V-SEMESTER

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION FOR BE V-SEMESTER
w.e.f. 2018-19 (CBCS)
(Students admitted in 2016-17)

Subject Code	V- SEMESTER Subject Name	Instruction Hours per week				Examination			Credits
		L	T	D	P	Duration Hours	Max. Marks SEE	CIE	
PC510CE	Reinforced Concrete Design – I	3	1	0	0	3	70	30	3
PC520CE	Theory of Structures-I	3	1	0	0	3	70	30	3
PC530CE	Fluid Mechanics – II	3	0	0	0	3	70	30	3
PC540CE	Soil Mechanics	3	1	0	0	3	70	30	3
PC550CE	Environmental Engineering	3	0	0	0	3	70	30	3
OE510XX	Open Elective – IV	1	0	0	0	2	35	15	1
OE520XX	Open Elective – V	2	0	0	0	3	70	30	2
MC510EH	Human Values & Professional Ethics-II	1	0	0	0	2	50	25	1
MC500EH	FS : III - Soft Skills	1	1	0	0	1.5	35	15	1
MC500CE	FS: III - Technical Skills	1	1	0	0	1.5	35	15	1
LABS									
PC561CE	Hydraulics & Hydraulics Machinery Lab	0	0	0	2	2	50	25	1
PC562CE	Soil Mechanics Lab	0	0	0	2	2	50	25	1
PC563CE	Concrete Technology Lab	0	0	0	2	2	50	25	1
PW519CE	Mini Project : Surveying Camp	0	0	0	0	0	0	50	1
Total		**21**	**5**	**0**	**6**		**725**	**375**	**25**
Contact hours		**32**					**1100**		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING
REINFORCED CONCRETE DESIGN-I
SYLLABUS FOR BE V-SEMESTER

Instruction	:	3+1 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC510CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
1. Design philosophies of working stress method and limit state method. 2. Indian standard codes of practice for Reinforced Concrete 3. Design of concrete structural elements using limit state method as per Indian code of practice.	1.Understand design philosophies of concrete and design beams for flexure with working stress method according to IS: 456 -2000. 2.Design beams for flexure with limit state method according to IS: 456-2000. 3.Design beams for shear, torsion and compute deflections with limit state design philosophy according to IS: 456-2000. 4.Perform yield line analysis of slabs and design slabs with limit state method according to IS: 456-2000. 5.Design columns and footings with limit state method according to IS: 456-2000.

UNIT-I

Introduction to Reinforced Cement Concrete: Need for Reinforcement in Concrete – Basic requirements of an RCC Structure- stability, strength, serviceability and durability.

Design Philosophies: Design philosophies- Working stress method (WSM) and limit state method (LSM) relative merits and demerits.

Working stress method: Theory of flexure in RCC beams, Balanced, under-reinforced and over reinforced sections; Analysis and design of singly and doubly reinforced rectangular sections.

UNIT-II

Basic concepts and terminology of LSM: Basic concepts and terminology of LSM - limit state, characteristic loads and strengths, Partial safety factors. Stress strain relationship for concrete and reinforcing steel; stress blocks.

Limit State of collapse in flexure: Assumptions, Analysis for flexure, failure in tension and compression, singly reinforced, doubly reinforced rectangular and flanged beams. Anchorage and development length, Curtailment of reinforcement in beams.

UNIT-III

Limit State of collapse in shear and torsion: Analysis and design for shear and torsion.

Limit State of Serviceability: Check for deflection and cracking.

UNIT-IV

Analysis and design of slabs: Types of slabs-one way, two way simply supported and continuous rectangular slabs subjected to uniformly distributed loads. Design of solid rectangular slabs.

Introduction to Yield line Theory for Slabs: Assumptions – Patterns of Yield lines – Analysis and design of a simply supported rectangular two- way slab using yield line approach.

UNIT-V

Analysis and design of columns: Assumptions, axially loaded circular, square and rectangular columns, Uniaxial and biaxial bending- interaction diagrams.

Design of Footings: Design of isolated square and rectangular footings as per IS code.

Learning Resources:

1.Unnikrishna Pillai S and Devdas Menon, "Reinforced Concrete Design", McGraw Hill Education India Pvt Ltd.,2009.
2.Varghese P.C, "Limit State Design of Reinforced Concrete", Prentice Hall of India, 2008.
3.Subramanian N., "Design of Reinforced Concrete Structures", Oxford University Press, 2013.
4.Robert Park and Thomas Paulay, "Reinforced Concrete structure", Wiley India Pvt. Ltd, 2013.
5.Shah H.J., "Reinforced Concrete", Vol.1, Charotar Publishing House, 2012.
6.Punmia B.C., Ashok K. Jain, Arun K. Jain, "Limit State Design of Reinforced Concrete", Laxmi Publications (P) Ltd. ,2012.
7.Ramamrutham, "Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Co., 2015.
8.Nptel.ac.in/courses/105105105, Design of Reinforced Concrete Structures.
9.IS:456-2000, Code of Practice for Plain and Reinforced concrete, Bureau of Indian Standards, New Delhi, India.
10.SP 16: Design Aids for Reinforced Concrete to IS 456:1978, Bureau of Indian Standards, New Delhi, India
11.SP 24: Explanatory Handbook on Indian Standard Code of Practice for Plain and Reinforced Concrete to IS 456:1978, Bureau of Indian Standards, New Delhi, India
12.SP 34: Handbook on Concrete Reinforcement and Detailing (With Amendment 1), Bureau of Indian Standards, New Delhi, India
13.IS: 875-1987 Code of Practice For Design Loads (Other Than Earthquake) For Buildings And Structures Parts (1, 2, 3, 4 & 5), Bureau of Indian Standards, New Delhi, India

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

THEORY OF STRUCTURES - I
SYLLABUS FOR BE V-SEMESTER

Instruction	:	3+1 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC520CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Explain methods of analysis for indeterminate beams, portal frames, arches and trusses 2. Describe analysis of beams and pin jointed frames using strain energy methods 3. Explain approximate methods of analysis for lateral loads	1. Find degree of indeterminacy of various structures subjected to external forces. 2. Perform analysis of beams and rigid jointed frames subjected to external loads using' moment distribution method' &'slope deflection method' and draw bending moment diagrams. 3. Analyse indeterminate structures subjected to external loads using Kani's method and draw bending moment diagrams 4. Analyse three hinged, two hinged parabolic arches carrying vertical loads and frames subjected to lateral loads and draw bending moment diagrams. 5. Apply strain energy methods in the analysis of beams and pin jointed frames subjected to external forces.

UNIT-I

Static and Kinematic indeterminacy: Determination of static and kinematic indeterminacy of beams, pin jointed and rigid jointed frames. Introduction to analysis by force method and displacement method.

Moment distribution method: Slope deflection equations, Analysis of continuous beams with and without sinking of supports, single bay single storey portal frames with and without side sway - loading on beam/portal frame shall be point load(s) and uniformly distributed load- shear force and bending moment diagrams.

UNIT-II

Slope deflection method: Analysis of continuous beams with and without sinking of supports, single bay single storey portal frames with and without side sway - loading on beam/portal frame shall be point load(s) and uniformly distributed load- shear force and bending moment diagrams.

UNIT-III

Kani's method: Analysis of continuous beams with and without sinking of supports, single bay single storey portal frames with and without side sway - loading on beam/portal frame shall be point load(s) and uniformly distributed load- shear force and bending moment diagrams.

UNIT-IV

Approximate methods: Portal method and cantilever method.

Analysis of arches: Three hinged and two hinged parabolic arches, determination of horizontal thrust, bending moment, normal thrust and radial shear for static loading.

UNIT-V

Strain energy methods: Determination of displacements using unit load method for statically determinate structures such as beams, pin-jointed trusses.

Redundant pin jointed trusses: Analysis of plane trusses with one degree of redundancy (internal / external), lack of fit and temperature effects.

Learning Resources:

1. Vazirani V.N., Ratwani M.M, Duggal S.K., "Analysis of Structures - Vol. II Theory, Design and Details of Structures", Khanna Publishers, 16th Edition, 2015.
2. Thandavamoorthy T.S., "Structural Analysis", Oxford Higher Education, Second Edition, 2012.
3. Ramamrutham S., Narayan R., "Theory of Structures", Dhanpath Rai publications, 2014
4. Devdas Menon, "Structural Analysis", 1st Edition, Narosa Book Distributors Pvt Ltd,2014.
5. Reddy C.S., "Basic Structural Analysis", 3rd Edition, Mc Graw Hill, 2010.
6. Junarkar S.B., Shah, "Mechanics of Structures", Volume II, Charotar Pub. House, 2010.
7. Chu-Kia Wang, "Intermediate Structural Analysis (English) 1st Edition", McGraw Hill Education, 2010.
8. Hibbeler R.C., "Structural Analysis", 8/E, Prentice Hall, Higher Education, 2012.
9. Louis F. Geschwindner, Harry H. West, "Fundamentals of Structural Analysis", 2nd Edition, Wiley India Pvt. Ltd., 2011.
10. Stephen P. Timoshenko and Donovan H. Young " Theory of Structures" McGraw Hill International Edition, 1968
11. http://nptel.ac.in/downloads/105101085/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

FLUID MECHANICS – II
SYLLABUS FOR BE V-SEMESTER

Instruction	:	3 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC530CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Study various aspects of open channel flow. 2. Learn the concepts of boundary layer theory 3. Discuss the performance and design of hydraulic turbines and centrifugal pump.	1. Compute velocity, specific energy and critical depth in steady uniform flow through open channels 2. Determine water surface profiles, hydraulic jumps and surges in non uniform flow through open channels 3. Explain growth and separation of boundary layer and evaluate drag & lift forces for various shapes of bodies in a medium 4. Evaluate the performance characteristics and perform design of turbines for various conditions of head, discharges and power 5. Evaluate the performance characteristics and perform design of centrifugal pump for various conditions of head, discharges and power

UNIT-I

Steady uniform flow through open channels: Descriptions and definitions, difference between pipe flow and channel flow, velocity and pressure distribution in channel cross section, energy and momentum correction coefficients, friction to flow in open channel, uniform flow, Manning's and Chezy's formulae, most efficient channel cross-section, specific energy, concept and applications of critical depth.

UNIT-II

Gradually varied flow: Significance of Froude Number, dynamic equation of gradually varied flow, classification of gradually varied flow profiles, computation of flow profiles and characteristics of flow profiles. Hydraulic Jump- Momentum equation for a jump in horizontal rectangular channel, energy dissipation in hydraulic jumps and surges in open channels, elementary surge analysis.

UNIT-III

Boundary layer: Boundary layer growth and separation, methods to control separation, drag and lift forces, drag on airfoil and sphere, Principle of stream lining. Displacement, energy & momentum thickness stream lined body and bluff body, magnus effect.

UNIT-IV

Hydraulic Turbines: Classification, specific speed, unit quantities velocity triangles and principles of design of pelton wheel turbine, Francis turbine and Kaplan turbine, characteristics curves cavitaion in turbines .

UNIT-V

Centrifugal Pump: Component, work done, heads and efficiencies, minimum starting speed, specific speed and characteristics curves of centrifugal pump.

Learning Resources:

1. Modi P.N., Seth S.M., "Fluid Mechanics", Standard Book House, 2013
2. Bansal R.K., "Fluid Mechanics & Hydraulic Machinery", Laxmi Publications, 2015
3. Rama Durgaiah D., "Fluid Mechanics and Machinery" New Age International Publishers, 2002
4. Ojha C.S.P., Brendtsson R., Chandramouli P.N., "Fluid Mechanics and Machinery", Oxford University Press, 2010.
5. Ven Te Chow "Open - Channel Hydraulics" International Student Edition, McGraw-Hill, 1983.
6. http://nptel.ac.in/courses/105107059/, Fluid Mechanics
7. http://nptel.ac.in/courses/105103096/3, Hydraulics

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING
SOIL MECHANICS
SYLLABUS FOR BE V-SEMESTER

Instruction	:	3+1 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC540CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
1. Study Origin, classification of soils and estimate index and engineering properties by different procedures 2. Learn Concepts of compaction and consolidation of soils 3. Estimate shear strength parameters, earth pressure and analyze stability of different slopes	1. Interpret composition and structure of soils and classify them according to IS Soil classification. 2. Evaluate effective stress under Hydrostatic Conditions, Steady State One-Dimensional Flow and Transient Hydrodynamic Conditions using analytical approach. 3. Compute stress distribution for a given loading condition using analytical and graphical methods. 4. Analyze mechanisms of compaction and consolidation of soils under given field conditions. 5. Determine and judge shear strength in soils under given field conditions. 6. Evaluate lateral earth pressure for cohesive, cohesionless and combination of them using Rankine's method and Columb's wedge theory. 7. Assess stability of finite and infinite slopes in soils under given field conditions.

UNIT-I

Introduction and clay chemistry: – Brief history of discipline, Soil formation, structure of soils, composition and structure of clay minerals, clay-water interaction

Soil phase relationships pseudo-elastic three phase particulate medium, Mass-volume &weight-volume relationships, and determination of specific gravity and water content.

Index properties: Shape and size characterization- Grain size distribution analysis including wet analysis-hydrometer analysis, Atterberg limits and consistency indices, Soil classification systems.

UNIT-II

Effective stress: Effective stress principle, Fundamentals of Effective stress under hydrostatic condition, distribution of stress with depth influence of shifting water table, shift in ground surface and capillarity. Functional relation between effective stress and engineering properties.

Permeability of Soils: Validity of Darcy's Law - Factors affecting permeability – Field and laboratory tests to determine permeability- Equivalent permeability of stratified soils.

Effective stress under one dimensional flow – seepage force, downward flow, upward flow, Quick Sand phenomena- Remedial measures.Laplace equation, qualitative representation of flownets under defined boundary conditions- Locating phreatic line in a homogeneous earthen dam using Kozeny's parabola – computation of seepage quantity, total, effective and neutral stress.

UNIT-III

Stress Distribution : : Boussinesq's and Westergaard's equations for point load. Application of point load formulae for uniformly distributed load on circular and rectangular areas. Use of Newmark's chart (for Boussinesq's equation). Contact pressure distribution.

Compaction Process: Compaction Mechanism; factors affecting compaction. Determination of compaction characteristics - standard and modified Proctor tests - Light and Heavy compaction tests.CBR test – Field and laboratory based.

Consolidation Process: Spring analogy - Void ratio and effective stress (e Vs logP) relationship – Terazaghi's theory of one dimensional consolidation - assumptions and derivation of one dimensional consolidation equation, computation of magnitude of settlement and time rate of settlement.

UNIT-IV

Shear Strength: Significance of Shear strength in soils – Mohr-Coulomb equation – shear parameters - Determination of shear strength – Direct shear test, large shear box test Tri-axial compression tests (Unconsolidated Undrained (UU), Consolidated Undrained (CU) and Consolidated Drained (CD)), UCC test, Vane shear test. Stress- strain behavior of soils-Stress path-Skemptons pore water parameters

UNIT-V

Earth Pressure: States of earth pressure-Active, passive, at rest condition; Rankine's theory: computation of active and passive earth pressure in cohesionless and c-φ soils; Coulomb's Wedge theory; Introduction to graphical solution.

Slope stability: Definition and classification of slopes-types and slope failures-Factors of safety with respect to cohesion, angle of shearing resistance, Height – Analysis of stability of slope using Swedish slip circle method and Taylor's stability number.

Learning Resources:

1. Murthy V.N.S., "A Textbook of Soil Mechanics & Foundation Engineering", CBS Publishers, 2015.
2. Gopal Ranjan, Rao A.S., "Basic and Applied Soil Mechanics", Wiley Eastern Limited, third edition, 2016.
3. Venkatramaiah C., "Geo-technical Engineering", New Age Publishers, fourth edition, 2012.
4. Shashi K.Gulhati and Manoj Datta, "Geotechnical Engineering", Tata Mc-Graw Hill, 2005
5. Braja M. Das, Khaled Sobhan, "Principles of Geotechnical Engineering", Cengage Learning, 2014
6. Craig's, R.F., "Soil Mechanics" Springer, 2013
7. Karl Terzaghi, Ralph B. Peck, Gholamreza Mesri., "Soil Mechanics in Engineering Practice" John Wiley & Sons, 07-Feb-1996
8. William Lambe T., Robert V. Whitman., "Soil Mechanics" John Wiley & Sons, 1969
9. Arora K.R., "Soil Mechanics and Foundation Engineering", Standard Publishers Distributors revised and enlarged sixth edition, 2007.
10. Scott, R.F., "Principles of Soil Mechanics", Addison Wesley, Massauchusetts,
11. IS Code: IS-2720, Methods of tests for Soils.
12. http://nptel.ac.in/courses/105101084/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

ENVIRONMENTAL ENGINEERING
SYLLABUS FOR BE V-SEMESTER

Instruction	:	3 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC550CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Analyze water and waste water system and understand the concepts of demand, supply and distribution system and Identify various public health elements 2. State the stages involved in water and sewage design treatment, mechanism and disposal 3. Describe the concept of sludge and solid waste management.	1. Assess the demand, quality of water and concept of storm water. 2. Design the components of a water treatment plant. 3. Understand various characteristics of domestic Sewage and its treatment by designing a simple sewerage system. 4. Understand the sludge and solid waste treatment and disposal.

UNIT-I

Water Demand and Forecasting Methods: Water demand and per capita consumption, population forecasting approaches. Water distribution systems and solution of a simple network using hardy cross method. Storm water sewers – storm water estimation by rational method.

Water Quality: Standards of potable water, Physical and Chemical Properties.

UNIT-II

Treatment of Water: Design of rectangular and circular sedimentation tanks, coagulation and flocculation, design of a flocculator. Filtration – types of filters and filter media. Design principles of slow and rapid sand filters, Disinfections – necessity and methods, chlorination of water supplied, Removal of hardness, tastes & odour control.

UNIT-III

Wastewater Characteristics and Disposal: Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Population equivalent, Relative Stability, Natural Methods of wastewater disposal-Self-purification of streams, Oxygen sag Analysis, Dilution into sea, disposal by land treatment

UNIT-IV

Waste Water Treatment: Preliminary treatment, Screens, Grit chambers. Trickling filter, Activated sludge process, Oxidation ponds, Oxidation ditches.

Sewage Conveyance – Sewer types and appurtenances. Velocity in sewers, Design of a simple sewerage system.

UNIT-V

Sludge: Sludge digestion and disposal methods – septic tanks – design parameters and working principles. Low cost waste treatment

Solid Waste: Types, source and composition of solid waste. Methods of collection, transportation and disposal

Learning Resources:

1. Punmia B.C., "Environmental Engineering Vol. I & II", Laxmi Publications Pvt Ltd., New Delhi, 2015
2. Birdi G.S, "Water Supply and Sanitary Engineering", Dhanpat Rai & Sons, 2014
3. Peavy H.S., Rowe D.R., Tchobanoglous G., "Environmental Engineering", Tata McGraw Hills, New Delhi, 1985
4. Metcalf & Eddy M.C., "Waste Water Engineering – Treatment & Reuse", Tata McGraw Hill Publications, New Delhi, 2003
5. http://nptel.ac.in/courses/105106119/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

FINISHING SCHOOL-III (SOFT SKILLS)
SYLLABUS FOR BE V-SEMESTER

Instruction	:	1+1 period per Week	Semester End Exam	:	35	Subject Reference Code	:	MC500EH
Credits	:	1	Sessional Marks	:	15	Duration of Sem. End Exam	:	1 ½ Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
This is a foundation course and aims at enhancing employability skills in students. Students will be introduced to higher order thinking skills and problem solving on the following areas - Arithmetic ability, Numerical ability and General reasoning. Students will be trained to work systematically with speed and accuracy while problem solving. The three major areas covered in this course include 1. Numerical Ability 2. Arithmetic Ability 3. General reasoning	1. Solve questions on the above mentioned areas using short cuts and smart methods 2. Understand the fundamentals concepts of Aptitude skills 2. Perform calculations with speed and accuracy

UNIT – I : QUANTITATIVE APTITUDE - NUMERICAL ABILITY
Numerical Ability
Introduction to higher order thinking skills
Speed Maths
Number systems
LCM & HCF

UNIT – II: QUANTITATIVE APTITUDE-ARITHMETIC ABILITY FOUNDATION
Arithmetic Ability
Percentage
Profit loss and discounts
Ratio proportions Allegations and mixtures
Averages

UNIT – III: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED
Arithmetic Ability
Time speed and distance
Time and work
Interest calculations

UNIT – IV: REASONING ABILITY – GENERAL REASONING PART 1
General Reasoning
Coding decoding
Directions
Series completions

UNIT – V: REASONING ABILITY- GENERAL REASONING PART 2
General Reasoning
Analogies
Classification
Alphabet test
Mathematical operations

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

FINISHING SCHOOL-III (TECHNICAL SKILLS)
SYLLABUS FOR BE V-SEMESTER

Instruction	:	1+1 period per Week	Semester End Exam	:	35	Subject Reference Code	:	MC500EH
Credits	:	1	Sessional Marks	:	15	Duration of Sem. End Exam	:	1 ½ Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Explain MATLAB basic environment 2. Describe creating and running m-files 3. Discuss the syntax control structures and execute related program 4. Explain matrix operations 5. Describe input/output operations	1. Understand basic MATLAB environment 2. Create and execute m-files 3. Write program using control structures 4. Perform matrix operations 5. Understand input/output operations

UNIT-I
Introduction: MATLAB Environment, basic syntax, variables, commands, data types, operators.

UNIT-II
User defined functions: M-files, creating and running script files.

UNIT-III
Control Structures: for loop, while loop, nested loops, if-else, switch statement.

UNIT-IV
Matrix Algebra: Matrix operations, addition and subtraction of matrices, transpose of a matrix, matrix multiplication, inverse of a matrix.

UNIT-V
Controlled Input-Output: User defined input and output operations, reading and writing data from file.
Learning Resources:

1.Holly Moore, “MATLAB for Engineers”, 3rd edition, Pearson Publication, 2012.
2.Agam Kumar Tyag, “MATLAB and Simulink for Engineers”, Oxford Higher Education

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

HYDRAULICS & HYDRAULIC MACHINERY LAB
SYLLABUS FOR BE V-SEMESTER

Instruction	:	2 period per Week	Semester End Exam	:	50	Subject Reference Code	:	PC551CE
Credits	:	1	Sessional Marks	:	25	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
1. Manning's rugosity coefficient and super elevation in open channels. 2. Impact coefficient on different types of vanes and drag & lift forces in wind tunnel. 3. Pre and post jump depths and calculate loss of energy in hydraulic jump. 4. Familiarize with the procedures of calculating overall efficiency of different types of pumps and turbines.	1. Determine Manning's rugosity coefficient and measure super elevation in an open channel and estimate loss of energy in hydraulic jump. 2. Evaluate impact coefficient for different types of vanes. 3. Evaluate the overall efficiency of various pumps and turbines and draw performance characteristic curves. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS

1	Open Channel coefficient	Determination of Manning's rugosity coefficient
2	Open Channel Bend	Determination of super elevation
3	Impact of Jets	Determination of vane coefficient on different types of vanes
4	Centrifugal pump	Determination of efficiency and performance characteristics.
5	Centrifugal pump test rig	Determination of efficiency and performance Characteristics under varying loads
6	Pelton Wheel Turbine	Determination of efficiency and Performance characteristics
7	Francis Turbine	Determination of efficiency and Performance characteristics
8	Kaplan Turbine	Determination of efficiency and Performance characteristics
9	Self priming pump	Determination of efficiency and performance characteristics
10	Wind tunnel	a) To study Drag & Lift characteristic of different angles of attack and find coefficient of drag and lift b) Study pressure distribution over an aerofoil
11	Hydraulic Jump	Determination of pre and post jump depth in channel flow

Virtual Lab: http://eerc03-iiith.virtual-labs.ac.in/ index.php? section=List% 20of%20experiments

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

SOIL MECHANICS LAB
SYLLABUS FOR BE V-SEMESTER

Instruction	:	2 period per Week	Semester End Exam	:	50	Subject Reference Code	:	PC561CE
Credits	:	1	Sessional Marks	:	25	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
1. Index and engineering properties of various soils 2. Field test procedures	1. Determine the index properties of soils and classify soils. 2. Determine Direct shear strength and Triaxial shear strength of a soil sample 3. Calculate Permeability and determine the compaction characteristics of soils 4. Practice working as a team member and lead a team 5. Demonstrateprofessionalbehaviour in conductingthe experiments and presenting the results effectively.

LIST OF EXPERIMENTS

DETERMINATION OF INDEX PROPERTIES:

1. Determination of Specific Gravity of soil solids using “Density bottle” method.
2. Determination of Specific Gravity & water content using “Pycnometer” method.
3. Determination of Liquid limit using Casgrande’s and Cone Penetration standard LL device.
4. Determination of Shrinkage and Plastic limits
5. Sieve Analysis including Hydrometer Analysis for plotting Particle size distribution curve
6. Determination of Field Density using Core cutter Method
7. Determination of Field Density using Sand Replacement Method

DETERMINATION OF ENGINEERING PROPERTIES

8. Determination of Compaction Characteristics by Standard Proctor test
9. Determination of Laboratory California Bearing Ratio (CBR) value
10. Determination of Co-efficient of Permeability by Constant Head Permeameter test and Variable Head Permeameter tests
11. Swell pressure test on expansive soils
12. Determination of shear strength parameters by Direct Shear Test
13. Determination of Shear Strength of Cohesive soils by “vane shear test”
14. Determination of Shear Strength by conducting “Triaxial Shear Test”
15. Consolidometer

DEMONSTRATION OF TEST PROCEDURES:

16. Standard Penetration Test

Learning Resources:

1. http://eerc02-iiith.virtual-labs.ac.in/
2. http://home.iitk.ac.in/~madhav/geolab.html

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

CONCRETE TECHNOLOGY LAB
SYLLABUS FOR BE V-SEMESTER

Instruction	:	2 period per Week	Semester End Exam	:	50	Subject Reference Code	:	PC571CE
Credits	:	1	Sessional Marks	:	25	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Determine the physical properties of cement, fine aggregate and coarse aggregate 2. Determine workability of concrete 3. Determine the strength of concrete using destructive and non-destructive methods	1. Determine the physical properties of cement, fine aggregate and coarse aggregate 2. Determine the workability of concrete 3. Determine the compressive strength using destructive and non-destructive methods and flexural strength by destructive method. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS I.TESTS ON CEMENT:

I TESTS ON CEMENT

1 (a) Specific gravity of cement.
(b) Unit weight or bulk density of cement.
2 Normal consistency of cement.
3 (a) Initial setting time of cement
(b) Final setting time of cement
(c) Fineness of cement by sieving
4 Compressive strength of cement

II TESTS ON AGGREGATE:

5 Silt content of sand.
6 (a) Specific gravity of fine aggregate.
(b) Bulk density of fine aggregate.
7 (a) Specific gravity of coarse aggregate.
(b) Bulk density of coarse aggregate.
8 Bulking of sand by laboratory method.
9 Bulking of sand by field method.
10 Fineness modulus of fine aggregate.
11 Fineness modulus of coarse aggregate.

III TESTS ON CONCRETE

12 Workability of concrete by slump test
13 Workability of concrete by compacting factor test
14 Compressive strength of concrete
15 Flexural strength of concrete

IV EXPERIMENTS FORDEMONSTRATION ONLY

16 Fineness of cement by Blain's air permeability method
17 Non-Destructive Testing of Concrete Structures.
18 Workability of concrete by Flow test
19 Workability of concrete by Vee-Bee test.

Learning Resources:

1. IS: 269-1989, Indian Standard Code of Practice for Ordinary Portland Cement, 33 Grade – Specifications (Fourth Revision), Bureau of Indian Standards, New Delhi
2. IS: 8112-1989, Indian Standard Code of Practice for 43 Grade Ordinary Portland Cement – Specifications (First Revision), Bureau of Indian Standards, New Delhi
3. IS: 12269-1987, Indian Standard Code of Practice for Ordinary Portland Cement, 53 Grade – pecifications, Bureau of Indian Standards, New Delhi
4. IS: 650-1991, Indian Standard Code of Practice for Standard Sand for Testing Cement – Specifications (Second Revision), Bureau of Indian Standards, New Delhi
5. IS: 2386 (Part-III) -1963, Indian Standard Methods of Test for Aggregates for Concrete, Bureau of Indian Standards, New Delhi
6. IS: 1199-1959, Indian Standard Methods of Sampling and Analysis of Concrete, Bureau of Indian Standards, New Delhi
7. IS: 516-1959, Indian Standard Methods of Tests for Strength of Concrete, Bureau of Indian Standards, New Delhi
8. IS: 13311 (Part-1)-1992, Indian Standard Non-Destructive Testing of Concrete – Methods of Test, Part-1 Ultrasonic Pulse Velocity, Bureau of Indian Standards, New Delhi
9. IS: 13311 (Part-2)-1992, Indian Standard Non-Destructive Testing of Concrete – Methods of Test, Part-2 Rebound Hammer, Bureau of Indian Standards, New Delhi
10. IS: 4031(Part-2)-1999, Indian Standard Methods of Physical Tests for Hydraulic Cement, Determination of Fineness by Blaine Air Permeability Method, Bureau of Indian Standards, New Delhi

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

MINI PROJECT: SURVEYING CAMP
SYLLABUS FOR BE V-SEMESTER

Instruction	:	-	Semester End Exam	:	-	Subject Reference Code	:	PW519CE
Credits	:	1	Sessional Marks	:	50	Duration of Sem. End Exam	:	-

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
1. Field exercises with modern surveying equipment including GPS and Total Station. 2. All aspects of executing and plotting of field surveys 3. Capturing topographical features	1. Measure the topographical features using advanced surveying instruments such as total station and GPS 2. Plot the data obtained in the field through mapping software like QGIS / ArcGIS 3. Interpret the need for accurate and thorough note taking process in the field work to serve as a legal record. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

Course Content:

A one week (6 days, 36 hours) surveying camp shall be organized in the intervening period between the completion of the IV semester and the commencement of V semester.

The work has to be graded for 50 Sessional marks by a committee consisting of the Head of the Department and 2 - 3 senior faculty members.

The surveying camp shall expose the students to all the aspects of planning, organizing and conducting a field survey, and plotting of the same.

VI-SEMESTER

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION FOR BE VI-SEMESTER w.e.f. 2018-19 (CBCS)
(Students admitted in 2016-17)

Subject Code	VI- SEMESTER								Credits
	Subject Name	Instruction Hours per week				Examination			
		L	T	D	P	Duration	Max. Marks		
	Theory					Hours	SEE	CIE	
PC610CE	Reinforced Concrete Design – II	3	1	0	0	3	70	30	3
PC620CE	Theory of Structures-II	3	1	0	0	3	70	30	3
PC630CE	Highway Engineering	3	1	0	0	3	70	30	3
PC640CE	Design of Steel Structures	3	1	0	0	3	70	30	3
PC650CE	Hydrology and Water Resources Engineering	3	0	0	0	3	70	30	3
OE610XX	Open Elective – VI	1	0	0	0	2	35	15	1
OE620XX	Open Elective – VII	2	0	0	0	3	70	30	2
MC600EH	FS : IV - Soft Skills	1	1	0	0	2	50	30	1
MC600CE	FS : IV –Campus Recruitment Training	1	1	0	0	2	50	30	1
LABS									
PC661CE	Transportation Engineering Lab	0	0	0	2	3	50	25	1
PC671CE	Computer Applications-I Lab	0	0	0	2	3	50	25	1
PC681CE	Environmental Engineering Lab	0	0	0	2	3	50	25	1
Total		**20**	**6**	**0**	**6**		**705**	**330**	**23**
Grand Total		**32**					**1035**		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

REINFORCED CONCRETE DESIGN – II
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	3+1 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC610CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
1. Design codes of practice for Reinforced Concrete 2. Design of concrete structures viz., combined footing, retaining walls, water tanks and bridges as per standard codes of practice	1. Design rectangular combined footing and understand the principles of design of trapezoidal footing with limit state method according to IS456: 2000. 2. Analyse and design cantilever and counter fort retaining walls for different load conditions with limit state method according to IS456: 2000. 3. Analyse and design water tanks, resting on ground and overhead water tanks according to IS3370: 2009. 4. Understand IRC loadings for the analysis of bridges according to IRC5: 2000 and IRC6: 2000. 5. Design Slab bridge and T-beam bridge with IRC loadings according to IRC21: 2000.

UNIT-I
Introduction : Principles of slender columns and Flat slabs

Combined Footing and Retaining walls: Limit state design & detailing of combined rectangular footing and principles of design of trapezoidal footing. Limit state design & detailing of cantilever and counter fort retaining walls subjected to different earth pressure conditions.

UNIT-II
Water Tanks: Elastic Design & Detailing for RCC circular and rectangular ground level and over-head water tanks-Design of staging. Principles of Design of Intze tanks.

UNIT-III
Bridges: IRC loadings; Elastic design and detailing of two lane, simply supported RC Slab Bridge using effective width method. Elastic design and detailing of two lane, simply supported RC T-beam bridge using effective width method, Pigeaud's method and Courbon's method.

Learning Resources:

1.Krishna Raju N., "Structural Design and Drawing – Reinforced Concrete and Steel", Orient Blackswan Pvt Ltd, 2009
2.Krishna Raju N., "Design of Bridges", Oxford & IBH Publication Company, 2008.
3.Jagadeesh T.R. and Jayaram M.A, "Design of Bridge Structures", PHI Learning Private Limited, 2014
4.Bhavikatti S.S., "Advanced R.C.C. Design", Volume-II, New Age International, 2016.
5.Shah H.J., "Reinforced Concrete", Volume-II, Charotar Publishing House, 2012.
6.Punmia B.C., Ashok k Jain, Arun K Jain, "Limit State Design of Reinforced Concrete", Laxmi Publications, 2012.
7.Krishna Raju N., "Advanced Reinforced Concrete Design", CBS Publishers, 2016.
8.IS:456-2000, Code of Practice for Plain and Reinforced concrete, Bureau of Indian Standards, New Delhi, India.
9.IS:3370-2009, Part I and Part IICode of Practice for Concrete Structures for Storage of Liquids, Bureau of Indian Standards, New Delhi, India.

10.IRC 5- 2000, Standard specification and code of practice for road bridges, Section I, General Features of Design, IRC, New Delhi, India.
11.IRC 6- 2000, Standard specification and code of practice for road bridges, Section II, Loads and Stresses, IRC, New Delhi, India.
12.IRC 21- 2000, Standard specification and code of practice for road bridges, Section III, Cement Concrete (Plain and Reinforced), IRC, New Delhi, India.
13.SP 34: Handbook on Concrete Reinforcement and Detailing (With Amendment 1), Bureau of Indian Standards,New Delhi, India
14.IS: 875-1987 Code of Practice For Design Loads (Other Than Earthquake)For Buildings And Structures Parts (1,2,3,4&5), Bureau of Indian Standards, New Delhi, India

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

THEORY OF STRUCTURES - II
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	3+1 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC620CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Explain the use of influence line diagrams in the analysis of simply supported beams and trusses subjected to moving loads. 2. Analyze beams and frames using flexibility method and stiffness method, and to develop element stiffness matrices and assembly of global stiffness matrices.	1. Perform analysis of simply supported beam subjected to moving loads using influence line diagrams 2. Compute forces in the members of the trusses subjected dead load & live load using influence line diagrams 3. Apply flexibility method for analysis of beams and frames with degree of indeterminacy not exceeding three 4. Explain the principles of analysis of structures subjected to external forces using stiffness method. 5. Analyse the structures subjected to external loads by developing element stiffness matrices, assembly of global stiffness matrices and load matrices.

UNIT-I

Moving loads and influence line diagrams: Influence lines for reaction, bending moment and shear force. Determination of maximum bending moment and shear force for moving load systems on simply supported girders, Curves of maximum bending moment and shear force for simply supported girders traversed, by (i) single point load, (ii) two point loads, (iii) uniformly distributed load longer than span, and (iv) uniformly distributed load shorter than span, enveloping parabola and EUDLL.

UNIT-II

Moving loads on trusses and arches: Influence lines for forces in members of statically determinate trusses under moving loads (warren truss and Pratt truss). Influence line diagrams for three hinged parabolic arches.

UNIT-III

Flexibility & Stiffness Methods of Analysis: Analysis of continuous beams, pin jointed plane trusses, rigid jointed plane frames with static indeterminacy not exceeding three with flexibility method. Introduction to stiffness method

UNIT-IV

Direct Stiffness Method - I: Development of element stiffness matrices for bar and truss elements Transformation matrices, assembly of global stiffness matrices and load matrices. Finding displacements and member end action matrices. Initial stresses and strains.

UNIT-V

Direct Stiffness Method-II: Development of element stiffness matrices for beam and plane frame elements. Transformation matrices, assembly of global stiffness matrices and load matrices. Finding displacements and member end action matrices.

Learning Resources:

1. Vazirani V.N., Ratwani M.M, Duggal S.K., “Analysis of Structures - Vol. II Theory, Design and Details of Structures”, Khanna Publishers, 16th Edition, 2015.
2. Thandavamoorthy T.S., “Structural Analysis”, Oxford Higher Education, Second Edition, 2012.
3. Weaver and Gere, “Matrix Analysis of Framed Structures”, CBS Publisher, 2004
4. Ramamrutham S., Narayan R., “Theory of Structures”, Dhanpath Rai publications, 2014
5. Devdas Menon, "Structural Analysis", 1st Edition, Narosa Book Distributors Pvt Ltd,2014.
6. Reddy C.S., "Basic Structural Analysis", 3rd Edition, Mc Graw Hill, 2010.
7. Junarkar S.B., Shah, “Mechanics of Structures”, Volume II, Charotar Pub. House, 2010.
8. Chu-Kia Wang, “Intermediate Structural Analysis (English) 1st Edition”, McGraw Hill Education, 2010.
9. Hibbeler R.C., “Structural Analysis”, 8/E, Prentice Hall, Higher Education, 2012.
10. Louis F. Geschwindner, Harry H. West, "Fundamentals of Structural Analysis", 2nd Edition, Wiley India Pvt. Ltd., 2011.
12. Stephen P. Timoshenko and Donovan H. Young “ Theory of Structures” McGraw Hill International Edition, 1968
13. http://nptel.ac.in/courses/105101086/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

HIGHWAY ENGINEERING
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	3+1 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC630CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1.To provide basic knowledge in transportation so that students can understand and solve transportation related problems and design for highway mode of transportation with focus on highway users' characteristics, geometric and pavement design, traffic engineering, and pavement construction / maintenance 2.Evaluate the fundamental theories and methods of traffic and transportation engineering, including traffic flow fundamentals, geometric design of highways, and pavement design.	1. Given the basic information on geometrical features, design horizontal and vertical alignment of highways/roads complying with IRC standards. 2. Compute key elements of traffic, present and analyse traffic data for solving mobility issues 3. Develop a survey plan for a transportation problem and identify the traffic studies to be carried out to solve urban traffic problems. 4. Characterize the highway materials used for road construction based on quality control tests and develop a job mix formula for the given materials in field using Rothfuch method. 5. Design flexible and rigid pavements for National highways as per IRC guidelines 6. Employ various construction techniques adopted in field, identify the causes of various pavement failures and suggest remedies.

UNIT-I : HIGHWAY CLASSIFICATION, ALIGNMENT AND GEOMETRIC DESIGN
Introduction, Highway development in India, Functional classification of roads as per IRC, Road patterns,
Highway alignment – Requirements and factors controlling alignment of roads – Factors governing geometric design ,
Highway cross-sectional elements – Carriageway, Shoulders, Medians, Right of way, Footpaths, Bus bays, Cycle tracks, Service roads, Camber. Sight distances – Stopping and overtaking sight distance.
Design of horizontal alignment – Speed, radius, super elevation, extra widening, transition curves.
Design of vertical alignment – gradient, grade compensation, summit curves and valley curves

UNIT-II : TRAFFIC ENGINEERING
Basic traffic characteristics – Volume, speed, density, headways and relationships amongst them.
Traffic studies - Objectives of traffic studies, Methods of data collection and presentation of various traffic studies such as volume studies, speed studies, speed and delay studies, origin destination studies, intersection delay studies, parking studies, accident studies. Highway capacity and Level of service concepts as per HCM.
Traffic regulation and control – Traffic signs, signals, markings and channelization. Principles of design of at-grade intersections – Simple layouts. Design of isolated signal by Webster and IRC method. Introduction to grade separated interchanges.

UNIT-III : PAVEMENT MATERIAL CHARACTERISATION
Types of pavements and materials for pavements.
Aggregates – characterizing the physical, mechanical and shape related properties of aggregate particles, durability tests and stripping tests, Blending of aggregates and job mix formula by Rothfuch method and 0.45 power gradation.
Binders – Types of paving binders – bitumen, cutbacks and emulsions, modified binders, characterization of bituminous binders : flash and fire point test, penetration test, softening point test, ductility test, Fraass breaking point test, viscosity test , Specific gravity test , elastic recovery test, separation test, simulation of short term aging using RTFOT, simulation of long term aging using PAV. Gradation of bitumen - penetration grading, Viscosity grading and performance grading. Bituminous mixture design by Marshall / Modified Marshall stability test, MS-2 procedure of computing volumetrics.

UNIT-IV : PAVEMENT DESIGN
Factors affecting pavement design –Traffic, soils and materials
Flexible pavement design using IRC 37:2012.
Rigid pavement design using IRC 58: 2015, Introduction to expansion , contraction, construction and longitudinal joints for jointed plain cement concrete pavements

UNIT-V: PAVEMENT CONSTRUCTION AND MAINTENANCE
Pavement construction - Construction of Water bound Macadam, Wet Mix Macadam and Granular sub base layers. Construction of Dense Bituminous macadam, Bituminous Macadam, Bituminous Concrete, Open Graded Premix Carpet, Mix Seal Surfacing, prime coat, tack coat, seal coat as per MORTH specifications, Introduction to recycled pavements.
Pavement failures and maintenance - Pavement failures – types, causes and remedies, Maintenance of bituminous pavements.

Learning Resources:

1. Khanna S.K., Justo C.E.G., Veeraraghavan A., "Highway Engineering", 10th Edition, Nem Chand & Bros, 2015
2. Kadiyali L.R., Traffic Engineering and Transportation Planning, Khanna Publishers, 2016.
3. Nicholas J. Garber Lester A. Hoel, Traffic and Highway Engineering- III edition, Cengage publication Indian edition 2006.
4. Yoder E.J., Witczak M.W., Principles of Pavement Design, John Wiley & Sons –Indian edition. 2008
5. Srinivasa Kumar R., Pavement design, Orient Blackswan Pvt. Ltd., New Delhi, 2013
6. IRC:37 : 2012 : Tentative guidelines for the design of flexible pavements
7. IRC 58 :2015: Guidelines for the design of plain jointed rigid pavements
8. IRC MORT&H- Specifications for road and bridge works, 2013 (Fifth Revision)
9. IRC 35 -2015 (Road markings), IRC 38 -1988 (Horizontal curves), IRC 53 -2012 (Accident forms), IRC 67 -2012 (Road signs), IRC:82-2015 (Maintenance of BT roads), IRC:86-1983 (geometric design standards), IRC:93-1985 (traffic signals), IRC:106-1990 (capacity), IRC:SP:23-1983 (vertical curves), IRC:SP:41-1994 (at-grade intersection)
10. MS-2 Manual by Asphalt institute
11. www.pavementinteractive.org
12. http://nptel.ac.in/courses/105105107/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

DESIGN OF STEEL STRUCTURES
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	3+1 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC640CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Understand the design philosophies of steel structures. 2. Design the bolted connections, welded connections including detailing, tension members, compression members and beams by limit state design as per IS: 800- 2007. 3. Estimate the loads on roof trusses and design the members of roof truss.	1. Compare the different design philosophies and employ limit state design in the design of structural elements using appropriate rolled steel sections like I-Section, channel sections, Angle sections and built up sections according to IS: 800-2007 2. Design bolted connection using block bolts and welded connections using fillet welds, groove welds subjected to concentric tensile loads by limit state method according to IS:800-2007 3. Design Tension members, compression members, and beams, using limit state design according to IS:800-2007 4. Estimate loads on roof trusses subjected to different load combinations and design purlins, members of truss using angle sections by limit state according to IS: 800-2007

UNIT-I

Materials and Specifications (Limit State Design): Chemical composition of steel, types of Structural Steel – classification of Rolled Steel Sections.

Design Philosophies: Elastic or working stress design, plastic or limit design and limit state design

Introduction to Limit State Design: Loads & load combinations, characteristic loads, design loads, design strength, partial safety factors for materials and loads.

Bolted Connections: Types of bolts, types of bolted joints, load transfer mechanism, modes of failure of bolted joints, design of bolted joints using ordinary black bolts for concentric loads. High strength friction grip bolts.

Welded Connections: Types of welds, types of welded joints, design of welded joints for concentric loads using fillet welds and butt welds.

UNIT-II

Design of Tension Members (Limit State Design): Introduction to tension members - applications of tension members, modes of failure, design of tension members – design of lug angles, tension splices - staggered bolting

Design of Compression Members (Limit State Design): Introduction, sections used for compression members. Effective length of compression members, slenderness ratio, types of buckling, design of compression members for axial loads with single section and built-up sections (symmetric in both directions), lacing and battening

UNIT-III

Design of Columns under combined axial load and moment. Design of Column splices.

Design of Column Bases: Design of slab base and gusseted base for axial load

UNIT-IV

Design of Beams (Limit State Design): Introduction to plastic analysis - plastic hinge, plastic moment, shape factor. Classification of cross sections, phenomenon of lateral torsional buckling; design of laterally restrained beams.

Secondary considerations : Check for web crippling, web buckling & deflection.
Introduction to Design of laterally unrestrained beams.

UNIT-V

Design of Roof trusses (Limit State Design): Types of trusses, estimation of loads - dead load, live load and wind load, design of purlins, analysis of roof trusses and design of its members with angle sections. Bracings of roof trusses.

Learning Resources:

1. Duggal S.K., "Design of Steel Structures", 2nd Edition, Tata McGraw Hill Publishing, 2014
2. Gambhir M.L., "Fundamentals of Structural Steel Design", McGraw Hill Education (India) Pvt. Ltd., New Delhi, 2013
3. Bhavikatti S.S., "Design of steel Structures", 4th Edition, I.K. International Publishing House Pvt. Ltd. 2014.
4. Subramanian N, "Design of Steel Structures", Oxford University Press, 2011.
5. IS: 800-2007: Code of Practice for General Construction in Steel, Bureau of Indian Standards, New Delhi
6. IS: 875-1987: Code of Practice for Design loads for buildings and structures, Bureau of Indian Standards, New Delhi
7. ISI Handbook No. 1 or Steel Tables by Bhavikatti S.S.
8. http://nptel.ac.in/courses/105103094/
9. www.steel-insdag.org

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

HYDROLOGY AND WATER RESOURCES ENGINEERING
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	3 period per Week	Semester End Exam	:	70	Subject Reference Code	:	PC650CE
Credits	:	3	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Describe the various aspects of reservoirs, types and functions of spill ways and energy dissipators. 2. Learn issues related to ground water flow 3. Compute rainfall, runoff and estimate floods in a catchment area.	1. Estimate floods, rainfall and runoff using different methods for peak flow estimation and plotting hydrograph 2. Explain parameters related to ground water flow and derive equations for steady, unsteady flow and yield of well 3. Estimate the capacity of reservoir incorporating sedimentation for computing life of reservoir. 4. Perform stability analysis on gravity dam for evaluating safety of the dam. 5. Evaluate the factors leading to the assessment of water power potential and layout of a hydel plant

UNIT-I

Precipitation: Hydrologic cycle, measurement of rainfall, estimation of mean rainfall over a catchment, infiltration, evaporation, runoff, factors affecting runoff, peak flow estimation, Unit Hydrograph, S-Hydrograph and variations.

UNIT-II

Ground Water Hydrology: Zoning of subsurface, Aquifer properties affecting ground water, well Hydraulics - Steady radial flow in to a well in confined and un confined aquifers, Unsteady flow into a confined aquifer, spacing of wells, well loss, yield of a well, Constant level pumping and recuperation test.

UNIT-III

Reservoir Planning: Selection of site, zones of storage in a reservoir, storage capacity analysis, Reservoir sedimentation, Flood routing through retarding basin, Estimation of life of a reservior

UNIT-IV

Storage Head Works: Types of dams, advantages & disadvantages, selection criteria, economical height of the dam, gravity dam, forces acting on dam, stability analysis, elementary profile and practical profile, low and high gravity dams.

UNIT-V

Water Power Engineering: Demand and generation, different heads, load factor, capacity factor and utilization factor , Assessment of water power potential, primary and secondary power, components and types of Hydel plants, Pen stocks & Surge Tanks, Power house layout, components and their functions.

Learning Resources:

1. Modi P.N. “Irrigation Water Resources and Water Power Engineering”, standard Book house, New Delhi, 2008
2. Garg S.K., “Irrigation Engineering & Hydralic Structures”, Khanna Publishers, 2009
3. Dandekar & Sarma, Water Power Engineering, Vikas Publishers, 2009
4. http://nptel.ac.in/courses/105104103/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

FINISHING SCHOOL-IV (SOFT SKILLS)
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	1+1 period per Week	Semester End Exam	:	50	Subject Reference Code	:	MC600EH
Credits	:	1	Sessional Marks	:	30	Duration of Sem. End Exam	:	2 Hrs

Course Objective:	**Course Outcomes**
The objectives of the course are to	*Upon the completion of the course, students are*
This course aims at enhancing the employability skills. Students will be trained in higher order thinking skills including analytical skills, problem solving skills and critical & logical reasoning skills. Students will be trained to work systematically and develop logical and analytical thinking. Students will be trained in the following areas 1. Critical and Non verbal reasoning 2. Pure Maths 3. Verbal ability 4. Logical reasoning 5. Data Interpretation and Analysis	1.Understand the fundamentals concepts of Aptitude and verbal skills 2.Solve questions using short cuts and smart methods 3.Perform calculations with speed and accuracy 4. Develop Analytical thinking and problem solving skills

UNIT 1 VERBAL ABILITY Finding errors

- Vocabulary
- Synonyms
- Antonyms
- Idioms and Phrases
- Fill in the blanks and sentence Jumbles
- Reading comprehension

UNIT 2 LOGICAL REASONING

- Logical Reasoning
- Assignments
- Puzzles
- Blood relations
- Syllogisms

UNIT 3 CRITICAL AND NON VERBAL REASONING

- Critical Reasoning
- Non verbal reasoning
- Figure series and completions

UNIT 4 QUANTITATIVE APTITUDE - PURE MATHS

- Pure maths
- Algebra
- Probability
- Permutations and combinations

UNIT 5 DATA INTERPRETATION AND ANALYSIS

- Data Interpretation
- Line graph
- Pie chart
- Tabulation

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

FINISHING SCHOOL-IV (CAMPUS RECRUITMENT TRAINING)
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	1+1 period per Week	Semester End Exam	:	50	Subject Reference Code	:	MC600CE
Credits	:	1	Sessional Marks	:	30	Duration of Sem. End Exam	:	2 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
1. Software package on construction management technology 2. Element wise assembling the parts of a building.	1. Plan, execute and monitor large scale projects execution using Oracle Primavera. 2. Execute Exterior designing plans and graphs of building by using Revit Architecture

Primavera

UNIT-I

- Training on Installation and setup
- Introduction to project management
- Introduction to primavera
- Enterprise project structure (EPS)

UNIT-II

- Organisational breakdown structure
- Project codes and values
- Global and project calendars
- Adding a project (W/O project architect)
- Work breakdown structure (WBS)

UNIT-III

- Budget and establishing spending plan
- Activity codes and values
- Work products and documents
- Activities, relationships and scheduling
- Constraints

UNIT-IV

- Grouping and filtering activities
- Bars and layouts
- Resources, roles and costs
- Baseline plan

UNIT-V

- Monitoring the current schedule
- Threshold monitoring and issues
- Project tracking and reports
- Role plays and Use cases discussion

Revit Architectures

- Project Units
- Levels
- Walls
- Basic Wall creation
- Basic creation of Plan

- Wall
- Compound Wall
- Modify Wall
- Stacked Wall
- Wall Opening

- Door
- Window
- Floor
- Ceiling
- Roof
- Components

- 3D modelling
- Stair
- Railing

- Views
- Section View
- Elevation View
- Camera View
- Visualization
- Rendering
- Walkthrough
- Print

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

TRANSPORTATION ENGINEERING LAB
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	2 periods per Week	Semester End Exam	:	50	Subject Reference Code	:	PC661CE
Credits	:	1	Sessional Marks	:	25	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Impart basic knowledge to carry out quality control lab tests for roads in highway engineering practice. 2. Conduct quality control in road construction as per standards and introduce the concepts of design mix 3. Conduct traffic studies and present the data for transportation engineering applications	1. Perform experiments on aggregates and bitumen on their suitability for road construction 2. Understand basic traffic studies for transportation planning and design. 3. Conduct tests on job mix formula and Marshall stability 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS

A) Tests on road aggregates

1. Aggregate crushing value test
2. Los Angeles abrasion test
3. Aggregate impact value test
4. Aggregate shape test (flakiness & elongation)
5. Water absorption & Specific gravity of Aggregate
6. Job mix formula by Rothfuch Method

B) Tests on bitumen

7. Penetration Test
8. Ductility Test
9. Elastic Recovery Test
10. Softening point Test
11. Specific gravity Test
12. Viscosity Test
13. Flash and fire point Test

C) Traffic Studies

14. Classified Traffic volume study at mid blocks
15. Spot Speed Study
16. Origin & Destination studies

D) Miscellaneous Tests (demonstration only)

18. Bitumen extraction test
19. Design of Bitumen mixture by Marshall stability test

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

COMPUTER APPLICATIONS -I LAB
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	2 period per Week	Semester End Exam	:	50	Subject Reference Code	:	PC671CE
Credits	:	1	Sessional Marks	:	25	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Use a structural Design software for analysis and design of RCC and Steel Structures.	1. Perform analysis and design of RCC beams and frames subjected to various loads using a structural design software. 2. Design of G + 2 residential building subjected to dead load and live load combination using software. 3. Design an RCC multi-storeyed building subjected to DL, LL and wind load combination using software. 4. Perform analysis and design of an RCC multi-storeyed building subjected to DL, LL, WL and seismic load combination using software 5. Perform analysis and design of steel trusses and frames subjected to various loads using software.

LIST OF EXPERIMENTS

Introduction of a structural analysis and design software for the design of RCC and Steel structures:

RCC Design:

Perform analysis and design of:

1. Beams
2. Plane frames
3. Space frames
4. G+2 residential building
5. Wind analysis of multistoried structures
6. Seismic analysis of multi-storeyed structures

Steel Design:

Perform analysis and design of:

7. Trusses
8. Frames

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

ENVIRONMENTAL ENGINEERING LAB
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	2 period per Week	Semester End Exam	:	50	Subject Reference Code	:	PC681CE
Credits	:	1	Sessional Marks	:	25	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Familiarize with the procedures of water quality analysis. 2. Estimate the Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) for sewage samples. 3. Calculate the coagulant dosage for reduction of turbidity and disinfection dosage. 4. Practice working of flame photometer.	1. Analyse the water samples for the determination of alkalinity, hardness, chlorides, calcium, pH, contents of sodium and potassium in water using flame photometer, total dissolved solids and turbidity. 2. Estimate the Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) in sewage samples. 3. Calculate the coagulant dosage for reducing the turbidity and disinfection dosage. 4. Practice working as a team member and lead a team 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively

LIST OF EXPERIMENTS

1. Determination of Alkalinity.
2. Determination of Hardness.
3. Determination of Chlorides.
4. Determination of Acidity.
5. Determination of Variation of pH.
6. Determination of Dissolved Oxygen
7. Determination of Biochemical Oxygen Demand (B.O.D.)
8. Determination of total dissolved solids
9. Determination of residual chlorine.
10. Determination of turbidity
11. Determination of coagulant dose – Jar test.
12. Determination of Chemical Oxygen Demand (C.O.D.)
13. Determination of Sodium & Potassium present in water using flame photometer (Demonstration).

OPEN ELECTIVE SUBJECTS

One credit

1. Environmental Impact Assessment
2. Remote Sensing
3. Intelligent Transportation System

Two Credit

1. Global Positioning Systems
2. Project Management
3. Integrated Solid Waste Management

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

Environmental Impact Assessment
(Open Elective – IV)
SYLLABUS FOR BE V-SEMESTER

Instruction	:	1 period per Week	Semester End Exam	:	50	Subject Reference Code	:	
Credits	:	1	Sessional Marks	:	30	Duration of Sem. End Exam	:	2 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
1. The issues, impact and management plan due to Environmental of the project	1. Apprise the need, legal provisions and methods of Environmental Impact Assessment 2. Predict the impact and prepare the management plan for Environmental issues of the project

UNIT-I

Environmental Impact Assessment: Need for environmental impact assessment (EIA), objectives of EIA. EIA capabilities and limitations. Legal provisions of EIA. Methods of EIA, base line data collection required for EIA

UNIT-II

Evaluation of impacts: Prediction of impacts. Preparation of Environmental Management Plan, preparation of EIAs of road project, Industry, and dam. Issues related to rehabilitation of affected people, Preparation of Environmental impact statement and Environment management plan.

Learning Resources:

1. Peavy and Rowe, *Environmental Engineering*, McGraw Hill Publications.
2. Keiley, *Environmental Engineering*, McGraw Hill Publishers, 2003.
3. Sincero and Sincere, *Environmental Engineering*, Prentice Hall of India.

Online Resources

1.http://nptel.ac.in/courses/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

REMOTE SENSING
Open Elective – IV (to other branches)
SYLLABUS FOR B.E. V-SEMESTER

Instruction	:	1period per Week	Semester End Exam	:	35	Subject Reference Code	:	OE3XXCE
Credits	:	1	Sessional Marks	:	15	Duration of Sem. End Exam	:	3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to	*Upon the completion of the course, students are expected to*
1. Provide fundamental knowledge on geo spatial technology such as remote sensing	1. Explain the basic principles of remote sensing to analyse the surface featureson the Earth. 2. Describe the characteristics of satellites, platforms & sensors used in acquisition of remote sensing data required for further processing. 3. Identify and correct the remotely sensed data for atmospheric, radiometric and geometric errors to produce a high quality image. 4. Apply the principles and techniques of remote sensing to solve various problems in engineering field.

UNIT-I

Introduction: Definition, Elements of remote sensing, Physics of remote sensing, Sources of Energy, Active and Passive Radiation, Types of remote sensing, Electromagnetic spectrum and radiation, Interaction with Atmosphere, Atmospheric windows, Spectral reflectance of Earth's surface features

Data Acquisition: Satellite orbits and characteristics, various types of platforms,Sensor types & characteristics, Types of resolution-spatial, spectral, radiometric &temporal

UNIT-II

Data Pre-processing: Atmospheric errors and removal, Radiometric corrections, Geometric corrections, Geo-referencing, re-sampling methods - Basic Principles of Visual Interpretation

Applications: Applications of optical remote sensing techniques in various fields of Engineering

Learning Resources:

1. Anji ReddyM., Remote Sensing and Geographic Information System, 2012 .
2. John A. Richards, Remote sensing Digital Image Analysis, 2012

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

OPEN ELECTIVE
INTELLIGENT TRANSPORTATION SYSTEMS
SYLLABUS FOR B.E. V-SEMESTER

Instruction	:	1 period per Week	Sem. End Exam	:		Subject Reference Code	:	
Credits	:	1	Sessional Marks	:		Duration of Sem End Exam	:	

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to	*Upon the completion of the course, students are expected to*
1. Impart knowledge on advanced transportation concepts in the field ITS.	1. Explain the concepts of ITS 2. Characterize the ITS functional areas for transportation planning.

UNIT 1:

Introduction to Intelligent Transportation Systems (ITS): Definition of ITS and Identification of ITS Objectives, Historical Background, Benefits of ITS - ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), video data collection, ITS architecture framework.

UNIT 2:

ITS functional areas – Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control Systems (AVCS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS)

Suggested Books:

1. ITS Hand Book 2000: Recommendations for World Road Association (PIARC) by Kan Paul Chen, John Miles.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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GLOBAL POSITIONING SYSTEM
Open Elective – I (to other branches)
SYLLABUS FOR B.E. V–SEMESTER

Instruction	:	1period per Week	Semester End Exam	:	70	Subject Reference Code	:	OE3XXCE
Credits	:	1	Sessional Marks	:	30	Duration of Sem. End Exam	:	3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to	*Upon the completion of the course, students are expected to*
1. To provide fundamental knowledge on geo spatial technology such as GPS	1. Describe the fundamental theory and concepts of the Global Positioning System to provide 3D positioning with great accuracy. 2. Compute errors and biases in GPS measurements and apply necessary corrections to obtain accuracyas per the user specifications. 3. Describe the differences between point and relative GPS positioning, DGPS and RTK surveys used to obtain GPS measurements in the field.

UNIT-I

Overview of GNSS and Introduction to GPS, GLONASS, GALILEO, COMPASS, IRNSS systems

GPS: Basic concepts, Functional system of GPS – Space segment, control segment and user segment, Working principle of GPS, Signal structure and code modulation, Pseudo-range measurements and navigation position

UNIT-II

Errors and biases in GPS measurements, Accuracy of navigation position: UERE and DOP, Intentional degradation of GPS signals: Selective availability (SA) and Anti-spoofing (AS)
Differential GPS: Space based augmentation systems (e.g., SBAS, GAGAN) and Ground based augmentation systems (e.g., WASS, EGNOS) GNSS applications: GIS and GPS integration

Learning Resources:

1. Leick, A., GPS Satellite Survey, John Wiley: NJ, 2015
2. Hofmann, B., Lichtenegger H. and Collins J., Global Positioning System: Theory and Practice, Springer: Berlin, 2011.
3. Hofmann-Wellenhof, Bernhard, Lichtenegger, Herbert, Wasle, Elmar, GNSS – GPS, GLONASS, Galileo and more, 2013.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

PROJECT MANAGEMENT
Open Elective - V
SYLLABUS FOR BE V-SEMESTER

Instruction	:	2 period per Week	Semester End Exam	:	70	Subject Reference Code	:	
Credits	:	2	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Learn the concept of project management along with functions and objectives. 2. Understand the various techniques used for project planning such as bar charts, CPM, PERT and crashing of networks. 3. Acquire knowledge on various types of contracts, tenders.	1. Understand the objectives, functions and principles of management in projects. 2. Practice the network techniques like CPM and PERT for better planning and scheduling of engineering works. 3. Analyse the importance of cost and time in network analysis and planning the work accordingly. 4. Knowledge on Contracts, Tenders, and Work orders related to the projects.

UNIT-I
Significance of Project Management: Objectives and functions of project management, management team, principles of organization and types of organisation.

UNIT-II
Project Planning: Project Planning, bar charts, network techniques in project management - CPM and PERT.

UNIT-III
Time Estimate: Expected likely, pessimistic and optimistic time, normal distribution curve and network problems.
Time Cost Analysis: Cost time analysis in network planning, updating

UNIT-IV
Contracts: Introduction, types of contracts and their advantages and disadvantages, conditions of contracts, Introduction to Indian contract act.
Tender: Tender form, Tender Documents, Tender Notice, Work Order.

Learning Resources:
1. Srinath L.S., PERT and CPM: Principles and Application, East-West Press, 1975.
2. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2009
3. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 1990.
4. http://nptel.ac.in/courses/

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

INTEGRATED SOLID WASTE MANAGEMENT
(Open Elective – VII)
SYLLABUS FOR BE VI-SEMESTER

Instruction	:	2 period per Week	Semester End Exam	:	70	Subject Reference Code	:	
Credits	:	2	Sessional Marks	:	30	Duration of Sem. End Exam	:	3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	*Upon the completion of the course, students are expected to*
1. Integrate technical solid waste management options and imposed environmental legislation for the guidance to the safe solutions.	1. Assess the implications of production, characteristic and environmental impact of Solid Waste Management based on its sources. 2. Assess the components of Biomedical and Radioactive wastes by inculcating the management methods based on standards. 3. Outline the phases of generation to disposal of E-waste with the global strategic terms of Recycling.

UNIT-I
Solid Waste and their Handling: Definition of solid wastes — types of solid wastes — Sources – Industrial, mining, agricultural and domestic — Characteristics. Solid waste Problems – impact on environmental health

UNIT-II
Biomedical Waste Management: Classification, collection, segregation Treatment and disposal. Radioactive waste: Definition, Low level and high level radioactive wastes and their management, Radiation standards.

UNIT-III
E-Waste Management: Waste characteristics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

Learning Resources:
1.Hazardous waste management by Prof. Anjaneyulu.
2.Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
3.Management of Solid waste in developing countries by FrankFlintoff, WHO regional publications 1976.
4.http://nptel.ac.in/courses/