

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC & NBA, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziznagar Gate, C.B. Post, Hyderabad-500 075

Department of Civil Engineering

MINUTES OF MEETING: BOARD OF STUDIES

The BOS meeting is held on 12th June 2021 at 11.00 AM, through online mode.

The following members were present in the meeting:

S.No	Name of the faculty	Designation	Signature
1.	Dr. Pallavi Badry, Professor & Head, DCE, VJIT.	Chairman	
2.	Dr. P. Sravana, Professor, DCE, JNTUH Hyderabad.	University Nominee	
3.	Dr. S. Sireesh, Professor, DCE, IIT, Hyderabad	External Member	
4.	Dr. Prabhakar Singh, Professor & Head, DCE, MEC Hyderabad.	External Member	
5.	Dr. Dilip Lataye, Professor, DCE, NIT, Nagpur.	External Member	
6.	Dr. K. Ramchandra Reddy, Professor, DCE, Anurag University, Hyderabad.	External Member	
7.	Er. N. Srinivas Rao, Reg. Head. Technical Services, UltraTech cement, Hyderabad	External Member	
8.	Dr. S. Srihari, Professor, DCE, VJIT, Hyderabad	Internal Member	
9.	Dr. N. Sudharsan, Professor, DCE, VJIT, Hyderabad.	Internal Member	
10.	Dr. Kamlini Devi, Assoc. Professor, DCE, VJIT, Hyderabad.	Internal Member	
11.	Ms. T. Sarada, Asst. Professor, DCE, VJIT, Hyderabad	Internal Member	

The following points were discussed

Item No. 1: Approval of (R20) course structure & syllabi for II, III, and IV Year B.Tech for the batches admitting from AY 2020-21 onwards.

Item No. 2: Approval of the course structure of the fast track batch for the same regulation.


Item No. 3: Approval of syllabi for Open Elective courses offered by Civil Engineering Department to the other Engineering branches for III and IV year.


Item No. 4: To approve the Panel of examiners.

Resolution (1) : The members after thorough discussion approved the proposed course structure, syllabi of II, III, IV Year B.Tech (R20), course structure of Fast track batch, open elective courses offered in III and IV year by Civil Engineering department.

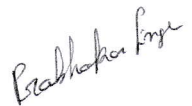
Resolution (2): The BOS Chairman is authorized to prepare the Panel of examiners as per the discussion regarding II, III, and IV Year B. Tech & open elective courses.

Noted and Approved.

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2.COURSE STRUCTURE FOR FAST-TRACK

I – I to III –I course structure same as normal track

B. Tech. III Year II Semester

S. No.	Category	Course Title	L	T	P	C
1	H&S-3	Managerial Economics and Financial Analysis	3	0	0	3
2	PC - 12	Foundation Engineering	3	0	0	3
3	PC – 13	Environmental Engineering	3	0	0	3
4	PC – 14	Water Resources Engineering	3	0	0	3
5	PC – 15	Rehabilitation and Retrofitting of structures	3	0	0	3
6	PE – 2	1. Construction Engineering & Management 2. Ground Improvement Techniques 3. Finite Element Method	3	0	0	3
7	OE – 2	Open Elective	3	0	0	3
8	PC Lab – 6	Environmental Engineering Lab	0	0	2	1
9	H&S Lab-1	Advance Communication Skills Lab	0	0	2	1
10	ES – 2	Quantitative Methods & Logical Reasoning	2	0	0	1
Total			23	0	4	24

1. Pallavi
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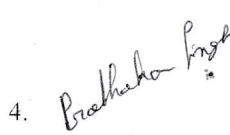




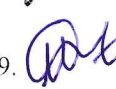


COURSE STRUCTURE FOR B.TECH IV YEAR

B. Tech. IV Year I Semester

S. No.	Category	Course Title	L	T	P	C
1	PC - 16	Design of Steel Structures	3	0	0	3
2	PC - 17	Estimation & Costing	3	0	0	3
3	PC - 18	Remote Sensing & GIS	3	0	0	3
4	PE - 3	1. Pre stressed Concrete Structure 2. Earthquake Engineering 3. Green Building Technologies	3	0	0	3
5	PE - 4	1. Railway Airport and Harbour Engineering 2. Advanced Structural Design 3. Ground water Hydrology	3	0	0	3
6	OE - 3	Open Elective	3	0	0	3
7	PC Lab - 7	Concrete & Highway Material Lab	0	0	2	1
	PC Lab - 8	Computational Lab	0	0	2	1
8	PW-1	Industry Oriented Mini Project	0	0	0	3
Total			18	0	4	23

B. Tech. IV Year II Semester

S. No.	Category	Course Title	L	T	P	C
1	--	Technical Seminar	0	0	2	2
2	--	Comprehensive Viva Voce	0	0	0	2
3	PW-2	Major Project	0	0	20	10
Total			0	0	22	14

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Department of Civil Engineering

1.R20 COURSE STRUCTURE FOR B.TECH I YEAR

B. Tech. I Year I Semester

S.No.	Course Category	Course Title	L	T	P	Credits
1.	BS	Mathematics-I	3	1	0	4
2.	BS	Engineering Physics	3	1	0	4
3.	BS	Engineering Physics Lab	0	0	3	1.5
4.	ES	Engineering Mechanics	4	0	0	4
5.	H&S	English Language Skills Lab (ELSL)	0	0	2	1
6.	ES	Programming for Problem Solving-I	2	0	0	2
7.	ES	Programming for Problem Solving Lab-I	0	0	2	1
8.	ES	Engineering Workshop	0	1	3	2.5
Total			12	3	10	20

B. Tech. I Year II Semester

S.No.	Course Category	Course Title	L	T	P	Credits
1.	BS	Mathematics-II	3	1	0	4
2.	BS	Chemistry	3	1	0	4
3.	BS	Chemistry Lab	0	0	3	1.5
4.	H&S	English	2	0	0	2
5.	ES	Engineering Graphics and Modelling	1	0	3	2.5
6.	H&S	English Communication Skills Lab (ECSL)	0	0	2	1
7.	ES	Programming for Problem Solving-II	2	0	0	2
8.	ES	Programming for Problem Solving Lab-II	0	0	2	1
Total			11	2	10	18

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COURSE STRUCTURE FOR B.TECH II YEAR

B. Tech. II Year I Semester

S. No.	Category	Course Title	L	T	P	C
1	H&S -1	Professional Communication	2	0	0	2
2	BS - 1	Partial Differential Equations & Numerical Methods & PDE	3	0	0	3
3	ES - 1	Fluid Mechanics	3	0	0	3
4	PC - 1	Solid Mechanics- I	3	1	0	4
5	PC - 2	Engineering Geology	3	0	0	3
6	PC - 3	Surveying & Geomatics	3	0	0	3
7	PC Lab - 1	Surveying & Geomatics Lab	0	0	2	1
8	PC Lab - 2	Engineering Geology Lab	0	0	2	1
9	MC - 1	Environmental Science	2	0	0	-
Total			19	1	4	20

B. Tech. II Year II Semester

S. No.	Category	Course Title	L	T	P	C
1	BS - 2	Probability & Statistics	3	0	0	3
2	ES - 2	Principles of Electrical Engineering	3	0	0	3
3	PC - 4	Solid Mechanics - II	3	0	0	3
4	PC - 5	Concrete Technology	3	0	0	3
5	PC - 6	Structural Analysis	3	0	0	3
6	PC - 7	Building Materials and construction	3	0	0	3
7	ES Lab - 1	Computer Aided Drafting Lab	0	0	2	1
8	PC Lab - 3	Solid Mechanics Lab	0	0	2	1
9	MC - 2	Gender sensitization	2	0	0	-
Total			20	0	4	20

1. *Falgun*
7. *Shiv*

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8. *mm*

3. *S. id*
9. *AK*

4. *Pradip Kumar*
10. *K Devi*

5. *Amis*
11. *Shiv*
6. *Arshad*

COURSE STRUCTURE FOR B.TECH III YEAR

B. Tech. III Year I Semester

S. No.	Category	Course Title	L	T	P	C
1	H&S-3	Managerial Economics and Financial Analysis	3	0	0	3
2	PC - 8	Hydraulics & Hydraulic Machinery	3	0	0	3
3	PC - 9	Geotechnical Engineering	3	0	0	3
4	PC - 10	Design of Reinforced Concrete Structures	3	0	0	3
5	PE - 1	1. Advanced Structural Analysis 2. Building planning & Drawing 3. Air Pollution and Control Methods	3	0	0	3
6	OE - 1	Open Elective	3	0	0	3
7	PC Lab - 4	Geotechnical Engineering Lab	0	0	2	1
8	PC Lab - 5	Fluid Mechanics & Hydraulic Machinery Lab	0	0	2	1
9	H&S-2	Personality Development & Behavioural Skills	2	0	0	1
Total			20	0	4	21

B. Tech. III Year II Semester

S. No.	Category	Course Title	L	T	P	C
1	PC - 11	Highway Engineering	3	0	0	3
2	PC - 12	Foundation Engineering	3	0	0	3
3	PC - 13	Environmental Engineering	3	0	0	3
4	PC - 14	Water Resources Engineering	3	0	0	3
5	PE - 2	1. Construction Engineering & Management 2. Ground Improvement Techniques 3. Finite Element Method	3	0	0	3
6	OE - 2	Open Elective	3	0	0	3
7	PC Lab - 6	Environmental Engineering Lab	0	0	2	1
8	H&S Lab-1	Advance Communication Skills Lab	0	0	2	1
9	ES - 2	Quantitative Methods & Logical Reasoning	2	0	0	1
Total			20	0	4	21

1. *Jalil*
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4. *Prabhakar Singh*
5. *Amir*
6. *Harsh*
7. *Shiv*
8. *Am*
9. *AK*
10. *K. Devi*
11. *Shiv*

COURSE STRUCTURE FOR B.TECH IV YEAR

B. Tech. IV Year I Semester

S. No.	Category	Course Title	L	T	P	C
1	PC - 15	Design of Steel Structures	3	0	0	3
2	PC - 16	Estimation & Costing	3	0	0	3
3	PE - 3	1. Pre stressed Concrete Structure 2. Earthquake Engineering 3. Green Building Technologies	3	0	0	3
4	PE - 4	1. Railway Airport and Harbour Engineering 2. Advanced Structural Design 3. Ground water Hydrology	3	0	0	3
5	OE - 3	Open Elective	3	0	0	3
6	PC Lab - 7	Concrete & Highway Material Lab	0	0	2	1
7	PC Lab - 8	Computational Lab	0	0	2	1
8	PW-1	Industry Oriented Mini Project	0	0	0	3
Total			15	0	4	20


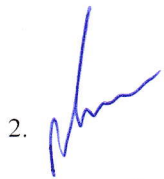
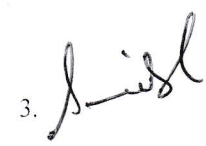
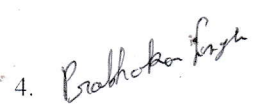


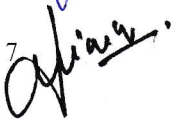

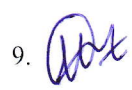


B. Tech. IV Year II Semester

S. No.	Category	Course Title	L	T	P	C
1	PC - 17	Rehabilitation and Retrofitting of structures	3	0	0	3
2	PC - 18	Remote Sensing & GIS	3	0	0	3
3	--	Technical Seminar	0	02	0	2
4	--	Comprehensive Viva Voce	0	0	0	2
5	PW-2	Major Project	0	0	20	10
Total			6	02	20	20

1. *Jalavar* 2. *[Signature]* 3. *[Signature]* 4. *Prabhakar* 5. *Amir* 6. *[Signature]*
 7. *[Signature]* 8. *[Signature]* 9. *[Signature]* 10. *K. Dev* 11. *[Signature]*

3 OPEN ELECTIVES OFFERED BY CIVIL ENGINEERING DEPARTMENT

OE-1	<ol style="list-style-type: none"> 1. Elements of civil Engineering 2. Smart cities 3. Disaster Management
OE-2	<ol style="list-style-type: none"> 1. Green building Technologies 2. Environmental Pollution & control methods 3. Construction Management
OE-3	<ol style="list-style-type: none"> 1. Remote Sensing & GIS 2. Introduction to earthquake Engineering 3. Solid Waste Management

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Department of Civil Engineering

COURSE STRUCTURE FOR B.TECH II YEAR

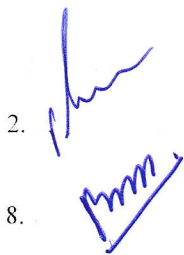
B. Tech. II Year I Semester

S. No.	Category	Course Title	L	T	P	C
1	H&S -1	Professional Communication	2	0	0	2
2	BS - 1	Partial Differential Equations & Numerical Methods	3	0	0	3
3	ES - 1	Fluid Mechanics	3	0	0	3
4	PC - 1	Solid Mechanics- I	3	1	0	4
5	PC - 2	Engineering Geology	3	0	0	3
6	PC - 3	Surveying & Geomatics	3	0	0	3
7	PC Lab - 1	Surveying & Geomatics Lab	0	0	2	1
8	PC Lab - 2	Engineering Geology Lab	0	0	2	1
9	MC - 1	Environmental Science	2	0	0	-
Total			19	1	4	20

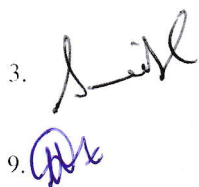
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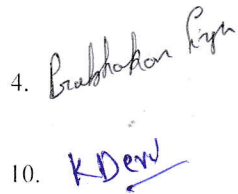
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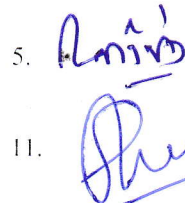
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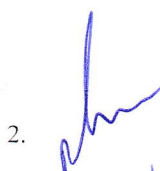

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Department of Civil Engineering

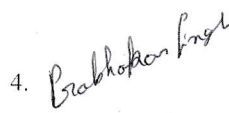

B. Tech. II Year II Semester



S. No.	Category	Course Title	L	T	P	C
1	BS - 2	Probability & Statistics	3	0	0	3
2	ES - 2	Principles of Electrical Engineering	3	0	0	3
3	PC - 4	Solid Mechanics - II	3	0	0	3
4	PC - 5	Concrete Technology	3	0	0	3
5	PC - 6	Structural Analysis	3	0	0	3
6	PC - 7	Building Materials and construction	3	0	0	3
7	ES Lab - 1	Computer Aided Drafting Lab	0	0	2	1
8	PC Lab - 3	Solid Mechanics Lab	0	0	2	1
9	MC - 2	Gender sensitization	2	0	0	-
Total			20	0	4	20

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Department of Civil Engineering

FLUID MECHANICS

L	T	P	C
3	0	0	3

Course Outcomes

After completion of this course students will be able to

- CO1: Understand different properties of fluid and the relationship between them.
- CO2: Explain the Continuity equation for One dimensional, two dimensional and three dimensional flows.
- CO3: Apply the Euler's and Bernoulli's equations in practical civil engineering problems.
- CO4: Analyse head losses in pipes and flow between parallel plates.
- CO5: Demonstrate the boundary layer concepts and its separation.

UNIT – I

Introduction: Dimensions and units – Physical properties of fluids, specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law – atmospheric, gauge and vacuum pressure – measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers. Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – II




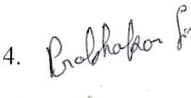
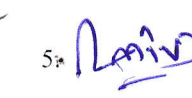
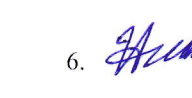



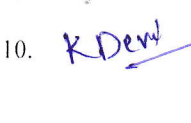
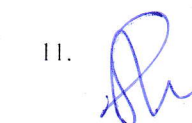
Fluid kinematics: Description of fluid flow, Stream line, path line, streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two, three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT – III

Fluid dynamics and measurement of flow: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, Navier – Stoke's equations (Explanatory). Momentum equation and its application – forces on pipe bend. Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular, trapezoidal and Stepped notches–Broadcrested weirs.

UNIT – IV

Closed conduit flow: Reynold's experiment – Characteristics of Laminar & Turbulent flows. Laws of Fluid friction – Darcy's equation, variation of friction factor with Reynold's number – Moody's Chart, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line. Pipe network problems, flow between parallel plates, flow through long tubes, flow through inclined tubes.

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UNIT – V


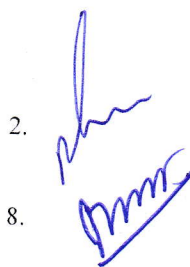
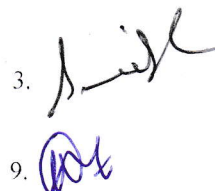
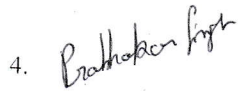




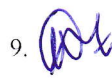


Boundary Layers: Boundary layer – concepts, Characteristics of boundary layer along a thin flat plate, Prandtl contribution, Vonkarmen momentum integral equation, laminar and turbulent boundary layers (no derivations) BL in transition, separation of BL, control of BL, flow around submerged objects – Drag and Lift – Magnus effect.

Text Books

1. *Hydraulics and Fluid Mechanics (Including Hydraulics Machines) by Modi and Seth. Standard book house. (English) 22nd Edition, 2019*

References

1. *A Textbook of Fluid Machines by R.K.Rajput, S. Chand & company Ltd. 2019.*

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Department of Civil Engineering

SOLID MECHANICS – I

L	T	P	C
3	1	0	4

Course Outcomes

After completion of this course students will be able to

- CO1: Examine stress – strain, elastic constants and strain energy.
- CO2: Analyse the shear force and bending moment diagrams of beams and relationship between them.
- CO3: Evaluate the flexural and shear stresses for various beam cross sections.
- CO4: Calculate principal stresses and strains using analytical and graphical solutions for the safety using failure theories.
- CO5: Determine the deflections of beams with various loadings using different methods.

UNIT – I

Simple Stresses and Strains: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress-strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses, Elastic constants.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

Shear Force and Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F, B.M and rate of loading at a section of a beam.

UNIT – III


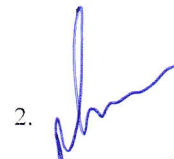


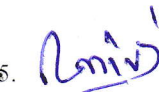



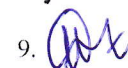


Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ – Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

Shear stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – IV

Principal Stresses and Strains: Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

UNIT – V

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Department of Civil Engineering

Deflection of Beams: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load – Mohr's theorems – Moment area method – application to simple cases including overhanging beams.


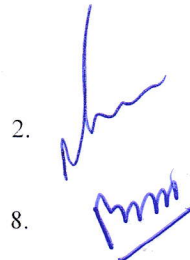
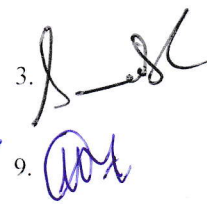

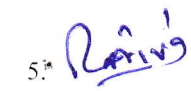



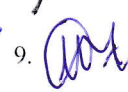


TextBooks

1. *Strength of Materials* by R.K.Bansal, Lakshmi Publications Pvt. Ltd, Sixth edition, 2015.

References

1. *Mechanics of Structures Vol –I* by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. 31st Edition : 2014

2. *Strength of Materials* by D.S Prakash Rao, Universities Press Pvt. Ltd. 1999

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Department of Civil Engineering

ENGINEERING GEOLOGY

L	T	P	C
3	0	0	3

Course Outcomes

After completion of this course students will be able to

- CO1: Classify and compare different rocks and minerals across the construction site.
- CO2: Identify and build the knowledge on main and most common igneous, sedimentary and metamorphic rocks encountered by foundations and sites.
- CO3: Define And Interpret The Geological Structures In The Geological Maps And Cross Sections
- CO4: Understand the importance of graphical studies and various geophysical methods.
- CO5: Illustrate the factors which affect the dams, reservoirs and tunnels.

UNIT – I

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

Weathering of rocks: Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like “Granite”




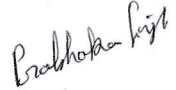







UNIT – II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of some common rock forming minerals. [Examples: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite]

Petrology: Definition of rock, Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous, Sedimentary and metamorphic rocks their distinguishing features, Megascopic and microscopic study of rocks [eg: Granite, Dolerite, Basalt, Pegmatite, Lignite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate]

UNIT – III

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints – their important types and case studies. Their importance In situ and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils, Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

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Department of Civil Engineering

UNIT – IV

Importance of geophysical studies: Principles of geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, Radiometric methods and Geothermal method, Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc, fundamental aspects of rock mechanics and Environmental Geology.

UNIT – V

Geology of Dams, Reservoirs And Tunnels: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site, analysis of dam failures of the past, factor's contributing to the success of a reservoir, geological factors influencing water lightness and life of reservoirs – Purposes of tunneling, effects of Tunneling on the ground role of Geological Considerations (ie. Lithological, structural and ground water) in tunneling over break and lining in tunnels.

Text Books

1. *Engineering Geology* by N.Chennakesavulu, Mc-Millan, India Ltd, 2005

References

1. *Principles of Engineering Geology & Geotechnics* by Krynine & Judd, CBS Publishers & Distribution
2. *Engineering Geology* by Subinoy Gangopadhyay, Oxford university press.
3. *Engineering Geology for Civil Engineers* – P.C. Varghese PHI Learning, 2012

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Department of Civil Engineering

SURVEYING & GEOMATICS

L	T	P	C
3	0	0	3

Course Outcomes

After completion of this course students will be able to

- CO1: Identify a detailed surveying at any site by any method.
- CO2: Ability to use modern survey equipment to measure angles and distances.
- CO3: Compute the differences in elevation, draw and utilize contour plots, volumes for earthwork.
- CO4: Understand the working principles of modern equipment and its methodologies.
- CO5: Analyze the basic concept of GPS and its applications.

UNIT – I

Introduction to surveying: Overview of plane surveying (chain, compass, theodolite and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals.

UNIT – II

Distances and direction: Distance measurement methods, use of chain, tape and electronic distance measurements, meridians, azimuths and bearings, declination, computation of angle.

UNIT – III

Leveling and contouring: Concept and Terminology, Temporary adjustments – method of leveling. Characteristics and Uses of contours – methods of conducting contour surveys and their plotting. Embankments and cutting for a level section and two level sections with and without transverse slopes.

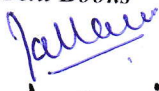


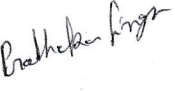







UNIT – IV

Modern field surveying systems: Principle of electronic distance measurements, types of EDM instruments, distomat, total station – parts of a total station – accessories – advantages and applications, field procedure for total station survey, errors in total station survey.

UNIT – V

Introduction to Geomatics: Global positioning systems – segments, GPS measurements, errors in biases, surveying with GPS, Co-ordinate transformation, accuracy considerations, electromagnetic spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, Remote sensing data acquisition, platforms and sensors, visual image interpretation, digital image processing.

Text Books

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1. Surveying (Vol – 1 & 2), by Duggal S K, "Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.


2. Remote sensing geographical Information system by AnjiReddy.M . B.S. publications, 2001.

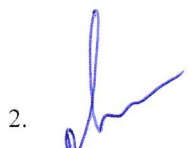

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1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press – 2012

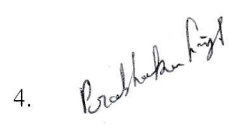

Chandra A M, "Plane Surveying" and "Higher Surveying" New age International Pvt. Ltd., Publishers, New Delhi, 2002.


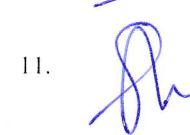
2. Advanced Surveying Total Station GIS and Remote Sensing by SatheeshGopi, R. Sathi Kumar and N.Madhu. Pearson Education India, 2007.

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Department of Civil Engineering

SURVEYING & GEOMATICS LAB

L	T	P	C
0	0	2	1

Course Outcomes

After completion of this course students will be able to

- CO1: Apply the principle of surveying for civil engineering applications
- CO2: Apply the knowledge to calculate areas, drawing plans and contour maps using different measuring equipment at field level.
- CO3: Identify data collection methods and prepare field notes.
- CO4: Understand the working principles of survey instruments, measurement errors and corrective measures
- CO5: Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and its methodologies.

List of experiments

1. Survey of an area by chain surveying.
2. Determination of two inaccessible points by using prismatic compass.
3. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
4. Radiation & intersection method by plane table survey.(Any one exercise)
5. Exercise on fly levelling using dumpy level.
6. An exercise on L.S, C.S and Plotting
7. Trigonometric leveling – Heights and distance problem
8. Determination of Area & Remote height using total station
9. Traversing & Contouring using total station
10. Distance, gradient, Diff. height between two inaccessible points using total station
11. Study on use of GPS for data collection
12. Collection of Point Data, Line Data, and Polygon Data using GPS.

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Department of Civil Engineering

ENGINEERING GEOLOGY LAB

L	T	P	C
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Course Outcomes

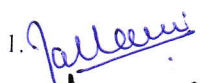
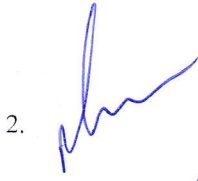

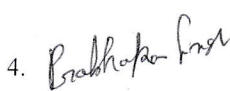







After completion of this course students will be able to

- CO1: To study the physical properties and identification of minerals referred under the theory.
- CO2: Describe and identify the rocks referred under the theory.
- CO3: Illustrate the Microscopic study of rocks.
- CO4: Interpret and draw the sections for geological maps showing tilted beds, faults, unconformities etc.,
- CO5: Solve the simple structural geological problems.

List of Experiments

1. Study of physical properties and identification of minerals.
2. Study of physical properties and identification of rocks(igneous)
3. Study of physical properties and identification of rocks(sedimentary)
4. Study of physical properties and identification of rocks(metamorphic)
5. Microscopic study of rocks
6. Microscopic study of minerals
7. Study of geological structures like faults and folds
8. Study of geological structures like tilted bed models and unconformities
9. Interpretation and drawing of sections for geological maps showing tilted beds
10. Interpretation and drawing of sections for geological maps showing faults , unconformities.
11. Simple structural geology problems on Strike.
- 12.Simple structural geology problems on Dip

ENVIRONMENTAL SCIENCE

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Department of Civil Engineering

L	T	P	C
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Course Outcomes

After completion of this course students will be able to

- CO1: Define and explain the structure and functions of ecosystem, value of biodiversity, threats and conservation of biodiversity.
- CO2: Explain the limitations of the resources and impacts of over utilization of all natural resources.
- CO3: Explain the sources and effects of environmental pollutions and list the available techniques to control the pollution.
- CO4: Explain the global environmental issues like climate change, ozone hole and can explain the scope of EIA, Environmental Management Plan, environmental audit and list the EIA methods.
- CO5: Mention the salient features of environmental acts and rules, define the sustainable goals along with measures required for the sustainability.

UNIT I

Ecosystem: Definition, Scope and Importance of ecosystem, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bio-magnification.
Biodiversity and Biotic Resources: Introduction, Definition, levels of Biodiversity, Value of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT II

Natural Resources: Classification of Resources, **Water resources:** use and over utilization of surface and ground water, Dams: benefits and problems, Rain water harvesting; **Energy resources:** growing energy needs, Renewable and Non Renewable Energy resources. **Land resources:** land degradation – Landslide and Soil Erosion; **Forest Resources –** Uses and Exploitation.


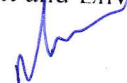
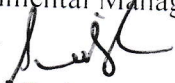
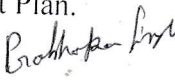




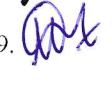


UNIT III

Environmental Pollution And Control: Types of Pollution, Sources, Effects and Control measures of Air Pollution, Water Pollution, Soil Pollution and Noise Pollution.

UNIT IV

Global Environmental Problems and Global Efforts: Green house effect, Global Warming, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Acid Rains.

Environmental Impact Assessment (EIA): Scope of EIA and EIA methods, scope of Environmental audit and Environmental Management Plan.

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Department of Civil Engineering

UNIT V

Environmental Policy, Legislation, Rules And Regulations: Salient features of Environmental Protection act, Air (Prevention and Control of pollution) Act- 1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Municipal solid waste, Hazardous waste, E-waste, Bio-medical waste, Radioactive waste Rules.

Towards Sustainable Future: Concept of Sustainable Development, Sustainable goals defined by UN, Threats to Sustainability, Environmental Education, Role of IT in Environment, Smart Cities, Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

Text books

1. Text Book of Environmental Studies by Anubha Kaushik (4th Edition), New age International Publishers.
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

Reference books

1. Text Book of Environmental Studies by Anubha Kaushik (3rd Edition), New age International Publishers.
2. Text book of Environmental Science and Technology by M.Anji Reddy 2007
3. Environmental Science: Towards a Sustainable Future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.

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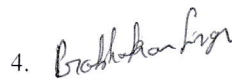
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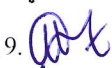
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Department of Civil Engineering

SOLID MECHANICS – II

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Course Outcomes

After completion of this course students will be able to

- CO1: Design and safety of the shaft subjected to Torsion and bending moment.
- CO2: Calculate the Column capacity for various end conditions due to axial and eccentric loading.
- CO3: Apply the concepts of direct and bending stresses to evaluate the safety of Structures.
- CO4: Evaluate the stresses and strains in Thin shells and Thick Cylinders.
- CO5: Determine the stresses due to Unsymmetrical bending of beams and locate the shear centre.

UNIT – I

Torsion of circular shafts: Theory of pure torsion – Derivation of Torsion equations $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending, torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull – springs in series and parallel.

UNIT – II

Columns and struts: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns – assumptions – derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Perry's formula.




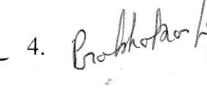
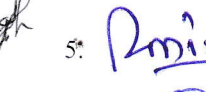
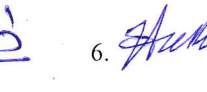

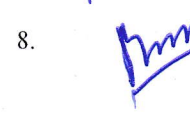

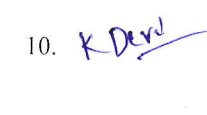
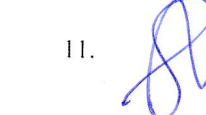
UNIT – III

Direct and bending stresses: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

UNIT – IV

Thin Shells: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia. and volume of thin cylinders – Thin spherical shells.

Thick cylinders: Introduction – Lamé's theory for thick cylinders – Derivation of Lamé's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage

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UNIT – V

Unsymmetrical bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axis – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis - Deflection of beams under unsymmetrical bending.

Shear centre: Introduction – Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

Text Books

1) *Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd. 6th ed. 2015*

References

1) *Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd. 2008.*

2) *Mechanics of Materials by R.C.Hibbeler, Pearson Education 9th ed 2014*

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Department of Civil Engineering

CONCRETE TECHNOLOGY

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- CO1: Understanding the properties of cements and admixtures.
- CO2: Analyse the properties of aggregates.
- CO3: Evaluate the properties of fresh concrete.
- CO4: Analyse the behavior of hardened concrete and durability of concrete.
- CO5: Design the concrete mix using IS Code and describe the special concretes.

UNIT – I

Cement: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

Admixtures :Types of admixtures – mineral and chemical admixtures.

UNIT – II

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III

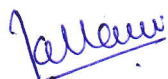

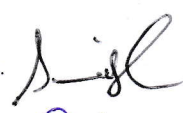

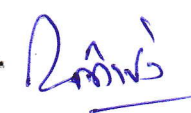






Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT – IV

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspace ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength

Testing of Hardened Concrete: Compression test – Tension tests — Flexure tests – Splitting tests – Non-destructive testing methods.

Elasticity, Creep & Shrinkage– Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

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UNIT – V

Mix Design : Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

Special Concretes: Introduction to Light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete – High performance concrete – Self compacting concrete.

Text books

1. *Concrete Technology* by M.S.Shetty. – S.Chand & Co.; 7thed 2015.
2. *Concrete Technology* by A.R. Santha Kumar, Oxford university Press, New Delhi 2006.

References

1. *Properties of Concrete* by A.M.Neville – 5th edition prentice Hall, 201.
2. *Concrete Technology* by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 5thed 2004.

1. Jallani
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Department of Civil Engineering

STRUCTURAL ANALYSIS

L	T	P	C
3	0	0	3

Course Outcomes

After completion of this course students will be able to

CO1: Analyze propped cantilever, fixed beams for external loadings and support settlements.

CO2: Understand the concept of Slope deflection, moment distribution method and analysis of continuous beams.

CO3: Examine the beams and arches.

CO4: Analyze the pin-jointed plane frames.

CO5: Draw the influence line diagram for moving loads .

UNIT – I

Propped cantilever and fixed beams: Determination of static and kinematic indeterminacies for beams, Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams – Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support..

UNIT – II

Continuous beams: Introduction – Continuous beams, Clapeyron's theorem of three moments – Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed – continuous beams with overhang, Effects of sinking of supports. Derivation of slope – deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method, Shear force and Bending moment diagrams.


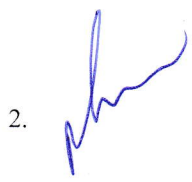
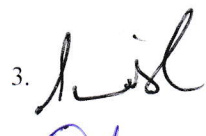
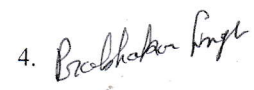
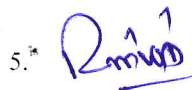


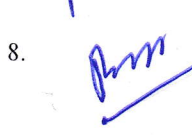

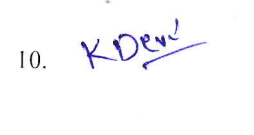

UNIT – III

Energy theorems: Introduction – Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem – Unit Load Method. Deflection of simple beams and statically determinate bent frames.

Arches: Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches (Circular and parabolic arches without temperature effect and yielding of support).

UNIT – IV

Analysis of perfect frames: Types of frames – Perfect, Imperfect and Redundant pin jointed frames. Analysis of determinate pin jointed frames using method of joints, method of sections for vertical loads, horizontal loads and inclined loads.

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UNIT – V

Moving loads and influence lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads – Equivalent uniformly distributed load – Focal length. Definition of influence line for SF, Influence line for BM – load position for maximum SF at a section – Load position for maximum BM at a section – Point loads, UDL longer than the span, UDL shorter than the span – Influence lines for forces in members of Pratt and Warren trusses. Equivalent uniformly distributed load.

Text Books

1. *Theory of Structures* by S.Ramamrutham and R.Narayan, Dhanapat Rai Publishing company (P) Ltd.9 edition 2015.
2. *Structural Analysis Vol –I & II* by V.N.Vazirani and M.M.Ratwani. Khanna Publishers.2008

References

1. *Structural Analysis Vol I & II* by G.S.Pandit and S.P.Gupta, Tata McGraw Hill Education Pvt. Ltd.2 edition (10 April 2008)
2. *Structural Analysis Vol-I & II* by S.S. Bhavikatti, Vikas Publishing House Pvt Ltd.4 edition. 2011

1. Palleu
2. Shu
3. S. S. L
4. Beehadon Singh
5. Ramish
6. Asubally
7. Spina
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Department of Civil Engineering

BUILDING MATERIALS AND CONSTRUCTION

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Course Outcomes

After completion of this course students will be able to

- CO1: Identify various building materials and to understand their basic properties.
- CO2: Understand the minimum standards required to designate and use the materials in construction..
- CO3: Discuss type metals and finishes used in the construction process.
- CO4: Understand modern materials in general construction practice.
- CO5: Recognize the concept of plastering, pointing and various other building services.

UNIT – I

Stones & Bricks: Building stones – classifications and quarrying – properties – structural requirements, Composition of Brick earth – manufacture and structural requirements, classification – Field and laboratory tests on bricks (compressive strength, water absorption, efflorescence, dimension and warpage).

Masonry: Definition and terms used in masonry. Brick masonry, characteristics and requirements of good brick masonry, Bonds in brick work, Header, Stretcher, English, Flemish bond, Stone masonry, Requirements of good stone masonry, Classification, characteristics of different stone masonry, Joints in stone masonry. Types of walls; load bearing, partition walls, cavity walls.

UNIT – II

Cement & Admixtures: Ingredients of cement – manufacture – Chemical composition – different types of cement and its uses, Hydration – field & lab tests on cements, Admixtures – mineral & chemical admixtures – uses.

Tiles, Timber and Glass: Introduction, Classification of Tiles, Tests on Tiles (Water absorption, Bulk density & Abrasion). Timber Structure, Types and properties, seasoning. Glass – properties, classification.












UNIT – III

Metals in constructions: Principle and characteristics of steel, Aluminium, Classification of steel, Tests on metals (Tension, Brittleness test, hardness test)

Paints: Purpose, types, ingredients and defects, Preparation and applications of paints to new and old plastered surfaces, wooden and steel surfaces.

UNIT – IV

Miscellaneous Materials: Gypsum – Classification, Plaster of Paris, Gypsum wall Plasters, Gypsum Plaster Boards, Adhesives, Heat and sound insulating materials, Geosynthetics.

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Department of Civil Engineering

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

UNIT -V



Plastering and Pointing: Purpose, materials and methods of plastering and pointing, defects in plastering – Stucco plastering, lathe plastering. Damp proofing – causes, effects and methods. Formwork – Requirements – types of form work – standards – scaffolding – shoring – underpinning.



Textbooks

1. *Engineering Materials* by Rangwala, S. Chand and Company Ltd – Edition 2017
2. *Building Construction* by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) Ltd., 10th ed. 2008

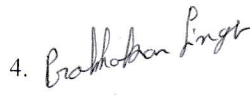

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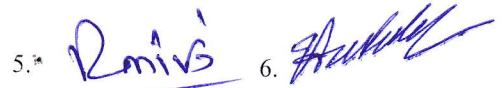
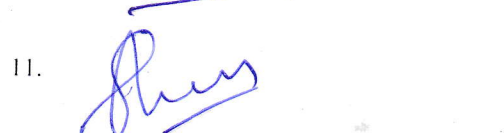
1. *Building Materials* by Duggal, New Age International. 4th revised ed. 2010
2. *Building Materials* by P.C. Varghese, PHI. 2nd revised ed. 2015

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Department of Civil Engineering

COMPUTER AIDED DRAFTING LAB

L	T	P	C
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Course Outcomes

After completion of this course students will be able to

- CO1: Assess the Software with aiding source.
- CO2: Demonstrate the different modes of commands.
- CO3: Draft the plan, Elevation & Sectional Views of the building.
- CO4: Develop the components of the building

CO5: Replicate the complete detailing of Building with BIM input

List of Experiments

1. Introduction to concept of drawings through computer aided drafting (CAD) .
2. Practice exercises on coordinate system reference planes , initial settings, drawing aids , Presentation norms and standards.
3. Practice Exercises on commands- drawing , Modifying, layers, text, blocks and dimensioning.
4. Practice on symbols and signs (materials, Architectural , structural , Electrical, Plumbing)
5. Drawing of single line plan - Single storey buildings .
6. Drawing of plans of Multi storied buildings with Brick thickness (Max G+2)
7. Developing sections and elevations of Single storey buildings
8. Detailing of different types (any 2 types) of doors and its components by using CAD
9. Detailing of different types (any 2 types) of windows and its components by using CAD
10. Exercises on the development of working drawing of building (working drawing) by using CAD
11. Drawing the complete layout of structure (Educational building)
12. Fundamentals of Building Information Modelling (BIM)

1. Pallavi
2. Shruti
3. Siddh
4. Prathapa Singh
5. Rishi
6. Harsh
7. Aditya
8. Rishi
9. Aditya
10. K.Devi
11. Shruti

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Department of Civil Engineering

SOLID MECHANICS LAB

L	T	P	C
0	0	2	1

Course Outcomes

After completion of this course students will be able to

- CO1: Demonstrate of materials under impact, hardness, tensile and compressive loads.
- CO2: Determine elastic constants by flexural and torsion test.
- CO3: Illustrate spring constants under various loadings.
- CO4: Understand the deflection of materials under bending
- CO5: Compute basic material properties stress and strain.

List of Experiments

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

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Department of Civil Engineering

COURSE STRUCTURE FOR B.TECH III YEAR

B. Tech. III Year I Semester

S. No.	Category	Course Title	L	T	P	C
1	H&S- 3	Managerial Economics and Financial Analysis	3	0	0	3
2	PC – 8	Hydraulics & Hydraulic Machinery	3	0	0	3
3	PC – 9	Geotechnical Engineering	3	0	0	3
4	PC – 10	Design of Reinforced Concrete Structures	3	0	0	3
5	PE – 1	1. Advanced Structural Analysis 2. Building planning & Drawing 3. Air Pollution and Control Methods	3	0	0	3
6	OE – 1	Open Elective	3	0	0	3
7	PC Lab –4	Geotechnical Engineering Lab	0	0	2	1
8	PC Lab – 5	Fluid Mechanics & Hydraulic Machinery Lab	0	0	2	1
9	H&S-2	Personality Development & Behavioural Skills	2	0	0	1
Total			20	0	4	21

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Department of Civil Engineering

B. Tech. III Year II Semester

S. No.	Category	Course Title	L	T	P	C
1	PC – 11	Highway Engineering	3	0	0	3
2	PC – 12	Foundation Engineering	3	0	0	3
3	PC – 13	Enviornmental Engineering	3	0	0	3
4	PC – 14	Water Resources Engineering	3	0	0	3
5	PE – 2	1. Construction Engineering Management 2. Ground Improvement Techniques 3. Finite Element Method	3	0	0	3
6	OE – 2	Open Elective	3	0	0	3
7	PC Lab – 6	Enviornmental Engineering Lab	0	0	2	1
8	H&S Lab-1	Advance Communication Skills Lab	0	0	2	1
9	ES – 2	Quantitative Methods & Logical Reasoning	2	0	0	1
Total			20	0	4	21

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Department of Civil Engineering

HYDRAULICS & HYDRAULIC MACHINERY

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- CO1: Determine the Froude number for a given flow to differentiate concepts of sub-critical, critical, and super-critical flows.
- CO2: Compute the non-uniform flow depths for gradually and rapid varied flow.
- CO3: Apply dimensional analysis to predict physical parameters that influence the flow in fluid mechanics and use dimensionless parameters
- CO4: Compute efficiencies of different types of turbines.
- CO5: Use performance curves to predict performance of centrifugal pumps.

UNIT – I

Open channel flow-I

Introduction: Definition of open channel, Comparison between pipe flow and open-channel flow, Types of open channels, Geometric elements and hydraulic properties of an open channel section, Classification of open-channel flows – steady, unsteady, uniform, non-uniform, gradually varied, rapidly varied, spatially varied,

Uniform Flow: through open channel by Chezy's, Manning's, Kutter's, and Bazin formulae;; Computation of normal depth hydraulically efficient channel section.

Critical Flow: Specific energy, critical depth, computation of critical depth, critical, sub-critical, and super critical flows, alternate depths; Transitions – channel with a hump, and change in width.

UNIT – II

Open channel flow-II


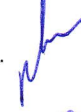









Non Uniform flow: Gradually Varied Flow: Basic assumptions; Derivation of differential equation of GVF; Characteristics and classification of flow profiles for Mild, Critical, Steep, horizontal, and adverse slopes; control sections; Computation of GVF by numerical method – Direct-Step method,

Rapidly Varied Flow: Characteristics of RVF; Hydraulic Jump in horizontal rectangular channels – momentum equation formulation for the jump, energy loss; Classification of jumps according to Froude's number; Basic characteristics of the jump - Height of jump, length of jump, location of jump,

UNIT – III

Dimensional Analysis: Philosophy of DA; Principle of Dimensional Homogeneity; Methods used - Rayleigh's method and Buckingham's Pi theorem; Common dimensionless groups in fluid mechanics.

Modelling and Similitude: Geometric, kinematic, and dynamic similarities; Similarity requirements or modelling laws; model and prototype relations; Definition of distorted and non-distorted models.

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UNIT – IV

Impact of jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency

Turbines: Layout of a typical Hydroelectric power plant; heads and efficiencies- Classification of turbines- pelton wheel turbine- francis turbine- Kaplan turbine; working proportions, velocity diagrams, work done, and efficiencies of turbine; governing of turbines.

UNIT – V




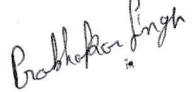
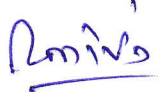



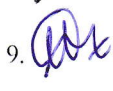


Centrifugal Pumps: Components of a centrifugal pump; Working of a centrifugal pump, classification of pumps; Expression for work done on the impeller; heads of pumps, losses and efficiencies, minimum starting speed, Multistage pumps - Pumps in series and parallel. Performance of pumps-characteristic curves, Net positive suction head- cavitation.

Text Books

1. *Hydraulics and Fluid Mechanics (Including Hydraulics Machines)* by Modi and Seth, Standard book house. (English) 22nd Edition. 2019

References

1. *A Textbook of Fluid Machines* by R.K.Rajput, S. Chand & company Ltd. 2019.

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Department of Civil Engineering

GEOTECHNICAL ENGINEERING

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- CO1: Illustrate the soil formation and classification.
- CO2: Explain the Hydrostatic effect in soil mass.
- CO3: Illustrate the stress distribution mechanism and compaction in soil mass.
- CO4: Illustrate the mechanism of consolidation.
- CO5: Identify the Shear strength parameters through analytical and experimental approach.

UNIT – I

Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass, volume relationship – Relative density.

Index properties of soils: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils.

UNIT – II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law, Permeability – Factors affecting – laboratory determination of coefficient of permeability – Permeability of layered soils – Insitu permeability tests (Pumping in & pumping out test).

Effective stress & seepage through soils: Total, neutral and effective stresses – principle of effective stress – quick sand condition – Introduction to Seepage through soils – Flow nets – Characteristics and Uses of flow nets.

UNIT – III

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties. – Field compaction Equipment – compaction quality control.

Stress distribution in soils: Boussinesq's and Westergaard's theories for point loads, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under a point load along the vertical and horizontal plane.

UNIT – IV

Consolidation: Types of compressibility – immediate settlement, primary consolidation and Secondary consolidation – stress history of clay; e-p and e-log-p curves – normal consolidation soil, over consolidated soil and under consolidated soil – pre-consolidation Pressure and its determination – Terzaghi's 1-D consolidation theory.

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Department of Civil Engineering

UNIT – V

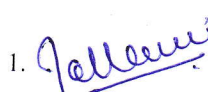










Shear strength of soils: Introduction of shear strength – Mohr - Coulomb Failure theories – Types of laboratory strength tests – Direct Shear test, Vane shear test – strength tests based on drainage conditions – Tri-Axial test strength envelopes – Shear strength of sands – dilatancy, Critical void ratio – Concept of liquefaction.

Text books

1. *Soil Mechanics and Foundation Engg. (7th edition) by Dr.Arora, K.R., Standard Publishers and Distributors, Delhi, 2010*

References

1. *Principles of Foundation Engineering, (7th edition) by Braja M. Das, Cengage Learning, 2011*
2. *Basic and applied soil mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.ltd, New Delhi 2016, third edition*

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Department of Civil Engineering

DESIGN OF REINFORCED CONCRETE STRUCTURES

L	T	P	C
3	0	0	3

Course outcome

After completion of this course students will be able to

- CO1: Understand the various design concepts and design a beam under flexure and draw the reinforcement details.
- CO2: Design the beam under shear and torsion, Calculate the anchorage and development length and check the serviceability requirements for RC structural elements.
- CO3: Analyze and solve various RC slabs and draw the reinforcement details
- CO4: Classify short, long columns and draw the reinforcement details
- CO5: Explore the design concept of footing & staircase.

UNIT – I

Concepts of RC design: Introduction- Structure - Components of structure - Different types of structures - Loads – Different types of Loads – Dead Load, Live Load, Earthquake Load and Wind Load - Working stress method – Ultimate load method – Limit State method – Stress-strain curve for concrete, steel – Partial safety factor – Characteristic values – Stress Block parameters – IS: 456 2000 provisions.

Design and detailing of beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – II


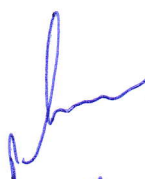
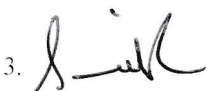





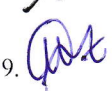


Shear, torsion and bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, IS Code provisions. Design examples in simply supported and continuous beams, detailing. Limit state of serviceability for deflection and cracking – IS Code provisions.

UNIT – III

Design and detailing of slabs: Design of one way, two way and continuous slabs using IS Codal provisions and coefficients, Cantilever slab / Canopy slab. Introduction to Yield line theory.

UNIT – IV

Design and detailing of short and long columns: Subjected to axial loads, uniaxial and biaxial bending – IS Code provisions.

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Department of Civil Engineering

UNIT – V

Design and detailing of footings and staircase: Different types of footings – Design of isolated, square, rectangular and circular footings – Introduction to combined footings. Design of staircase (dog-legged type)

Text books

1. Dr. B. C. Punmia, "Limit state design of reinforced concrete", Laxmi Publications, New Delhi.
2. N. Krishna Raju and R. N. Pranesh, "Reinforced Concrete Design", New Age International Publishers, New Delhi.


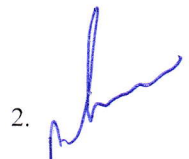


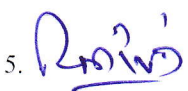






Reference books

1. Fundamentals of Reinforced Concrete design by M.L Ghambhir, Prentice Hall of India, 2013.
2. Plain and Reinforced Concrete, Vol. I, Jain & Jaikrishna, Nemchand Brother, 2012.

IS Code

1. IS: 456 2000 Indian Standard plain and reinforced concrete - code of practice (Fourth Revision) Tenth Reprint APRIL 2007
2. SP16, Design Aids for Reinforced Concrete to IS 456:1978

Note : IS: 456 2000 and SP16 need to be provided during examination

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Department of Civil Engineering

ADVANCED STRUCTURAL ANALYSIS (PE1)

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- CO1: Analyze the continuous beams, portal frames by Kani's method.
- CO2: Demonstrate the Indeterminacy of Trusses by Castiglione's second theorem.
- CO3: Evaluate the shear forces and bending moments in Two-Hinged arches and to execute secondary stresses due to rise of temperature and Elastic Shortening of rib.
- CO4: Analyze the Multi-storey frames by approximate methods for gravity (vertical) and horizontal loads.
- CO5: Understand the concept of Matrix method for the analysis of continuous beams and Pin jointed plane frames.

UNIT – I

Kani's method: Analysis of continuous beams and portal frames including side sway due to unsymmetrical vertical loading.

UNIT – II

Indeterminate Trusses: ~~Determination of Static and Kinematic indeterminacies~~ – Analysis of trusses having single and two degrees of internal and external indeterminacies – Castigliano's second theorem.

UNIT – III

Two hinged arches: Introduction – classification of two hinged arches – analysis of two hinged parabolic arches, analysis of circular arches – secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT – IV

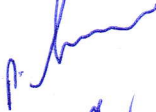
Approximate methods of analysis: Introduction – Analysis of multi – storey frames for lateral loads: Portal Method, Cantilever Method. Analysis of multi storey frames for gravity (vertical) loads. Substitute frame method.

UNIT – V

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy – Stiffness method - Analysis of continuous beams including settlement of supports - Analysis of pin-jointed determinate plane frames – Analysis of single bay single storey frames, including side sway. Flexibility method - Analysis of continuous beams up to three degrees of the indeterminacy.

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Department of Civil Engineering

Text books

1. Theory of Structures by S.Ramamrutham Dhanpat Rai Publishing Company 9th Edition 2015
2. Strucrual Analysis-II by S.S Bhavikatti, Vikas Publishing house pvt.Ltd.

References

1. Strucrual Analysis Vol -I and II by Vazrani and Ratwani, Khanna publishers.
2. Mechanics of structures Volume- II by G.S Pandit and S.P.Gupta Tata Mcgraw Hill Education pvt. Ltd.

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Department of Civil Engineering

BUILDING PLANNING & DRAWING (PE1)

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- CO1: Identify various building components, conventional signs and symbols.
- CO2: Illustrate the building bye-laws and the principles of planning.
- CO3: Compute the building services and safety aspects.
- CO4: Design and draft the plans of various types of buildings and detailing of doors, windows.
- CO5: Understand the elements of perspective drawing involving simple problems.

UNIT – I

Basic components of buildings: Design of various elements of building like various types of footing, open foundation, raft, grillage, pile and well foundation, drawing of frames of doors or windows, various types of door, window, and ventilators, lintels and arches, stairs and staircase, trusses, flooring, roofs etc.

Drawing practice: Sketches of various building components, one drawing sheet of various building components like doors, windows, lintels and arches, stairs foundation etc.

UNIT – II

Building planning: provision on national building code, building bye-laws, open area, setbacks, FAR terminology, principles of architectural composition (ie. Unity, contrast etc) , principles of planning orientation.

Drawing practice: one drawing sheet each of services and interiors of buildings.

UNIT – III




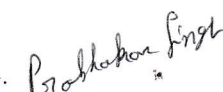
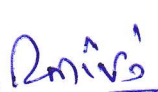



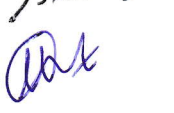
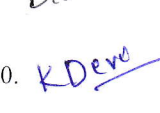

Building Services - Introduction of building services like water supply and drainage, electrification, ventilation and lighting and staircases, fire safety, thermal insulation, acoustics of buildings.

Drawing practice: Detailed planning of one/ two bedroom residential building (One drawing sheet)

UNIT – IV

Design and Drawing of Building: Design and preparation of detailed drawings of various types of buildings like residential building, institutional buildings and commercial buildings, detailing of doors , windows, ventilators and staircases.

Drawing practice: Residential building, Institutional buildings (One drawing sheet each)

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UNIT – V

Perspective Drawing: Elements of Perspective Drawing involving simple problems, one point and two point Perspectives, principles of energy efficient buildings

Drawing practice: One drawing sheet on each one point and two point Perspectives problem.

NOTE


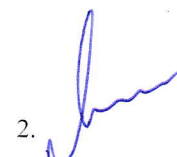

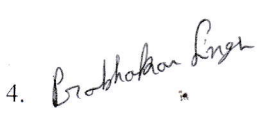
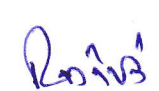



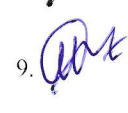


Two periods per week of drawing class should be conducted. The end examination paper should consist of Part – A and Part – B. Part – A should consist of theory questions on the syllabus while Part – B should consist of 4 questions on drawing out of which 2 to be answered. Weightage for Part – A is 60 % and Part – B is 40 %. In exam drawing board should be provided.

Textbooks

1. Building Planning and Drawing, N Kumar swamy and Kameswar Rao, charator publications, 7th Edition, 2015
2. Building planning, Design and scheduling, Gurucharan Singh Jagdish Singh 2nd edition, (2008).

References

1. Civil Engineering Drawing (2nd Editon), (2010).
2. Building drawing with an integrated approach to built environment , fourth edition, Shah , Kale & Patki, (2002).

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Department of Civil Engineering

AIR POLLUTION AND CONTROL METHODS (PE1)

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- CO1: Find the sources, causes & effects of air pollution.
- CO2: Understand the meteorological components and the plume behavior for atmospheric stability conditions.
- CO3: Identify the types of equipments to control the particulates at sources.
- CO4: Minimize the control measures of NOX, SOX and other gaseous emissions.
- CO5: Demonstrate the factors for siting an industry by examining the air quality standards.

UNIT – I

Air Pollution: Definitions, Air Pollution Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution-stationary and mobile sources. Effects of Airpollutants on man, material and vegetation; Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc

UNIT – II












Meteorology: plume Dispersion; properties of the atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Significance of various meteorological parameters in air pollution, wind rose diagrams. Lapse Rates, Pressure Systems.

UNIT – III

Control of particulates –Control at Sources-Raw material changes, Process Changes, Equipment modifications or replacement, Equipment's – Settling Chambers, Centrifugal separators or cyclones, Fabric filters, Electrostatic precipitator and Wet scrubbers.

UNIT – IV

Control of gaseous emissions: Adsorption, Absorption, Combustion, Sox Control technology- Natural dispersion by dilution, Using alternate fuels, removal of sulphur from fuels(Desulfurization), NOx Control technology- NOx control by modification of operating and design conditions- Low Excess air combustion, Decreasing Combustion air temperature, Two stage combustion, Flue gas recirculation.

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Department of Civil Engineering

UNIT – V

Air Pollution Monitoring and management: Environmental guidelines for siting of industries, Environmental impact assessment, Stack emission standards Ambient air quality standards, air pollution control act. Ambient air quality monitoring- location of stations, Duration of sampling period, SPM sampling, Gaseous sampling.

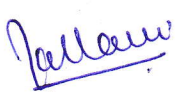

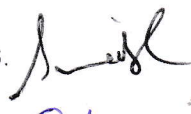








Textbooks

1. Air pollution and Control by K.V.S.G. Murali Krishna, 1st Edition, 2015

References

1. An introduction to air pollution by R.K. trivedy and P.K. Goel, B.S publications, 1986.

2. Environmental pollution control engineering by C.S. Rao, 2nd Edition 2006

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Department of Civil Engineering

GEOTECHNICAL ENGINEERING LAB

L	T	P	C
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Course Outcomes

After completion of this course students will be able to

- CO1: Demonstrate the engineering properties the soil.
- CO2: Illustrate the field bulk and dry density of cohesive and cohesion less soils.
- CO3: Classify the Coarse grained soils based on sieve analysis test & a grain size distribution curve.
- CO4: Compute the shear strength of cohesive and cohesion less soil.
- CO5: Determine the permeability of coarse grained soil and fine grained soil by constant head permeability test and falling head method.

List of Experiments

1. Atterberg's limits
2. Field density- core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant head test.
5. Permeability of soil variable head test.
6. Compaction test
7. C.B.R test
8. Consolidation test
9. Unconfined compression test
10. Triaxial compression test
11. Direct shear test
12. Vane shear test.

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Department of Civil Engineering

FLUID MECHANICS & HYDRAULIC MACHINERY LAB

L	T	P	C
0	0	2	1

Course Outcomes

After completion of this course students will be able to

- CO1: Examine the calibration of different flow meters.
- CO2: Illustrate flow measuring devices used in pipes, channels and notches.
- CO3: Determine major and minor losses in pipes.
- CO4: Analyse the energy equation for problems in pipe flow.
- CO5: Examine the performance characteristics of turbines and pumps.

List of experiments

1. Calibration of venturimeter and Orifice meter
2. Determination of coefficient of discharge for a small orifice/mouthpiece by constant head method
3. Calibration of contracted rectangular notch and triangular notch
4. Determination of friction factor of a pipe
5. Determination of coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of hydraulic jump.
9. Performance test on Pelton wheel turbine.
10. Performance test on Kaplan Turbine
11. Performance characteristics of a single stage /multi stage centrifugal pump.
12. Performance characteristics of a reciprocating pump

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Department of Civil Engineering

HIGHWAY ENGINEERING

L	T	P	C
3	0	0	3

Course Outcomes

After completion of this course students will be able to

- CO1: Summarize the road developments in India from different periods.
- CO2: Apply the concept of geometric design in real time engineering.
- CO3: Make use of parameters related to traffic studies.
- CO4: Design & model the intersections with specific standards.
- CO5: Evaluate the different pavement design methods using IRC standards.

UNIT- I




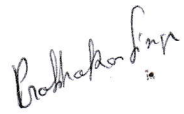







Highway development and planning: Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports – Highway Project.

UNIT – II

Highway geometric design: Importance of Geometric Design - Design controls and Criteria - Highway Cross Section Elements - Sight Distance Elements- Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance - Design of Horizontal Alignment - Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT- III

Traffic engineering & regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – On street & Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings- Types of Road Markings - Design of Traffic Signals – Webster Method.

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Department of Civil Engineering

UNIT- IV

Intersection design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

UNIT -V

Pavement Design: Factors affecting design, Highway Materials Introduction, Characteristics of highway materials, Design of Pavements, Design of Flexible pavement by CBR method as per IRC 37-2012 and theory of empirical mechanistic method. ~~Design of rigid pavements as per IRC 58-2015~~, Stresses in rigid pavement by westergards and IRC methods.

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Text books

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).

References

1. Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.(2005).
3. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997

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Department of Civil Engineering

FOUNDATION ENGINEERING

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- CO1: Organize the preparation and programme of soil investigation.
- CO2: Examine the earth pressure theories and stability of retaining walls.
- CO3: Evaluate the bearing capacity of soil and allowable settlement.
- CO4: Analyse the capacity and settlement of pile foundation.
- CO5: Analyse the stability of finite and infinite slopes using various methods.

UNIT – I

Soil Exploration: Need – methods of soil exploration – boring and sampling methods – penetration tests – plate load test – pressure meter – planning of soil exploration programme and preparation of soil investigation report.

UNIT – II

Earth pressure theories: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory




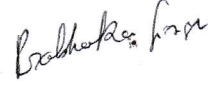




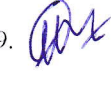


Retaining walls: Types of retaining walls – stability of gravity and cantilever retaining walls against overturning, sliding and, bearing capacity. Drainage from backfill, introduction to reinforced earth walls.

UNIT – III

Bearing capacity and settlement foundation: Types - choice of foundation – location and depth - safe bearing capacity — Terzaghi, Mayerhof, Skempton and IS methods.– Safe bearing pressure based on SPT N – value- Allowable bearing pressure; safe bearing capacity- allowable settlement of structures and plate load test – allowable settlements of structures.

UNIT – IV

pile foundation: Types of piles – load carrying capacity of piles based on static pile formulae – dynamic pile formulae – Pile Capacity through SPT and CPT results - pile load tests - load carrying capacity of pile groups in sands and clays – Settlement of pile groups – negative skin friction

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UNIT – V

Slope stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish slip circle method, method of slices. Bishop's Simplified method of slices – Taylor's Stability Number- stability of slopes.

Text books

1. *Soil Mechanics And Foundation Engineering* by K.R. Arora (2008). Standard publishers distributors, seventh edition.

References

1. *Principles of Foundation Engineering, (7th edition)* by Braja M. Das, Cengage Learning, 2011

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Department of Civil Engineering

ENVIRONMENTAL ENGINEERING

L	T	P	C
3	0	0	3

Course Outcomes

After completion of this course students will be able to

- CO1: Predict the population by different methods.
- CO2: Design the filter and settling tanks for water treatment.
- CO3: Examine the characteristics of sewage.
- CO4: Analyse and design the sewers for sewerage system.
- CO5: Design different units of sewage treatment plant .

UNIT – I

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – types of water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards, sources of water – Comparison from quality, quantity and other considerations – intakes – infiltration galleries.

UNIT – II




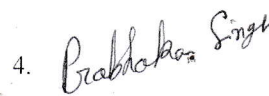




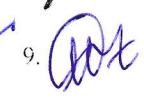
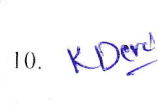

Layout and general outline of water treatment units: sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants - feeding arrangements, Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation - comparison of filters – disinfection – theory of chlorination, chlorine demand - other disinfection practices- Miscellaneous treatment methods.

UNIT – III

Water distribution systems: Types of layouts of distribution system- design of distribution system- Hardy cross and equivalent pipe methods – service reservoirs – determination of storage capacity. Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows, combined flow-characteristics of sewage– examination of sewage – B.O.D – C.O.D equations.

UNIT – IV

Design of sewers: Hydraulic formulae, Maximum and minimum velocities in sewer, Differences in the design of water supply pipes and sewer pipes, Shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – housedrainage – components requirements – sanitary fitting traps – one pipe and two pipe systems of plumbing.

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UNIT –V

Design of different units: primary sedimentation tank – design of screens – grit chambers – principles and design of biological treatment – trickling filters, activated sludge process, oxidation ditches.

Text books

1. "Water Supply Engineering", Vol. I, by B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, 2nd Edition, New Delhi, 2016.
2. "Waste water Engineering" Vol. II, by B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, 2nd Edition, New Delhi, 2016

Reference

1. Sewage Disposal and Air Pollution Engineering" by Santhosh kumargarg, Khanna Publications, 24th edition, 2012.
2. Water Supply and Sanitary Engineering by G.S.Birdie, Dhanpat Rai Publishing Company, Ninth Edition, 2011

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Department of Civil Engineering

WATER RESOURCES ENGINEERING

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- Describe the components in the hydrologic cycle and interaction among various processes in the hydrologic cycle
- Analyze the flood and its measurement by means of hydrograph.
- Analyze the phenomenon of Ground water occurrence by means of aquifers.
- Assess the methods of irrigation and its quality with the help of duty delta relationship.
- Design the canals by using standard theories.

UNIT I

Introduction to engineering hydrology and its applications: hydrologic cycle, Types and forms of precipitation, Rainfall Measurement, Different types of rain gauges, rainfall measurement, computation of average rainfall over a basin, processing of rainfall data- Adjustment of record – rainfall double mass curve. Runoff- factors affecting runoff- runoff over a catchment – Empirical and rational formulae.

Abstraction from rainfall- evaporation, factors affecting evaporation, measurement of evaporation- evapotranspiration- penman and balney & credde methods- infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT II


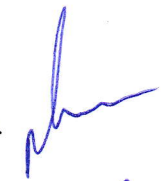

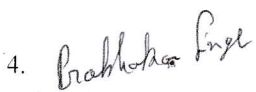







Flood measurement and analysis: Distribution of runoff – Hydrograph analysis flood hydrograph- effective rainfall- base flow- base flow separation- direct runoff hydrograph- Unit Hydrograph, definition and limitations of applications of unit hydrograph, derivation of unit hydrograph from direct runoff hydrograph and vice versa- S- Hydrograph, Synthetic unit hydrograph.

UNIT III

Ground water occurrence: types of aquifers, Aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, Steady radial flow to wells in confined and unconfined aquifer. Types of wells – Well construction- well development.

UNIT IV

Necessity and importance of irrigation: Types of irrigation, advantages and ill effects of irrigation, Indian agricultural soils, Rabi and Kharip seasons, methods of improving soil fertility- crop rotation,

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preparation of land for irrigation, standards of quality for Irrigation water, crop period, base period, kor period, Duty and delta, factors affecting duty, efficiencies. Water Logging

UNIT V

Canals and its design: Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design, canal lining.

Certain important definitions: GCA, CCA, intensity of irrigation, Design capacity of an irrigation canal, Computation of design capacity. Stream Gauging – measurement and estimation of stream flow.

Text books

1. *Engineering Hydrology* by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi 2016, third edition.
2. *Irrigation and Hydraulic structures* by S.K. Grag - Khanna publishers 2009.

References

1. *Irrigation and water power engineering* by B. C. Punmia, P.B.B Lal, A.K. Jain & A.K. Jain, Laxmi publications pvt. Ltd., New Delhi, 16th Edition (Reprint) 2014.

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Department of Civil Engineering

CONSTRUCTION ENGINEERING & MANAGEMENT (PE2)

L	T	P	C
3	0	0	3

Course Outcomes

After completion of this course students will be able to

- CO1: Understand the behavioural aspect of entrepreneurs, various approaches of time management, their strength and weakness.
- CO2: Apply the concepts of project management during the construction phase, project organization, project planning and control using CPM, PERT techniques.
- CO3: Analysis various materials and equipments for construction work.
- CO4: Examine on different types of contracts and specifications.
- CO5: Outline the labour regulations and safety in construction.

UNIT – I

Management Techniques: Roles, Management theories, Social responsibilities, Planning and strategic management, Strategy implementation, Decision making tools and techniques – Organizational structure, Human resource management – motivation performance – leadership.

UNIT – II

Management Applications: Classification of Construction projects, Construction stages, Resources – Functions of Construction Management and its Applications. Preliminary Planning – Collection of Data – Contract Planning – Scientific Methods of Management: Network Techniques in construction management – Bar chart, Gant chart, CPM, PERT, Cost & Time optimization.

UNIT – III

Resource Management: Resource planning – planning for manpower, materials, costs, equipment. Labour, Scheduling, Forms of scheduling – Resource allocation, Budget and budgetary control methods

UNIT – IV

Contracts and Tenders: Contract – types of contract, contract document, specification, important conditions of contract – tender and tender document – Deposits by the contractor – Arbitration, Negotiation – M.Book – Muster roll – stores.

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UNIT – V

Management Information System: Labour Regulations: Social Security – welfare Legislation – Laws relating to Wages, Bonus and Industrial disputes, Labour Administration – Insurance and Safety Regulations, Workmen's Compensation Act – other labour Laws – Safety in construction, legal and financial aspects of accidents in construction, occupational and safety hazard assessment, Human factors in safety,

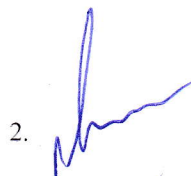

Textbooks



1. Ghalot, P.S., Dhir, D.M., Construction Planning and Management, Wiley Eastern Limited, 1992.
2. Chitkara, K.K., Construction Project Management, Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. Management Theory and practice by VSP Rao, Excel Books - New Delhi

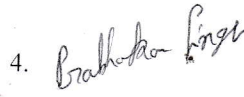

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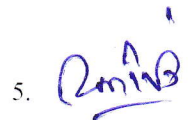

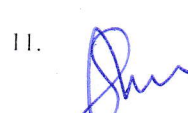
1. Estimation, costing, specification and valuation in civil engineering by M.Chakraborti, Eighteenth Edition

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Department of Civil Engineering

GROUND IMPROVEMENT TECHNIQUES (PE2)

L	T	P	C
3	0	0	3

Course outcomes

After completion of this course students will be able to

- CO1: Illustrate the several Ground modification mechanisms
- CO2: Illustrate the Ground Improvement Techniques through mechanical approach.
- CO3: Identify the different Hydraulic ground improvement techniques through Dewatering techniques.
- CO4: Explain the quick settlement techniques through chemical and physical modification.
- CO5: Distinguish the inclusion and confinement techniques of ground improvement.

UNIT I

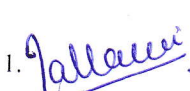


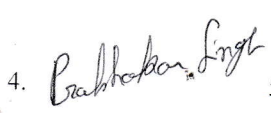







Introduction to engineering ground modification: Need for Ground Improvement Techniques, Traditional Objectives and Emerging Trends, Identification of soil types, In situ and laboratory tests to characterize problematic soils, Classification of Ground Improvement techniques, Suitability, Feasibility, and Desirability

UNIT II

Mechanical Modification: Principles of soil densification –Moisture Content, Comparative Effort, Soil type and Preparation, Properties of Compacted soil, Compaction control tests, Specification of compaction requirements in terms of water content and Density, Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT III

Hydraulic Modification: Objectives and techniques, Methods of de-watering- sumps and interceptor ditches- single, multi stage well points, vacuum well points. Horizontal wells, Electro-osmosis, Filtration, Drainage and seepage control with Geosynthetics, Preloading and vertical drains, Electro-kinetic dewatering.

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UNIT IV

Physical and Chemical Modification: Methods of stabilization, cement, lime, bituminous, chemical stabilization with calcium chloride, sodium silicate and gypsum. Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing

UNIT V

Modification by Inclusions and Confinement: Soil Reinforcement, Reinforcement with strip, bar, mesh, sheet and grid reinforced soil. In-situ ground reinforcement, Ground Anchors, Types of ground anchors, Rock bolting and Soil nailing.

Text books

1. Hausmann, M. R. (1990) – *Engineering Principles of Ground Modifications*, McGraw Hill publications
2. Dr.P.PurushothamaRaj, *Ground Improvement Techniques – 3rd edition*.

References

1. Koerner, R. M (1994) – *Designing with Geosynthetics – Prentice Hall, New Jersey*
2. Jones C. J. F. P. (1985) – *Earth Reinforcement and soil structures – Butterworths, London*.

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Department of Civil Engineering

FINITE ELEMENT METHOD (PE2)

L	T	P	C
3	0	0	3

Course Outcome

Upon successful completion of this course students will be able to

- CO1: Explain plane stress-plane strain equations and develop displacement functions.
- CO2: Analyze one-dimensional problems using stiffness matrix.
- CO3: Examine the different elements based on continuity and compatibility.
- CO4: Illustrate quadrilateral elements using nodal points and shape functions.
- CO5: Discuss the solution techniques for static condition.

UNIT – I

Introduction to Finite Element Method: Basic Equations in Elasticity Coordinate system – Natural, Global Coordinate System Coordinates. Stress – Strain equation – concept of plane stress – plane strain advantages and disadvantages of FEM. Element shapes – nodes – nodal degree of freedom— strain displacement relations.

UNIT – II

One dimensional problem: Bar element – Shape functions, stiffness matrix Strain displacement matrix formulation, FEA Beam elements – stiffness matrix – shape function – Analysis of continuous beams – stress strain relation.

UNIT – III

Two dimensional problem: FEA Two dimensional problem – CST – LST element – shape function – stress – strain Relation, Lagrangian – serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element – shape functions.

UNIT – IV

Isoparametric formulation: Concepts of isoparametric elements for 2D analysis – 4 noded and 8 noded iso- parametric quadrilateral elements.

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Department of Civil Engineering

UNIT – V



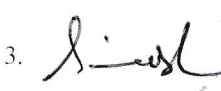
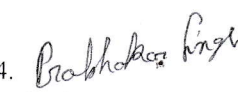




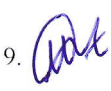


Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

Textbook

1. *Introduction to finite Elements in Engineering* by Tirupathi R. Chandrupatla, and Ashok D. Belegundu, Prentice Hall of India 4th revised, 2012.

References

1. *Finite Element Analysis* by P.Seshu, PHI Learning Private Limited, 2012.
2. *Concepts and applications of Finite Element Analysis* by Robert D. Cook et al., Wiley India Pvt. Ltd. 3rd edition, October 1988.

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Department of Civil Engineering

ENVIRONMENTAL ENGINEERING LAB

L	T	P	C
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Course outcomes

After completion of this course students will be able to

- CO1: Understand principles and their practical application in water treatment.
- CO2: Determine physical, chemical and biological characteristics of water and wastewater.
- CO3: Determine the optimum dose of coagulant.
- CO4: Estimate the chloride, nitrate and iron content in water.
- CO5: Summarize the solutions using titration, conductivity meter, pH meter, turbidity meter and DO meter.

List of experiments

1. Determination of pH and turbidity
2. Determination of Conductivity and total dissolved solids
3. Determination of Alkalinity and Acidity
4. Determination of Chlorides
5. Determination of Iron
6. Determination of Dissolved Oxygen
7. Determination of Nitrates
8. Determination of Optimum dose of Coagulant
9. Determination of Chlorine Demand
10. Determination of B.O.D
11. Determination of C.O.D
12. Presumptive Coliform test

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