RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
AUTONOMOUS
DEPARTMENT OF CIVIL ENGINEERING

II B.TECH, I-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY SUBJECTS								
A0011203	Numerical Methods & Probability Theory	2	1	0	3	30	70	100
A0102203	Strength of Materials	2	1	0	3	30	70	100
A0103203	Surveying	2	1	0	3	30	70	100
A0104203	Fluid Mechanics	2	1	0	3	30	70	100
A0105203	Building Materials & Constructions	2	1	0	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0012203	Design Thinking and Innovations	1	2	0	2	30	70	100
MANDATORY LEARNING COURSE								
A0022203	Constitution of India	2	0	0	0	0	0	0
PRACTICALS								
A0191203	Surveying Lab	0	0	3	1.5	25	50	75
A0192203	Strength of Materials Lab	0	0	3	1.5	25	50	75
A0193203	Building Planning & Drawing Lab	0	0	3	1.5	25	50	75
	Total	**13**	**7**	**9**	**21.5**	**255**	**570**	**825**

II B.TECH, II-SEMESTER COURSE STRUCTURE

Subject Code	Name of the Subject	Hours/Week			Credits	Marks		
		Theory	Tutorial	Lab		Internal	External	Total
THEORY SUBJECTS								
A0504203	Python Programming	2	1	0	3	30	70	100
A0106204	Hydraulics and Hydraulic Machines	2	1	0	3	30	70	100
A0107204	Structural Analysis	2	1	0	3	30	70	100
A0108204	Concrete Technology	2	1	0	3	30	70	100
A0017203	Managerial Economics and Financial Analysis	2	1	0	3	30	70	100
SKILL DEVELOPMENT COURSE								
A0019203	Aptitude Arithmetic Reasoning and Comprehension	1	2	0	2	30	70	100
PRACTICALS								
A0571203	Python Programming Lab	0	0	3	1.5	25	50	75
A0393203	Fluid Mechanics and Hydraulic Machines Lab	0	0	3	1.5	25	50	75
A0194204	Concrete Technology Lab	0	0	3	1.5	25	50	75
	Total	**11**	**7**	**9**	**21.5**	**255**	**570**	**825**

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AUTONOMOUS
DEPARTMENT OF CIVIL ENGINEERING

II B.Tech, I-Sem (CE) | L | T | C
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(A0011203) NUMERICAL METHODS & PROBABILITY THEORY
For branches: CE & ME

COURSE OBJECTIVES:
- ❖ To familiarize the students with the foundations of probability and Numerical methods.
- ❖ To impart probability concepts and Numerical methods in various applications in Engineering.

COURSE OUTCOMES:
After completion of the course the student will be able to:
- ❖ Understand various Numerical methods to solve transcendental equations and rate of convergence. Analyze the concept of Interpolation its applications in digital image processing, computer graphics and in many engineering disciplines.
- ❖ Understand the concept of Numerical differentiation and integration and its importance in mechanics.
- ❖ Identify various numerical methods to solve linear and non-linear ordinary differential equations and its applications in non-linear analysis.
- ❖ To know the importance of probability, random variables and distributions in solving various mechanical and civil engineering problems.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	2	-	-	-	-	-	-	-				
CO2	3	3	2	2	3	-	-	-	-	-	-	-				
CO3	2	3	2	3	2	-	-	-	-	-	-	-				
CO4	3	2	3	2	3	-	-	-	-	-	-	-				
CO5	2	3	2	3	3	-	-	-	-	-	-	-				

UNIT-I
Solution of Algebraic and Transcendental Equations: Introduction-The Bisection Method-The Method of False Position-The Iteration Method-Newton-Raphson Method.

UNIT-II
Interpolation: Introduction-Finite differences-Forward Differences-backward Differences – Newton's forward and backward difference formulae for interpolation-Gauss forward and backward difference formulae for interpolation - Lagrange's Interpolation formula.

UNIT-III
Curve fitting: Fitting a straight line-Second degree curve-Exponential curve-Power curve by method of least squares.

UNIT-IV
Numerical Differentiation-Numerical Integration-Newton-cote's integration formula-Trapezoidal rule-Simpson's 1/3 Rule-Simpson's 3/8 Rule.
Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method –Euler's Modified Method- Runge-Kutta Method.

UNIT-V
Basic concept of probability-Random variables-Discrete and continuous Random variables – Moment generating function - Expectation

UNIT-VI

Distribution functions: Binomial Distribution-Poison Distribution and Normal Distribution-Related properties.

TEXTBOOKS

1) T.K.V. Iyengar, B. Krishna Gandhi and Others, Probability and Statistics, S. Chand & Company
2) S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.

REFERENCES

1) R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Alpha science International limited,2016
2) Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.
3) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.

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DEPARTMENT OF CIVIL ENGINEERING

II B.Tech, I-Sem (CE)

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(A0102203) STRENGTH OF MATERIALS

Prerequisites: Physics, Mathematics II, and Engineering Mechanics

COURSE OBJECTIVES:

- The course provides knowledge about stress, strain, SF, BM. It provides understanding and estimation of bending and shear stresses in beams. Also learning about compression members and buckling phenomenon.

COURSE OUTCOMES:

At the end of the course student is able to

- Apply basic mechanics principles on structural members subjected to various loading.
- Understand from simple stresses to complex stresses and strains.
- Analyze the structural members subjected to various types of loading.
- Evaluate shear force, bending moment, slope, deflection of structural members for different loading.

MAPPING OF COs & POs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3		1	2							3	3	2	1
CO2	3	3		1	2							3	3	2	2
CO3	3	3		1	3							3	3	2	2
CO4	3	3		1	1							3	3	2	1

UNIT-I

Simple Stresses and Strains - Concept of stress and strain, St. Venant's principle, stress and strain diagram, 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 (dilatancy)-Elastic moduli and the relationship between them-Bars of varying section-composite bars-Temperature stresses. Strain Energy-Resilience-Gradual, sudden, impact and shock loadings.

UNIT-II

Introduction to analysis of stress and strain-State of stress at a point-2D system, stress at a point on a plane, principal stresses, principal planes and maximum shear stresses, Mohr circle of plane stress, - Principal stresses for a general state of stress. 2D stress-strain system, principal strains and principal axis of strain, Mohr Circle for plane strains.

UNIT-III

Shear Force (SF) and Bending Moment (BM) diagrams for cantilevers, simply supported beams with and without overhangs. Calculation of maximum BM and SF and the point of contra flexure under concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of couples. Relationship between loads, SF and BM.

UNIT-IV

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 Beams for bending stresses.

Shear Stresses- Derivation of formula-Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT-V

Slope and deflection- Differential equation of the deflection curve, Relationship between moment, slope and deflection, Double integration method, Moment area method, Macaulay's method, Conjugate beam method.

UNIT-VI

Columns and Struts: Direct and bending stresses –Kernel of section-Slenderness ratio and effective length of column - Buckling and stability-Columns with pinned ends, other support conditions, Eccentric axial loads using differential equations.

Direct and Bending Stresses: Determination of stresses in the case of chimneys, retaining walls and dams - conditions for stability-stresses due to direct loading and B.M. about both axes.

TEXT BOOKS

1) Punmia B.C., Jain A.K., (2017), Mechanics of Materials, Lakshmi Publishers, India.
2) Rajput R.K., (2015), Strength of Materials, S Chand Publishers, India.

REFERENCE BOOKS

1) Jindal U.C., (2012), Strength of Materials, Pearson publishers, India.
2) Gere J.M., Goodno B.J., (2013), Mechanics of Materials, Cengage Learning, USA.
3) Popov E.P., (2012), Engineering Mechanics of Solids, PHI Learning Private Limited, New Delhi.
4) Hibbeler, R. C., (2004), Mechanics of Materials, East Rutherford, NJ: Pearson Prentice Hall, USA.

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II B.Tech, I-Sem (CE) | L | T | C
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(A0103203) SURVEYING

COURSE OBJECTIVES:

- Provides knowledge of various surveying & geomatics instruments Chain, Tape, Compass, Auto level, Theodolite, Total Station, GPS, DGPS etc.
- Provides understanding and application of various concepts: Principles of surveying, Chain Surveying, Compass Surveying, Levelling & Contouring, Tachometric Surveying, Trigonometric and Trilateral Principles, Curve Setting techniques, Computation of Areas & Volumes, EDM.

COURSE OUTCOMES:

At the end of the course student is able to;

- To interpret horizontal measurements with the help of chain and compass surveying in the field
- Apply the knowledge of theodolite in different operations in Civil Engineering
- Able to apply Total Station and Electronic Distance Measurements in Traversing, Distance measurements
- Formulate the setting out of curve by Linear measurements
- Summarize the basic principles of GPS

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-				1	1	1	1			1	2	1
CO2	3	2	1					1	2	1			1	2	1
CO3	3	2	1				1	2	1	2			1	2	1
CO4	3	2	2	1			2	2	2	2			1	2	1
CO5	3	2	2	1					2	2			1	1	1

UNIT-I

Basics of Surveying: Definition, principles and classification of surveying - Principles of chain survey - Methods of measuring horizontal and slope distance - Ranging - Chaining past obstacles - Plotting of chain survey - Construction and working of prismatic compass - Types of bearing - Plotting of a traverse - Declination, dip, local attraction.

UNIT-II

Levelling: Principle of levelling - Methods of levelling - Booking of readings–Contouring - Trigonometric levelling and Axis signal corrections

UNIT-III

Computation of areas: Area Between a Traverse Line and an irregular Boundary-Methods-Mid ordinate, Average ordinate, Trapezoidal rule, Simpsons Rule-Coordinates.

Computation of volumes: Area of cross sections-Single level section-Two level section

UNIT-IV

Triangulation & Trilateration: Theodolite traversing - Measurement of horizontal and vertical angles - Omitted Measurements - Triangulation network-Signals - Base line measurement - Inter-visibility of stations.

Tachometric Surveying: Principle of tachometric surveying - Distance equation for horizontal and inclined line of sights -Tangential Tachometry-Errors.

UNIT-V

Curves: Types of curves–Terminology - Elements of simple circular curve - Setting out methods - Elements of compound curve - Transition curve-Types - Methods of determination

of length - Characteristics and elements of transition curve - Vertical curve-Types and length of vertical curves - Setting out of foundation trench of a building and culvert.

UNIT-VI

Modern Field Survey Systems:

EDM and Total Station: Measurement principle of EDM - EDM instrument characteristics - Accuracy in EDM - Total station-Introduction-Advantages - Types and applications of total station - Field procedure.

Global Positioning System (GPS): Introduction - Working principle - GPS receivers - Applications of GPS.

TEXT BOOKS

1) B.C. Punmia B.C. and Jain A.K, (2016), Surveying Vol. I, II, Laxmi Publications (P) Ltd., New Delhi.
2) N.N. Basak, (2017), Surveying and Levelling, Mc.Graw Hill, New Delhi.

REFERENCE BOOKS

1) Venkatramaiah C., (2011), Surveying, Universities Press, India.
2) Arora K.R, (2015), Surveying vol. I, II& III, standard book house, New Delhi.
3) Subramanyam R., (2012), Surveying and Levelling, Oxford University Press, New Delhi.
4) Basak N.N., (1994), Surveying and Levelling, Tata McGraw Hill Publishers, New Delhi.
5) Agor R., A (1980), Surveying & Levelling, Khanna Publishers, New Delhi.
6) Satheesh Gopi., Sathi Kumar R., and Madhu N., (2006), Advanced Surveying, Pearson Education, Dorling Kindersley (India) Pvt. Ltd, New Delhi.

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(A0104203) FLUID MECHANICS

COURSE OBJECTIVES:

- The student shall learn the basics related to fluid i.e. properties of fluid, fluid statics, fluid kinematics, fluid dynamics, pipe flow, types of flow and flow measurement.

COURSE OUTCOMES:

At the end of the course student is able to

- Understand the properties of fluids and their behavior under static and dynamics conditions
- Apply the knowledge of conservation laws to solve the fluid related problems
- Applications of Bernoulli's equation for flow measuring devices
- Computing discharge through pipes considering losses.
- Analyze laminar and turbulent flows.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	-	1	1	-	-	-	-	2	2	1	1
CO2	3	3	1	1	-	1	1	-	-	-	-	2	2	1	1
CO3	3	3	1	1	2	1	1	-	-	-	-	2	2	1	1
CO4	3	3	3	1	3	1	1	-	-	-	-	2	2	1	1
CO5	3	3	2	1	-	1	1	-	-	-	-	2	2	1	1

UNIT-I

Properties of Fluids: Dimensions and units-Physical properties of fluids- specific gravity, viscosity, surface tension, Capillarity, vapor pressure and their influences on fluid motion.

Fluid Statics: 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 surfaces (Horizontal and Vertical)-total pressure and center of pressure.

UNIT-II

Fluid Kinematics: Description of fluid flow, Stream line, path line and 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, flow net.

UNIT-III

Fluid Dynamics: Surface and body forces-Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, Momentum equation and its application-forces on pipe bend. Kinetic energy correction factor and momentum correction factor.

UNIT-IV

Measurement of Fluid Flow: Pitot tube, Venturi meter and orifice meter-classification of orifices, flow over rectangular, triangular, trapezoidal and stepped notches - –Broad crested weirs.

UNIT-V

Flow Through Pipes: Laws of Fluid friction-Darcy's equation, Minor losses (types), equation for head loss due to sudden expansion-pipes in series-pipes in parallel-Total energy line and hydraulic gradient line, Hydraulic transmission through pipe, siphon, Water Hammer.

UNIT-VI

Laminar Flow: Reynold's experiment; Characteristics of laminar flow; Steady laminar flow through a circular pipe (Hagen Poiseuille equation).

Turbulent Flow: Characteristics of turbulent flow, Hydro dynamically smooth and rough boundaries, Velocity distribution, Friction factor for flow in pipe, Variation of friction factor with Reynold's number– Moody's chart.

TEXT BOOKS

1) Modi P.N., and Seth S.M., (2019), Hydraulics and Fluid Mechanics Including Hydraulics Machines, Standard Book House, New Delhi.
2) Frank. M. White., (2015), Fluid Mechanics, Tata Mc. Grawhill Pvt. Ltd., USA.

REFERENCES

1) Bansal R.K., (2018), Fluid Mechanics and Hydraulic Machines, Laxmi Publications (P) Ltd., New Delhi.
2) Douglas, J.F., Gaserek, J.M. and Swaffirld, J.A., (2005), Fluid Mechanics, Pearson Education, India.
3) Mohanty A.K., (1994), Fluid Mechanics, Prentice Hall of India Pvt. Ltd., New Delhi.
4) Som S.K., and Biswas. G., (2010), Introduction to Fluid Machines, Tata Mc.Grawhill publishers Pvt. Ltd., USA.
5) Edward J. Shaughnessy, Jr, Ira M. Katz and James P., (2005), Schaffer Introduction to Fluid Machines", Oxford University Press, New Delhi.

WEB RESOURCES

1) Fluid Mechanics, http://nptel.ac.in/courses/105101082/
2) Fluid Mechanics, http://www.nptel.ac.in/courses/112104118/ui/TOC.htm

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II B.Tech, I-Sem (CE) | L | T | C
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(A0105203) BUILDING MATERIALS & CONSTURCTIONS

COURSE OBJECTIVES:
- Principles & bye-laws in planning public and residential buildings.
- Properties & application of various building materials.
- Principles and methods of construction of building components.
- Building services required with respect to safety and other requirements.

COURSE OUTCOMES:
At the end of the course student is able to:
- Ability to identify types of building and basic requirements of building components.
- Ability to Explain types of masonry, wood, formwork, casting procedure and necessity of underpinning and scaffolding.
- Ability to elucidate different types of flooring and roofing materials.
- Ability to Describe types of doors, windows, arches and lintel.
- Ability to illuminate means of vertical circulation and protective coatings.
- Ability to Explain different materials especially eco-friendly materials and safety measures to be adopted at any construction site.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS03
CO1	3					1						1	3	1	
CO2	3	1				1						1	3	2	3
CO3	3					1						1	3		
CO4	3					1						1	3		
CO5	3					1						1	3		
CO6	3					1						1	3		

UNIT-I
Building Planning -Introduction, Principles of Building Planning, Classification of buildings, Selection of site, Minimum standards for various Components of building, Open space requirements, Built-up area limitations, Height of the buildings, Wall thickness.
Building Bye–laws and Regulations - Introduction, Objectives of building bye-laws, Principles underlying building bye-laws.

UNIT-II
Basic Building materials -Introduction, Importance, Objectives of study of building materials, Classification of construction materials, Properties of materials.
Stones - Properties of building stones, Relation to their structural requirements, Classification of stones, Dressing of stones, Testing of stones.
Bricks - Composition of good brick earth, Methods of manufacturing of bricks, Qualities of a good brick, Testing of bricks.
Cement: Properties of cement-types of cements-Testing of cements.

UNIT-III
Wood: Structure, Seasoning of timber, Defects in timber, Industrial forms of Timber. Tiles: Characteristics of good tile, Manufacturing methods, Types of tiles.
Other Materials: Properties and uses of iron, glass, ceramics, plastics, steel, aluminum, fly ash, fiber-reinforced plastics.

UNIT-IV
Building Construction -Foundations, Types of Shallow foundations, Types of deep foundations, Masonry - Bonds in Stone & brick masonry, Cavity walls and Partition walls.

Floors - Different types of floors, Roofs-types of roofs, types of roof trusses, Stair cases - Terminology, Types of stairs.

UNIT-V

Form work-Requirements and standards of form work, Scaffolding-Design of scaffolding, Shoring, Underpinning; Surface Finishes - Plastering, Pointing, White washing, distempering and Painting, Cladding, Damp proofing.

UNIT-VI

Building Services: Plumbing services-Water distribution, Sanitary lines and fittings; Ventilations-Necessity, Functional requirements; Lighting - Day and artificial lighting, Types of lighting in working places. Fire Protection: Causes, Fire hazards, General fire safety requirements, Fire resistant materials and construction. Acoustics-characteristics, absorption, Acoustic design.

TEXT BOOKS

1) S.C.Rangwala, K.S. Rangwala and P.S. Rangwala, (2012) Engineering materials, Charotar Publishers.
2) N. Kumara Swamy, and A. Kameswara Rao, (2012), Building Planning and Drawing, Charotar Publishers.
3) B.C. Punmia, (2016), Building construction, Laxmi Publications (P) Ltd., New Delhi.

REFERENCE BOOKS

1) S.K. Duggal, (2012), Building materials, New Age international (P) Ltd., New Delhi.
2) N.L. Arora and B.L. Gupta, (2014), Building construction, Satya prakshan publications, New Delhi.
3) Bureau of Indian Standards, (2005), National Building Code of India, New Delhi.

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II B.Tech, I-Sem (CE)	L	T	C
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(A0012203) DESIGN THINKING AND INNOVATIONS
(Skill Development Course)
For branches: CE, EEE, ME, ECE, CSE(DS) & CSE&BS

COURSE PRE-REQUISITES: None

COURSE OBJECTIVES:
- To create awareness of design thinking among students of engineering
- To teach a systematic approach to identifying and defining a problem before brainstorming for a solution
- To instill a sense of significance towards applying creativity to product and service design
- To motivate students to apply design thinking while implementing a project focusing on local or global societal problems

COURSE OUTCOMES
After completion of this course, the student will be able to
- Identify design principles from an engineering perspective
- Cultivate sensitivity towards design aspects of Activities, Environments, Interactions, Objects, and Users (A-E-I-O-U) in daily life.
- Validate problem statements through user empathisation with societal and environmental consciousness.
- Devise visual design and documentation to communicate more effectively.
- Develop project management skills in a multidisciplinary environment

STUDENTS' RESPONSIBILITIES
1. Forming diverse teams of 3–5 members each to work collaboratively throughout the semester.
2. Proactively engaging to observe the objects and interactions in their daily life and society from a design perspective.
3. Identifying general societal and social problems that may be effectively addressed using design thinking principles
4. Presenting and reporting the tasks to the concerned faculty members using their creative communication and people skills.

UNIT-I
Introduction, *what is design thinking*, the traditional model of innovation, The model of design thinking, Design thinking is not old, Design thinking is to innovation, The sweet spot of design thinking.
Why design thinking now?: Products & Services, Multifaceted problems, fast becoming B2C, wide spread digitization, Customer knowledgeable, Clash of business models, Challenging markets.

UNIT-II
Key tenets of Design thinking, Human centric, focus on subject not object, Problem solving with the customer not for the customer, thinking beyond products, striking balance, Think Broad, Solution Generation, validation, root causes, what else, visualize your thinking, Fail often.
Inspire: Create a stretch, Get the design brief right, Adopt the power of metaphors, Widen the aperture, Bring on diversity, The learning personas, the organizing personas, the building personas.

UNIT-III

Empathize and Define: The traditional market research is broken, create new channels to listen to customers, Be the customer you wish to serve, Leverage technology, get to the customers, do not limit empathy to customers, Engineering empathy, Mind mapping, Stake holder map, Customer journey map, Empathy map, picking problem worth solving, framing problem sharply, Innovating in absence of customer.

UNIT-IV

Ideate: Ideas are like Lego blocks, Hybrid brain storming, Intersection of disciplines, imitate with grace, Breaking the pattern, Challenging assumptions, Value chain, looking beyond current users, designing for extreme, Analogous design, Triggering ideation.

Prototype and Test: The high cost of just doing it, seeking clarity, be quick and dirty, Manageable hypotheses, Doing last experiment first, Visualize through storyboarding and scenarios, Engaging through stories, Is dogfooding enough? Solicit feedback, Inventory prototypes.

UNIT-V

Scale: Keep the main thing as the main thing, cut some slack, Leaders must show up, provide 'air cover', cultivate innovation evangelists, Measure for impact, Don't confuse empathy with good business sense.

Design Thinking in action: A two-day Design thinking workshop, session objectives, Ground rules, workshop flow, mentoring program, build your own version of design thinking program, offer avenues to practice design thinking, think beyond, Juggad, pay attention to the physical space, trust the process

UNIT-VI

How to be a Design Thinker Live curious, listen with intent, observe with purpose, defer your judgement, Hone multiple affiliations, Be a T-shaped person, develop failure tolerance.

Case studies of Design thinking like Chota Cool, Indian post box, Big Bazar, Reliance, royal Enfield etc. (Any other case studies may also be considered).

TEXT BOOKS

1. Pavan Soni, Design your thinking, Penguin Random house India, 2020.
2. Vijay Kumar, "101 Design Methods: A Structured Approach for Driving Innovation in Your Organization", John Wiley & Sons (2012) (ISBN: 978-1118083468)
3. Jeanne Liedtka and Tim Ogilvie , Designing for Growth: A Design Thinking Tool Kit for Managers, Columbia Business School Publishing, E-ISBN 978-0-231-52796-5
4. B. K. Chakravarthy, Janaki Krishnamoorthi, Innovation By Design: Lessons from Post Box Design & Development, Springer India, 2013
5. Donald A. Norman, "The Design of Everyday Things", MIT Press, 2013 (ISBN: 978-0262525671)
6. Tom Kelly, Jonathan Littman, "The Art of Innovation", HarperCollins Business, 2002 (ISBN: 978- 0007102938)

REFERENCE BOOKS

1. Kishore Biyani, It happened in India: The story of Pantaloons, Big Bazar, Central and the Great Indian Consumer, Rupa Publications, New Delhi, 2007.
2. V. Kasturi Rangan and Mona Sinha, Hindustan Unilever's "Pureit" water purifier, a Harvard Business School case Study, 1 February 2011.
3. Kelley and Littman, The Ten Faces of Innovation: IDEO's Strategies for Beating the Devil's Advocate and Driving Creativity Throughout Your Organization
4. Ravi Arora, Igniting Innovation: The Tata Way, Harper Business, New Delhi, 2019.

5. Ashton, How to fly a Horse: The Secret History of Creation, Invention, and Discovery.
6. Kelley, The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm.
7. Rishika T. Krishnan, From Juggad to Systematic innovation: the challenge for India, The Utpreraka Foundation, 2010.
8. Eric Schmidt and Jonathan Rosenberg, How Google Works, Grand Central Publising, New York, 2014.

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II B.Tech, I-Sem (CE)

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(A0022203) CONSTITUTION OF INDIA

(Mandatory Learning Course)

For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:

- To understand the structure and composition of Indian Constitution
- To understand and analyze federalism in the Indian context.
- To study the Panchayati Raj institutions as a medium of decentralization
- To study and analyze the three organs of the governance in the contemporary scenario.

COURSE OUTCOMES:

Students will be able to

- Be aware of historical background of the constitutional making and its importance for building a democratic India.
- Possess the knowledge of the History, features of Indian constitution, the role of Governor and Chief Minister, role of state election commission, the decentralization of power between central, state and local self-government.
- Know the status of Indian government, the structure of state government, the local Administration.
- Able to know the functioning of governments at the rural and national level and role of the electoral bodies.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS03
CO1															
CO2															
CO3															
CO4															
CO5															
CO6															

UNIT-I

History of Indian Constitution: History of Making of the Indian Constitution - History Drafting Committee - Composition & Working of Constitution.

UNIT-II

Philosophy of the Indian Constitution: Preamble Salient Features of Indian Constitution.

UNIT-III

Contours of Constitutional Rights & Duties: Fundamental Rights: Right to Equality - Right to Freedom - Right against Exploitation - Right to Freedom of Religion - Cultural and Educational Rights - Right to Constitutional Remedies - Directive Principles of State Policy.

UNIT-IV

Organs of Governance: Parliament - Composition - Qualifications and Disqualifications Powers and Functions of Executive - President - Governor - Council of Ministers-Judiciary-Qualifications, Appointment and Transfer of Judges.

UNIT-V

Local Administration: Role and Importance of Municipal Corporation Role and Importance Panchayati raj: Role and Importance Zilla Panchayat: Position and role - Village level: Role of Elected and Appointed officials - Importance of grass root democracy.

UNIT-VI

Election Commission: Role and Functioning of Election Commission Role and Functioning of Chief Election Commissioner and Election Commissioners - Role and Functioning of State Election Commission.

TEXT BOOKS

1) Introduction to Constitution of India, D.D. Basu, Lexis Nexus
2) The Constitution of India, PM Bhakshi, Universal Law

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AUTONOMOUS
DEPARTMENT OF CIVIL ENGINEERING

II B.Tech, I-Sem (CE) | P 3 | C 1.5

(A0191203) SURVEYING LAB

COURSE OBJECTIVES:

- Provide knowledge & skill in using various traditional and modern Surveying Instruments.
- Provides knowledge and application of concepts in Chain Surveying, Compass Surveying, Leveling & Contouring, Tachometric Surveying, Trigonometric Surveying, and Curve Setting.

COURSE OUTCOMES:

At the end of the course student is able to;

- identify different survey instruments, tools and their applications
- Handle survey instruments, taking measurements, computation and interpretations like chain, compass, levelling, theodolite
- Analyze different methods of surveying, triangulation, traversing etc.,
- Interpret different modern techniques using surveying instrument such as Total Station, EDM & GPS etc.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS03
CO1	2	1	1						3		1		2	3	3
CO2	2	1	1						3		1		2	3	3
CO3	2	1	1						3		1		2	3	3
CO4	2	1	1						3		1		2	3	3

LIST OF EXERCISES

1) Surveying by Chain and Compass (Obstacles, area) & Plotting
2) An exercise of L.S and C.S and plotting using levelling instrument.
3) Measurement of horizontal angles and vertical angles by using theodolite.
4) Trigonometric Levelling - Heights and distance problem (Two Exercises)
5) Heights and distance using Principles of tacheometric surveying (Two Exercises)
6) Curve setting-different methods. (Two Exercises)
7) Setting out works for buildings & pipe lines.
8) Determine of area using total station
9) Traversing, contouring, stake out & finding remote height using total station
10) Distance, gradient, Difference in height between two inaccessible points using total stations
11) Learning the use of GPS
12) Learning the use of DGPS
13) Perform different built-in application programs using Total Station.
14) Data collection using Total Station.
15) Demonstration of Advanced surveying instruments and E-Survey CAD

TEXT BOOKS

1. B.C. Punmia B.C. and Jain A.K, (2016), Surveying Vol. I, II, Laxmi Publications (P) Ltd., New Delhi.

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II B.Tech, I-Sem (CE) P 3 C 1.5

(A0192203) STRENGTH OF MATERIALS LAB

PREREQUISITES: Strength of Materials

COURSE OBJECTIVES

- The course objective of this subject consists. Shear, tension, bending test, hardness, spring, impact, torsion, Maxwell's reciprocal theorem on beam.

COURSE OUTCOMES

At the end of the course student is able to;

- Application of loads on materials to test the strength of materials.
- Understand the deflection profile of beam members subjected to loads.
- Analyze the behavior of metals subjected to various loads.
- Evaluate the properties of material.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	1	1	2	3	2	2		1	1	3
CO2	3	3	2	3	3	1			3	2	1		1	1	3
CO3	3	3	2	3	3	1			2	2	1		2	1	3
CO4	3	3	2	3	3	1	1	2	3	2	2		2	1	3

EXPERIMENTS

1) Tension test
2) Deflection test on (Steel / Wood) Overhanging beam.
3) Deflection test on simply supported beam.
4) Compression test on steel
5) Torsion test
6) Hardness test
7) Spring test
8) Impact test
9) Verification of Maxwell's Reciprocal theorem on beams.

TEXT/REFERENCE BOOKS

1. Timoshenko and Gere, (2018), Mechanics of Materials, CBS Publishers, New Delhi.

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II B.Tech, I-Sem (CE) P 3 C 1.5

(A0193203) BUILDING PLANNING & DRAWING LAB

COURSE OBJECTIVES:
- ❖ To have knowledge of building bye-laws and the regulations as per National Building Code.
- ❖ To obtain skill in planning and drawing of different types of buildings (plan, elevation and sectional views) including components.

COURSE OUTCOMES:
At the end of the course student is able to:
- ❖ Apply basic commands to draw a building component and its plan using Auto CAD.
- ❖ Understand building bye-laws to draw building plans.
- ❖ Draw plan, elevation and sectional view of buildings as per requirements.
- ❖ Create effective and efficient plan as per requirement of client.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PS03
CO1	3	2	3		3	2	2	2	2	2	2		3	2	2
CO2	3	2	3		3	1		1		2			3	2	2
CO3	2	2	3		3	1	1	2		2	2		3	2	2
CO4	2	2	3		3	1	1	2					3	2	2

SOFTWARE: AutoCAD EXERCISES:
1. Basics of AutoCAD and practice on Drawing and Editing Tools (simple drawing using tools).
2. Conventional signs &symbols used in Civil Engineering drawings.
3. Draw the given Building components using AutoCAD.
   a. Door
   b. Window
   c. Staircase
   d. Simple Roof trusses
4. Line plan and dimensional plan of a residential building using AutoCAD as per building bye-laws.
5. Dimensional plan, elevation and sectional plan of a residential building using AutoCAD as per building bye-laws.
6. Dimensional plan, elevation and sectional plan of any commercial building like Office building, School building, Hospital building etc., using AutoCAD as per building bye-laws.
7. Drawing of Footing Foundation using AutoCAD.

NOTE
1) Students should draw all the drawings as per the dimensions in a lab observation book /A4 sheet before performing in laboratory.
2) At least two building components to be drawn from Exercise-03.

TEXT BOOKS
1) S.C.Rangwala, K.S. Rangwala and P.S. Rangwala, (2012) Engineering materials, Charotar Publishers.
2) N. Kumara Swamy, and A. Kameswara Rao, (2012), Building Planning and Drawing, Charotar Publishers.
3) B.C. Punmia, (2016), Building construction, Laxmi Publications (P) Ltd., New Delhi.

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II B.Tech, II-Sem (CE) | L | T | C
2 | 1 | 3

(A0504203) PYTHON PROGRAMMING
For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:
This course will enable students to:
- Learn Syntax and Semantics of various Operators used in Python.
- Understand about Various Input, Output and Control flow statements of Python.
- Understand Strings, List, Tuple, Set and Dictionary in Python.
- Implement Object Oriented Programming concepts in Python.
- Understand Exception handling and File I/O in Python.
- Understand Functions, Modules and Regular Expressions in Python.

COURSE OUTCOMES:
The students should be able to:
- Examine Python syntax and semantics and be fluent in the use of various Operators of Python.
- Make use of Flow Control statements, Input / Output functions and Strings of Python.
- Demonstrate proficiency in handling of data structures like List, Tuple, Set and Dictionary.
- Demonstrate the use of Functions, Modules and File I/O operations in in Python.
- Interpret the Concepts of Object-Oriented Programming in Python.
- Interpret the various issues of Exception handling mechanisms and Regular Expressions in Python.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1			2				1	1		1	1	1	
CO2	3	2	1		2				1	1		1	1	1	
CO3	3	3	2	1	2				1	1		2	1	2	2
CO4	3	2	1	1	2				1	1		1	1	1	1
CO5	3	3	2	1	2	1			1	1		2	2	2	2
CO6	3	3	2	1	2	2			1	1		2	2	2	2

UNIT-I
Introduction: History of Python, Need of Python Programming, Applications Basics of Python Programming Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation. Overview on Fundamental data types of Pythons.
Operators in Python: Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Shift Operators, Ternary operator, Membership Operators, Identity Operators, Expressions and order of evaluations. Illustrative examples on all the above operators.

UNIT-II
Input and Output statements: input () function, reading multiple values from the keyboard in a single line, print () function, 'sep' and 'end' attributes, Printing formatted string, replacement operator ({}).
Control flow statements: Conditional statements. Iterative statements. Transfer statements.
Strings: Operations on string, String slicing, important methods used on string.

UNIT-III
Lists: Operations on List, important methods used on list. List comprehensions
Tuples: Operations on tuples, important methods used on tuple.
Sets: Operations on sets, important methods used on set.

Dictionaries: Operations on Dictionaries, important methods used on dictionaries.

UNIT-IV

Functions - Defining Functions, Calling Functions, Types of Arguments - Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful functions, Scope of the Variables in a Function. Recursive functions.

Modules: Creating modules, import statement, from Import statement.

File I/O: Need of files concept, Types of files, Opening and Closing a Text file, Reading & Writing operations on files, setting offsets in a file, Traversing a Text file.

UNIT-V

Object Oriented Programming (OOP) in Python: Classes and Objects, 'self-variable', Types of Variables and Methods used in Classes, Constructor Method, Inheritance, Overriding Methods, Abstract Classes, Data hiding.

UNIT-VI

Error and Exceptions: Difference between an Error and Exception, Types of Exceptions, Handling Exceptions, try, except, else and finally blocks, control flow in try-except-else-finally blocks, Raising Exceptions, Customized Exceptions.

Regular Expressions: Character matching in regular expressions, extracting data using regular expressions.

TEXT BOOKS

1. Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.
2. Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018**.**

REFERENCE BOOKS

1) R.Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press, 2019Core Python Programming, 2016 W.Chun, Pearson.
2) Introduction to Python, 2015 Kenneth A. Lambert, Cengages
3) https://www.w3schools.com/python/python_reference.asp
4) https://www.python.org/doc/

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II B.Tech, II-Sem (CE) | L | T | C
| | 2 | 1 | 3

(A0106204) HYDRAULICS AND HYDRAULIC MACHINES

COURSE OBJECTIVES:

- The student shall learn the concept of boundary layer theory and fundamentals of flow through open channels, dimensional analysis; Hydraulic machines such as flow through turbines and pumps including their performance characteristics and design aspects.

COURSE OUTCOMES:

At the end of the course student is able;

- To understand the concept of boundary layer theory, forces on submerged bodies.
- To visualize the flow transitions mathematically in open channels.
- To prepare models for prototypes of hydraulic structures.
- To evaluate the forces exerted by the jet of fluid on vanes.
- To evaluate the performance of pumps and turbines.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	1	-	2	1	-	-	-	1	2	-	-	1
CO2	2	3	3	1	1	2	1	-	-	-	1	2	-	-	2
CO3	2	3	3	1	3	2	3	-	-	-	1	2	1	2	3
CO4	2	3	-	1	2	2	2	-	-	-	1	2	1	2	1
CO5	2	3	3	1	3	2	3	-	-	-	1	2	1	2	3

UNIT-I

Boundary Layer Theory: Boundary layer-concepts, Characteristics of boundary layer along a thin flat plate, Von Karman momentum integral equation (No derivation); Forces on Submerged bodies: Drag & Lift force (Concepts and problems), Magnus effect.

UNIT-II

Open Channel Flow:

Uniform Flow: Introduction, Classification of flows, Types of channels; Chezy's, Manning's, Bazin, Kutter's Equations; Hydraulically efficient channel sections - Rectangular, Trapezoidal and Circular channels; Velocity distribution; Energy and momentum correction factors.

Non - Uniform Flow: Concept of specific energy; Specific energy curves; Critical flow; Critical flow in a rectangular channel; Critical slope.

Gradually Varied Flow: Dynamic equation; surface profiles; Computation of surface profiles by single step method; Back water curves and draw down curves.

Rapidly Varied Flow: Hydraulic jump; Elements and characteristics of hydraulic jump; Types of hydraulic jump; Location and applications of hydraulic jump; Energy loss in a hydraulic jump.

UNIT-III

Hydraulic Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models-Geometric, kinematic and dynamic similarities-dimensionless numbers-model and prototype relations.

UNIT-IV

Basics of Turbo Machinery: 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

UNIT-V

Hydraulic Turbines: Layout of a typical Hydropower installation-Heads and efficiencies-classification of turbines- Pelton wheel-Franci's turbine-Kaplan turbine-working, working

proportions, velocity diagram, work done and efficiency - draft tube-theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT-VI

Centrifugal-Pumps: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed- multistage pumps-pumps in parallel- performance of pumps- characteristic curves- NPSH-cavitation-Model testing-Performance characteristics.

Reciprocating Pumps: Main components-Working of a Reciprocating Pump-Types of reciprocating pumps

– Work done by single acting and double acting pumps-Coefficient of discharge, slip, percentage slip-Negative slip.

TEXT BOOKS

1) Modi P.N., and Seth SM., (2019), Hydraulics and Fluid Mechanics Including Hydraulics Machines, Standard Book House, New Delhi.
2) Bansal R.K., (2018), Fluid mechanics and hydraulic machines, Laxmi Publications (P) ltd., New Delhi.

REFERENCES

1) Ranga Raju, (2008), Elements of Open channel flow, Tata McGraw Hill Publications, New Delhi.
2) Rajput Er., (2016), Fluid Mechanics and Fluid Machines, S Chand & Co., India.
3) Banga and Sharma, (1995), Hydraulic Machines, Khanna Publishers, India.
4) Subramanya K, (2015), Open Channel Flow, Tata Mc. Grawhill Publishers, New Delhi.
5) Ramamrutham S, (2014), Hydraulics, Fluid Mechanics and Fluid Machines, Dhanapat Rai Publishing Company, India.

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L	T	C
2	1	3

(A0107204) STRUCTURAL ANALYSIS

PREREQUISITES: Engineering Mechanics and Solid Mechanics.

COURSE OBJECTIVES:

- The course objective of this subject consists of Analysis of fixed & continuous beams with differing loading and support settlements with theorem of three moments. Analysis of beams and portal frames with slope deflection method, moment distribution method and Kani's method. Analysis of rolling loads, influences line diagrams.

COURSE OUTCOMES:

At the end of the course student is able to

- Apply basic mechanics principles to beams and frames subjected to loading.
- Understand the shear force and bending moment for beams and frames.
- Analyze the structural members when subjected to moving loads.
- Evaluate the beams and frames by various methods like slope-deflection, Kani's, moment distribution methods.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				2			2				3	3	2	
CO2	3				3			2				3	3	2	
CO3	3				3			2				3	3	2	
CO4	3				3			2				3	3	2	

UNIT-I

FIXED BEAMS- Introduction to statically indeterminate beams with U.D. load, central point load, eccentric point load, series of point loads, uniformly varying load, couple and combination of loads shear force and bending moment diagrams-Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT-II

CONTINOUS BEAMS- Introduction-Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT-III

SLOPE-DEFLECTION METHOD: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports and portal frames

UNIT-IV

MOMENT DISTRIBUTION METHOD: Introduction-Stiffness and carry over factors-Distribution factors

– Analysis of continuous beams with and without sinking of supports –portal frames with and without Sway.

UNIT-V

KANI'S METHOD: Basic concepts- Analysis of continuous beams-including settlement of supports - portal frames (single bay-single storey) with and without sway.

UNIT-VI

INFLUENCE LINES & MOVING LOADS: 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

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 single point load, U.D.load longer than the span, U.D.load shorter than the span.

TEXT/REFERENCE BOOKS

1) LS Negi, RS Jangid, (2004), Structural Analysis, Tata Mcgraw Hill Publishing Co Ltd.
2) R. C Hibbeler, (2017), Structural Analysis, Pearson Publishers, India.
3) Wang C.K. (2010), Intermediate Structural Analaysis, Tata Mc Graw Hill Publishing Co Ltd.
4) S.Ramamrutham, R.Narayan, (2014), Theory of structures, Dhanpat Rai Publishing Co Ltd.

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II B.Tech, II-Sem (CE)

L	T	C
2	1	3

(A0108204) CONCERETE TECHNOLOGY

PREREQUISITES: Building Materials and Construction

COURSE OBJECTIVE

- Student shall learn about the various ingredients of concrete, admixtures, workability and strength of concrete, effect of shrinkage and creep, methods of curing, design of concrete mix by IS method, special concretes and their importance.

COURSE OUTCOMES

At the end of the course student is able to;

- Illustrate physical and chemical properties of concrete ingredients and able to conduct test on cement and concrete
- Classify the physical properties of fresh and hardened concrete and also about manufacturing of cement
- Distinguish the special concrete like Self compacting Concrete, Fiber Reinforced Concrete, Polymer Concrete and Light weight concrete etc.
- Compute the design mix proportion for special work for required strength and workability with available material at workplace.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1											2	1	2
CO2	2	2	2	2									2	1	2
CO3	3	1											2	1	2
CO4	3	1											2	1	2

UNIT-I

FRESH CONCRETE: Properties of fresh concrete- Workability-different tests of workability- Factors influencing workability compaction, finishing, curing.

UNIT-II

HARDENED CONCRETE: Water / Cement ratio-Abram's Law-Gel space ratio-Nature of strength of concrete-Maturity concept-Strength in tension & compression-Factors affecting strength-Relation between compressive & tensile strength - Curing.

TESTING OF HARDENED CONCRETE: Compression tests-Tension tests-Factors affecting strength-Flexure tests-Splitting tests-Non-destructive testing methods-codal provisions for NDT.

UNIT-III

DURABILITY: Factors influencing durability-Chemical effects on concrete- Carbonation, Sulphate attack, Chloride attack.

UNIT-IV

CREEP OF CONCRETE:-Factors influencing creep-Relation between creep & time-Nature of creep-Effects of creep-Shrinkage-types of shrinkage.

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-ACI method & IS 10262 methods

UNIT-VI

SPECIAL CONCRETES: Light weight aggregates-Lightweight aggregate concrete-Cellular concrete-No-fines concrete-High density concrete-Fiber reinforced concrete-Different types of fibers-Factors affecting properties of F.R.C-Applications-Polymer concrete-Types of Polymer concrete-Properties of polymer concrete-Applications-High performance concrete-Self-compacting concrete

TEXT BOOKS

1) AM Nevelli, (2012), Properties of Concrete, Prentice Hall Publishers.
2) M. S. Shetty, (2006), Concrete Technology, S Chand Co. Publishers.
3) M. L. Gambhir, (2017), Concrete Technology, Tata Mc Graw Hill Publishers.

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II B.Tech, II-Sem (CE) | L | T | C
2 | 1 | 3

(A0017203) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
For branches: CE, EEE & ECE

COURSE OBJECTIVE:
- To impart the students with fundamental concepts of economics, budgeting and accounts and its relevance in business management.

COURSE OUTCOMES:
The student will be able to:
- Identify managerial problems with optimum solutions.
- Analyze the demand factors on a product that may be existed/new.
- Know various methods of Demand forecasting
- Understand different business organizations.
- Know techniques and evaluation of capital budgeting.
- Understand financial performance through financial statements

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2	1											
CO2				1	2										
CO3				2			2								
CO4								1	2	2					
CO5		3	2	1	1										
CO6										1	3				

UNIT-I
INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, nature and scope of managerial economics- relation with other disciplines- Demand Analysis: Demand Determinants, Law of Demand and its exceptions

UNIT-II
ELASTICITY OF DEMAND: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand forecasting, factors governing demand forecasting, methods of demand forecasting (Survey methods, Statistical methods, Expert opinion method, Test marketing, Controlled experiments, Judgmental approach to Demand Forecasting)

UNIT-III
TYPES OF BUSINESS ORGANISATIONS AND NEW ECONOMIC ENVIRONMENT: Characteristic
features of business, features and evaluation of sole proprietorship, partnership, Joint Stock Company, public enterprises and their types, changing business environment in post-liberalization scenario.

UNIT-IV
CAPITAL AND CAPITAL BUDGETING: Capital and its significance, types of capital, estimation of fixed and working capital requirements, methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposal, methods of capital budgeting-payback method, accounting rate of return (ARR) and Net present value method (Simple problems).

UNIT-V
INTRODUCTION TO FINANCIAL ACCOUNTING: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT-VI

FINANCIAL ANALYSIS THROUGH RATIOS: Computation, Analysis and Interpretation of financial statements through Liquidity Ratios (Current and Quick ratio), Activity ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt- Equity Ratio, Interest Coverage Ratio) and Profitability ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratios and EPS), Du Pont Chart.

TEXT BOOKS

1. Management Economics and Financial Analysis, Aryasri, 4/e, TMH, 2009.
2. Managerial Economics, Varshney & Maheswari, Sultan Chand, 2009.

REFERENCES

1. Financial Accounting and Analysis, Premchand Babu, Madan Mohan, Himalaya, 2009
2. Managerial Economics and Financial Analysis, S.A. Siddiqui, and A.S. Siddiqui, New Age
3. Principles of Business Economics, Joseph G. Nellis and David Parker, 2/e, Pearson.
4. Managerial Economics in a Global Economy, Domnick Salvatore, Cengage, 2009.
5. Managerial Economics, H.L.Ahuja, 3/e, S.Chand, 2009

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L	T	C
1	2	2

(A0019203) APTITUDE ARITHMETIC REASONING AND COMPREHENSION

(Skill Development Course)

For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:

- To familiarize the students about the concepts of aptitude, arithmetic and reasoning.
- To cope up the students to improve their employable skills.

COURSE OUTCOMES:

After completion of the course the student will be able to:

- Understand number system which helps to become well trained for recruitment drives.
- Analyze permutations and combinations concept.
- Obtain the knowledge of coding and decoding concept.
- Understand the topics related to clock and probability.
- Identify the topics related to Venn diagrams, reasoning and Non-verbal reasoning.

MAPPING OF COS & POS:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	-	-	-	-	-	-	-			
CO2	3	3	2	-	-	-	-	-	-	-	-	-			
CO3	3	2	2	-	-	-	-	-	-	-	-	-			
CO4	3	2	3	-	-	-	-	-	-	-	-	-			
CO5	3	3	2	-	-	-	-	-	-	-	-	-			

UNIT-I

Numbers, Number Systems, Simple Equations, Ratio, Proportion, Variation Quadratic Equations, Progressions, Percentages.

UNIT-II

Profit and Loss, Partnerships, Averages, Mixtures & Allegations, Simple Interest, Compound Interest, Time and Work, Pipes, indices, surds, inequalities, Cisterns Time and Distance Geometry and Mensuration.

UNIT-III

Permutations and Combinations, Probability, Data Interpretation & Data Sufficiency.

UNIT-IV

Number & Letter Series, Analogies, Coding and Decoding, Odd Man Out, Blood Relations.

UNIT-V

Direction Sense, Symbols and Notations, Deductions & Connectives, Clocks, Calendars Analytical

UNIT-VI

Reasoning (Verbal and Non-Verbal), Venn Diagrams, Analytical Puzzles and Octal number system.

TEXTBOOKS & REFERENCES

1) R.S.Agarwal, (2016), Quantitative Techniques, S.Chand Publishers.
2) Shankuntala Devi, (2003), Techniques of Reasoning. S.Chand Publishers.

RGM COLLEGE OF ENGINEERING AND TECHNOLOGY
AUTONOMOUS
DEPARTMENT OF CIVIL ENGINEERING

II B.Tech, II-Sem (CE) P 3 C 1.5

(A0571203) PYTHON PROGRAMMING LAB

For branches: CE, EEE, ME, ECE, CSE, CSE(DS) & CSE&BS

COURSE OBJECTIVES:

- To be able to introduce core programming basics and various Operators and flow control statements of Python programming language through proper practice.
- To demonstrate about various Python fundamental data structures such as int, float, complex, bool and strings.
- To demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries.
- To demonstrate about Functions, Modules and File Input - Output operations in Python programming language.
- To demonstrate about Object Oriented Programming in Python Programming.
- To understand about and Exception handling mechanisms and Regular Expressions in Python Programming.

COURSE OUTCOMES:

- Student should be able to understand the basic concepts of scripting and the contributions of scripting language.
- Student should be able to explore Fundamental data structures in Python.
- Student should be able to explore python data structures like Lists, Tuples, Sets and dictionaries.
- Student should be able to explore Functions, Modules and File input-Output Operations in Python programming language.
- Student should be able to explore Object Oriented Programming in Python Programming.
- Student should be able to create practical and contemporary applications using Exception handling mechanisms and Regular Expressions.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	3	1			1				1	1		1	2	1	1
CO 2	3	3	2		2				1	1		1	1	1	1
CO 3	3	2	2	1	2				1	1		2	1	2	1
CO 4	3	2	1		2				1	1		1	1	2	
CO 5	3	3	1	1	1				1	1		2	2	2	2
CO 6	3	3	1	1	1				1	1		2	2	2	2

S.No	Name of the Experiment
1	a) Demonstrate about Basics of Python Programming.
	b) Demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types)
	c) Demonstrate the working of following functions in Python. i) id( ) ii) type( ) iii) range( )
	d) Write a Python program to demonstrate various base conversion functions.
	e) Write a Python program to demonstrate various type conversion functions.
2	a) Demonstrate the following Operators in Python with suitable examples. i) Arithmetic Operators ii) Relational Operators iii) Assignment Operator iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators
3	a) Write Python programs to demonstrate the following: i) input( ) ii) print( ) iii) ‘sep’ attribute iv) ‘end’ attribute

	v) replacement Operator ({ })
	b) Demonstrate the following Conditional statements in Python with suitable examples. i) if statement ii) if else statement iii) if-elif-else statement
	c) Demonstrate the following Iterative statements in Python with suitable examples. i) while loop ii) for loop
	d) Demonstrate the following control transfer statements in Python with suitable examples. i) break ii) continue iii) pass
4	Write Python programs to print the following Patterns:
	i) A A B A B C A B C D A B C D E
	ii) * * * * * * * * * * * * * * *
	iii) E E E E E E E E E D D D D D D D C C C C C B B B A
	iv) 4 4 3 4 3 2 4 3 2 1 4 3 2 1 0 4 3 2 1 4 3 2 4 3 4
	v) 4 3 4 2 3 4 1 2 3 4 0 1 2 3 4 1 2 3 4 2 3 4 3 4 4

	vi) * * ** ** *** *** **** **** ***********
	vii) ** ** **** **** ****** ****** ******** ******** ********** **********
	viii) E D E C D E B C D E A B C D E B C D E C D E D E E
5	a) Write a Python program to demonstrate various ways of accessing the string. i) By using Indexing (Both Positive and Negative) ii) By using Slice Operator
	b) Demonstrate the following functions/methods which operates on strings in Python with suitable examples: i) len( ) ii) strip( ) iii) rstrip( ) iv) lstrip( ) v) find( ) vi) rfind( ) vii) index( ) viii) rindex() ix) count( ) x) replace( ) xi) split( ) xii) join( ) xiii) upper( ) xiv) lower( ) xv) swapcase( ) xvi) title( ) xvii) capitalize( ) xviii) startswith() xix) endswith()
6	a) Demonstrate the different ways of creating list objects with suitable example programs.
	b) Demonstrate the following functions/methods which operates on lists in Python with suitable examples: i) list( ) ii) split( ) iii) len( ) iv) count( ) v) index ( ) vi) append( ) vii) insert( ) viii) extend() ix) remove( ) x) pop( ) xi) reverse( ) xii) sort( ) xiii) copy( ) xiv) clear( )
	c) Demonstrate the following with suitable example programs: i) List slicing ii) List Comprehensions
7	a) Demonstrate the different ways of creating tuple objects with suitable example programs.
	b) Demonstrate the following functions/methods which operates on tuples in Python with suitable examples: i) len( ) ii) count( ) iii) index( ) iv) sorted( ) v) min ( ) vi)max( ) vii) cmp( ) viii) extend() ix) remove( ) x) pop( ) xi) reverse( ) xii) sort( ) xiii) copy( ) xiv) clear( )

8	a) Demonstrate the different ways of creating set objects with suitable example programs.
	b) Demonstrate the following functions/methods which operates on sets in Python with suitable examples: i) add( ) ii) update( ) iii) copy( ) iv) pop( ) v) remove( ) vi)discard( ) vii) clear( ) viii) union() ix) intersection( ) x) difference( )
9	a) Demonstrate the different ways of creating dictionary objects with suitable example programs.
	b) Demonstrate the following functions/methods which operates on dictionary in Python with suitable examples: i) dict( ) ii) len( ) iii) clear( ) iv) get( ) v) pop( ) vi)popitem( ) vii) keys( ) viii) values() ix) items( ) x) copy( ) xi) update( )
10	a) Demonstrate the following kinds of Parameters used while writing functions in Python. i) Positional Parameters ii) Default Parameters iii)Keyword Parameters iv) Variable length Parameters
	b) Write a Python program to return multiple values at a time using a return statement.
	c) Write a Python program to demonstrate Local and Global variables.
	d) Demonstrate lambda functions in Python with suitable example programs.
11	a) Python program to perform read and write operations on a file.
	b) Python program to copy the contents of a file to another file.
	c) Python program to count frequency of characters in a given file.
	d) Python program to print each line of a file in reverse order.
	e) Python program to compute the number of characters, words and lines in a file.
12	Demonstrate various Object-Oriented Programming Concepts in Python Programming with illustrative examples.
13	Demonstrate about Exception Handling in Python Programming with illustrative examples.
14	a) Demonstrate the following in-built functions to use Regular Expressions very easily in our applications. i) compile( ) ii) finditer( ) iii) match( ) iv) fullmatch( ) v) search ( ) vi) findall ( ) vii) sub( ) viii) subn ( ) ix) split ( )
	b) Write a Regular Expression to represent all RGM language (Your own language) identifiers. **Rules**: 1. The allowed characters are a-z, A-Z,0-9, #. 2. The first character should be a lower-case alphabet symbol from a to k. 3. The second character should be a digit divisible by 3. 4. The length of identifier should be at least 2. Write a python program to check whether the given string is RGM language identifier or not?
	c) Write a Regular Expression to represent all 10-digit mobile numbers. **Rules:** 1. Every number should contain exactly 10 digits. 2. The first digit should be 7 or 8 or 9 Write a Python Program to check whether the given number is valid mobile number or not?

TEXT BOOKS

1) Learning Python, Mark Lutz, Orielly, 3 Edition 2007.
2) Python Programming: A Modern Approach, Vamsi Kurama, Pearson, 2017.

REFERENCE BOOKS

1) Think Python, 2 Edition, 2017 Allen Downey, Green Tea Press
2) Core Python Programming, 2016 W.Chun, Pearson.
3) Introduction to Python, 2015 Kenneth A. Lambert, Cengages
4) https://www.w3schools.com/python/python_reference.asp
5) https://www.python.org/doc/

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II B.Tech, II-Sem (CE) P 3 C 1.5

(A0393203) FLUID MECHANICS AND HYDRAULIC MACHINES LAB

For branches: CE & ME

COURSE OBJECTIVES:

- Provides practical knowledge to understand fluid mechanics concepts
- Provides practical knowledge to understand fluid machines

COURSE OUTCOMES:

At the end of the course student is able to;

- Calibrate flow measuring devices used in pipes, channels and tanks
- Determine fluid flow properties
- Characterize the head loss in pipes.
- Examine the energy equation.
- Determine the performance characteristics of various fluid machines like pumps, turbines etc.
- Determine Energy loss in Hydraulic jump

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	2	1	1	3	2	1	1	-	-	3
CO2	3	2	2	1	1	1	-	-	3	1	1	1	-	-	3
CO3	3	2	2	2	3	1	1	1	3	1	1	1	-	-	3
CO4	3	3	2	2	3	1	-	1	3	1	1	1	-	-	3
CO5	3	3	2	2	3	1	1	1	3	1	2	1	-	-	3
CO6	3	3	3	3	2	3	1	-	3	1	2	1	-	-	3

LIST OF EXPERIMENTS

1) Determination of Coefficient of discharge for Venturi meter & Orifice meter
2) Determination of Coefficient of discharge for a small orifice by a constant head method.
3) Determination of Coefficient of discharge for an external mouth piece by variable head method.
4) Determination of Coefficient of discharge for contracted Rectangular Notch and /or Triangular Notch
5) Determination of Coefficient of loss of head in a sudden contraction and friction factor.
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 Franci's turbine.
11) Efficiency test on centrifugal pump.
12) Efficiency test on reciprocating pump.
13) Incipient motion of sand bed particles

READING:

1) Modi P.N., and Seth S.M., (2019), Hydraulics and Fluid Mechanics Including Hydraulics Machines, Standard Book House, New Delhi.

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II B.Tech, II-Sem (CE) P 3 C 1.5

(A0194204) CONCRETE TECHNOLOGY LAB

PREREQUISITES: Concrete Technology.

COURSE OBJECTIVES:

- The student shall learn the conduct of various tests on cement, aggregates (fine & course), fresh and hardened concrete.

COURSE OUTCOMES:

At the end of the course student is able to:

- Achieve the practical knowledge regarding concrete testing equipment
- Demonstrate test on cement Aggregate and Concrete.
- To interpret behavior of concrete materials and their properties
- To test concrete and construction structures for various characteristics or properties and compare the same with those given as per IS Code.

MAPPING OF COs & POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3							2	1			1	2	1
CO2	2	3							2	1			1	2	1
CO3	1	2							2	1			1	2	1
CO4	1	3							2	1			2	2	1

TESTS ON CONSTRUCTION MATERIALS LIKE CEMENT, FINE AND COARSE AGGREGATE:

1) Fineness of cement
2) Standard consistency of cement paste.
3) Initial and final setting of cement.
4) Soundness of cement (By Lechatlier method)
5) Specific gravity of cement
6) Compressive strength of cement
7) Tests on Fine Aggregate
   a) Sieve analysis-finding FM value and identifying zone as per code of practice.
   b) Specific gravity
   c) Determination of moisture content
8) Tests on coarse aggregate
   a) Sieve analysis
   b) Specific gravity of Coarse Aggregate
9) Mix Design (IS Code method)
   a) Workability Tests: Slump Cone Test, Compaction factor test.
   b) Preparing and curing concrete specimens for tests & Determination of compressive strength of concrete cubes
10) Demonstration of rebound test hammer.

READING

1) AM Nevelli, (2012), Properties of Concrete, Prentice Hall Publishers.
2) M. S. Shetty, (2006), Concrete Technology, S Chand Co. Publishers.
3) M. L. Gambhir, (2017), Concrete Technology, Tata Mc Graw Hill Publishers.