabilitation of RCC buildings, Published by CPWD, Delhi, 2002.

**Reference Books:**

1. Earthquake resistant design of structures by Pankaj Agarwal and Manish Shrikhande, Prentice-Hall of India, 2006.

# FINITE ELEMENT ANALYSIS

| | | |
|---|---|---|
| **Course Code** | : | **CE 726 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Finite Element Analysis** |
| **Course Credits** | : | **04** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- Introduction to FEM and its applicability, Review of mathematics: Matrix algebra, Gauss elimination method, Uniqueness of solution, Banded symmetric matrix and bandwidth. Structure analysis: Two-force member element, Local stiffness matrix, coordinate transformation, Assembly, Global stiffness matrix, imposition of Boundary conditions, Properties of stiffness matrix.
- One-dimensional Finite Element Analysis: Basics of structural mechanics, stress and strain tensor, constitutive relation, Principle of minimum Potential, General steps of FEM, Finite element model concept /Discretization, Derivation of finite elements, equations using potential energy approach for linear and quadratic 1-D bar element, shape functions and their properties, Assembly, Boundary conditions, Computation of stress and strain.51
- Two Dimensional Finite Element Analysis: Finite element formulation using three nodded triangular (CST)
- element and four nodded rectangular element, Plane stress and Plain strain problems, Shape functions, node numbering and connectivity, Assembly, Boundary conditions, Isoparametric formulation of 1-D bar elements, Numerical integration using gauss quadrature formula, computation of stress and strain.
- Finite Element Formulation from Governing Differential Equation: Method of Weighted Residuals, Collocation, Sub domain method, Least Square method and Galerkin's method, Application to one dimensional problems, one-dimensional heat transfer, etc. introduction to variational formulation (Ritz Method.)

- Higher Order Elements: Lagrange's interpolation formula for one and two independent variable, Convergence of solution, compatibility, element continuity, static condensation, p and h methods of mesh refinement, Aspect ratio and element shape, Application of FEM, Advantages of FEM, Introduction to concept of element mass matrix in dynamic analysis.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text books:**


1. Text Book of Finite Element Analysis, Seshu P., Prentice Hall India.
2. Finite Element Procedure in Engineering Analysis, Bathe K.J., Prentice Hall India.


**References:**


1. An Introduction to the Finite Element Method, Reddy J.N., Tata McGraw-Hill, New Delhi.
2. Concepts & Applications of Finite Element Analysis, Cook and Plesha, Willey India New Delhi.
3. Introduction to Finite Elements in Engineering, Chandupatla and Belegundu, Prentice Hall India.

# DISASTER MANAGEMENT

| | | |
|---|---|---|
| **Course Code** | : | **CE 727 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Disaster Management** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- ***Response Essential Components*** Disaster Response Plan, Communication, Participation and Activation of Emergency Preparedness Plans, Search, Rescue, Evacuation and other logistic management, Needs and Damage Assessment; Types and Technique
- ***Stakeholders Co-ordination in Disaster Response*** Disaster Response: Central, State, District and Local Administration, Armed Forces in Disaster Response: Role and Responsibility, Disaster Response: Police and Other organisations, Role of Multiple stakeholders in Disaster Response
- ***Human Behaviour and Response Management***: Psychological Response and Psychological Rehabilitation, Trauma and Stress Management, Rumour and Panic Management, Medical and Health Response to Different Disasters, Role of Information and Communication Technology in Response Management.
- ***Relief Measures***: Minimum Standard of Relief, Relief Management- essential components, Funding Relief- short term and long term, Disaster Site Management, Recovery.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


1. White, G.F, 1974, Natural Hazards: Local, National, Global, Oxford University Press, New York.
2. Taori, K (2005) Disaster Management through Panchayati Raj, Concept Publishing Company, New Delhi.

# DESIGN OF PRE-STRESSED CONCRETE STRUCTURES

| | | |
|---|---|---|
| **Course Code** | : | **CE 728 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Design of Pre-stressed Concrete Structures** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- **Introduction:** Systems of pre - stressing in detail, pre - stressing techniques, transfer of pre - stress, types of commercially available jacks, computation of losses of pre - stress.
- **Anchorage Zone:** end block stresses, design
- **Cable profiles:** Concordant and non - concordant cable profile and associated factors in continuous members. Modern cable laying: materials & practices, precautions etc. Computation of deflection in pre - stressed concrete members.
- **Design of Pre-stressed Concrete Sections:** Flexural, shear and torsion resistance of members, preliminary and final design of sections, design of pre and post tensioned flexural members; simply supported and continuous members.
- **Pre-stressed Slab:** Design of slabs, tendon layout, precast slab, production and their applications.
- **Partial Prestressing:** Principles and advantages, methods, practices and design. Design of circular pipes and circular water retaining structures etc. Case study of one bridge girder with design and constructional features.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**

1. T.Y. Lin, Design of Prestressed Concrete, Structures, Asia Publishing House, 1955.
2. N.Krishnaraju, Prestressed Concrete, Tata McGraw Hill, New Delhi, 1981.

**Reference Books:**

1. Y. Guyan, Limit State Design of Pre-stressed Concrete, Applied Science Publishers, 1972.

# ADVANCED TRANSPORTATION ENGINEERING

| | | |
|---|---|---|
| **Course Code** | : | **CE 729 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Advanced Transportation Engineering** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

***Airport Planning and Design***

Aircraft characteristics related to airport design; Airport configuration - runway configurations, relation of terminal area to runways, runway orientation; Geometric design of the airfield - ICAO and FAA design standards, runways, taxiways, holding aprons and aprons; Planning and design of the terminal area - apron-gate system, size and number of gates, aircraft parking configurations, the passenger terminal system; airport lighting and marking; air traffic control; airport planning and air travel demand forecasting; Structural design of airfield pavements.

***Railway Engineering***

Indian Railway Track - different gauges, cross sections, coning of wheels; Tractive resistances; Track components - rails, rail failures, sleepers, rail fixtures and fastenings and ballast; Geometric design of the track; Points and crossings Track junctions; Stations and yards; Signalling and interlocking; Track stresses; Track construction and maintenance;

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


1. Horonjeff, R. Mckelvey, F. X. (1994). Planning & Design of airports, Mc Graw Hill, New York.
2. Khanna, S. K. Arora, M. G. and Jain, S. S. (1994). Airport Planning and Design, Nemchand Bros., Roorkee.
3. Ashford, N. and Wright, P. H. (1979). Airport engineering, John Wiley, New York.


**Reference Books:**


1. Sexena, S.C. Arora, S. P. (1990). A text Book of Railway Engineering, Dhanpat Rai & Sons, New Delhi.
2. Mundary, J.S. Railway Track Engineering, Tata McGraw Hill, New Delhi.
3. Agarwal, M. M. (1991). Indian Railway Track, Sachdeva Press, Mayapuri, New Delhi.
4. Hay, W. W. (1988). Railroad Engineering, John Wiley and Sons, New York.
5. Khanna, S. K. and Justo, C. E. G. (1991). Highway Material Testing - a Laboratory Relevant IRC and BIS standards.
6. S.L. Dhingra, and G.V. Rao, Transportation Engg. Laboratory manual, C.D. Cell, Civil Engineering Department, IIT Delhi.

# EARTHQUAKE ENGINEERING

| | | |
|---|---|---|
| **Course Code** | : | **CE 730 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Earthquake Engineering** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- ***Elements of Seismology*** – General effects of an earthquake, terminology, structure of earth, causes of an earthquake, plate tectonic theory, seismic waves, magnitude and intensity, methods of measurement, energy released, seismograph, strong motion earthquakes, accelerogram, soil liquefaction, prominent earthquakes of India.
- ***Free vibrations of single degree-of-freedom systems*** – Dynamic loads and dynamic analysis, degrees of freedom, Undamped free vibrations, multiple elastic forces, viscously damped vibrations, equations of motion and solution, logarithmic decrement.
- ***Forced vibrations of single degree-of-freedom systems*** – Forced vibrations (harmonic loading) of single degree of freedom systems. Undamped and viscously damped vibrations, equations of motion and solution, Force transmitted to foundation, transmissibility, response to harmonic support excitations.
- ***Response spectrum theory***: Response to general dynamic loading, Duhamel's integral, rectangular and triangular loading, Earthquake response spectrum, tripartite spectrum, construction of design response spectrum, effect of foundation and structural damping on design spectrum.
- ***Principles of earthquake resistant design*** – Planning aspects, symmetry, simplicity, regularity. Resistance of structural elements and structures for dynamic load, design criteria, strength and deflection.
- ***Evaluations of Seismic Forces*** – Philosophy of earthquake resistant design, Provisions of IS 1893, Soft storey, Design spectrum of IS 1893, evaluation of lateral loads due to earthquake on multistory buildings.
- ***Ductile detailing of RCC members***- Concept of ductility, different ways of measuring ductility, factors affecting ductility, energy absorption, provisions of IS 13920.
- ***Earthquake resistant construction*** - Failure mechanism of different types of masonry construction, Construction aspects of Masonry and Timber structures, Retrofitting and strengthening techniques of low cost and low rise buildings. Provisions of I.S. 4326 and IS 13935.

- ***SDOF Systems Subjected to General Dynamic Loading:*** Duhamel's integral, Application to simple loading cases, numerical evaluation of response integral, Piece wise exact method, Newmark's-Beta method.
- ***Free Vibration Analysis of MDOF systems – I:*** MDOF systems, selection of DOFs, formulation of equations of motion , Stiffness matrices, Static condensation, Free Vibration as Eigen Value problem, Frequencies and Mode Shapes, Determination of natural frequencies and mode shapes by Stodola- Vianello method, Orthogonality conditions.
- ***Free Vibration Analysis of MDOF systems – II***: Modal analysis method for free vibration analysis, modal combination rules, systems with and without damping, proportional damping.
- ***Forced Vibration Analysis of MDOF systems***: Governing equations, modal analysis, numerical evaluation of modal equations by Newmark's-Beta method, mode combinations.
- ***Distributed- Parameter Systems***: Partial differential equations of motion, Free and forced Vibration, Application to beams in flexure.
- ***Energy Methods***: Rayleigh method for Discrete and continuous systems, Fundamental mode analysis.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


1. Dynamics of Structures –A.K. Chopra
2. Structural Dynamics - Mario Paz CBS Publication
3. Earthquake Resistant Structures –D.J. Dowrick John Wiely Publication

4. Dynamics of Structures – R. M. Clough and Penzian ,McGraw Hill co.New Delhi
5. Mechanical Vibrations – G. R. Grover Roorkee University, Roorkee
6. Analysis and Design of Foundations for Vibrations – P. J. Moove. Oxford and I. B. H. Publication, Delhi

**Reference Books:**

1. Foundation Design Manual – N. V. Nayak, Dhanpatrai and sons, Delhi
2. Manual of Earthquake Resistant Non engineering Construction, University of Roorkee
3. Elements of Earthquake Engineering – Jai Krishna, South Asian Pub.New Delhi
4. Earthquake Resistant, Design of Masonry and Timber Structures – A.S. Arya
5. Elements Seismology – Rochter
6. Earthquake Resistant Design of R. C. C. Structures – S. K. Ghosh
7. IS 1893-2002 –Part I, IS 13920, IS: 4326 and IS 13935.
8. Earthquake Tips published by NICEE, IIT Roorkee.
9. Government of Maharashtra Earthquake resistant Design of house guiding lines and assessment of damages.

# DESIGN OF BRIDGE STRUCTURES

| | | |
|---|---|---|
| **Course Code** | : | **CE 731 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Design of Bridge Structures** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- ***Components of bridges***- Classification, importance of bridges, Investigation for Bridges.
- ***Standard specification for Road Bridges.*** I.R.C. bridge code, width of carriage way, clearances, loads to be considered i.e. D.L., L.L., Impact load, wind load, Earthquake load, Longitudinal force, Centrifugal force, buoyance, Earth pressure, water current force, thermal force etc.
- ***General design considerations for R.C.C. & P.S.C. Bridges*** Traffic aspects for highway bridges. Asthetics of bridge design, Relative costs of bridge components. Design of reinforced concrete deck slab, Pigeaud's theory, beam and slab and T–beam, Courbon's theory.
- ***Construction Techniques*** – Construction of sub structure footing, piles, cassions, construction of reinforced earth retaining wall and reinforced earth abutments, super structure – erection method for bridge deck construction by cantilever method, Inspection maintenance and repair of bridges.
- ***Design of sub structure*** – abutments, Piers, approach slab.
- ***Bearing and expansion joints*** – forces on bearings – Types of bearings, design of reinforced elastomeric bearings, expansion joints.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |

| | | | |
|---|---|---|---|
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**

1. Concrete Bridge Practice by Dr.V.K.Raina, Tata McGraw Hill
2. Essentials of Bridge Engg. by D. Johnsons Victor, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Design of RCC Bridges- Jagdish Jayaram

**Reference Books:**

1. Reinforced Concrete Structures – Vol. II by Dr.B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications.
2. Bridge Engg. by S. Ponnuswamy, Tata McGraw Hill

# WATER POWER ENGINEERING

| | | |
|---|---|---|
| **Course Code** | : | **CE 732 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Water Power Engineering** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- Introduction: Principal Components of hydro-electric scheme, water requirement, concept of firm power and secondary power, plant capacity.
- Types hydro electric plants: Classification of hydro-power plants. Storage, Run off of the river and pumped storage plants, classification based on operating head, base load and peak load plants.
- Pondage and storage: Need for pondage and storage, requirements of storage, economic analysis of storage capacity, aspects of cost allocation for different purposes, reservoir operation using flow duration and mass curves considerations for flood routing.
- Intake: Types of intake, design of trench weir.
- Desilting: Introduction, types of desilting basins, Principal of desilting, Design of Desilting basins.
- Water conductor system: Intake structures, desilting tanks, conveyance channels and tunnels, surge tanks, surge shafts or fore bays, pressure shafts, penstocks, power house and tail race channels, different types of three structures and their brief design aspects.
- Hydraulics prime movers: Conveyance channels and tunnels, surge tanks, surge shafts or fore bays, Pressure shafts, penstocks, designs of water conveyance systems and penstocks.
- Power house: Types of power houses, various components and power planning.

- Economics of hydro power installation: Engineering feasibility, political consideration, economic feasibility, analysis of cost, cost of power, operation of a power plant system, cost of hydro power.
- Project report: General report, design report, cost and estimate report.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**


1. Hydro□electrical Engineering : Creager and Justin
2. Water Power Engineering : Barrows
3. Water Power Development (Vol.□I and II) : Mosony L. Emil

# RURAL WATER SUPPLY & SANITATION

| | | |
|---|---|---|
| **Course Code** | : | **CE 733 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Rural Water Supply & Sanitation** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

- Concept of environment and scope of sanitation in rural areas. Magnitude of problems of rural water supply and sanitation. Population to be covered, difficulties. National policy.
- Water supply: Design population and demand loads. Various approaches of planning of water supply schemes in rural areas. Development of proffered sources of water springs. Wells, infiltration wells, radial wells and infiltration galleries, collection of raw water from surface source. Specific practices and problems encountered in rural water supply.
- Improved methods and compact systems of treatment of surface and ground waters for rural water supply. Brief Details of multi-bottom settlers (MBS), diatomaceous earth filter, cloth filter, slow sand filter, chlorine diffusion cartridges. Pumps, pipe materials, appurtenances and improved devices for use in rural water supply. Planning of distribution system in rural areas.
- Community and sanitary latrines. Various methods of collection and disposal of night soil. Planning of waste water collection system in rural areas. Treatment and Disposal of waste water. Compact and simple waste water treatment units and systems in rural areas such as stabilization ponds, septic tanks, Imhoff tank, soak pit etc. Disposal of waste water soakage pits and trenches.
- Disposal of Solid Wastes. Composting, land filling, incineration, Biogas plants, Rural health. Other specific issues and problems encountered in rural sanitation

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**

1. 'Water Treatment and Sanitation – Simple Method for Rural Area' by Mann H.T. and Williamson D.
2. 'Water Supply for Rural Areas & Small Communities' by Wanger E.G. and Lanoix J.N., WHO

**Reference Books:**

1. 'Water Supply and Sewerage', by E.W.Steel & T.J.Mcghee, McGraw Hill.
2. Manual on Water Supply and Treatment', CPHEEO, Mini. Of Urban Development, Govt. of India.
3. Manual on Sewerage and Sewage Treatment', CPHEEO, Mini. Of Urban Development, Govt. of India
4. 'Environmental Engineering' by D. Srinivasan, PHI Learning Pvt. Ltd. 2009

# EARTHQUAKE RESISTANT DESIGN & TECHNIQUES

| | | |
|---|---|---|
| **Course Code** | : | **CE 734 (Elective-I/II/III/IV/V)** |
| **Course Title** | : | **Earthquake Resistant Design & Techniques** |
| **Course Credits** | : | **4** |
| **Total Hours per Week (L+T+P)** | : | **3+0+0** |

**Course Syllabi (Theory):**

1. Introduction: Causes of Earthquakes, plate tectonics, Earthquake mechanism, seismic zoning map of India, Epicenter, focus, magnitude, intensity, characteristics of ground motion and attenuation, Earthquake recording instruments□seismograph, Accelerograph, Seismoscopy/multi SAR.
2. Theory of vibration: SDOF system, MDOF, Earthquake Excitation, forced vibration, continuous systems□uniform bending beam, uniform shear beams.
3. Earthquake response spectra: Strong motion earthquakes Elastic spectra, inelastic spectra□equivalent linear system.
4. Site response to earthquakes: Local geology and soil conditions, soil investigations and tests dynamic design criteria for a given site.
5. A seismic design of structures:
   i. Design data and philosophy, seismic coefficients, permissible stresses and load factors multi□storeyed buildings, base shear, fundamental period of building, distribution of forces along the height, dynamic analysis
   ii. Earthquake resistant instruction of building and ductility provisions in RCC as per IS□13920□1893, IS□1893□2002, IS□456□2000, IS□800□2000, IS□4326□2002
   iii. Elevated water tanks□behaviour, Design features and analysis.
   iv. Stack like structures□fundamental period, Dynamic bending moment and shear diagram.
   v. Bridges□Seismic force, live load, superstructure and substructure.
   vi. Dams□Hydrodynamic pressure, Zanger method, vertical component of reservoir load.

6. Base isolation: Isolation systems, base Isolation of single and multi□storey buildings, Application of base Isolation.
7. Seismic strengthening, repair of restoration concepts: Existing buildings, Aging, weathering, development of cracks, repair of masonry and concrete structure.

**Evaluation Scheme (Theory):**

| EC No. | Evaluation Component | Duration | Marks (100) (Weightage %)* |
|---|---|---|---|
| 1. | Mid Term Test-I | 1 hour | 20 |
| 2. | Mid Term Test-II | 1 hour | 20 |
| 3. | End Term Test | 3 hour | 40 |
| 4. | Class Participation | Day to day | 10 |
| 5. | Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others) | 30 min. | 10 |

**Text Books:**

1. Dynamics of structures; : AK Chopra
2. Structural Dynamics : Mario Paz

**Reference Books:**

1. Soil dynamics : Swami saran
2. Elements of Earthquake Engg. : Jai Krishna
3. Relevant IS Code by AR Chander Sekoran

# SEMINAR

| | | |
|---|---|---|
| **Course Code** | : | **SEM701** |
| **Course Title** | : | **Seminar** |
| **Course Credits** | : | **2.5** |
| **Total Hours per Week (L+T+P)** | : | **0 + 0 + 4** |

**Course Syllabi (Theory):**

## Operation Procedure

1. Student has to devote full semester for SEM701 course.
2. Student has to report to the Supervisor regularly.
3. Seminars s evaluation has to be carried out in the presence of a two member Committee comprising.
4. Experts in the relevant area constituted by the Supervisor.

Final Seminar Report to be submitted has to be in formal hard bound cover bearing of the Institute emblem.

**Reference Books:**

Based on literature survey to be done with peer reviewed journals and magazines.

**Evaluation Scheme (Theory):**

| S. No. | Evaluation Component | Duration (Hours) | Marks (100) | Nature of Component |
|---|---|---|---|---|
| 1. | Presentation | Weekly | 25 | Open Book |
| 2. | Report(Soft Copy) | Weekly | 25 | Open Book |
| 3. | Assignment | Continuous | 10 | Open Book |
| 4. | Final Presentation | | 20 | Open Book |
| 5. | Final Report(Hard Copy) | | 20 | Open Book |


# JK Lakshmipat University

Laliya Ka Vas, P.O. Mahapura, Ajmer Road, Jaipur 302 026

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## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## 4 Year B. Tech Programme

## (Branch: Civil Engineering)

## Batch 2012-2016

## SEMESTER-EIGHTH

# Detailed Syllabus

# &

# Scheme of Examination

## Academic Council (20.04.2013)

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# PRACTICE SCHOOL – II

| | | |
|---|---|---|
| **Course Code** | : | **PS801** |
| **Course Title** | : | **Practice School – II** |
| **Course Credits** | : | **16** |
| **Duration** | : | **Five and Half Months** |

**Course Syllabi:**

This course is for five and half months (summer and one semester) in VII or VIII Semester. The objective of this programme is to provide the students, an opportunity to work on live projects of corporate world in various fields. During this programme, they will work on real world applications of their curricula through organizational function of their choice. The students are expected to be involved directly in problem solving efforts of specific interest to the host organization. The learning of PS-I will help them in completing PS-II successfully.

**Evaluation Scheme:**

| S. No. | Evaluation Component | Marks (100) (Weightage %) |
|---|---|---|
| 1 | Quiz-I | 4 |
| 2 | Quiz-II | 4 |
| 3 | Group Discussion-I | 4 |
| 4 | Group Discussion-II | 4 |
| 5 | Seminar-I | 4 |
| 6 | Seminar-II | 4 |
| 7 | Diary-I | 4 |
| 8 | Diary-II | 4 |
| 9 | Observation-I | 4 |
| 10 | Observation- II | 4 |
| 11 | Mid Term Evaluation (Project Report and Presentation/Viva) | 20 |
| 12 | Final Evaluation (Project Report and Presentation/Viva) | 40 |

# Department of Civil Engineering, IET, JKLU, Jaipur

## Corrigendum of Course Booklet

### Programme Name: B.Tech. Civil Engineering

### Batch: 2012-16

1. Code of Workshop Practice should be read as ME141 in place of ME102.
2. Course name of CE606 should be read as Construction and Project Management in place of Construction Project Management.
3. Credit of ME241 Machine Drawing should be read as 2.
4. Course name of CE 721 should be read as Hydraulics and Hydraulic Machines.