DIRECTOR
Institute of Engineering and Technology
JK Lakshmipat University
JAIPUR (Rajasthan)

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 Program

(Branch: Civil Engineering)

Batch 2013-17

SEMESTER – I - VIII

Curriculum, Detailed Syllabus

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Scheme of Examination

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

24/4/2013

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 Program

(Branch: Common to all Branches)

Batch 2013-17

SEMESTER – I & II

Detailed Syllabus

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Scheme of Examination

Academic Council Meeting (20.04.13)

Institute of Engineering and Technology
Department of Civil Engineering
Course Structure for the Batch 2013-17

Semester	Courses								(L T P) Credits Hrs/Week
I	English Communication Skills	Engineering Mathematics - I	Engineering Physics –I	Engineering Chemistry -I	Computer Programming & IT	Environmental Studies	Workshop Practice	Engineering Graphics	(17 4 11) 26.5
	LA101 (1 1 0) 2	MA101 (3 1 0) 4	PH101 (3 1 2) 5	CH101 (3 1 2) 5	CSE101 (3 0 2) 4	ID101 (3 0 0) 3	ME141 (0 0 3) 1.5	CE101 (1 0 2) 2	32
II	Professional Communication Skills	Engineering Mathematics - II	Engineering Physics – II	Engineering Chemistry -II	Electrical & Electronics Engineering	Engineering Mechanics	Machine Drawing		(16 3 11) 24.5
	LA201 (1 1 2) 3	MA201 (3 1 0) 4	PH201 (3 0 2) 4	CH201 (3 0 2) 4	EE201 (3 0 2) 4	ME201 (3 1 0) 4	ME241 (0 0 3) 1.5		30
III	Structure Analysis - I	Fluid Mechanics - I	Engineering Geology	Building Planning and Construction Materials	Surveying	Engineering Mathematics - III	Principles of Management for Engineers		(20 3 8) 27
	CE305 (3 1 0) 4	CE306 (3 1 2) 5	CE304 (3 0 2) 4	CE307 (3 0 2) 4	CE308 (3 0 2) 4	MA301 (3 1 0) 4	HS302 (2 0 0) 2		31
IV	Structure Analysis - II	Fluid Mechanics - II	Environmental Engineering - I	Concrete and Construction Technology	Advanced Surveying	Numerical And Statistical Methods			(18 2 10) 25
	CE405 (3 1 0) 4	CE406 (3 1 2) 5	CE407 (3 0 2) 4	CE402 (3 0 2) 4	CE408 (3 0 2) 4	MA402 (3 0 2) 4			30
V	Practice school I (PS 501) – (4 to 6 Weeks Duration) – 4 Credits								
	Design of RCC Structure	Geotechnical Engineering - I	Environmental Engineering - II	Hydrology and Water Resources Engineering	Transportation Engineering - I	Urban and Regional Planning	Elective - I		(21 3 6) 27+4
	CE507 (3 1 0) 4	CE508 (3 1 2) 5	CE509 (3 0 2) 4	CE510 (3 0 0) 3	CE511 (3 0 2) 4	CE512 (3 0 0) 3	(3 1 0) 4		30
VI	Design of Steel Structure	Geotechnical Engineering - II	Estimating Costing & Evaluation Engineering	Irrigation Engineering	Transportation Engineering - II	Elective - II	Elective - III		(21 4 4) 27
	CE607 (3 1 0) 4	CE608 (3 1 2) 5	CE609 (3 1 0) 4	CE610 (3 0 0) 3	CE611 (3 0 2) 4	(3 1 0) 4	(3 0 0) 3		29
VII	Construction Project Management	Geoinformatics	Construction Equipment methods	Infrastructure Planning and Finance Management	Seminar	Elective - IV	Principles of Economics		(18 0 8) 22
	CE701 (3 0 2) 4	CE702 (3 0 2) 4	CE703 (3 0 0) 3	CE705 (3 0 0) 3	SEM701 (0 0 4) 2	(3 0 0) 3	HS701 (3 0 0) 3		26
VIII	Practice school –II (PS 801) – (16 Weeks Duration) – 16 Credits								16

List of Elective Courses

Elective I	River engineering CE521	Ground water hydrology CE522		Understanding natural and manmade disaster CE523			
Elective II	Hazardous solid waste management CE621	EIA and Environmental Auditing CE622		Rural water supply and sanitation CE623		Models for air and water quality CE624	
Elective III	Design of pre-stressed concrete structure CE625	Finite element analysis CE626	Earthquake engineering CE608	Structure dynamics CE609	Engineering Optimization MA621		
Elective IV	Ground improvement Technique CE735	Rock mechanics CE736					

Total Credits: 199

04/01/14

JK Lakshmipat University

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

4 Year B. Tech Programme

(Branch: Common to all Branches)

Batch 2013-2017

SEMESTER-FIRST

Detailed Syllabus

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Scheme of Examination

ENGLISH COMMUNICATION SKILLS

Course Code	:	**LA 101**
Course Title	:	**English Communication Skills**
Course Credits	:	**2.5**
Total Hours Per Week	:	**1+1+0**

Course Syllabi:

- Introduction to the course, Characteristic Features of Effective Communication and Ways to Overcome Barriers to Communication
- Vocabulary Extension: Roots, Prefixes and Suffixes
- Vocabulary Extension: Synonyms, Antonyms, Homophones, One Word Substitution
- Vocabulary Extension: Learning words through Situations
- Basics of English Grammar, Applied English Grammar
- Standard English Usage, Listening Skills
- Phonetics and Spoken English: Sounds of English
- Introducing students to the rules of Word Accent and Weak Forms in English
- Reading Comprehension, Paragraph Writing
- Art of Condensation, Essay Writing

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:

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.

ENGINEERING MATHEMATICS-I

Course Code	:	**MA101**
Course Title	:	**Engineering Mathematics – I**
Course Credits	:	**5.5**
Total Hours per week (L+T+P)	:	**3+1+0**

Course Syllabi:

- **Calculus of several variables**: Functions of two or more variables, Partial Derivatives, Total derivative, chain Rule, Euler's Theorem, Jacobian and transformation, Applications to errors, Optimization using derivatives - Maxima-Minima of functions of two variables, Lagrange's method.
- **Curve Sketching**: Asymptotes, Double and Triple Points, Cartesian, parametric and polar curve sketching
- **Vector function and its derivatives**: Vector functions, their derivatives and integration, Arc length and unit tangent vector, Curvature and unit normal vector, Torsion and unit Bi-normal vector, Directional derivative and gradient vectors, Tangent plane, Divergence and curl of a vector field
- **Integral Calculus**: Definite Integral - Integral calculus, Line integral, Arc length, Solids of revolution: Surface and volume, Multiple Integrals - Double integral: Area, change of order of integration, changing to polar coordinates, Triple integral, Volume integral, Improper Integrals - Gamma and Beta functions
- **Vector Integration**: Line integral, flux, work done, circulation, Path independence, potential function and conservative fields, Surface area and surface integral, Green's theorem in the plane, Stoke's theorem, Divergence theorem,
- **Sequence and Series**: Sequence, Series, Orthogonal function, Fourier Series

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 hours	40
4.	Class Participation	Day to day	10
5.	Additional continuous Evaluation (Quizzes, Assignments, Presentations, and others)	--	10

Text books and Reference books

1. G.B. Thomas, Jr., *Thomas' calculus*, 11th edition (Indian), Pearson education, Delhi, 2008
2. Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Fourth Edition (Student Edition), Jones & Barlett, Viba, New Delhi, 2011
3. Rober Wrede, Spiegel M. R., *Schaum's outline of advanced calculus*, 3rd edition, Tata Mc-GrawHill, NewYork, 2011
4. Peter V. O'Neil, *Advanced Engineering Mathematics*, Seventh Indian Reprint, Cengage Learning, New Delhi, 2011.
5. Kreyszig, E., *Advanced Engineering Mathematics*, John Willey, Delhi (2011).
6. Potter M.C., Goldberg J.L., Edward F.A., *Advanced Engineering Mathematics*, 3rd Edition, Oxford University Press, 2005.

ENGINEERING PHYSICS-I

Course Code	:	**PH101**
Course Title	:	**Engineering Physics-I**
Course Credits	:	**7**
Total Hours per Week (L+T+P)	:	**3+1+2**

Course Syllabi (Theory):

- **Coherence, Interference and Optical Technology**
  - Introduction to optics, Spatial Coherence, Temporal coherence, Coherence length, Coherence time and 'Q' factor for light
  - Formation of Newton's rings, Measurement of wavelength of light, Diameter of Newton's rings
  - Michelson's Interferometer: Production of circular & straight line fringes, Determination of wavelength of light, Determination of wavelength separation of two nearby wavelengths
  - Elementary idea of anti-reflection coating and interference filters
- **Diffraction**
  - Single slit diffraction, position of maxima / minima and width of central maximum, intensity variation.
  - Construction and theory. Formation of spectra by plane transmission grating, Determination of wavelength of light using plane transmission grating
  - Introduction, Raleigh criterion, Resolving power of diffraction grating.
- **Polarization**
  - Plane, circular and elliptically polarized light on the basis of electric (light) vector
  - Malus law, Qualitative description of double refraction
  - Quarter and half wave plates, construction, working and use of these in production and detection of plane, circular and elliptically polarized light.
  - Introduction and law of optical rotation, specific rotation and its measurement using the half-shade and bi-quartz device.
- **Quantum Mechanics**
  - Heisenberg's Uncertainty Principle, Wave and Particle Duality of Radiation, De-Broglie's Concept of Matter waves, Quantum Nature of Light

- Photoelectric Effect and Compton Effect
- Concept of Wave Function, Physical interpretation of wave function and its properties
- Schrödinger's Wave Equation: Time dependent and time independent cases
- Particle in one-dimensional box

- **Nanotechnology**
  - Introduction of Nanotechnology, Effect on physical properties due to Nano scale
  - Methods of Nano material construction, Size determination by XRD, Applications of Nano materials
- **Solar Cell and Applications**
  - Introduction to Photovoltaic Cell/Solar Cell and It's Principles
  - Theory of Solar Cells, Types of Solar Cells, and Applications

Course Syllabi (Practical):

1. To determine the wave length of monochromatic light with the help of Fresnel's Biprism
2. To determine the wave length of sodium light by Newton's Ring
3. To determine the specific rotation of Glucose (Sugar) solution using a Polarimeter
4. To measure the Numerical Aperture of an Optical Fibre.
5. To determine the wavelength of sodium light by Michelson Interferometer
6. To determine coherent length and coherent time of laser using He-Ne Laser
7. To determine the height of object with the help of a Sextant.
8. 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.
9. To determine the wave length of prominent lines of mercury by plane diffraction Grating with the help of spectrometer.
10. To verify the expression for the resolving power of a Telescope.
11. To study characteristics of photocell and determination of Planck's constant
12. To study diffraction pattern of single slit using laser

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. 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

ENGINEERING CHEMISTRY-I

Course Code	:	**CH101**
Course Title	:	**Engineering Chemistry-I**
Course Credits	:	**7**
Total Hours per Week (L+T+P)	:	**3+1+2**

Course Syllabi (Theory):

Water

Introduction and common Impurities in water, Hardness of water, Determination of hardness by Clark's test and complex metric (EDTA) method. Removal of hardness by Lime Soda, Zeolite and Ion exchange process.

Boiler feed water: troubles their causes, disadvantages and prevention, Scale & Sludge Carry over (Priming and Foaming), Boiler Corrosion and Caustic embrittlement.

Numerical based on EDTA method, LS process and Zeolite softening methods.

Polymers

Introduction to Polymer, Classification and constitutions of polymers. Methods of Polymerisation, Plastics: Thermosets and Thermoplastic. Preparation, properties and uses of Vinyl resins, Bakelite, Polyesters and Nylons. Rubbers: Natural rubber, vulcanization, synthetic rubbers e.g. Buna-S, Buna-N, Butyl, Thiocol and Neoprene rubbers.

Lubricants

Introduction, classification and uses of lubricants. Types of lubrication. Viscosity & viscosity index, Flash point and Fire point, cloud and pour point, steam emulsification number, precipitation number and neutralization number.

Organic Chemistry

Inductive, Electromeric Mesomeric and Hyperconjugative effects. Stability of reaction intermediates (carbocation, carbanion and free radicals). Mechanism of nucleophilic substitutions. Mechanism of the following reactions:

(i) Aldol condensation
(ii) Cannizaro reaction
(iii) Beckman rearrangement
(iv) Hoffmann rearrangement and
(v) Diels-Alder reaction.

Stereochemistry: E-Z nomenclature, R.S. configuration, optical isomerism, chirality and its implications, Conformations of butene.

Engineering Materials

Cement: Definition, Composition basic constituents and their significance, manufacturing of Portland cement by Rotary Kiln technology. Chemistry of setting and hardening of cement and role of gypsum.

Glass: Definitions, properties, Manufacturing of glass. Types of silicates glasses and their commercial uses. Importance of annealing in glass making.

Course Syllabi (Practical):

1. To determine the hardness of water by complex metric method using EDTA.
2. To determine the hardness of water by HCl method.
3. To determine the amount of free chlorine in given sample.
4. Determination of total residual chlorine in a water sample.
5. Determination of free carbon dioxide in a given sample.
6. To determine the viscosity of a given sample of lubricant oil at various temperature.
7. To determine flash and fire point of a given lubricant using Pensky-Martin's apparatus.
8. To determine cloud and pour point of a given sample of lubricating oil using Cloud and Pour point apparatus.
9. Measurement of Nitrate in water sample.
10. Measurement of Oxygen in water 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. 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).
6- Polymer Chemistry by Malcolm P. Stevens (Oxford University press)
7- Fundamentals of Polymers by Niranjan Karak (PHI India)
8- Polymer Chemistry by Gowariker (New Age International)

COMPUTER PROGRAMMING & IT

Course Code	:	**CSE101**
Course Title	:	**Computer Programing & IT**
Course Credits	:	**5.5**
Total Hours Per Week (L+T+P)	:	**3 + 0 + 2**

Course Syllabi (Theory):

- 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.
- 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.
- 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.
- 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.
- Arrays in C, Pointers, Using pointers to represent arrays, Dynamic Memory allocation, structures, using typedef,
- Pointers: What is a Pointer? - How do you Define a Pointer? - Pointer Indexing - Pointer
- Arithmetic - Function data return with a Pointer - A pointer to a Function, Arrays of Structures & pointers,
- File Handling (Opening in different modes & closing of file, fscanf & fprintf only).

Course Syllabi (Practical):

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. Program using Structure and Union

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. 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.

ENVIRONMENTAL STUDIES

Course Code	:	**ID 101**
Course Title	:	**Environmental Studies**
Course Credits	:	**4**
Total Hours per Week (L+T+P)	:	**3 + 0 + 0**

Course Syllabi (Theory):

- Understanding environment, The global crisis, Basic Concepts
- Forest and Grassland ecosystems, Desert Ecosystems, Aquatic Ecosystems
- Introduction to Biodiversity, Biodiversity Conservation
- Water Resources, Energy Resources, Forest Resources
- Land, Food, and Mineral Resources
- Air and Noise Pollution, Water, Soil, and Marine Pollution
- Solid Waste Management and Disaster Management
- Population Growth, Environment and Human Health, Sustainable Development
- Global Warming, Acid Rain, and Ozone Depletion
- Different types of laws and regulations

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:

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

WORKSHOP PRACTICE

Course Code	:	**ME 141**
Course Title	:	**Workshop Practice**
Course Credits	:	**2**
Total Hours per Week (L+T+P)	:	**0+0+3**

Course Syllabi (Practical):

- Basics of manufacturing, types of production systems, ethics, safety in workshop.
- Metrology, quality, Least Count of a measuring Instrument, measurement with Varnier Caliper or Micrometer.
- Machining – Demonstration of Turning, Step Turning, Facing, etc.
- Casting – Demonstration of sand casting process
- Forging – Demonstration of forging operations
- Sheet metal working applications.
- Hands on practice of Sheet metal working operations using hand tools- Preparation of Funnel.
- Gas Welding, Demonstration of Gas Welding
- Hands on practice of Joining of metal parts by Arc Welding- Preparation of a Lap Joint model.
- Mechanical joining processes, Arc Welding
- Hands on practice of Joining of metal parts by Arc Welding- Preparation of a Butt Joint model.
- Introduction to wood working, Wood working Tools, Types of wood, Types of joints.
- Hands on practice of Wood working operations using hand tools- preparation of Lap Tee Joint, Mechanical joining processes, Soldering, Brazing.

- Machining – Demonstration of Shaping operations
- Hands on practice of Fitting operations using hand tools- Prepare a job in fitting shop.

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

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

ENGINEERING GRAPHICS

Course Code	:	**CE101**
Course Title	:	**Engineering Graphics**
Course Credits	:	**2.5**
Total Hours per Week (L+T+P)	:	**1 + 0 + 2**

Course Syllabi (Theory & Practical):

- Introduction to Engineering Drawing & AutoCAD
- Drawing Setup, formatting, Basic Commands, Draw Toolbar
- Advanced Command, Object & Modify toolbar
- Orthographic Projection-I, Dimensioning
- Orthographic Projection-II, Orthographic Projection-III
- Isometric Projection-I, Isometric Projection-II, Isometric Projection-III

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. 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.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

4 Year B. Tech Programme

(Branch: Common to all Branches)

Batch 2013-2017

SEMESTER-SECOND

Detailed Syllabus

&

Scheme of Examination

PROFESSIONAL COMMUNICATION SKILLS

Course Code	:	**LA 201**
Course Title	:	**Professional Communication Skills**
Course Credits	:	**04**
Total Hours per Week	:	**1+1+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.

Course Syllabi (Practical):

- Sounds of English
- Accent and Intonation
- Listening Skills
- Reading Comprehension
- Vocabulary Extension

- Professional Presentations
- Group Discussions
- Job Interviews

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 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.

ENGINEERING MATHEMATICS-II

Course Code	:	**MA201**
Course Title	:	**Engineering Mathematics - II**
Course Credits	:	**5.5**
Total Hours per Week (L+T+P)	:	**3+1+0**

Course Syllabus:

- **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, Strum- Liouville Problem
- **Partial differential equation**: Partial Differential Equations of First Order, , Variable separable technique for solving PDE, Boundary value problems: Heat equation, wave equation, Laplace equation
- **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

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. B.V.Ramana, *Higher Engineering Mathematics*, Tata Mc-graw Hill.
3. Peter V. O'Neil, *Advanced Engineering Mathematics*, Seventh Indian Reprint, Cengage Learning, New Delhi, 2011.
4. Kreyszig, E., *Advanced Engineering Mathematics*, John Willey, Delhi (2011).
5. Potter M.C., Goldberg J.L., Edward F.A., *Advanced Engineering Mathematics*, 3rd Edition, Oxford University Press, 2005.
6. G.B. Thomas, Jr., *Thomas' calculus*, 11th edition (Indian), Pearson education, Delhi, 2008.

ENGINEERING PHYSICS-II

Course Code	:	**PH201**
Course Title	:	**Engineering Physics - II**
Course Credits	:	**7**
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.
- Distinction between Insulators, Semiconductors and Conductors, Intrinsic and Extrinsic Semiconductors.

Statistical Mechanics (No derivation required)

- 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, Poynting vector.

Course Syllabi (Practical):

1. To determine the ferromagnetic constants retentivity, permeability and susceptibility by tracing I-H curve using C.R.O.
2. To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted).
3. To determine the high resistance by method of leakage, using a Ballistic Galvanometer.
4. To determine dielectric constant of a material using moving coil Ballistic Galvanometer.
5. To study characteristics of G.M. Counting System.
6. To determine the absorption coefficient of lead using lead sheet by G.M. Counting System.
7. To determine the specific resistance of the material of a wire by Carey Fosters Bridge.
8. To convert a Galvanometer in to an ammeter of range 1.5/3 amp and calibrate it.
9. To convert a Galvanometer in to a Volt of range 1.5/3 volt and calibrate it.
10. 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
11. To study the variation of thermo e. m. f. of iron copper thermo couple with temperature

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. 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

ENGINEERING CHEMISTRY-I

Course Code	:	**CH 201**
Course Title	:	**Engineering Chemistry- II**
Course Credits	:	**7**
Total Hours per Week (L+T+P)	:	**3+1+2**

Course Syllabi (Theory):

Solid State Chemistry

Solid State, Types of solids, Space Lattice and Unit cell, Types of unit cell, Cubic System – number of atoms per unit cell, Atomic Radius, Density Calculation of unit cell. Bragg's Law X-ray studies of Crystals.
Graphite – Structure, Properties and applications.
Liquid Crystal: Liquid Crystalline state, Classification of liquid crystal and their applications.

Chemical Kinetics and Phase Rule

Rate of reaction, Molecularity and order of reaction, Zero, I and II order reactions, Theories of reaction rate, Temperature Dependence of rate of reaction (Arrhenius Equation). Calculation of activation energy.
Gibbs Phase Rule: Explanations of the terms used in phase rule. Application of phase rule to one component system (Water System)

Corrosion

Definition and its significance, Theories of corrosion - Dry corrosion theory, Wet (Electrochemical) theory, Passivity, Types of electrochemical corrosion. Factors influencing rate of corrosion. Protection from corrosion – protective coating, Cathodic and anodic protection, Modification in design

New Engineering Materials

Nanotechnology and Nano materials: Fullerenes and Carbon Nano tubes - Introduction, Structural properties, preparation and their applications.
Optical Fibers: Introduction, Structural properties, preparation and their applications.
Conducting Polymers: Introduction, types of conducting polymers, Mechanism of doping (p-type, n-type) and their applications.

Fuels

Definition and classification of fuels, Calorific value – Units, Gross (HCV) and Net (LCV) calorific values. Determination of HCV and LCV by Bomb Calorimeter. Calculation of calorific value by Dulong's Formula.

Coal: Types of coal, proximate and ultimate analysis of coal. Petroleum.

Course Syllabi (Practical):

1. Proximate analysis of solid fuel.
2. Determination of calorific value of solid fuels.
3. Measurement of pH of given sample by pH meter.
4. Measurement of conductivity of given sample by conductivity meter.
5. Measurement of Fluoride in water sample.
6. To determine the strength of copper sulphate with the help of Hypo solution.
7. To determine the strength of Ferrous Ammonium sulphate solution
8. To determine the strength of NaOH and Na_2CO_3 in given alkali mixture
9. Determination of Barium as barium sulphate gravimetrically.
10. Determination of Na/K/Ca by Flame photometer in a 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. 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).
6- Introduction to Nanotechnology by Poole Owens (Wiley)

ELECTRICAL & ELECTRONICS ENGINEERING

Course Code	:	**EE201**
Course Title	:	**Electrical & Electronics Engineering**
Course Credits	:	**7**
Total Hours per Week (L+T+P)	:	**3+1+2**

Course Syllabi (Theory):

Introduction:, basic physical laws, circuit elements, Source Transformation, KVL, KCL, Wye (Y) – Delta (Δ) and Delta (Δ) – Wye (Y) transformations.

Theorem: Norton, Thevenin, Superposition, Max power transfer Theorem

AC Networks: Fundamental aspects of single phase ac supply, Sinusoidal Steady State, Real/Reactive Power, Phasor,Three phase circuits, Start-delta, Two watt-meter Method, simple circuits, RMS Average value, Transients in R-L, R-C, R-L-C,

Transformer & Machine: Basics of transformer Faraday and Lenz law, Mutual Inductance, construction, Working Principles of Transformers,AC/DC machines

Introduction to Semiconductors: Defining Insulator, Semiconductor, Conductors. Band gap energy and band formation, elementary idea about semiconductor behavior, conductivity, types of semiconductor, p-type and n-type, working principle, characteristics and applications of Diode and Transistor, Transistor CE, CB, CC configuration

Introduction to SCR & Communication.

Course Syllabi (Practical):

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 (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:

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.

ENGINEERING MECHANICS

Course Code	:	**ME 201**
Course Title	:	**Engineering Mechanics**
Course Credits	:	**5.5**
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.

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. Meriam and Kraige, **"Engineering Mechanics-STATICS"**, John Wiley & Sons, Fifth Edition, 2010

T2. Meriam and Kraige, **"Engineering Mechanics-DYNAMICS"**, John Wiley & Sons, Fifth Edition, 2010

Reference Books:

R1 Engineering Mechanics, Basudeb Bhattacharyya, Oxford University Press

R2 Vector Mechanics for Engineers, Beer and Johnston, Tata McGraw-Hill., Ninth Edition, 2009.

R3 Engineering Mechanics, Hibbeler, Pearson Education, Sixth Edition, 2010

R4 Engineering Mechanics, Andrew Pytel & Kiusalas, Cengage Learning, Third Edition, 2010.

R5 Engineering Mechanics, Timoshenko and Young, Tata McGraw-Hill, Fourth Edition, 2006.

R6 Engineering Mechanics- Statics and Dynamics, Shames, Pearson Education.

R7 Engineering Mechanics, Boresi and Schmidt, CL-Engineering, First Edition, 2008.

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):

- **Introductory concepts & BIS conventions:** Introduction, Classification of drawing, Code of practice, Drawing instruments, Size and layout of drawing sheets, Folding of drawing sheets, Description of different types of lines, Patterns of lettering, Patterns of section & other conventions, General system of dimensioning, Conventional representation of threads & threaded parts, Conventional representation of springs, Conventional representation of gears.
- **Isometric drawing:** Introduction, Isometric planes, lines and axes, Isometric scales, Isometric projection and isometric view, Some basic methods for drawing isometric figures, Conversion of orthographic views into isometric views, Conversion of orthographic views into isometric projections, Conversion of isometric figure into orthographic projections, Blueprint and reading of blueprint, Procedure of reading blueprint, Recovering missing lines and missing views, Freehand sketching, Freehand orthographic views, Freehand isometric views, AutoCAD supplement, Setting isometric grid and snap. Drawing isometric circles, displaying different views
- **Sectional views:** Introduction, Convention for placement of section planes, Types of section planes, obvious section plane, Specified section plane, Convention for placement of section views, Section of interpenetrated solids, AutoCAD supplement.
- **Limits, tolerance & fits:** Introduction, Some basic definitions, Nominal size, Actual size, Basic size, Design size, Zero line, Limits of size, Allowance, Deviation, Maximum metal condition, Least metal condition, Engineering tolerance, Consideration for setting tolerance, Grade of tolerance, Linear tolerance indication, Angular tolerance indication, Cumulative tolerance, **Fits** Types of fits, Basis of fits, Indication of fits, Selection of fits, AutoCAD supplement.

Evaluation Scheme:

EC No.	Evaluation Component	Duration	Marks (100) (%)	Nature of Component
1.	Mid Term Test	2 hour	20	Closed Book
2.	End Term Test	2 hour	40	Closed Book
3.	Class Participation	Day to day	15	.....
4.	Continuous Evaluation (Discipline, Punctuality, Assignment & Viva Voce)	Day to day	25	.....

Text Books:

T1. Basudeb Bhattacharyya, ***"Machine Drawing including AutoCAD Supplements,"*** Oxford University Press, 2012, Second Impression

T2. Ajeet Singh, ***"Machine Drawing: Includes AutoCAD,"*** TMH, 2nd edition

Reference Books:

R1. Yarwood, Alf. ***"Introduction to Auto – CAD 2011 2D and 3D Design"***, Elsevier, *1st* edition, 2010

R2. Ellen Finkelstein, ***"Auto-CAD 2011 & Auto-CAD LT 2011 Bible,"*** Wiley India Edition

R3 Bhatt, N.D. ***"Machine Drawing"***, Charotar Pulisher, 38th edition, 2003

R4 James E Fuller, ***"Using Auto-CAD,"*** Denmark Publishing Co.

R5 Dhawan, R.K. "***Machine Drawing***", S. Chand and Co, 2005

R6 Radhakrishnan, P., ***"Computer Graphics and Design***", Dhanpatrai and Sons

Approved for implementation

27.12.2013

JK Lakshmipat University

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

B. Tech (2013-17)

4 Years Degree Programme

(Branch: Civil Engineering)

Semester – III - VIII

Curriculum, Detailed Syllabus

&

Scheme of Examination

Academic Council Meeting (23.12.2013)

JK Lakshmipat University

Laliya Ka Vas, P.O. Mahapura, Ajmer Road, Jaipur 302026

Ph.: +91-141-7107500/504

INSTITUTE OF ENGINEERING AND TECHNOLOGY

4 Year B. Tech Programme

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Batch 2013-17

SEMESTER-THREE

Detailed Syllabus

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Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 305	STRUCTURE ANALYSIS I	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (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

Text Books:

1. Pytel, A., and JaanKiusalaas, ***"Mechanics of Materials",*** CL Engineering,2nd edition, 2011
2. Hibbeler, R.C., ***"Mechanics of Materials SI",*** 6th SI edition, Prentice Hall
3. Ryder, G.H., ***"Strength of Materials",*** Palgrave Macmillan, 1969

Reference Books:

1. Beer, F.P., Johnston, E.R., DeWolf, J.T., "***Mechanics of Materials***", McGraw Hill, 4th edition,
2. Craig, R.R., "***Mechanics of Materials***", John Wiley and Sons, 2nd edition, 1999
3. Singh, Sadhu, "***Strength of Materials - I***", Khanna Book Publishing, Latest edition
4. Rattan, S.S., ***"Strength of Materials"***, McGraw Hill, New Delhi, 2nd edition,

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 306	FLUID MECHANICS I	3	1	2	5

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Syllabus (Theory)

Physical properties of fluids- Viscosity, Compressibility, Elasticity, Ideal and Real fluids, Concepts of shear stress, Newtonian and Non-Newtonian fluids. ; Pressure-density-height relationships, Pascal's law, Pressure on plane and curved surfaces, Buoyancy, measurement of pressure, manometers, Stability of immersed and floating bodies, oscillation of a floating body

Free and forced vortex; steady and unsteady; uniform and non-uniform, laminar and turbulent flows, free surface flows and enclosed flows, definition of one, two and three dimensional flows, velocity and accelerations, stream lines, streak lines and path lines, stream tubes, stream function and velocity potential, flow nets, circulation and vorticity.

Equation of continuity, one dimensional Euler's equation of motion and its integration to obtain Bernoulli's equation, momentum equation, hydraulic mean radius, concept of friction loss, Darcy-Weisbach equation minor losses in pipe, branched pipes in parallel and series, transmission of power, water hammer in pipes, laminar flow in pipes Hazen Poiseulli's equation, Turbulent flow in pipes, velocity distribution in pipes, Moody's diagram.

Boundary layer thickness, energy thickness, laminar and turbulent boundary layer, separation of boundary layer, momentum integral equation, drag and lift coefficient, pressure drag and friction characteristics of sphere, cylinder and disc, circulation, lift and magnus effect, lift characteristics of air foils, induced drag

Syllabus (Practical)

1. Determination of viscosity of oil
2. Establish relationship between pressure and height
3. Determination of metacentre of a floating body
4. Verification of conservation of energy in a duct based on Bernouli's theorem
5. Calibration of venturimeter, orificemeter, pitot tube and rotameter
6. Determination of coefficient of friction in close conduit as major losses
7. Determination of minor losses from bend, elbow, sudden contraction, enlargement

Text Books:

1. Fluid Mechanics and hydraulic machines, RK Bansal, Laxmi Publishing
2. Fluid Mechanics and hydraulic machines, RK Rajput.

References Books

1. Fluid Mechanics: Fundamentals and applications, YA Cengel, JM Cimbala, McGraw Hill Publication
2. Fluid flow in pipes and channels, GL Asawa, CBS Publishers

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE304	ENGINEERING GEOLOGY	3	0	2	4

Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100**	20	40	15	25	100**

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Syllabus (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.

Syllabus (Practical)

1. Megascopic study of minerals
2. Megascopic study: Igneous, Sedimentary, Metamorphic
3. Understand fold and faults within a rock mass
4. Study geological features of rocks such as strike and dip
5. Soil erosion and physical weathering in the rocks
6. Structural analysis using stereo nets or Wulff's net
7. Geological maps representing the geological structure of some segment
8. Use of GPS instrument for geological data generation

Text Book(s)

1. Prof Parbin Singh, 'Engineering & General Geology" S K Kataria& Sons, 8 th edition, 2008
2. Principles of Engineering Geology, Bangar,

Reference Book(s)

1. Structural Geology by Billings
2. Petrology by Tyrll.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE307	BUILDING Planning AND CONSTRUCTION Materials	3	0	2	4

Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100**	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Course Syllabi (Theory):

Components of a building and their functions, foundation, shallow and deep foundation, grillage, raft, inverte arches, causes of failure of foundations and remedial measures, Masonry: types- Bricks and stone masonry functions, material requirements, different bonds, damp proofing course

Shoring, under pining, scaffolding, horizontal and vertical shores, purpose and methods of under pinning, differen types of scaffolding, floors and roofs: types, details of construction and materials

Doors: paneled, glazed, flushed doors, collapsible steel doors, Windows: Casement, Sash, and Skylight windows Staircase: Requirement of a good staircase, different types of stair cases

Functional planning of buildings: Planning, designing and construction, General building requirements, Permit an Inspection (as per the National building Code)

Practice and Techniques: Elements of City plan, Estimating future needs, Planning standards, Zoning, definition regulations and procedures, building bye laws, height and bulk zoning, F.A.R., planning law and administration

Syllabus (Practical)

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

Text Book(s)

1. Surendra Singh, Engineering Materials, Konark Publishers Pvt. Ltd.
2. D.S.Arora, 'Text Book of Engineering Materials', Kalyani Publishers
3. B.C. Punmia, 'Building Construction' Laxmi Publications Pvt. Ltd.
4. S C Rangwala, *Building Materials*, Charotar Publishing House Pvt, Ltd, 13 th Edition, 2012
5. Sushil Kumar, Building Construction, Standard Publishers, Delhi

Reference Book(s)

1. The Handbook of Building Construction by MM Goyal.
2. National Building Code of India, 2005, Bureau of Indian Standards, Delhi

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 308	Surveying	3	0	2	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks **	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others
**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

Principles Surveying: Classification of surveys; Linear measurements using chains and tapes, chaining and ranging, principles of chain survey, reciprocal ranging, applications, errors and corrections in chaining, obstacles in chaining, Electronic Distance Measurement (EDM).

Angle and direction measurements: Measurement of bearing, Designation of bearings, whole circle bearings & quadrant bearings, fore bearing and back bearing, Computation of angles from bearings, Principles of compass survey, local attraction and corrections, compass traverse and adjustments ; Plane table survey: Equipment, working operations, different methods, advantages and disadvantages, Two point and Three point problems.

Elevation measurements: Principle of leveling, leveling instruments- Dumpy and Automatic levels, booking and reducing levels, simple and differential leveling, profile and cross-section leveling, reciprocal leveling, methods of leveling, leveling difficulties, curvature and refraction corrections, examples, Contouring: definition, contour interval, characteristics of contours, direct and indirect methods of contouring, interpolation of contours, uses of contour maps.

Distance and Elevation measurements: Theodolite, temporary and permanent adjustments, measurement of horizontal and vertical angles, elimination of errors, Traversing: Uses and method of traversing, traversing procedure, check in closed and open traverse, traverse computation, ploting of traverse survey, numericals, Total station, functioning and measurements, field project using total station.

Syllabus (Practical)

1. Measurement of offsets for a building
2. Tape and compass traverse survey for a boundary line
3. Simple leveling and measurement of gradients
4. Profile leveling and cross-section leveling for a road line
5. Preparation of a contour sheet for an area
6. Plane table surveying for a land area, traffic junction
7. Measurement of horizontal and vertical angles using theodolite
8. Field project using total station

Text and References Books:

1. Plain Surveying, AM Chandra, New Age International Publishers
2. Surveying Vol-I, BC Punamia, AK Jain, AK Jain, Laxmi Publishing G.Strang, Linear algebra and its applications (4rh Ed.), Thomson (2006).

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MA 301	Engineering Mathematics – III	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Course Syllabi (Theory):

Unit 1: Integral Transforms

Laplace transform and its properties, Fourier Transform.

Unit 2: Applications of Transform Calculus

Integral transform method for solving differential equations, Systems of Linear Differential Equations

Unit 3: Special Functions

Legendre and Bessel functions, series representations and recurrence relations

Unit 4: Calculus of variations

Extremal function, Euler Equation, Isoperimetric problems

Unit 5: 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

Text books 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. H. K. Dass, *Advanced Engineering Mathematics*, 12th editions with corrections, S. Chand and Company, Meerut, 2004
6. B. V. Ramana, *Higher Engineering Mathematics*, Tata Mcgraw Hill.
7. Potter M.C., Goldberg J.L., Edward F.A., *Advanced Engineering Mathematics*, 3rd Edition, Oxford University Press, 2005

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS 302	Principles of Management for Engineers	2	0	0	2

Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Text Books:

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

Reference Books:

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

2. Stoner, James A. F. and Freeman, R Edward. "Management". Prentice Hall of India, New Delhi. 6th e, 1989.
3. Bateman, T. S. and Snell, S. A. "Management: Leading and Collaborating in a Competitive World", McGraw Hill Irwin. 8th edition,2009.
4. Draft, R. L. "Principles of Management". Cengage learning.2009
5. 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 2013-17

SEMESTER-FOUR

Detailed Syllabus

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Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE405	Structure Analysis II	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test – II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (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.

Text Books:

1. S.B. Junarkar & H.V., "Mechanics of Strucutres", Vol. II
2. Hibbeler, R.C., ***"Mechanics of Materials SI",*** 6th SI edition, Prentice Hall
3. Ryder, G.H., ***"Strength of Materials",*** Palgrave Macmillan, 1969
4. Srivastava, A.K., and P.C. Gope, ***"Strength of Materials",*** PHI, 2nd edition, 2012

Reference Books:

1. Beer, F.P., Johnston, E.R., DeWolf, J.T., "***Mechanics of Materials***", McGraw Hill, 4th edition,
2. Craig, R.R., "***Mechanics of Materials***", John Wiley and Sons, 2nd edition, 1999
3. Singh, Sadhu, "***Strength of Materials - I***", Khanna Book Publishing, Latest edition
4. Rattan, S.S., ***"Strength of Materials"***, McGraw Hill, New Delhi, 2nd edition,
5. C. K. Wang, "Structural Analysis"

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE406	FLUID MECHANICS II	3	1	2	5

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others
**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

Dimensional and Model Analysis: Primary and secondary quantities, Dimensional homogeneity, importance of dimensional analysis, methods of dimensional analysis, Rayleigh's method and Buckinghum's methods, repeating variables, Similarity laws and model studies, dimensionless numbers, model testing of partially and submerged bodies, classification of models, undistorted and distorted models

Open channel flow: Classification of flow in channels, geometry elements in channel section, velocity distribution in a channel, Chezy's formula, Uniform flow, Chezy's, Kutter's and Manning's equation, most economic sections of a channel, rectangular, trapezoidal, circular and triangular channel sections

Critical flow in channel, normal and critical slopes, specific force, computations for critical velocity and critical depth, hydraulic jump, expression for hydraulic jump, length of hydraulic jump, gradually varied flow, characteristics of gradually varied flow, computations of gradually varied flow in channels, applications of critical flow concepts

Orifices and Mouth pieces: Classification of orifices, hydraulic coefficients, flow through large orifices, time of emptying a tank; Notches and Weirs: classification of notches, discharge over a triangular notch, velocity of approach, Francis's and Bazin's formula, discharge over submerged weir

Syllabus (Practical)

1. Calibration of triangular notch for field installation
2. Study on velocity distribution in an open channel
3. Study phenomena of hydraulic jump
4. Study on critical depth of flow

Text Book(s)

1. Fluid Mechanics and hydraulic machines, RK Bansal, Laxmi Publishing
2. Fluid Mechanics and hydraulic machines, RK Rajput

Reference Book(s)

1. Fluid Mechanics: Fundamentals and applications, YA Cengel, JM Cimbala, McGraw Hill Publication
2. Fluid flow in pipes and channels, GL Asawa, CBS Publishers

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE407	ENVIRONMENTAL ENGINEERING I	3	0	2	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Syllabus (Theory)

General requirement for water supply , Quality and quantity of water, Domestic water quality standards; Water analysis (ISO, WHO standards), Sources of water and their yield, Water supply forecast, population forecast, variation in demand pattern, design period; Intakes, pumping and transportation of water

Physical, chemical and biological characteristics of water and their significance, water quality criteria, apurtenances of water treatment and distribution systems, pump, pumping systems, pipes and fitings Designing a water treatment plant, process of treatment, mixing, aeration, sedimentation, coaugulation, disinfection, softening, distribution systems- analysis and distribution of network, layout of distribution system, methods of water supply, distribution reservoir, capacity of reservoirs
introduction to water supply software, waterCAD, EPANET2

Syllabus (Practical)

1. Determination of turbidity, chlorine, pH, and hardness
2. Determination of turbidity using Aluminum sulfate-Jar test
3. Determination of chlorine demand and chloride residuals
4. Analysis of water quality, quantity parameters in a water supply system
5. Determination of various parameters in water treatment plant
6. Designing a water distribution systems Software practice

Text Book(s)

1. Environmental engineering, HS Paevy, DR Rowe, G Tchobanoglous, McGraw Hill
2. Environmental engineering: Water supply engineering, SK Garg, Khanna Publishers
3. Water supply Engineering , B.C. Punamia

Reference Book(s)

1. Water supply and sanitation engineering, GS Birdie, JS Birdie, Galgotia Publishing Ltd
2. Wastewater Engineering, Metcalf and Eddy, McGraw-Hill Higher Education

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE402	Concrete and Construction Technology	3	0	2	4

Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

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

Syllabus (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 , Nondestructive testing
6. Mix Design of Concrete.

Text Book(s)/ Reference Book(s)

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.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE408	Advanced Surveying	3	0	2	4

Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others
**The ratio of weightage between Theory and Practical content will be 60%: 40%

Course Syllabi (Theory):

Curve setting: Designation of curves, setting out simple circular curve, methods of curve setting, obstacles to the location of curves, compound and reverse curve, setting out compound curve, spiraling compound and reverse curves, transition curves, length of a transition curve, ideal transition curve, characteristics of a transition curve, vertical curves, types and length of a vertical curve, setting out a vertical curve, sight distance, applications of site distance in transport planning Hydrographic surveying: Need of a hydrographic survey, shore line survey, survey inside water bodies, methods of locating soundings, plotting of soundings, tides, tide gauges, mean sea level, Route surveying: reconnaissance survey, preliminary survey, location survey, construction survey Photogrammetric surveying: Basic principles, elevation of a point by photogrammetric measurement, scale of a vertical photographs, determination of flying height, tilt and relief, stereoscopic vision, parallax in aerial stereoscope, effects of change of elevation and parallax, parallax bar and numerical Remote sensing and GPS: principles of remote sensing, EMR, concept of signature, resolution, types of sensors, visual and digital image processing, image interpretation, applications in civil engineering, Global positioning system: definition, principles, map making using GPS, transferring data into computer, numerical.

Syllabus (Practical)

1. Setting out a simple circular curve
2. Setting out simple circular curve using 2-thedolite method
3. Tidal analysis from hydrographic survey data
4. Rapid visual survey for route in a city
5. Determination of difference in height of a buildings/objects using stereo pair photographs
6. Visual image interpretation and identification of objects in a satellite image
7. Mapping of an area using global positioning system
8. Field project using global positioning system

Text Book(s)

1. Surveying Vol.2 by B.C.Punmia
2. Surveying Vol.3 by B.C.Punmia
3. Surveying Vol.2 by T.P.Kanitkar
4. Higher Surveying, AM Chandra, New Age International Publishers

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MA 402	Numerical and Statistical Methods	3	0	2	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Syllabus (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: Bisection Method, *Regula-falsi* Method, Secant Method, Newton Raphson Method
- **Linear Algebraic Equations:** LU Decomposition Method, Gauss Elimination Method, Gauss Jordan Elimination Method, Iterative methods for solving system of linear equations.
- **Interpolation and approximation:** Netwon Formula for forward and backward interpolation, Sterling Central difference interpolation, Lagrangian Interpolation
- **Numerical Differentiation and Integration:** Numerical Differentiation and Integration, Newton-Cotes Integration Formulae.
- **Ordinary Differential Equations:** Picard Method, Euler Method, Modified Euler Method, Runge-Kutta 4^{th} order Method, Milne Predictor-Corrector Method
- **Random Variables and probability distributions:** Introduction to probability, Discrete and continuous random variables, Probability Distributions: Binomial, Possion, Exponential, Normal distributions, 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 Tests, Chi-square goodness of fit test, Contingency tables.
- **Correlation and regression:** Types of Relationships, Scatter Diagrams, Regression Line, Coefficients of Determination and Correlation

Syllabus (Practical)

Numerical Methods using MATLAB and Statistical Analysis using SPSS in Computer Labs that includes:

1. Numerical solution of algebraic and transcendental equations.
2. Numerical solution of system of linear equations.
3. Interpolation.
4. Numerical differentiation.
5. Numerical integration.
6. Numerical solution of differential equations.
7. Data Analysis using Correlation and Regression
8. Test of Hypothesis

Text books 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, *Applied Numerical Methods with MATLAB for Engineers and Scientists*, 3rd Editions, Tata Mc Graw Hill, New Delhi, 2012.
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.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

4 Year B. Tech Programme

(Branch: Civil Engineering)

Batch 2013-17

SEMESTER-FIVE

Detailed Syllabus

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Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE507	Design of RCC Structure	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

Design: strength, stiffness, stability, serviceability, Design process: Analysis, design and detailing, Design philosophy: working stress method, Ultimate load method, Limit state method, plastic method

Flexural design: Analysis, design and detailing of rectangular & flanged beams, one-way & two way simply supported & continuous slabs, Flexural and shear design: Design and detailing of rectangular & flanged beams; Axial load design: Design and detailing of axially loaded Short columns Combined axial, shear and flexural design: Design and detailing of uniaxial & biaxial - Short & long columns; Torsion design: Design of rectangular beam section for torsion

Combined shear and torsion: Design of rectangular beam section, Shear, flexural, punching, torsion: Design of isolated footing and combined footing, Bond and development length: Checking bond & development length for bars under tension, compression, Combined axial, shear, flexure: Design and detailing of uniaxial & biaxial – Short & long columns. Design of flat slabs

Axial force design: Tension member, compression member, Flexural design for beams: Restrained, unrestrained Combined axial and flexural design: Columns, Footing : slab based, gusseted base foundation, Torsion design and conncetions, Beams, columns, Combined axial, flexural and torsion: columns, Connections: Bolted – bearing type, Hsfg for seismic purpose, Welded: types of electrodes, Connection design for tension, compression, flexural, flexural + shear.

IS Codes:

1. Code of practice for plain and reinforced concrete IS : 456 (III revision) (with amendment I)
2. Code of practice for structural safety of Buildings IS : 875 Part I to V
   Loading standards.(revised)(with Amendment 1)

Text books:

1. Shah and Karve; Limit State theory & Design of Reinforced Concrete
2. A.K.Jain; Design of Concrete Structures, Nemchand Publication.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE508	Geotechnical Engineering - I	3	1	2	5

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Syllabus (Theory)

Fundamental definitions, origin and formation of soil. Phase Diagram, Voids ratio, Porosity, Percentage Air Voids, Air content, Degree of saturation, Water content, Specific Gravity of soil solids and soil mass, Densities and Unit weights - Bulk, Dry, Saturated & submerged and their inter relationships

Index Properties of soil- Water content , Specific Gravity, Particle size distribution, Relative Density, Consistency limits and indices, in-situ density, Activity of Clay, Laboratory methods of determination of index properties of soils.

Permeability, Darcy's law- assumption and validity, coefficient of permeability and its determination, factors affecting permeability, permeability of stratified soils, Seepage velocity, Superficial velocity and coefficient of percolation, quick sand phenomena, Capillary Phenomena,

Concept of shear strength, Mohr-coulomb theory, conventional and modified failure envelops, Effective stress concept total stress, effective stress and Neutral stress, Concept of pore pressure, Total and effective shear strength parameters, factors affecting shear strength of soils Compaction, Standard and Modified proctor's compaction tests, factors affecting compaction, effect of compaction on soil properties, Field compaction control – compactive effort & method, lift thickness and number of passes, Proctor's needle, Compacting equipment

Consolidation: Definition, Terzaghi's one dimensional consolidation theory-assumption and limitations, Normally consolidated, under consolidated and over consolidated soils, pre-consolidation pressure and its determination, Consolidation characteristics of soil

Syllabus (Practical)

List of Experiments:

1. Determination of moisture content
2. Determination of specific gravity
3. Field density test
4. Determination of Relative Density
5. Determination of sieve analysis
6. Determination of consistency limits and indices
7. Standard proctor compaction test
8. Permeability test
9. Unconfined Compression Test
10. Vane Shear Test

Text Book(s)/Reference Books

1. Soil Mechanics and Foundation Engg. Punmia B.C. (2005), 16th Edition Laxmi Publications Co., New Delhi.
2. Principles of Soil Mechanics and Foundation Engineering- Murthy V.N.S. (1996), 4th Edition, UBS Publishers and Distributors, New Delhi.
3. Geotechnical Engineering; Braja, M. Das (2002), Fifth Edition, Thomson Business Information India (P) Ltd., India
4. Foundation Analysis and Design- Bowles J.E. (1996), 5th Edition, McGraw Hill Pub. Co. New York.
5. Soil Engineering in Theory and Practice- Alam Singh and Chowdhary G.R. (1994), CBS Publishers and Distributors Ltd., New Delhi.
6. Basic and Applied Soil Mechanics- Gopal Ranjan and Rao A.S.R. (2000), New Age International (P) Ltd., Newe Delhi.
7. Geotechnical Engineering- Donold P Coduto Phi Learning Private Limited, New Delhi
8. Geotechnical Engineering- Shashi K. Gulathi & Manoj Datta. (2009), Tata Mc Graw Hill.
9. Text Book of Geotechnical Engineering- Iqbal H. Khan (2005), 2nd Edition, PHI, India.
10. Numerical Problems, Examples and objective questions in Geotechnical Engineering- Narasimha Rao A. V. & Venkatrahmaiah C. (2000), Universities Press., Hyderabad.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE509	ENVIRONMENTAL ENGINEERING II	3	0	2	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Syllabus (Theory)

Waste water treatment, sewage and effluent, sources of wastewater, classification of wastewater, pollutions, characteristics and testing of sewage, composition, sampling, physical and chemical analysis

Industrial waste treatment: objectives, significance of treatment, classification of treatment processes, wastewater treatment, operations, screenings, skimming, sedimentation, biological treatment, aerobic and anaerobic treatment, trickling filters and design, LRTF & HRTF, types and modifications, activated sludge process, modes of waste water disposal membranes

Sewage treatment, principles, ETP design, Energy recovery from waste, sludge digesters and bio gas plants

Syllabus (Practical)

1. Determination of DO, COD and BOD
2. Analysis of water quality, quantity parameters in a wastewater
3. Designing a wastewater distribution systems
4. Designing a filtration system.

Text Book(s)

1. Environmental engineering, HS Paevy, DR Rowe, G Tchobanoglous, McGraw Hill
2. Environmental engineering: Wastewater engineering, SK Garg, Khanna Publishers
3. Water supply and sanitation engineering, GS Birdie, JS Birdie, Galgotia Publishing Ltd.

Reference Book(s)

1. Water and wastewater engineering, Metcalf and Eddy, McGraw Hill

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE510	Hydrology and Water resources Engineering	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Course Syllabi (Theory):

Hydrologic cycle - rainfall and its measurement - computation of mean rainfall over a catchment area using arithmetic mean, Theissen polygon and Isohyetal methods - Runoff -infiltration indices - Storm Hydrograph and unit hydrograph River regions and their characteristics - classification of rivers on alluvial plains - meandering of rivers - river training

Reservoir planning - Investigations - zones of storage in a reservoir - single purpose and multipurpose reservoir - determination of storage capacity and yield - reservoir sedimentation - Reservoir life - Sediment prevention - Flood estimation- Flood forecasting - Flood routing.

Ground water - types of aquifers - storage coefficient - coefficient of transmissibility - steady radial flow into a well located in an unconfined and confined aquifers - Tube wells and Open wells.yield from an open well. Water logging - causes and effects of water logging - remedial measures - land reclamation - land drainage - benefits - classification of drains - surface drains - subsurface drains - design principles and maintenance of drainage systems.

Text Book(s)/ Reference Book(s)

1. Punmia, B.C., Irrigation and Water Power Engineering, Standard Publishers, 2001.
2. Ragunath. H.M., Hydrology, Willey Eastern Limited, New Delhi, 2000.
3. Subramanya, Engineering Hydrology, Tata-McGraw Hill, 2004.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE511	Transportation Engineering I	3	0	2	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others
**The ratio of weightage between Theory and Practical content will be 60%: 40%

Course Syllabi (Theory):

PRINCIPLES OF TRANSPORTATION ENGINEERING: Importance of transportation, Different modes of transportation and comparison, Characteristics of road transport, Road types and classification, road patterns, planning surveys, Indian Roads Congress Guidelines

HIGHWAY GEOMETRIC DESIGN: Ideal Alignment, Factors affecting the alignment, Terrain classification, Design speed, Factors affecting geometric design, Cross sectional elements-Camber- width of pavement-Shoulders-, Width of formation- Right of way, Typical cross sections; Sight Distance-Restrictions to sight distance- Stopping sight distance- Overtaking sight distance- overtaking zones- Examples on SSD and OSD-Sight distance at intersections, Horizontal alignment-Radius of Curve- Super elevation – Extra widening-Transition curve and its length, setback distance – Examples, Vertical alignment-Gradient-summit and valley curves

PAVEMENT MATERIALS: Sub grade soil – desirable properties-HRB soil classification-determination of CBR and modulus of sub grade reaction-Examples, Aggregates- Desirable properties and list of tests, Explanation on Tar, bitumen, cutback and emulsion-List of tests on bituminous materials; PAVEMENT DESIGN: Pavement types, component parts of flexible and rigid pavements and their functions, design factors, ESWL and its determination, Flexible pavement- Design of flexible pavements as per IRC;37-2001-, Rigid pavement- Westergaard's equations for load and temperature stresses- Design of slab thickness only as per IRC:58-2002

PAVEMENT CONSTRUCTION: Earthwork –cutting-Filling, Preparation of sub grade, Specification and construction of i) Granular Sub base, ii) WBM Base, iii) WMM base, iv) Bituminous Macadam, v) Dense Bituminous Macadam vi) Bituminous Concrete, vii) Dry Lean Concrete sub base and PQC viii) concrete roads; HIGHWAY DRAINAGE: Significance and requirements, Surface drainage system and design-Examples, sub surface drainage system, design of filter materials; HIGHWAY ECONOMICS: Highway user benefits, VOC using charts only-Examples, Economic analysis – annual cost method-Benefit Cost Ratio method-NPV-IRR methods- Examples, Highway financing-BOT-BOOT concepts.

Syllabus (Practical)

1. To determine the elongation and flakiness index for an aggregate sample
2. To determine the Crushing value for an aggregate sample
3. To determine the Impact value for an aggregate sample
4. To determine the Abrasion value for an aggregate sample

Text Book(s)/ Reference Book(s)

1. Highway Engineering – S K Khanna and C E G Justo, Nem Chand Bros, Roorkee
2. Highway Engineering - L R Kadiyali, Khanna Publishers, New Delhi
3. Transportation Engineering – K P Subramanium, Scitech Publications, Chenna
4. Transportation Engineering – James H Banks, Mc. Graw. Hill Pub. New Delhi
5. Highway Engineeering –R. Sreenivasa Kumar, University Press. Pvt.Ltd. Hyderabad

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE512	Urban and Regional Planning	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

Introduction to Planning Discipline Defining planning as a discipline, multidisciplinary nature, role of a planner, fields of planning- Urban, regional, environmental, transport and infrastructure.

Evolution of Settlement The City in History. Settlement size, pattern and structure as a function of socio-cultural, economic, military and religious factors. Variations in civilizations- Egyptian, Mesopotamian, Greek, Roman. Town planning in medieval times and in Renaissance Europe. Origin and evolution of civic planning; Impacts of Industrial Revolution on town and regional planning.

Planning in Post Industrial Revolution Era Concepts of garden City, City beautiful, linear city etc., contributions of all leading masters in planning. Socio-economic impacts of growth of urban areas; Rural-urban migration. Impact of technology on urban forms. Urban structure and form- land use distribution.

Definitions and Bases of Planning Various definitions of town and country planning; Goals and objectives of planning; Components of planning; Benefits of planning; Arguments for and against planning. Economics and social planning as bases of physical planning. Planning Process. Levels of planning in India.

Types of Plans Definition of development plan; Types of development plans: Master plan, City development plan,

Structure plan, District plan, Action area plan, Subject plan, Comprehensive planning, Zonal plans etc.

Regional planning Regional planning process, 73rd and 74th constitutional amendment act, special area development plan e.g. SEZ(special economic zones),SIR(special investment regions),DMIC(delhi-mumbai industrial corridor)

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE521 (Elective I)	River Engineering	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

Elements of River Geomorphology: Origin and properties of sediments, river problems control of vegetation and river morphology

Soil Erosion and Sediments Yield: Types of erosion, mechanism of soil erosion, sediment delivery ratio, and process based modeling of soil erosion.

Hydraulics of Alluvial Streams: Incipient motion, modes of sediment transport, bed-forms., resistance to flow in alluvial rivers, bed load transport, suspended load transport

River Geometry and Plan Forms: Stable channels and their geometry, flow around river bends, braided river, meandering river.

Gravel Bed Rivers: Hydraulic geometry of gravel bed rivers, armouring, bed forms and resistance to flow in gravel bed rivers.

Bed Level Variations in Steams: Degradation, local scour, aggradations, reservoir sedimentation, mathematical modeling for river bed variations.

Rivers and Environment: Environmental effects of hydraulic structures, river pollution, river action plans, stream restoration.

Text Book(s)/ Reference Book(s)

Garde, R.J., "River Morphology", New Age International.

Julin, P.Y., "Erosion and Sedimentation", Cambridge University Press.

Jansen, P.P.H., "Principles of River Engineering", VSSD Publications.

Rosgen, D., "Applied River Morphology", Wildland Hydrology books, Pagosa Springs

Graf, W.H. and Altinakar, M.S., "Fluvial Hydraulics: Flow and Transport Processes in Channels of Simple Geometery", John Wiley.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE522 (Elective I)	Ground Water Hydrology	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

Groundwater occurrence – distribution – aquifer – types - Surface investigation - Geophysical - electrical resistivity - Seismic refraction - Gravity and magnetic - Geologic - Air photo interpretation - Dowsing.

Subsurface investigation - test drilling - resistivity logging- potential logging - temperature and caliper logging.

Steady unidirectional flow - well in a uniform flow - steady flow with uniform recharge - unsteady radial flow to a well - well flow near aquifer boundaries - Multiple well systems - partially penetrating wells - characteristic well losses.

Secular and seasonal variations - Fluctuations due to evapo-transpiration, Meteorological phenomena, tides, external loads and earthquakes - control by drains and wells. Recharge through sewage pits, shafts and wells.

Occurrence of sea water intrusion - Ghypon-Heizberg relation between fresh and saline waters - shape length and structure of the fresh salt water interface - prevention and control of seawater intrusion - role of sea water in ground water - coastal zoning.

Sand models - Electrical models - Viscous fluid models - membrane models - numerical analysis methods

Text Book(s) /Reference Book(s)

1. Raghunath H.M., Ground Water Hydrology, New-Age International, 2nd Edition, 1990.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE523 (Elective I)	Understanding natural and manmade disaster	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Course Syllabi (Theory):

Introduction to natural resources, their distribution and challenges, natural disasters and their classification. Definition and scales of disasters, Disaster Management Act and Policy, Institutional Framework and Mechanism, History and Status of Disaster Management in India, Terminology and Concepts in Disaster Risk Management .

Earthquakes Physics: Wave propagation, Wave types (compression, shear, surface), Attenuation; Causes: Tectonic plate motions, Magma movement, Isostatic rebound, subsurface fluid changes; Effects: No damage or massive damage, Tsunamis, Subsidence, Detection, Seismic network, Warning, Recovery, Updated building codes, Man mitigate damage; Tsunamis Physics: Pressure, Wave propagation, Causes: Earthquakes, Underwater landslides; Effects: Sudden rise and fall in sea level, Coastal damage, Loss-of-life; Detection: Seismic networks, Pressure gauges, Wave-height buoys, Warning, Siren, Recovery: Hampered by loss of infrastructure, Rebuild with knowledge that it can happen again, upgrade facilities and infrastructure; Volcanic Eruptions Physics: Pressure, Density, Causes: Tectonic plate interactions, Hot spots; Effects: Lahars (hot mud flows), Nue Ardente (firey clouds), Lava flows over roads and buildings, Ash flows, Earthquakes, Detection: Small seismic network, Tilt meters, Laser ranging; Landslides Physics: Friction, Causes: Saturated soil, Unstable snow; Effect:Destroys buildings, roads, trees; Detection: Geologic profiles identify candidate areas, Snow depth, cohesion, etc.

Floods Physics: Response time, Fluid flow, Causes, Excessive rain upstream, Channelizing Effects: Property loss, Life loss, Sedimentation, Change in course of river, Detection: Stream gauges, Forecast models of stream flow; Recovery: Move people & buildings, Build dykes, Flood control; Nuclear accidents (TMI and Chernoble) Physics: Nuclear energy, Half-life, Causes: Operational mistakes, Poor construction, Poor design; Effects: Radioactive fallout, Radiation sickness, Increased cancer rate, Detection: Radiation monitors, Radionuclide observations; Recovery: Clean-up & disposal of contaminated material, Iodine tablets; Droughts: Classification of droughts, Causes of droughts, Effects of droughts, Preventive measures of droughts, Drought management strategies

Text Book(s)/ Reference Book(s)

1. Mohamed Gad-el-Hak, Large-Scale Disasters: Prediction, Control and Mitigation, Published by Cambridge University Press, 2008, ISBN 0521872936, 9780521872935.
2. Natural Disasters, 5th Edition, Patrick Leon Abbott, San Diego State University, ©2005, ISBN 0072921986
3. William G. Ramroth Planning for disaster: how natural and man-made disasters shape the built environment, Published by Kaplan Publishing, 2007, ISBN 1419593730, 9781419593734

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
PS501	Practice School – I				4

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

Course Syllabus:

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.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

4 Year B. Tech Program

(Branch: Civil Engineering)

Batch 2013-17

SEMESTER-SIX

Detailed Syllabus

&

Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE607	Design of Steel Structure	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

Design of connections in steel structures: Riveted, and bolted and welded connections, assumptions, Different types of joints, design of various types of riveted and welded connections subjected to direct loads and moments; Design of tension members: Selection of section, I.S. specifications, design of axially loaded tension members, design of members for axial tension and bending, end connections, design of lug angles and tension splices

Design of compression members: Theory of buckling, design of column, cross section (single and built up sections), design of angle struts, eccentrically loaded columns, column splices, lacings and battens; Design of beams: Laterally stability, design of single and built up beams, plated beams and curtailment of flange plates

Design of column bases and column footings: Slab base, gusseted base, and column bases subjected to moment. Independent column footing, combined column Footing; Design of roof trusses: Types of trusses, roofs and side coverage, types of loadings and load combinations, design of members and connections

Water tanks: Design of rectangular pressed steel tanks, cylindrical tanks with hemispherical bottom, design of staging; Plastic design of steel structures: Review of plastic analysis as covered in earlier courses, Effect of normal and shear forces on plastic moments, lateral buckling and local buckling of beam. Design of beams and frames, design of connections-straight corner, beam column and plate connections

Text Book(s)/ Reference Book(s)

1. K. S. Sai Ram; Design of Steel Structures, Pearson
2. Arya &Ajmani; Design of Steel Structures
3. Dayaratnam ; Design of Steel Structures
4. B.C.Punamia; Steel Structures, Laxmi Publication

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE608	Geotechnical Engineering II	3	1	2	5

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks **
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others
**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

SUBSURFACE EXPLORATION: Importance of exploration program, Methods of exploration: Boring, Seismic refraction method of grophysical exploration, Types of samples - undisturbed, disturbed and representative samples, Samplers, sample disturbance, area ratio, Recovery ratio, clearance, Stabilization of boreholes - Typical bore log. Number and depth of borings for various civil engineering structures, soil exploration report.

DRAINAGE AND DEWATERING: Determination of ground water level by Hvorselev's method, Control of ground water during excavation: Dewatering - Ditches and sumps, well point system, Vacuum method, Electro- Osmosis method.

STRESSES IN SOILS: Boussinesq's and Westergaard's theories for concentrated, circular and rectangular loads. Comparison of Boussinesq's and westergaard's analysis. Pressure distribution diagrams, Contact pressure, Newmark's chart.

FLOWNETS: Laplace equation (no derivation) assumptions and limitations only, characteristics and uses of flownets, Methods of drawing flownets for Dams and sheet piles. Estimating quantity of seepage and Exit gradient. Determination of phreatic line in earth dams with and without filter. Piping and protective filter.

LATERAL EARTH PRESSURE: Active and Passive earth pressures, Earth pressure at rest. Rankine'sand Coulomb's Earth pressure theories—assumptions and limitations, Graphical solutions for active earth pressure (cohesion less soil only) – Culmann's and Rebhann's methods, Lateral earth pressure in cohesive and cohesionless soils, Earth pressure distribution.

STABILITY OF EARTH SLOPES: Types of slopes, causes and type of failure of slopes. Definition of factor of safety, Stability of infinite slopes, Stability of finite slopes by Method of slices and Friction Circle method, Taylor's stability number, Fellineous method.

BEARING CAPACITY: Definitions of ultimate, net and safe bearing capacities, Allowable bearing pressure. Terzaghi's and Brinch Hansen's bearing capacity equations - assumptions and limitations, Bearing capacity of footing subjected to eccentric loading. Effect of ground water table on bearing capacity. Field methods of evaluation of bearing capacity - Plate load test, Standard penetration test and cone penetration test.

FOUNDATION SETTLEMENT: Importance and Concept of Settlement Analysis, Immediate, Consolidation and Secondary settlements (no derivations, but, computation using relevant formula for Normally Consolidated soils), Tolerance. BIS specifications for total and differential settlements of footings and rafts.

PROPORTIONING SHALLOW AND PILE FOUNDATIONS Allowable Bearing Pressure, Factors influencing the selection of depth of foundation, Factors influencing Allowable Bearing Pressure, Factors influencing the choice of foundation, Proportioning isolated, combined, strip and mat foundations, Classification of pile foundation, Pile load capacity, Proportioning pile foundation.

Syllabus (Practical)

1. Determination of Free Swell Index and Swelling Pressure
2. California Bearing Ratio Test
3. Consolidation Test
4. Direct Shear Test
5. Triaxial Shear Test
6. Standard Penetration Test

Text Book(s)

1. Alam Singh andChowdhary G.R. (1994), Soil Engineering in Theory and Practice, CBS Publishers and DistributorsLtd., New Delhi.
2. S Punmia B.C.(2005), soil Mechanics and Foundation Engg. 16th Edition Laxmi Publications Co. , New Delhi.

Reference Book(s)

1. Bowles J.E. (1996),Foundation Analysis and Design5th Edition, McGraw Hill Pub. Co. New York.
2. Murthy V.N.S. (1996), Soil Mechanics and Foundation Engineering- 4th Edition, UBS Publishers and Distributors, New Delhi.
3. GopalRanjan and Rao A.S.R. (2000), Basic and Applied Soil Mechanics New Age International (P) Ltd., Newe Delhi.
4. Venkatrahmaiah C. (2006), Geotechnical Engineering 3rd Edition New Age International (P) Ltd., Newe Delhi.
5. Craig R.F. (1987), Soil Mechanics Van Nostrand Reinhold Co. Ltd.
6. Braja M. Das (2002)Principles of Geotechnical Engineering, 5th Edition, Thomson Business Information India (P) Ltd., India.
7. Iqbal H. Khan (2005), Text Book of Geotechnical Engineering 2nd Edition, PHI, India.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE609	Estimating costing and evaluation engineering	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (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.

Text Book(s)

1. Estimating & Costing by B.N. Dutta

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE610	Irrigation Engineering	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Course Syllabi (Theory):

Necessity of Irrigation in India, Advantages and disadvantages, techniques of irrigation water, Quality of irrigation water, Crop water requirements, crops and crop season, Consumptive use, Irrigation requirements, Estimation of consumptive use of water by climatic approaches, Irrigation efficiencies, Soil moisture-irrigation relationship

Canal Irrigation: Classification of canals, Canal losses, alignment of canals, Design of Irrigation Canals: Design of stable channels using Kennedy's and Lacey's theory, Garret's diagram, Cross section of irrigation canals, Lining of Irrigation Canals: Advantages and economics of lining, Various types of lining, Design of lined canals

Types of Cross-Drainage Works: Types of CD works, Selection of a suitable type to suite a particular condition, Design consideration for CD works, Canal Falls: Necessity, Proper location, Types, Design and detailing of one type of fall; Weirs and Barrages: Weirs and Barrages, Types of weirs and barrages, Layout of a diversion head work, Introduction of different components of a diversion head works, Design of weirs and barrages: Bligh's creep theory, Design of weir using Bligh's theory, Lane's weighted creep theory, Khosla's theory, Khosla's method of independent variables, Exit gradient

Dams: Typical cross section, Various forces acting on gravity dam, Combination of forces for design, modes of failure and criteria for structural stability, High and low gravity dam, Design of high dam, Typical section of low gravity dam, Earth and Rock fill Dams: Types, Causes of failure, Preliminary section of an earth dam, Preliminary section of an earth dam, Seepage control in earth dams, Spillways: Descriptive study of various types of spillways

Reclamation of Water Logged and Saline Soils: Causes and control of water logging. Reclamation of saline and alkaline land, Surface and Sub-surface drainage

Text Book(s)/ Reference Book(s)

1. Irrigation engineering and hydraulic structures, SK Garg, Khanna Publishers

2. Irrigation and water power engineering, BC Punamia, Pandey BB Lal, Standard Publishers

3. Principles and practice of irrigation engineering, SK Sharma, S Chand and Company

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE611	Transportation Engineering II	3	0	2	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Course Syllabi (Theory):

RAILWAY ENGINEERING

INTRODUCTION: Role of railways in transportation, Indian Railways, Selection of Routes, Permanent way and its requirements, Gauges and types, Typical cross sections-single and double line B G track in cutting, embankment and electrified tracks, Coning of wheels and tilting of rails, Rails-Functions-requirements—types and sections length- defects-wear-creep-welding-joints, creep of rails

SLEEPERS AND BALLAST: Functions, requirements, Types, Track fitting and fasteners-Dog spike, screw spike and Pandrol clip,-Fish plates-bearing plates, Calculation of quantity of materials required for laying a track-Examples, Tractate resistances and hauling capacity

GEOMETRIC DESIGN: Necessity, Safe speed on curves, Cant-cant deficiency-negetivecant-safe speed based on various criteria,(both for normal and high speed tracks) Transition curve, Gradient and types, grade compensation, Examples on above.

POINTS AND CROSSING: Components of a turnout, Details of Points and Crossing, Design of turnouts with examples (No derivations) types of switches, crossings, track junctions Stations and Types, Types of yards, Signalling-Objects and types of signals, station and yard Equipment-Turn table, Fouling mark, buffer stop, level crossing, track defects, and maintenance.

AIRPORT ENGINEERING INTRODUCTION: Layout of an airport with component parts and functions, Site selection for airport, Aircraft characteristics affecting the design and planning of airport, Airport classification, Runway orientation using wind rose with examples.

RUNWAY- Basic runway length-Corrections and examples, Runway geometrics, Taxiway-Factors affecting the layout - geometrics of taxiway-Design of exit taxiway with examples, Visual aids- Airport marking – lighting-Instrumental Landing System.

DOCKS AND HARBOURS: Harbour classifications, Layout with components Natural phenomenon affecting the design of harbours - wind, wave and tide, currents, Breakwater-Types Wharf and Quays, Jetties and Piers, Dry dock and wet docks, Slipways, Navigational aids, warehouse and transit-shed

Syllabus (Practical)

1. To determine the Softening point for a bitumen sample
2. To determine the Penetration value for a bitumen sample
3. To determine the Ductility value for a bitumen sample
4. Introduction to design a bitumen mix using Marshall Method

Text Book(s)

1. Saxena and Arora,Railway Engineering - DhanpatRai& Sons, New Delhi
2. M M Agarwal, Indian Railway Track Jaico Publications, Bombay
3. Khanna Arora and Jain Airport Planning and Design , Nem Chand Bros, Roorkee
4. R Srinivasan,Doks and Tunnel Engineering Charaotar Publishing House
5. H P Oza and G H Oza Docks and Harbour Engineering Charaotar Publishing House
6. B C Punmia,SurveyingLaxmi Publications

Reference Book(s)

1. Mundrey, Railway Engineering McGraw Hill Publications

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE621 (Elective II)	Hazardous Solid Waste Management	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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.

Text Book(s)

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 Book(s)

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.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 622 (Elective II)	EIA and Environmental Auditing	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Course Syllabi (Theory):

Introduction: Environmental Assessment process, objectives of EIA, Terminology, Hierarchy in EIA, Historical Review of EIA, Concepts related to EIA, Basic data collection for EIA

Legislation and Procedures: National Environmental Policy Act and Implementation, EIA legislative requirements and administrative procedures in India/Indian States, EIA notification 2006

Techniques and Methodology: Description of the environmental setting, Methods of Impact Analysis, Environmental risk assessment, baseline data collection for EIA

Public Participation in environmental decision making, regulatory requirement, techniques, advantages and disadvantages of public participation

Preparation and writing of EIA report

Prediction and Assessment of Impacts on Air, Water, Noise, Biological, Cultural and socio-economic Environment, Mining, blasting

Case studies of EIA for Industries like Oil, Petrochemical, iron and steel, fertilizer, sugar and distillery, projects of road/dams and housing etc.

Environment Management Plan: Planning, selection of appropriate procedures, Introduction to Environmental budget, to minimize environmental Impacts

Environmental Audit: Definition of Environment Audit and its importance for industries. Types of audits, General audit methodology and basic structure of audit. Elements of an audit process and its importance. Concept of 1SO14000

Requirements of Rule 14 for Environmental Audit under Environmental protection Act 1986, Definitions of a.Signatory, b. Consumption Audit, c. Pollution audit, d. Hazardous audit, d. Solid waste audit, e. Disposal audit, f. Cost audit, g. Investment audit, h. Voluntary.

Text Book(s)/ Reference Book(s)

1. Larry W. Canter," Environment Impact Assessment", McGraw-Hill Book Company, New York
2. G.J. Rau and C.D. Weeten, "Environmental Impact Analysis Hand book, McGraw Hill, 1980.
3. Vijay Kulkarni and T V Ramchandra. "Environmental management" Capital Publishing Co
4. Mhaskar A.K., "Environmental Audit" Enviro Media Publications.
5. S.K. Dhameja, "Environmental Engineering and Management" S.K. Kalaria and Sons Publishers.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE623 (Elective II)	Rural water supply and sanitation	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

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

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE624 (Elective II)	Models for air and water quality	3	1	0	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Course Syllabi (Theory):

Introduction to Mathematical Models: Modeling approaches to water quality - classification of models Mathematical models for water quality - model development, calibration and verification - cost: benefit analysis using models, Model requirements and limitations. D.O. Models for Streams: Dissolved oxygen model for streams - sources and sinks of dissolved oxygen.

Estimation of system parameters - Streeter - Phelps model - oxygen 'sag' curve - determination of deoxygenation and reaeration coefficients - Benthal oxygen demand - mass transport mechanisms - Advective and diffusive mass transport Models by O'connor, Dobbins and Thomann. Models for Estuary and Lakes: Physical chemical and biological processes in estuaries - water quality distribution in estuaries - modeling estuaries and lakes for water quality - temperature models for lakes and rivers Models for microorganisms decay, nitrogen and phytoplankton. Air quality models: Micrometeorological processes, wind rose, dispersion, coefficients and stability classes, Gaussian and dispersion model, Regional air quality models.

Text Book(s)/ Reference Book(s)

1. Chapra, Steven C., "Surface water quality modeling", McGraw Hill Book Company, New York, 1997.
2. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 2nd Edition, Prentice Hall, 1998.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 625(Elective III)	Design of Pre-stressed Concrete Structures	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (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.

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.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 626(Elective III)	Finite Element Analysis	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (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.

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.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 608(Elective III)	Earthquake Engineering	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Markss	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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.

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

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 609(Elective III)	Structure dynamics	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Markss	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

Introduction: Types of dynamic loads - Basic background of methods available and motivation for structural dynamics.

Dynamics of Single Degree-of-Freedom Structures: Dynamic equation of equilibrium - Free vibration of single degree of freedom systems - Forced vibration: harmonic and periodic loadings - Dynamic response functions, force transmission and vibration isolation - SDOF response to arbitrary functions.

Numerical Evaluation of Dynamic Response of SDOF Systems : Time domain analysis: finite difference methods - Frequency domain analysis: basic methodology.

Earthquake Response of SDOF Systems : Earthquake excitation, response history and construction of response spectra - Response spectrum characteristics, tripartite plot, and design spectrum - Multi Degree of Freedom Systems - Basics : Dynamic equations of equilibrium - static condensation - Symmetricplan and plan-asymmetric systems.

Free Vibration Response of MDOF Systems : Undamped systems: natural modes and their properties - Numerical solution for the eigenvalue problem - Solution of free vibration response for undamped systems - Free vibration analysis of systems with damping.

Dynamic Analysis of Linear MDOF Systems : Introduction, modal analysis - Response-history for earthquake excitations using modal analysis - Response spectrum analysis for peak responses - Concept of Caughey damping as a general type of proportional damping.

Generalized Single Degree of Freedom Systems : Basic concepts, mass-spring system - Lumped mass systems - Systems with distributed mass and elasticity – Rayleigh's method, shape function selection.

Introduction to Dynamics of Continuous Systems : Equations of motions for axial vibration of beam - Equations of motion for flexural vibration of a beam - Free vibration analysis - Introduction to forced vibration analysis using modal superposition method.

Text Books:

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

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MA 621 (Elective III)	Engineering Optimization	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

- **Introduction:** Introduction to Optimization and its scope, Formulating a Mathematical Model, Deriving Solutions from the Model
- **Linear Programming Problems:** Revised Simplex Method, Duality Theory and Sensitivity Analysis, Dual Simplex Method, Transportation Problem, 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
- **Other Optimization Models:** Dynamic Programming, Integer Programming, Game Theory
- **Multi-objective optimization**: Introduction to various multi-objective optimization techniques and its scope, Linear Goal Programming and Its Solution

Text books and 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.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

4 Year B. Tech Programme

(Branch: Civil Engineering)

Batch 2013-17

SEMESTER-SEVEN

Detailed Syllabus

&

Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE701	Construction Project Management	3	0	2	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	20	40	15	25	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Syllabus (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.

Syllabus (Practical)

Uses of PRIMVEERA and MS PROJECT.

Text /Reference Books:

1. PERT & CPM by B.C. Punmia

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE702	Geoinfromatics	3	0	2	4

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

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

Syllabus (Theory)

Aerial Photographs- Basic terms & Definitions, scales, relief displacements, Flight Planning, Stereoscopy, Characteristics of photographic images, Fundamentals of aerial photo-interpretation

Physics of remote sensing, Ideal remote sensing system, Remote sensing satellites and their data products, Sensors and orbital characteristics, Spectral reflectance curves, resolution and multi-concept

Satellite Image - Characteristics and formats, Image histogram, Introduction to Image rectification, Image Enhancement, Land use and land cover classification system, Supervised Classification, Applications of remote sensing

Basic concepts of geographic data, GIS and its components, Data acquisition, Raster and Vector formats, topology and Data models, Spatial modelling, Data output, GIS Applications

Introduction, Satellite navigation System, GPS- Space segment, Control segment, User segment, GPS satellite signals, Receivers, Static, Kinematic and Differential GPS

Syllabus (Practical)

Introduction and exercise to remote sensing and GIS Software (ARC-GIS and ILWIS)

Text Book(s)/ References Book(s):

1. A M Chandra : Higher Surveying
2. B C Punamia : Surveying & Leveling , Vol 2
3. M Anjireddy : Remote Sensing & GIS , BS Publications
4. T M Lillesand et al: Remote Sensing & Image Interpretation , Wiley India , 5 th
5. A M Chandra : Remote Sensing & GIS , Narosa
6. S K Duggal : Surveying Vol 2 , TMH
7. N K Agarwal : Essentials of GPS , Spatial Networks: Hyderabad.
8. Principles of Remote Sensing: Curran, P.J.
9. . Remote Sensing & DIP: Lillesand&Keifer
10. Manual of Remote Sensing I & II

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE703	Construction Equipment's method	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

CONSTRUCTION EQUIPMENT MANAGEMENT

Identification – Planning - Equipment Management in Projects – Maintenance Management – Replacement - Cost Control of Equipment - Depreciation Analysis – Safety Management

EQUIPMENT FOR EARTHWORK

Fundamentals of Earth Work Operations - Earth Moving Operations - Types of Earth Work Equipment - Tractors, Motor Graders, Scrapers, Front end Waders, Earth Movers

OTHER CONSTRUCTION EQUIPMENTS

Equipment for Dredging, Trenching, Tunneling, Drilling, Blasting - Equipment for Compaction - Erection Equipment - Types of pumps used in Construction - Equipment for Dewatering and Grouting – Foundation and Pile Driving Equipment – Equipment for Demolition.

MATERIALS HANDLING EQUIPMENT

Forklifts and related equipment - Portable Material Bins – Conveyors - Hauling Equipment

EQUIPMENT FOR PRODUCTION OF AGGREGATE AND CONCRETING

Crushers – Feeders - Screening Equipment - Handling Equipment - Batching and Mixing Equipment - Hauling, Pouring and Pumping Equipment – Transporters

Text Book(s)/ Reference Book(s):

1. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., Construction Planning, Equipment and Methods, McGraw Hill, Singapore, 2006.
2. Sharma S.C. Construction Equipment and Management, Khanna Publishers, New Delhi, 1988.
3. Deodhar, S.V. Construction Equipment and Job Planning, Khanna Publishers, New Delhi, 1988.
4. Dr.Mahesh Varma, Construction Equipment and its planning and Application, Metropolitan Book Company, New Delhi. 1983.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE705	INFRASTRUCTURE PLANNING AND FINANCE MANAGEMENT	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks**
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

INFRASTRUCTURE: Governing Features, Historical overview of Infrastructure development in India. Infrastructure Organizations &Systems.

INFRASTRUCTURE PLANNING: Infrastructure Project Budgeting and Funding; Regulatory Framework; Sources of Funding

FINANCIAL MANAGEMENT FUNDAMENTALS: Time value of money, cash flow, Inflation - depreciation, taxes, inflation, Personnel cost - Equipment costs – overheads

INFRASTRUCTURE FINANCE MANAGEMENT: Life-cycle costing, evaluation of alternatives, cost-benefit analysis, Feasibility Studies.

CONSTRUCTION FINANCE MANAGEMENT: Procurement and Efficient use of resources – Statement of Changes in Financial Position (SCFP), Preparation of SCFP on Working Capital Basis, Cash Basis, and Total Resources Basis – SCFP usefulness.

SEMINAR

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
SEM701	Seminar	0	0	4	2

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

Course Syllabi (Practical):

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.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 735 (Elective IV)	GROUND IMPROVEMENT TECHNIQUES	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Markss	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

INTRODUCTION

Role of ground improvement in foundation engineering - methods of ground improvement – Geotechnical problems in alluvial, laterite and black cotton soils -Selection of suitable ground improvement techniques based on soil condition.

DRAINAGE AND DEWATERING

Drainage techniques - Well points - Vaccum and electroosmotic methods - Seepage analysis for two dimensional flow-fully and partially penetrating slots in homogenous deposits (Simple cases only).

INSITU TREATMENT OF COHESIONLESS AND COHESIVE SOILS

Insitu densification of cohesionless and consolidation of cohesive soils -Dynamic compaction and consolidation - Vibrofloation - Sand pile compaction - Preloading with sand drains and fabric drains – Stone columns – Lime piles - Installation techniques only - relative merits of various methods and their limitations.

EARTH REINFORCEMENT

Concept of reinforcement - Types of reinforcement material - Applications of reinforced earth – use of Geotextiles for filtration, drainage and separation in road and other works.

GROUT TECHNIQUES

Types of grouts - Grouting equipment and machinery - Injection methods - Grout monitoring – Stabilisation with cement, lime and chemicals - Stabilisation of expansive soils.

Text Books:

1. Koerner R.M., "Construction and Geotechnical Methods in Foundation Engineering", McGraw-Hill, 1994.

2. Purushothama Raj, P. "Ground Improvement Techniques", Tata McGraw-Hill Publishing Company, New Delhi, 1995

Reference Books

1. Moseley M.P., Ground Improvement Blockie Academic and Professional, Chapman and Hall, Glassgow, 1993.

2. Jones J.E.P., Earth Reinforcement and Soil Structure, Butterworths, 1995.

3. Koerner, R.M., "Design with Geosynthetics", (3rd Edition) Prentice Hall, New Jersey, 2002

4. Jewell, R.A., "Soil Reinforcement with Geotextiles", CIRIA special publication, London, 1996

5. Das, B.M., "Principles of Foundation Engineering", Thomson Books / Cole, 2003.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE 736 (Elective IV)	Rock Mechanics	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Markss	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

CLASSIFICATION AND INDEX PROPERTIES OF ROCKS

Geological classification – Index properties of rock systems – Classification of rock masses for engineering purpose.

ROCK STRENGTH AND FAILURE CRITERIA

Modes of rock failure – Strength of rock – Laboratory and field measurement of shear, tensile and compressive strength – Stress strain behavior in compression – Mohr-coulomb failure criteria and empirical criteria for failure – Deformability of rock.

INITIAL STRESSES AND THEIR MEASUREMENTS

Estimation of initial stresses in rocks – influence of joints and their orientation in distribution of stresses – technique for measurements of insitu stresses.

APPLICATION OF ROCK MECHANICS IN ENGINEERING Simple engineering application – Underground openings – Rock slopes – Foundations and mining subsidence.

ROCK BOLTING

Introduction – Rock bolt systems – rock bolt installation techniques – Testing of rock bolts – Choice of rock bolt based on rock mass condition.

Text Book(s)

1. Goodman P.E., "Introduction to Rock Mechanics" , John Wiley and Sons, 1999.
2. Stillborg B., "Professional User Handbook for rock Bolting", Tran Tech Publications, 1996.

Reference Book (s)

1. Brow E.T., "Rock Characterisation Testing and Monitoring", Pergaman Press, 1991.
2. Arogyaswamy R.N.P., "Geotechnical Application in Civil Engineering", Oxford and IBH, 1991.
3. Hock E. and Bray J., "Rock Slope Engineering, Institute of Mining and Metallurgy", 1991.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS701	Principle of Economics	3	0	0	3

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
20	20	40	10	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (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 macroeconomics; Foreign Exchange rate and Balance of payments.

Text Book(s)

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

Reference Book(s)

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

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

4 Year B. Tech Programme

(Branch: Civil Engineering)

Batch 2013-2017

SEMESTER-EIGHT

Detailed Syllabus

&

Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS801	Practice School - II	-	-	-	16

Evaluation Scheme (Theory)						Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation	Additional Continuous Evaluation	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation *	Total Marks
-	-	-	-	-	-	-	-	-	-	-

**** Duration for practice school is Five and a half month**

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: 2013-17

1. Credit of CSE101 Computer Programming & IT should be read as 5.5.
2. Credit of CH101 Engineering Chemistry - I should be read as 7.
3. Credit of CE101 Engineering Graphics should be read as 2.5.
4. Credit of MA101 Engineering Mathematics-I should be read as 5.5.
5. Credit of PH101 Engineering Physics-I should be read as 7.
6. Credit of LA101 English Communication Skills should be read as 2.5.
7. Credit of ID101 Environmental Studies should be read as 4.
8. Credit of ME141 Workshop Practice should be read as 2.
9. Credit of EE201 Electrical & Electronics Engineering should be read as 7.
10. Credit of CH201 Engineering Chemistry - II should be read as 7.
11. Credit of MA201 Engineering Mathematics should be read as 5.5.
12. Credit of ME201 Engineering Mechanics should be read as 5.5.
13. Credit of PH101 Engineering Physics-II should be read as 7.
14. Credit of ME241 Machine Drawing should be read as 2.
15. Credit of LA201 Professional Communication Skills should be read as 4.
16. CE703 should be read as Construction Equipment Methods.

Signature