VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Ibrahimbagh, Hyderabad-31

Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad

SYLLABUS BOOK FOR
B.E (CIVIL) V and VI SEMESTER
UNDER CBCS WITH EFFECT FROM 2021–2022
(For the students admitted in 2019-20)

DEPARTMENT OF CIVIL ENGINEERING
+91-40-23146010, 23146011
Fax: +91-40-23146090
Website: www.vce.ac.in

Institution Vision

"Striving for a symbiosis of technological excellence and human values."

Institution Mission

"To arm young brains with competitive technology and nurture holistic development of the individuals for a better tomorrow."

Department Vision

To strive for excellence in order to make the students better citizens with technical knowledge and social awareness

Department Mission

To impart knowledge in the latest technologies to the students of civil engineering to fulfil the growing needs of the society.

Program Educational Objectives (PEOs):

1. To provide a better understanding of basic sciences and fundamentals of civil engineering.

2. To develop competence in latest technologies to serve the industry or pursue higher studies.

3. To inculcate professionalism with effective communication skills and ethical values.

Program Specific Outcomes (PSOs)

1.Understand various concepts of basic engineering sciences and mathematics to learn advanced concepts of Civil Engineering and apply them to practical problems.

2.Apply principles of various specializations of Civil engineering including structural engineering, transportation engineering, environmental engineering, water resources engineering and Geotechnical engineering to tackle engineering problems.

3.Acquire knowledge of ethical practices, communication skills, technical report writing skills and collaborative effort leading to lifelong learning.

Program Outcomes (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION (R-19)
B.E. – (CIVIL ENGINEERING) V-SEMESTER ACADEMIC YEAR 2021 - 2022
(Students Admitted in 2019-20)

BE (Civil) V-Semester								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U19HS010EH	Economics & Finance for Engineers	2	-	-	3	60	40	2
U19HS020EH	Human Values and Professional Ethics-II	1	-	-	2	40	30	1
U19HS510EH	Skill Development-III: Soft Skills	1	-	-	2	40	30	1
U19PC510CE	Structural Analysis	3	-	-	3	60	40	3
U19PC520CE	Hydraulics and Hydraulic Machinery	2	-	-	3	60	40	2
U19PC530CE	Environmental Engineering	3	-	-	3	60	40	3
U19PC540CE	Reinforced Concrete Design	3	-	-	3	60	40	3
U19PE510CS	Skill Development-III:Technical Skills	1	-	-	2	40	30	1
U19OEXXXXX	Open Elective-III	3	-	-	3	60	40	3
PRACTICALS								
U19PC521CE	Hydraulics and Hydraulic Machinery Lab	-	-	2	3	50	30	1
U19PC531CE	Environmental Engineering Lab	-	-	2	3	50	30	1
U19PC541CE	Concrete Lab	-	-	2	3	50	30	1
U19PC551CE	Surveying Camp	-	-	-	-	-	50	1
Student should complete one online certificate course equivalent to 2 credits during III-VII Semester								
TOTAL		**19**	**-**	**6**	**-**	**630**	**470**	**23**
GRAND TOTAL		**25**				**1100**		

Note: The left over hours are to be allotted to ECA –II / CCA-III / Sports / Library /Mentor Interaction *based on the requirement .*

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
ECONOMICS AND FINANCE FOR ENGINEERS

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):2 : 0 : 0	SEE Marks:60	Course Code: U19HS010EH
Credit: 2	CIE Marks:40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The objectives of the course are to	Upon the completion of the course, students are expected to
The objective of the Course is to equip the prospective engineers with the concepts and tools of economics, finance, cost and taxes that facilitate business decisions.	1. Enable students to identify the essential components such as production quantity limits, elasticity, demand and supply in business decision making. 2. Facilitate students in calculation of cost components to enable control of costs. 3. Make better investment decisions both in short and long run by understanding the financial viability of given investment proposals. 4. Analyze the given financial statements of a firm to understand the past performance and to make decisions for future. 5. Identify the impact of the new tax policies on the company's financial structure/ individual's incomes.

UNIT I: BASICS OF ECONOMICS: Scarcity Definition of Economics - Macro and Micro Economics -Managerial Economics - Meaning of a Firm - Objectives of a Firm - Demand Concept and Law of Demand -Price Elasticity of Demand (types), Income elasticity - cross elasticity - advertising elasticity - Meaning of Supply - Equilibrium Price and Quantity - Production - Cobb Doughlas Production Function - Economies of Scale. (Simple problems on computation of elasticity)

UNIT II: COST AND PRICE: Cost - Meaning -Classification of Costs -Short run and Long run costs -Cost Sheet - Break even Analysis - Methods of Pricing (Problems on Cost Sheet, Breakeven Analysis and Methods of Pricing can be asked).

UNIT III: SOURCES AND USES OF FINANCE: RBI and its role - Commercial Banks - Functions - Capital Budgeting -Discounting and Non discounting Techniques (including simple problems) - Working Capital Management - Concepts and Components of Working Capital – determinants of working capital - Operating Cycle - estimation of working capital.

UNIT IV: UNDERSTANDING FINANCIAL STATEMENTS: Financial Statements- Meaning - Types - Purpose - Ratios (Liquidity, Solvency & Profitability Ratios including problems)

UNIT V: DIRECT & INDIRECT TAXES: Heads of Income - Income from Salaries - Income from House Property - Income from Business - Income from Capital Gains - Income from Other Sources – old and new regime tax rates and calculation of tax - Latest Tax Rates - GST -CGST - SGST - IGST - GST network.

Learning Resources:

1. S.P.Jain and K.LNarang., "Cost Accounting", Kalyani Publishers, Twentieth Edition Revised– 2008.
2. S.P.Jain and K.L Narang., "Financial Accounting", Kalyani Publishers –2002.
3. Mehta P.L.,"Managerial Economics: Analysis,Problems and Cases", Thirteenth Edition, Sultan Chand and Sons, Nineteenth Edition - 2013.
4. M.Y.Khan and P.K. Jain., "Financial Management – Text, Problems and Cases", Mc Graw Hill Education Private Limited, New Delhi.
5. Vinod KSinghania and Kapil Singhania., "Direct Taxes Law and Practice", Taxmann Publications, Sixtieth Edition - 2018.
6. Dr,Vinod K Singhania., "Students' Guide to GST and Customs Law", Taxmann Publications, Edition - 2018.
7. Muralidharan., "Modern Banking", Prentice Hall of India.
8. Accounting for Managers by Narayana swamy
9. *M. L. Seth., "Micro Economics",* Lakshmi Narain Agarwal.
10. Dr. R.P. Rustagi., "Fundamentals of Financial Management"Taxmann Publications.
11. Dr. D.M. Mithani, "Money Banking International Trade & Public Finance", Himalaya Publishing House - 2014.
12. Rajesh., "Banking Theory and Practice", Tata Mc Graw Hill Publishing

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
HUMAN VALUES AND PROFESSIONAL ETHICS-II

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs/Week) : 1 hour	SEE Marks : 40	Course Code: U19HS020EH
Credits:1	CIE Marks : 30	Duration of SEE : Hours : 02

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :-	At the end of this course, the student will be able to
1. Create an awareness on the interrelation between Society, Ethics and Human Values	1. Identify ethical risks in everyday life and in societies that can lead to unethical choices, such as structures that diffuse responsibility or a group that has collectively de-stigmatized unethical behavior
2. Understand how ethical dilemmas apply to real life scenarios	2. Identify ethical concerns in research and intellectual contexts, including academic integrity,use and citation of sources, and the objective presentation of data.
3. Develop ethical human conduct and professional competence.	3. Assess their own ethical values and the social context of problems and articulate what makes a particular course of action ethically defensible
4. Understand the role of good ethical practices and apply it in a project	4. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

UNIT1 - NORMATIVE ETHICS & SOCIETAL ETHICS

This unit deals with normative ethics, the branch of moral philosophy, or ethics, concerned with criteria of what is morally right and wrong. It includes the formulation of moral rules that have direct implications for what human actions, institutions, and ways of life should be like. This unit also covers societal ethics which is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.

UNIT 2 - PROFESSIONAL ETHICS - NEED **FOR ETHICAL CODES**

This unit covers the code of Professional Ethics- it is designed to ensure that students learn the necessary skills that groom them to behave like employees should, one that is socially acceptable and respectful of one another. It establishes the rules for behavior and sends a message to every employee that universal compliance is expected.

UNIT 3 - PRIVACY

This unit covers "Cyber ethics" - the code of responsible behavior on the Internet. Just as we are taught to act responsibly in everyday life with lessons such as "Don't take what doesn't belong to you" and "Do not harm others," we must act responsibly in the cyber world as well.

The basic rule is "Do not do something in cyberspace that you would consider wrong or illegal in everyday life."

UNIT 4- MEDIA AND MEDICAL ETHICS

This unit covers Media and Medical ethics is the best division of applied ethics dealing with the specific ethical principles and standards of media (including broadcast media, film, theatre, the arts, print media and the internet) and medicine (practice of clinical medicine and related scientific research)

MODE OF DELIVERY

Questionnaires **Quizzes** **Case-studies** **Observations and practice** **Home and classroom assignments**	**Discussions** **Skits** **Short Movies/documentaries** **Team tasks and individual tasks** **Research based tasks** **Project**

Relevant Websites,CD's and Documentaries

- https://plato.stanford.edu/

Learning Resources:

- learn.talentsprint.com

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	1	Max. Marks for each Internal Tests	:	20
2	No. of Assignments	:	1	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	1	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
Skill Development-III : Soft Skills

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs/Week): 1:0:0	SEE Marks: 40	Course Code: U19HS510EH
Credits: 1	CIE Marks: 30	Duration of SEE: 2 Hours

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

UNIT 1 QUANTITATIVE APTITUDE - NUMERICAL ABILITY

- Introduction to higher order thinking skills
- Speed Maths
- Number systems
- LCM & HCF

UNIT 2 QUANTITATIVE APTITUDE- ARITHMETIC ABILITY FOUNDATION

- Percentage
- Profit loss and discounts
- Ratio proportions Allegations and mixtures
- Averages

UNIT 3 REASONING ABILITY – GENERAL REASONING PART 1

- Cding decoding
- Directions
- Series completions - Letter, Number & Element Series

UNIT 4 REASONING ABILITY- GENERAL REASONING PART 2

- Analogies
- Classification
- Alphabet test
- Blood Relations

UNIT 5 REASONING ABILITY- ARITHMETIC REASONING

- Mathematical operations

- Ranking
- Ages
- Clocks & Calendars

Learning Resources:

1. scoremore.talentsprint.com

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	20
2.	No. of Assignments	: 2	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 2	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 1 Hour 30 Minutes

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
STRUCTURAL ANALYSIS

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19PC510CE
Credit: 3	CIE Marks:40	Duration of SEE: 3 Hours

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 in determinate 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'smethod 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 sides way-loading on beam/portal frames hall 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 sides way-loading on

beam/ portal frames hall 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. Thandava moorthy T.S.,"Structural Analysis",Oxford Higher Education, Second Edition,2012.
3. Ramamrutham S.,Narayan R.,"Theory of Structures",Dhanpath Rai publications,9th edition, 2017
4. Devdas Menon,"StructuralAnalysis",2nd Edition, Narosa Book Distributors PvtLtd,2018.
5. Reddy C.S.,"Basic Structural Analysis",3rd Edition, Mc GrawHill, 2010.
6. Junarkar S.B.,Shah,"Mechanics of Structures", VolumeII, CharotarPub. House, 24th edition, 2015.
7. Chu-KiaWang,"Intermediate Structural Analysis (English)1stEdition", Mc Graw Hill Education,2010.
8. HibbelerR.C.,"StructuralAnalysis",10/E,Prentice Hall ,Higher Education, 2018.
9. Louis F. Gesch windner, 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/

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Duration of Internal Tests : 90 Minutes

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
HYDRAULICS AND HYRAULIC MACHINERY

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):2: 0 : 0	SEE Marks:60	Course Code: U19PC520CE
Credits: 2	CIE Marks:40	Duration of SEE: 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 cavitation 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. Vente Chow "Open - Channel Hydraulics" International Student Edition, McGraw-Hill, 2009.
2. ModiP.N., Seth S.M.,"Hydraulics and Fluid Mechanics including Hydraulics Machines ",Standard Book House,2019
3. Bansal R.K.,"A Textbook Of Fluid Mechanics And Hydraulic Machines", Laxmi Publications,2018
4. Rama Durgaiah D., "Fluid Mechanics and Machinery" New Age International Publishers, 2002
5. Ojha C.S.P., Brendts son R.,Chandramouli P.N.,"Fluid Mechanics and Machinery",Oxford University Press,2010.
6. K Srinivasa Raju and D Nagesh kumar, " Fluid Mevhanics problem solving using MATLAB" Prentice Hall of India, 2020
7. http://nptel.ac.in/courses/105107059/,FluidMechanics
   http://nptel.ac.in/courses/105103096/3,Hydraulics

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Duration of Internal Tests : 90 Minutes

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
ENVIRONMENTAL ENGINEERING

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19PC530CE
Credits : 3	CIE Marks:40	Duration of SEE: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. Formulate preliminary design of waste water treatment plant. 3. Understand the characteristics of domestic sewage and methods of disposal. 4. Design of primary, secondary and tertiary treatment units of waste water and a simple sewerage system. 5. Understand the sludge and solid waste management.

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 flocculate. 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: Waste water characteristics: sampling, significance and techniques, physical, chemical and biological characteristics, 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: Screens: types, disposal. Grit chamber, oil and grease removal. primary and secondary settling tanks.
Biological Treatment Process: Suspended growth system - conventional activated sludge process and its modifications. Attached growth system – trickling filter, bio-towers and

rotating biological contactors.
Principle of stabilization ponds, oxidation ditch, Sludge digesters(aerobic and anaerobic), Equalization., thickeners and drying beds Sewage Conveyance – Sewer types and appurtenances. Velocity in sewers, Design of a simple sewerage system.

UNIT-V: Low cost treatment process: Working principal and design of septic tanks for small community
in rural and urban areas, two-pit latrines, eco-toilet and soak pits.
Solid Waste Management: Sources of Solid waste, Types of solid waste, Physical and Chemical composition of municipal solid waste. Generation rate, Numerical Problems.
Collection: Collection of solid waste- services and systems, equipments,
Transportation: Need of transfer operation, transfer station, transport means and methods, route optimization. Solid waste management 2000 rules with, 2016 amendments.

Learning Resources:

1. B C Punmia, “Environmental Engineering vol-II”, Laxmi Publications 2nd, 2016
2. Karia G.L., and Christian R.A, “Wastewater Treatment Concepts and Design Approach”, Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017
3. S.K.Garg, “Environmental Engineering vol-II, Water supply Engineering”, Khanna Publishers, – New Delhi, 28th edition and 2017
4. Birdi G.S, “Water Supply and Sanitary Engineering", Dhanpat Rai & Sons, 2014
5. Peavy H.S., Rowe D.R., Tchobanoglous G., “Environmental Engineering”, Tata McGraw Hills, New Delhi, 2017
6. Metcalf & Eddy M.C., “Waste Water Engineering – Treatment & Reuse”, Tata McGraw Hill Publications, New Delhi, 2003
7. http://nptel.ac.in/courses/105106119/

The break-up of CIE: Internal Tests + Assignments + Quizzes

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2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
REINFORCED CONCRETE DESIGN

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19PC540CE
Credits : 3	CIE Marks:40	Duration of SEE: 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 RC 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 RC 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. Unni krishna Pillai S and Devdas Menon,"Reinforced Concrete Design",Mc Graw Hill EducationIndia Pvt Ltd.,2017.
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.,"ReinforcedConcrete",Vol.1,CharotarPublishingHouse,2016.
6. Punmia B.C., Ashok K.Jain, Arun K.Jain,"Limit State Design of Reinforced Concrete", Laxmi Publications(P) Ltd.2016.
7. Ramamrutham,"Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Co.,2016.
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. SP16:Design Aids for Reinforced Concrete to IS456:1978,Bureau of Indian Standards, New Delhi, India
11. SP24:Explanatory Hand book on Indian Standard Code of Practice for Plain and Reinforced Concrete to IS456:1978, Bureau of Indian Standards, New Delhi, India
12. SP34:Hand bookon Concrete Reinforcement and Detailing (With Amendment1), Bureau of Indian Standards, NewDelhi, India
13. IS:875-1987 Code of Practice For Design Loads (Other Than Earth quake) For Buildings And Structures Parts (1,2,3,4&5), Bureau of Indian Standards, New Delhi, India

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVICOLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH,HYDERABAD- 500 031
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SKILL DEVELOPMENT-III:TECHNICAL SKILLS
PRINCIPLES OF DATA STRUCTURES LAB
SYLLABUS FOR B.E. V -SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks : 50	Course Code : **U19PC510CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Design and implement abstractions of various data structures and their practical applications.	1. Perform operations on vanous abstractions like stacks, queues, linked lists. 2. Implement problems involving trees and graphs. 3. Choose the right data structure based on the requirements of the problem.

1. Menu driven program that implements Stacks using arrays for the following operations
   a)create b)push c)pop d) peek
2. Implementation of Infix to Postfix Conversion and evaluation of postfix expresstion.
3. Menu driven program that implements Queues using arrays for the following operations
   a)create b)insert c)delete d) display
4. Menu driven program that implements Circular Queues for the following operations
   a)create b)Insert c)delete d) display
5. Implementation of Singly Linked List,Stack using Singly Linked List, Queue using Singly Linked List.
6. Implementation of polynomial operations using Linked List.
7. Implementation of Doubly Linked List,Circular linked list.
8. Implementation of Operations on Binary Tree (Insert,Delete,Level Order, Search)
9. Implementation of Recursive and Iterative Traversals on Binary Trees.
10. Implementation of Operations on Binary Search Tree.

11. Implementation of Quick Sort.
12. Implementation of merge Sort.

Suggested Reading:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition (2002), Pearson
3. Richard F, Gilberg, B.A. Forouzan, "Data Structures, A Pseudocode Approach with C", Cengage, 2nd Edition
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stem 'Introduction to Algorithms' 2002.
5. Tanenbaum A. M , Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson
6. Data Structures through C in depth, S K Srivastava, Deepali Srivastava, BPB publications, 2nd Edition

Online Resources:

1. http://nptel.ac.in/courses/106106127/
2. http://nptel.ac.in/courses/106103069/

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18

Duration of Internal Test: 2Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
HYDRAULICS & HYDRAULICS MACHINERY LAB

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks:50	Course Code: U19PC521CE
Credits: 1	CIE Marks:30	Duration of SEE: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 Flow	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
4	Centrifugal pump	Determination of efficiency and performance
5	Centrifugal pump testing	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) b) Study pressure distribution over an aerofoil

11	Hydraulic Jump	Determination of pre and post jump depth in channel flow

Learning Resources:

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

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
ENVIRONMENTAL ENGINEERING LAB

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0: 2	SEE Marks:50	Course Code: U19PC531CE
Credits: 1	CIE Marks:30	Duration of SEE: 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).

No. of Internal Tests: 01 Max. Marks for Internal Test: 12

Marks for day-to-day laboratory class work 18

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
CONCRETE LAB

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0 : 2	SEE Marks:50	Course Code: U19PC541CE
Credits:1	CIE Marks:30	Duration of SEE: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

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

III TESTS ON CONCRETE

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

IV EXPERIMENTS FOR DEMONSTRATION ONLY

15 Non-Destructive Testing of Concrete Structures.
16 Workability of concrete by Flow test
17 Workability of concrete by Vee-Bee test.

Learning Resources:

1. IS: 269-2013, Indian Standard Code of Practice for Ordinary Portland Cement, 33 Grade – Specifications (Fourth Revision), Bureau of Indian Standards, New Delhi
2. IS: 8112-2013, Indian Standard Code of Practice for 43 Grade Ordinary Portland Cement – Specifications (First Revision), Bureau of Indian Standards, New Delhi
3. IS: 12269-2013, Indian Standard Code of Practice for Ordinary Portland Cement, 53 Grade – Specifications, Bureau of Indian Standards, New Delhi
4. IS: 650-2008, 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) -2002, Indian Standard Methods of Test for Aggregates for Concrete, Bureau of Indian Standards, New Delhi
6. IS: 1199-2002, Indian Standard Methods of Sampling and Analysis of Concrete, Bureau of Indian Standards, New Delhi
7. IS: 516-2004, Indian Standard Methods of Tests for Strength of Concrete, Bureau of Indian Standards, New Delhi
8. IS: 13311 (Part-1)-1992 (Reaffirmed-2004), 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(Reaffirmed-2004), 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(Reaffirmed-2004), Indian Standard Methods of Physical Tests for Hydraulic Cement, Determination of Fineness by Blaine Air Permeability Method, Bureau of Indian Standards, New Delhi

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
SURVEYING CAMP

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0:0	SEE Marks: - - -	Course Code: U19PC551CE
Credits: 1	CIE Marks: 50	Duration of SEE: ---

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 team

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.

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. V SEMESTER (2021-22)

Dept	Title	Code	credits
Civil	Spatial Information Technology	U19OE510CE	3
CSE	Principles of Data Structures	U19OE510CS	3
ECE	Sensors for Engineering Applications	U19OE510EC	3
ECE	Mathematical Programming for Engineers	U19OE010EC	3
EEE	Solar Power and applications	U19OE510EE	3
Mech.	Introduction to Robotics	U19OE510ME	3
Mech.	Introduction to Automobile Engineering	U19OE520ME	3
Maths	Numerical Methods	U19OE510MA	3
Physics	Thin Film Technology and Applications	U190E52OPH	3
H&SS	Technical Writing and Professonal Presentations	U190E520EH	3

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
SPATIAL INFORMATION TECHNOLOGY
(Open Elective-III)

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U19OE510CE
Credits : 3	CIE Marks:40	Duration of SEE:3 Hrs

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 Remote sensing GPS and GIS.	1. Select the type of remote sensing technique/data, identify and analyze the earth surface features from the satellite images. 2. Identify GPS components, interpret the navigational message and signals received by the GPS satellites, Identify the error sources and apply corrections for accurate positioning. 3. Analyse the basic components of GIS, process spatial and attribute data, identify and rectify mapping inaccuracies and prepare thematic maps

Unit-I: Introduction and Basic Concepts of Remote Sensing : Introduction, Basic concepts of remote sensing, Airborne and space born sensors, Passive and active remote sensing, EMR Spectrum, Energy sources and radiation principles, Energy interactions in the atmosphere, Energy interactions with earth surface features, Atmospheric windows, Spectral reflectance curves

Unit-II: Remote Sensing Systems: Satellites and orbits, Polar orbiting satellites, Image characteristics and different resolutions in Remote Sensing, Multispectral, thermal and hyperspectral remote sensing. Some remote sensing satellites and their features, Map and Image, color composites, introduction to digital data, elements of visual interpretation techniques. Applications of Remote sensing in various fields.

Unit-III: Global positioning Systems (GPS) : Overview of GNSS and Introduction to GPS, GLONASS, GALILEO, COMPASS, IRNSS systems , Applications of GPS.
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 message

Unit-IV: Errors and Positioning methods of GPS: 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). GPS Carrier Phase measurements: Single Differencing, Double Differencing and Triple Differencing in GPS measurements.

Unit-V:Basic Concepts: Introduction to GIS, History of GIS, Early development in GIS, Areas of GIS application, Components of GIS, Overview of GIS Software packages, Current issues and Trends in GIS. Variables-Point, line, polygon, Geographic coordinate system, Map projections, Map Analysis.
GIS Data: Data types – spatial, non-spatial (attribute data) – data structure, data format – point line vector – Raster – Polygon
Data Input : Keyboard entry, Manual Digitizing, Scanner, Remotely sensed data, Existing Digital data Cartographic database, Digital elevation data
Data Editing: Detection and correction of errors, data reduction, edge matching

Learning Resources:

1. James B. Campbell & Randolph H. Wynne., Introduction to Remote Sensing, The Guilford Press, 2011
2. Lillesand, Kiefer, Chipman., Remote Sensing and Image Interpretation, Seventh Edition, 2015
3. Leick, A., GPS Satellite Survey, John Wiley: NJ, 2015
4. Hofmann, B., Lichtenegger H. and Collins J., Global Positioning System: Theory and Practice, Springer: Berlin, 2011.
5. Basudeb Bhatta, Remote Sensing and GIS, Oxford University Press, 2011.
6. Hofmann-Wellenh of, Bernhard, Lichtenegger, Herbert, Wasle, Elmar, GNSS – GPS, GLONASS, Galileo and more, 2013
7. Thanappan Subash., Geographical Information System, Lambert Academic Publishing, 2011.
8. Paul Longley., Geographic Information systems and Science, John Wiley & Sons, 2005
9. John E. Harmon & Steven J. Anderson., The design and implementation of Geographic Information Systems, John Wiley & Sons, 2003
10. ArcGIS 10.1 Manuals, 2013.
11. Kang Tsung Chang., Introduction to Geographic Information Systems, Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 2008.
12. Burrough, P.A., Principles of GIS for Land Resource Assessment, Oxford Publications, 2005.
13. C.P.Lo & Albert K. W.Yeung, Concepts and Techniques of Geographic Information Systems, Prentice Hall India Pvt.Ltd, 2002.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

PRINCIPLES OF DATA STRUCTURES (OPEN ELECTIVE-II)
SYLLABUS FOR B.E. V SEMESTER

L : T : P(Hrs./week): 3	SEE Marks:60	Course Code: U19OEXXXXX
Credits: 3	CIE Marks :40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Attheend of the course, students will be able to:
1. Understand Basic linear and non-linear data structures and learn techniques of recursion 2. Understand concepts of Linked lists 3. Understand Concepts of Stacks and queues 4. Understand Concepts of Trees 5. Understand Concepts of Graphs and different sorting and searching techniques and their complexities.	1. Understand the basic concepts of data structures. 2. Understand the notations used to analyze the performance of algorithms. 3. Choose and apply an appropriate data structure for a specified application. 4. Understand the concepts of recursion and its applications in problem solving. 5. Demonstrate a thorough understanding of searching and sorting algorithms.

UNIT-I: Introduction: Data Types, Data structures, Types of Data Structures, Operations, ADTs, Algorithms, Comparison of Algorithms, Complexity, Time- space tradeoff.
Recursion: Introduction, format of recursive functions, recursion Vs. Iteration, examples.

UNIT-II: Linked Lists: Introduction, Linked lists and types, Representation of linked list, operations on linked list, Comparison of Linked Lists with Arrays and Dynamic Arrays.

UNIT-III: Stacks and Queues: Introduction to stacks, applications of stacks, implementation, and comparison of stack implementations. Introduction to queues, applicationsof queues and implementations, Priority Queues and applications.

UNIT-IV: Trees: Definitions and Concepts, Operations on Binary Trees, Representation of binary tree, Conversion of General Trees to Binary Trees, Representations of Trees, Tree Traversals, Binary search Tree.

UNIT-V: Graphs: Introduction, Applications of graphs, Graph representations, graph traversals, Minimal Spanning Trees.

Searching and Sorting: Linear searching, binary Searching, sorting algorithms: bubble sort, selection sort, quick sort, heap sort.

Learning Resources:

1. Narasimha Karumanchi, "Data Structures and Algorithms MadeEasy", Career Monk Publications, 2017
2. Horowitz E, Sahni S., and Susan Anderson-Freed," Fundamentals ofData structures in C", Silicon Pr; 2 edition (1 August 2007)
3. ReemaThareja, "Data Structures using C", Oxford, 2014.
4. Kushwaha D. S. and Misra A. K, "Data structures A ProgrammingApproach with C", PHI.
5. Seymour Lipschutz," Data Structures with C", McGraw Hill Education,2017.
6. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
7. https://www.edx.org/course/foundations-of-data-structures
8. https://sites.google.com/site/merasemester/data-structures
9.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	3	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SENSORS FOR ENGINEERING APPLICATIONS (OPEN ELECTIVE)

SYLLABUS FOR B.E. V - SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U19OE510EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. The student will come to know the various stimuli that are to be measured in real life instrumentation. 2. He will be able to select the right process or phenomena on which the sensor should depend on 3. He will be aware of the various sensors available for measurement and control applications.	*On completion of the course, students will be able to* 1. Appreciate the operation of various measuring and control instruments which they encounter in their respective fields. 2. Visualize the sensors and the measuring systems when they have to work in areas of interdisciplinary nature and also think of sensors and sensors systems when for a new situation they encounter in their career 3. Identify and select the right process or phenomena on which the sensor should depend on. 4. Know various stimuli that are to be measured in real life instrumentation.

UNIT - I

Introduction to sensors and transducers .Need for sensors in the modern world. Different fields of sensors based on the stimuli - various schematics for active and passive sensors. Static and dynamic characteristics of sensors - zero, I and II order sensors – Response to impulse, step, ramp and sinusoidal inputs. Environmental factors and reliability of sensors.

UNIT – II

Sensors for mechanical systems or mechanical sensors - Displacement - acceleration and force - flow of fluids - level indicators - pressure in fluids - stress in solids. Typical sensors - wire and film strain gauges, anemometers, piezo electric and magnetostrictive accelerometers, potentio metric sensors, LVDT.

UNIT – III

Thermal sensors – temperature – temperature difference – heat quantity. Thermometers for different situation – thermocouples thermistors – color pyrometry.

Optical sensors: light intensity – wavelength and color – light dependent resistors, photodiode, photo transistor, CCD, CMOS sensors.

Radiation detectors: radiation intensity, particle counter – Gieger Muller courter (gas based), Hallide radiation detectors.

UNIT – IV

Magnetic sensors: magnetic field, magnetic flux density – magneto resistors, Hall sensors, super conduction squids.

Acoustic or sonic sensors: Intensity of sound, frequency of sound in various media, various forms of microphones, piezo electric sensors.

UNIT – V

Electrical sensors: conventional volt and ammeters, high current sensors, (current transformers), high voltage sensors, High power sensors.

High frequency sensors like microwave frequency sensors, wavelength measuring sensors.

MEMs and MEM based sensors.

Learning Resources :

1. Doebelin, “Measurement Systems: Application and Design”, McGraw Hill Kogakusha Ltd.
2. Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim “Microsensors, MEMS and Smart Devices”, New York: Wiley, 2001.
3. Henry Bolte, “Sensors – A Comprehensive Sensors”, John Wiley.
4. Jocob Fraden,” Handbook of Modern Sensors, Physics, Designs, and Applications”, Springer.
5. Manabendra Bhuyan,” Intelligent Instrumentation Principles and Applications”, CRC Press.
6. Randy Frank,” Understanding Smart Sensors”, Second edition, Artech House.

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2. No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
MATHEMATICAL PROGRAMMING FOR ENGINEERS (OPEN ELECTIVE)

SYLLABUS FOR B.E. V – SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U19OE010EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of programming language for solving problems.	*On completion of the course, students will be able to* 1. Generate arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications 5. Design GUI for basic mathematical applications.

UNIT - I : Introduction:
Basics of MATLAB,MATLAB windows, Advantages of MATLAB,on-line help, file types.
MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation-Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.
Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions
Script Files, Function Files, Debugging methods in MATLAB.
Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots-subplots-specialized 2D plots: stem-,bar, hist, pi, stairs, loglog , semilog ,polar ,comet 3D plots: Mesh,Contour,Surf,Stem3,ezplot.

UNIT - III : Numerical Methods Using MATLAB
Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration.
Linear Equations- Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations, Advanced topics.

UNIT - IV : Nonlinear Equations
System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions ployval and polyfit, cubic fit using least square method. Finding roots of a polynomial -roots function, Newton-Raphson Method.

UNIT - V :

Solution of Ordinary differential Equations(ODEs)-The 4th order Runge-kutta Method, ODE Solvers in MATLAB, Solving First –order equations using ODE23 and ODE45.

Structures and Graphical user interface(GUI): Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt. Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen, Elsevier-18th April 2014.
5. https://nptel.ac.in/courses/103106118/2
6. https://www.udemy.com/numerical-methods/

The break-up of CIE : Internal Tests + Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SOLAR POWER AND APPLICATIONS

Open Elective-III
SYLLABUS FOR B.E. V SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE510EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To impart the basics of solar energy harnessing and solar panel and array.	1. Compare different energy resources. 2. Identify and choose proper type of meter for solar radiation measurement. 3. Use proper solar thermal system according to the load requirements. 4. Categorize and compare photovoltaic cells. 5. Apply the knowledge of solar energy.

UNIT – I: Fundamentals of Energy Sources: Oil crisis of 1973, Classifications of Energy Resources, Importance of Non-conventional energy sources, Advantages-disadvantages and salient features of Non-conventional energy sources.

UNIT – II: Solar Energy Basics: Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder.

UNIT – III: Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive space – heating and cooling systems, Solar Cookers, Solar furnaces, Solar thermal water pump, Vapour compression refrigeration and Solar pond Electric power plant.

UNIT – IV: Solar Photovoltaic Systems: Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT.

UNIT – V:Solar PV systems & Applications: Solar PV system classification - Stand-Alone Solar PV system and Grid-Interactive Solar PV system. Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

Suggested Reading:

1. B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.
2. G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna Publications.

The break-up of CIE : Internal Tests+Assignments+Quizzes

1. No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2. No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF MECHANICAL ENGINEERING
INTRODUCTION TO ROBOTICS (Open Elective-III)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE510ME**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
The objectives of this course are to: Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications.	1. understand the anatomy of the robot and various robot configurations for it's selection depending on the task. 2. classify the end effectors , understand different types of joints,various types of mechanical actuation and robot drive systems for carrying out the assigned job effectively. 3. analyze a planar manipulator through forward kinematics and understand the control of robot manipulator for better reliability and efficiency. 4. Classify the various sensors used in robots for proper selection to an

UNIT-I
ROBOT BASICS
Robot-Basic concepts, Need, Law, History, Anatomy, specifications.
Robot configurations-cartesian, cylindrical, polar ,articulated and SCARA.
Robot wrist mechanism, Precision and accuracy of robot.

UNIT-II
ROBOT ELEMENTS
End effectors-Classification, Types of Mechanical actuation, Gripper design, Robot drive system types: Electrical, pneumatic and hydraulic. Position and velocity feedback devices, Robot joints and links-Types, Motion interpolation.

UNIT-III
ROBOT KINEMATICS AND CONTROL
Robot kinematics – Basics of direct and inverse kinematics, Robot trajectories, 2D and 3D Transformation- Scaling, Rotation and Translation, Homogeneous transformation. D-H matrix. Forward kinematics for a 2-link RR planar manipulator.
Control of robot manipulators – Point to point and Continuous Path Control. Robot programming.

UNIT-IV
ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors, Light sensors, Pressure sensors.
Introduction to Machine Vision and Artificial Intelligence.

UNIT-V
ROBOT APPLICATIONS

Applications of robots in Industries, Medical, Household, Entertainment, Space, Underwater, Defense, and Disaster management.
Applications of Micro and Nanorobots, Future Applications of robots.

Learning Resources:

1. MikellP. Groover, Mitchell Weiss, Roger N Nagel and Nicholas G Odrey, "Industrial Robotics Technology, Programming and Applications", TataMcGraw-Hill Publishing Company Limited , 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw HillPublishing Company Limited, 2010.
3. KlafterR.D, Chmielewski T.A, and Negin. M, "Robotic Engineering: An Integrated Approach", Prentice Hall of India Pvt. Ltd.,1994.
4. K.S. Fu,R.C. Gonzalez and C.S.G.Lee , "Robotics control, sensing, vision and intelligence",TataMcGraw-Hill Publishing Company Limited, 2008
5. R.K. Mittal and I.J.Nagrath"Robotics and Control", Tata McGraw-Hill Publishing Company Limited,2003.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF MECHANICAL ENGINEERING
INTRODUCTION TO AUTOMOBILE ENGINEERING (OE-III)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE520ME**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. familiarize the student with the different types of automobiles and engine components. 2. impart adequate knowledge in fuel supply, cooling, lubrication systems of IC engines. 3. understand the steering geometry, steering mechanism and types of suspension systems. 4. gain the knowledge about working of clutch, gear mechanism, brakes 5. make the student conversant with types of wheels, tyres and pollution control techniques.	1. identify types of Automobiles and engine components. 2. describe the engine fuel system in petrol and Diesel engines, cooling, lubrication systems. 3. describe the steering mechanism, suspension systems 4. analyse the working principle and operation of clutch, gear mechanism and brakes. 5. know the pollutants from automobile and pollution control techniques and identify the types of wheels, tyres.

UNIT-I

Introduction: Types of automobiles: Hybrid Vehicles, Electrical, gas and Fuel cell vehicles. Chassis and body, Lay out of transmission system, Engine components: cylinder block, cylinder head, crankcase, crank shaft and cam shaft. Types of IC Engines: SI and CI engines, two stroke and four stroke engines.

UNIT-II

Fuel system: Fuel supply system for SI engines and CI engines. Simple carburettor, Introduction to Multipoint fuel injection system (**MPFI**) of petrol engines and Introduction to **CRDI** system for diesel engines.

Cooling system: air cooling, water cooling: Thermo syphon, pump circulation system.

Lubrication system: Petroil System, splash system, pressure lubrication: Wet sump and Dry Sump.

Ignition system: Battery Ignition System, Magneto Ignition System and Electronic Ignition System.

UNIT-III

Suspension system: Rigid axle, Independent suspension system:Double wish bone type, Macpherson strut system, Air suspension system.

Steering system: front axle, wheel alignment, steering geometry: camber, caster, toe-in,

toe-out, steering linkage for vehicle with rigid axle front suspension, steering linkage for vehicle with independent front suspension, Ackermann steering mechanism.

UNIT –IV

Power Train: Single plate clutch, Multi plate clutch. Manual Gear Box: sliding mesh gear box, constant mesh gear box, synchromesh gear box and Automatic Gear Box. Working principle of Differential.

Brakes: Types: Drum and Disc brakes, Mechanical and Hydraulic Brakes, **ABS** system.

UNIT –V

Wheels and Tyres: Types of Wheels: wire wheels, disc wheels, alloy wheels. Types of tyres: Tube type, tubeless type. **SRS** Airbag system.

Automobile Emissions and control: Automobile pollutants and sources of pollution. Pollution Control Techniques: Catalytic Converters, EGR and PCV. Bharath emission Norms.

Learning Resources:

1. Crouse & Anglin, “Automobile Engineering”, 10th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi,. 2007.
2. Kirpal Singh, “Automobile Engineering”, Vol.I& II, 13th Edition, Standard Publishers, New Delhi 2013.
3. R.B Gupta, “Automobile Engineering” 7th Edition, Satya Prakashan, New Delhi, 2015.
4. Joseph Heitner, “Automotive Mechanics”, 2nd Edition, Affiliated East West Pvt. Ltd., 2013.

C.P. Nakra, “Basic Automobile Engineering”, 7th Edition, Dhanpat Rai Publishing C (P) Ltd., 2016.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Ibrahimbagh, Hyderbad-500031

DEPARTMENT OF MATHEMATICS
NUMERICAL METHODS (OPEN ELECTIVE)
(For CSE & IT only)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE510MA**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Study various numerical methods to solve Algebraic and Transcendental equations. **2. Understand** the methods to solve linear system of equations. **3. Understand** the numerical methods in interpolation and extrapolation. **4. Understand** the numerical methods in interpolation using central differences.	*1.* **Apply** numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods *2.* **Solve** linear system of equations using direct and iteration methods. *3.* **Use** various numerical methods in interpolation and extrapolation. *4.* **Use** various numerical methods in

Unit – I:

Solution of Algebraic and Transcendental equations:

Intermediate value property of equations-Solution of Algebraic and Transcendental equations: Bisection method, Newton-Raphson method Regula-Falsi method.

Unit – II:

Solution of linear system of equations:

Direct methods- Gauss elimination method- Factorization method- Iterative methods: Jacobi's Iteration method- Gauss - Seidel Iteration method-Ill-conditioned system of equations.

Unit – III:

Numerical differences-I

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences- Newton's divided difference formula.

Unit – IV:

Numerical differences-II

Central differences interpolation-Gauss's forwards and backward difference formulae-Stiriling's formula- Bessel's formula.

Unit – V:

Numerical Solutions of Ordinary Differential Equations

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta Method of 4^{th} order (without proofs).

Text Books:

1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers

2. Advanced Engineering Mathematics by R.K.Jain & S.R.K.Iyengar, Narosa publishing house.

Reference Books:

1. Numerical Analysis by S.S.Sastry, PHI Ltd.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF PHYSICS
THIN FILM TECHNOLOGY AND APPLICATIONS (OE)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE520PH**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Learn the fundamental atomistic mechanisms. 2. Narrate thin film deposition techniques 3. Acquire knowledge on thin film devices	1. State fundamental definitions of thin film technology 2. Describe thin film deposition techniques 3. Illustrate thin film devices and their use

UNIT-I: THIN FILM GROWTH
Classification of films- formation of thin films- Condensation and nucleation, growth and coalescence of islands, -nucleation theories: capillarity and atomistic models, sticking coefficient, adhesion, substrate effect, film thickness effect.

UNIT-II: DEPOSITION TECHNIQUES
Thin film deposition techniques- simple thermal evaporation- Chemical vapor deposition technique-Advantages and disadvantages of Chemical Vapor deposition (CVD), physical vapour deposition electron beam evaporation- RF sputtering, flash evaporation, Laser ablation- spin coating- molecular beam epitaxy (MBE), Spin coating, Film thickness measurement-ellipsometry, quartz crystal oscillator techniques, structure and microstructure of thin films.

UNIT-III: THIN FILM MATERIAL CHARACTERIZATION TECHNIQUES
Characterization techniques: X-Ray Diffraction (XRD), working principles of Scanning Electron Microscopy (SEM), working of Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM).

UNIT-IV: PROPERTIES OF THIN FILMS
Electrical conduction in continuous and discontinuous metallic thin films. Transport and optical properties of metallic, semiconducting and dielectric films.

UNIT-V: THIN FILM DEVICES AND APPLICATIONS
Anti-reflection coatings, fabrication of thin film resistor, capacitor, diode, gas sensors and temperature sensors. Thin film solar cells, Quantum well and Quantum dot solar cells. Application of thin films in different areas such as electronics, medical, defense, sports, automobiles, applications of thin films in various fields etc.

Learning resources:

1. Kasturi Chopra Thin Film Device Applications, Mac Graw Hill, New York, 2012
2. A. Goswami, thin film fundamentals, New age international, 2006

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS (OE)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE520EH**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
This course introduces the principles and mechanics of technical writing for students of engineering. Students will learn: 1. Specific communications skills associated with reporting technical information and will write a series of papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose, which are pre-requisites for start-up companies and getting into foreign universities as well	**At the end of the course the student will be able to** 1. write effective reports 2. research and write project proposals and SoPs 3. make persuasive presentations

UNIT I
A. TECHNICAL REPORTS- INFORMAL
Informal report formats, project and research reports

B. TECHNICAL REPORTS-FORMAL
Formal report components, feasibility reports, evaluation reports,
Analytical and informational reports, executive summaries.

UNIT II
TECHNICAL WRITING IN BUSINESS CORRESPONDENCE
Components of a letter, types of electronic communication, effective emails, instant and text messaging guidelines.

UNIT III
Technical Resume, Curriculum Vitae, Biodata, Cover letter, resume format.

UNIT IV
A. PROFESSIONAL PRESENTATIONS
Paper presentations, Poster presentations, PowerPoint presentations, video demos and tutorials

B. VIDEO DEMOS AND TUTORIALS

Storyboard writing, e-learning methods; video demos, training videos, webinars, conducting surveys, questionnaire, assessments, quiz, introduction to e-learning tools; Adobe Captivate, TechSmith Camtasia.

UNIT-V

HOW TO WRITE PROPOSALS AND STATEMENT OF PURPOSE

Types of proposals, persuasive elements, requests for proposals, stating your objective

METHODOLOGY: -

Case Studies
Demonstration
Expert lectures
Writing and Audio-visual lessons

ASSESSMENT: -

Online assignments
Individual and Group Presentations

Learning Resources: -

1. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw-Hill Education, 2005
2. Raman, Meenakshi & Sangeeta Sharma. Technical Communication: Principles and Practice. Second Edition. New Delhi: Oxford University. Press, 2011.
3. Hacking Your Statement of Purpose: A Concise Guide to Writing Your SOP, Milena Young, 2014.
4. How to prepare a feasibility study: a step-by-step guide including 3 model studies. Front Cover. Robert E. Stevens, Philip K. Sherwood. Prentice-Hall, 1982.
5. Successful Presentations (with DVD): John Hughes & Andrew Mallett. Oxford university Press.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION (R-19)
B.E. – (CIVIL ENGINEERING) VI-SEMESTER ACADEMIC YEAR 2021 - 2022
(Students Admitted in 2019-20)

BE (Civil) VI-SEMESTER								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U19HS610EH	Skill Development-IV: Soft Skills	1	-	-	2	40	30	1
U19PC610CE	Design of Steel Structures	3	-	-	3	60	40	3
U19PC620CE	Soil Mechanics	3	-	-	3	60	40	3
U19PC630CE	Advanced Structural Analysis	2	-	-	3	60	40	2
U19PC640CE	Highway Engineering	3	-	-	3	60	40	3
U19PE610CE	Skill Development-IV: Technical Skills	1	-	-	2	40	30	1
U19PE7XXCE	Professional Elective – I	3	-	-	3	60	40	3
U19OEXXXXX	Open Elective-IV	3	-	-	3	60	40	3
PRACTICALS								
U19PC621CE	Soil Mechanics Lab	-	-	2	3	50	30	1
U19PC631CE	Computer Aided Structural Engineering Lab	-	-	2	3	50	30	1
U19PC641CE	Transportation Engineering Lab	-	-	2	3	50	30	1
U19PW619CE	Theme Based Project	-	-	2	-	-	30	1
Student should complete one online certificate course equivalent to 2 credits during III-VII Semester								
TOTAL		**19**	**-**	**8**		**590**	**420**	**23**
GRAND TOTAL		**27**				**1010**		
Note: The left over hours are to be allotted to ECA –III Sports / Library /Mentor Interaction *based on the requirement .*								

PROFESSIONAL ELECTIVE – I		
1	U19PE711CE	Design of Concrete Structures
2	U19PE712CE	Rock Mechanics
3	U19PE713CE	Ground Water Hydrology
4	U19PE714CE	Quality Control And Assurance In Construction

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
Skill Development-IV: Soft Skills

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code:**U19HS610EH**
Credits: 1	CIE Marks: 30	Duration of SEE :2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
This course aims at enhancing employability skillI:	At the end of the course students will be able to:
1. Students will be introduced to higher order thinking and problem solving in the following areas - Vocabulary, Fill in the Blanks, Passage Based Questions, Jumbles & Spotting the Errors 2. Students will be trained to work systematically with speed and accuracy while problem solving 3. Students will enhance their vocabulary and use it effectively to solve problems	1. Solve questions in Verbal Ability in the mentioned areas using shortcuts and smart methods 2. Solve questions with speed and accuracy. 3. Clear the Verbal Ability Section in Employment Eligibility Tests

Unit 1: Vocabulary- Reading for Content and Context

Overview:

This course is designed for students to not just understand the importance of vocabulary but also to build on it by using the appropriate tools and methods. After which they will be able to solve vocabulary based questions and also use vocabulary as a tool to solve problems.

Learning Outcomes

Upon completion of the course, students should be able to:

1. Use context to find the meanings of words
2. Possess better vocabulary
3. Use vocabulary as a tool to solve questions in verbal ability

Competencies

1. Understand Collocations
2. Build on words by using Root Words
3. Understand how prefixes and suffixes work
4. Identify incorrect usage of words

Sessions

1.1 Concepts & Context Rules: Collocations & Phrasal Verbs

1.2 Prefixes/ Suffixes & Root Words
1.3 Phrases & Idioms; Questions based on it
1.4 One Word Substitution; Questions based on it
1.5 Antonyms, Synonyms & Incorrect Word Usage

Unit 2: Fill in the Blanks- Applying Content and Context
Overview:
This course is designed for students to identify the clue/ theme words in sentences, then understand the context in which the words are used and finally apply concepts like collocation, antonyms, and synonyms to solve questions.

Learning Outcomes
Upon completion of the course, students should be able to:
1. Identify the theme/ clue words in sentences
2. Solve Single & Double Fill in the blank questions
3. Solve Cloze tests by applying collocations and contextual vocabulary

Competencies
1. Use contextual vocabulary to solve problems
2. Apply vocabulary based tools
3. Apply tricks to solve questions

Sessions
2.1 Concepts & Rules: Single Fill in the Blanks
2.2 Double/ Triple Fill in the Blanks
2.3 Cloze Test

Unit 3: Jumbles
Overview:
This course is designed to develop and improve reading and study skills needed for college work. Topics include identifying main idea and supporting details, determining author's purpose and tone, distinguishing between fact and opinion, identifying patterns of organization in a sentence or passage and the transition words associated with each pattern, recognizing the relationships between words and sentences, identifying and using context clues to determine the meanings of words, identifying logical inferences and conclusions.

Learning Outcomes
Upon completion of the course, students should be able to:
1. Identify the structure of sentences & paragraphs
2. Apply tools of vocabulary and context to organize content
3. Solve questions on jumbled sentences & parajumbles

Competencies
1. Identify the author's purpose, point of view, tone, and method of development.
2. Use tools of language and logic to solve problems
3. Synthesize information given into logically correct sentences or passages

Sessions
3.1 Concepts- Purpose, Tone, Point of view
3.2 Parajumbles
3.3 Jumbled Sentences

Unit 4: Critical Reading Skills
Overview:
Research shows that good reading skills can lead to well written assignments. In this unit, students will learn, develop and improve reading and study skills needed for college work. Building on these basic strategies, students will develop skills to critically analyze texts and then the ability to identify its theme.

Learning Outcomes
Upon completion of the course, students should be able to:
1. Read a given text critically and propaganda techniques
2. Use contextual Vocabulary to find out meanings of new words
3. Use comprehension and vocabulary strategies to raise reading rate.

Competencies
1. Analyze text, e.g., simple outlining and note taking, summarize, draw conclusions, and apply information to personal experiences.
2. Increase speed of reading
3. Solve Reading Comprehensions using elimination strategies
4. Identify the theme of the passage

Sessions
4.1 Concepts- Basic Introduction & Short Passages
4.2 Article & Article Based Passages
4.3 Theme Detection

Unit 5: Spotting the Errors

Overview:

In this unit students will focus on identifying errors in sentences, rectifying them and improving the quality of sentences. Building on these skills will also have an impact on the written and spoken skills of students since they will be aware of the common and often made errors and therefore be able to avoid them while using language.

Learning Outcomes

Upon completion of the course, students should be able to:

1. Read, identify and rectify errors in sentences
2. Improve the quality of sentences by fixing errors
3. Use comprehension and vocabulary strategies to raise reading rate.

Competencies

1. Analyze language and improve its quality
2. Apply tips and tricks to solve questions faster
3. Improve the quality of their writing by being aware of the common errors

Sessions

5.1 Concepts- Basic Introduction & Sentence Fillers
5.2 Spot the Errors
5.3 Sentence Improvement

METHODOLOGY	**ASSESSMENTS**
- Demonstration	- Online assignments
- Presentations	- Individual and Group
- Expert lectures	
- Writing and Audio-visual lessons	

Learning Resources:

learn.talentsprint.com

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 2	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 2	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
DESIGN OF STEEL STRUCTURES

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19PC610CE
Credits: 3	CIE Marks:40	Duration of SEE: 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 and welded connections including detailing . 3. Design tension members, compression members and beams by limit state design as per IS: 800- 2007. 4. 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 rolled steel sections according to IS: 800-2007 Design bolted connection using black bolts and welded connections using fillet welds, groove welds subjected to concentric loads by limit state method according to IS:800-2007 2. Design tension members using limit state design according to IS:800-2007 3. Design compression members and column bases using limit state design according to IS:800-2007 4. Design laterally supported beams using limit state design according to IS:800-2007 5. 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): 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 groove 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.

UNIT-III: 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.
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. Check for web crippling, web buckling & deflection.

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., "Limit state design of Design of Steel Structures", 3rd Edition, McGraw Hill Education, 2019
2. Shiykar, M.R "Limit state design in structural steel" , 3rd edition,2017, PHI learning private limited.
3. Gambhir M.L., "Fundamentals of Structural Steel Design", McGraw Hill Education (India) Pvt. Ltd., New Delhi, 2013
4. Bhavikatti S.S., "Limits state Design of steel Structures", 5th Edition, Dream tech Press 2019.
5. Subramanian N, "Design of Steel Structures (Limit State methods)", 2nd Edition Oxford University Press, 2018.
6. IS: 800-2007: Code of Practice for General Construction in Steel, Bureau of Indian Standards, New Delhi
7. IS: 875-1987: Code of Practice for Design loads for buildings and structures, Bureau of Indian Standards, New Delhi
8. ISI Handbook No. 1 or Steel Tables by Bhavikatti S.S.
9. http://nptel.ac.in/courses/105103094/
10. www.steel-insdag.org

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	: 2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
SOIL MECHANICS

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19PC620CE
Credits : 3	CIE Marks:40	Duration of SEE: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 and analyze mechanism of compaction and consolidation of soils under given field conditions. 4. Analyze mechanism of consolidation of soils under given field conditions. 5. Determine and judge shear strength 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.

UNIT-IV: Consolidation Process: Spring analogy - Void ratio and effective stress (e Vs log P) 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-V: 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

Learning Resources:

1. Murthy V.N.S., "A Textbook of Soil Mechanics & Foundation Engineering", CBS Publishers, 2018.
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, 2017.
4. Shashi K.Gulhati and Manoj Datta, "Geotechnical Engineering", Tata Mc-Graw Hill, 2017
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, 2012
9. Arora K.R., "Soil Mechanics and Foundation Engineering", Standard Publishers Distributors revised and enlarged sixth edition, 2020.
10. Scott, R.F., "Principles of Soil Mechanics", Addison Wesley, Massachusetts,-1965
11. IS-2720 all parts, Methods of tests for Soils.
12. http://nptel.ac.in/courses/105101084/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
ADVANCED STRUCTURAL ANALYSIS

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):3:0 : 0	SEE Marks:60	Course Code: U19PC630CE
Credits: 3	CIE Marks:40	Duration of SEE: 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.IITheory,Design and Details of Structures",Khanna Publishers,16th Edition, 2015.
2. Thandava moorthy T.S.,"Structural Analysis",Oxford Higher Education, Second Edition,2012.
3. Weaverand Gere,"Matrix Analysis of Framed Structures", CBS Publisher,2nd edition, 2004
4. Ramamrutham S.,Narayan R.,"Theory of Structures",Dhan path Rai publications, 9th edition,2017
5. DevdasMenon,"StructuralAnalysis",2st Edition,Naros a Book Distributors Pvt Ltd,2018.
6. ReddyC.S.,"Basic Structural Analysis",3rd Edition, Mc Graw Hill, 2010.
7. Junarkar S.B.,Shah,"Mechanics of Structures",Volume II,CharotarPub. House, 24th edition, 2015.
8. Chu-Kia Wang,"Intermediate Structural Analysis (English) 1st Edition", Mc Graw Hill Education, 2010.
9. HibbelerR.C., "Structural Analysis",10/E,PrenticeHall,HigherEducation, 2018.
10. Louis F.Geschwindner,Harry H.West,"Fundamentals of Structural Analysis", 2ndEdition,WileyIndia Pvt.Ltd.,2011.
11. Stephen P. Timoshenko and Donovan H. Young "Theory of Structures" McGraw Hill International Edition, 1968
12. http://nptel.ac.in/courses/105101086/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
HIGHWAY ENGINEERING

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):3:0 : 0	SEE Marks:60	Course Code: U19PC640CE
Credits: 3	CIE Marks:40	Duration of SEE: 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 and develop a survey plan for a transportation problem through traffic studies to solve urban traffic problems. 3. 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. 4. Design flexible and rigid pavements for National highways as per IRC guidelines 5. 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, 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, Blending of aggregates and job mix formula by Rothfuch method.
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.

UNIT-IV : PAVEMENT DESIGN
Factors affecting pavement design –Traffic, soils and materials
Flexible pavement design using IRC 37:2018.
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, 2017
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 2014.
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 : 2018 : 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. www.pavementinteractive.org
11. http://nptel.ac.in/courses/105105107/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
FINISHING SCHOOL-IV: TECHNICAL SKILLS

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):1: 0 : 0	SEE Marks:40	Course Code: U19PE610CE
Credits : 1	CIE Marks:30	Duration of SEE: 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. 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 Project Management software. 2. Execute Exterior designing plans and graphs of building by using Building Information Modelling Software.

Project Management Software	**Building Information Modelling**
UNIT-I	
• Training on Installation and setup • Introduction to project management • Introduction to primavera • Enterprise project structure (EPS)	• Project Units • Levels • Walls • Basic Wall creation • Basic creation of Plan
UNIT-II	
• Organisational breakdown structure • Project codes and values • Global and project calendars • Adding a project (W/O project architect) • Work breakdown structure (WBS)	• Wall • Compound Wall • Modify Wall • Stacked Wall • Wall Opening
UNIT-III	
• Budget and establishing spending plan • Activity codes and values • Work products and documents • Activities, relationships and scheduling • Constraints	• Door • Window • Floor • Ceiling • Roof • Components

Project Management Software	Building Information Modelling

UNIT-IV

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

- 3D modelling
- Stair
- Railing

UNIT-V

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

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

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	1	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	-	Max. Marks for each Assignment	:	-
3	No. of Quizzes	:	-	Max. Marks for each Quiz Test	:	-

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
DESIGN OF CONCRETE STRUCTURES

SYLLABUS FOR B.E. VI-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19PE711CE
Credits: 3	CIE Marks:40	Duration of SEE: 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: Combined Footing and Retaining walls: Limit state design & detailing of combined rectangular footing and principles of design of trapezoidal footing. Limitstate design & detailing of cantilever and counterfort 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 RajuN.,"DesignofBridges",Oxford&IBHPublicationCompany,2019.
2. Praveen Naga rajan,"Design of Concrete Bridges",Wiley,2020.

3. Jagadeesh T.R.and Jayaram M.A,"Design of Bridge Structures",PHI Learning Private Limited, 2020
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,2014.
6. Punmia B.C., Ashok kJain, Arun K Jain, "Limit State Design of Reinforced Concrete",Laxmi Publications, 2016.
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 II Code of Practice for Concrete Structures for Storage of Liquids, Bureau of Indian Standards, New Delhi,India.
10. IRC5-2000, Standard specification and code of practice for roadbridges, SectionI, General Features of Design, IRC, New Delhi, India.
11. IRC6-2000, Standard specification and code of practice for road bridges, Section II, Loads and Stresses, IRC, New Delhi, India.
12. IRC112-2011, Code of Practice for concrete road bridges, IRC, New Delhi, India
13. SP34:Hand book on Concrete Reinforcement and Detailing (With Amendment1), 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

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	: 2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
ROCK MECHANICS

SYLLABUS FOR B.E. VI-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19PE712CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Identify the classification of Rocks as per engineering aspects 2. Explain the basic laboratory in-situ tests, strengths and its responses 3. Understand Rock slopes and its failures, underground and open excavations and its requirements	1. Able to determine the required rock properties and classify rock mass 2. Determination of bearing capacity of rocks, 3. Checking the stability of slopes, and design underground and open excavation. 4. The students will be able to predict strength of rock mass with respect to various Civil Engineering applications

UNIT-I: Engineering Classification of Rocks: Classification of intact rocks, Rock mass classifications, Rock Quality Designation (RQD), Rock Structure Rating (RSR), Rock Mass Rating (RMR), Norwegian Geotechnical Classification (Q-system), Strength and modulus from classifications, Classification based on strength & modulus and strength and fracture strain, Geo engineering classification

UNIT-II: Laboratory and In-Situ Testing of Rocks: Physical properties, Compressive strength, Tensile strength, Direct shear test, Triaxial shear test, Slake durability test, Schmidt rebound hardness test, Sound velocity test, In-Situ Tests: Seismic methods, Electrical resistivity method, In situ stresses, Plate loading test, Goodman jack test, Plate jacking test, In-situ shear test, Field permeability test.

UNIT-III: Strength, Modulus and Stresses-Strain Responses of Rocks: Factors influencing rock response, Strength criteria for isotropic intact rocks, Modulus of intact rocks, effect of confining pressure, Uniaxial Compressive strength, Strength criteria for intact rocks, Strength due to induced anisotropy in rocks,.
Stress Strain Models: Constitutive relationships, Elastic, Elasto-plastic, Visco-elastic, Elastovisco plastic stress-strain models.

UNIT-IV: Introduction to Rock Slopes: Introduction to Rock slopes, Modes of failure, Rotational failure, Plane failure, Design charts, Wedge method of analysis, Buckling failure, Toppling failure, Improvement of slope stability and protection.

UNIT-V: Underground and Open Excavations: Blasting operational planning, Explosive products, Blast Design, Underground blast design, Controlled blasting techniques, blasting damage and control, Safe practice with explosives and shots.

Learning Resources:

1. Goodman – Introduction to Rock mechanics, Willey International
2. Ramamurthy, T. - Engineering in Rocks for slopes, foundations and tunnels, Prentice Hall of India (2007)

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
GROUND WATER HYDROLOGY
SYLLABUS FOR B.E. VI-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19PE713CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Grasp the properties of Ground water and solve for problems on steady flows. 2. Explain the various methods used to calculate parameters of unsteady flow. 3. Describe various geophysical exploration methods and selection of sites 4. Interpret the various artificial methods of ground water recharge, sea water intrusion and its control. 5. Explain conjunctive use of ground water, different ground water analog models.	1. Assess the ground water parameters and flow characteristics, equations 2. Interpret various equations for unsteady radial flow to a well. 3. Understand different methods of geophysical explorations 4. Evaluate the methods of artificial recharge of ground water. 5. Analyse various ground water analog models and hydrologic balance equations

UNIT-I: Introduction: Ground water in the hydrologic cycle, vertical distribution of ground water. Types of aquifers – unconfined, confined and leaky aquifers, porosity, void ratio, storage coefficient, permeability, transmissivity, specific yield, safe yield. General equation of ground water flow, steady undirectional flow, steady radial flow to a well in unconfined and confined aquifers. Steady flow with uniform recharge.

UNIT-II: Unsteady Radial Flow to a well: Non equilibrium equation for pumping tests, Theis method of solution, Cooper Jacob method, Chow's methods of solution, law of times, well flow near acquifer boundaries. Image wells, multiple well systems, partially penetrating wells, steady radial flow in leaky artersion aquifer. Well completion and well development.

UNIT-III: Geophysical Exploration: Surface investigations of ground water – Electrical Resistivity method, seismic refraction method, gravity and magnetic methods, geologic methods, Dowsing. Subsurface Investigations – Test Drilling, resistivity logging, potential logging, Interpretation of logs and selection of site as a well.

UNIT-IV: Artificial Recharge of Ground Water: Methods of recharge, water spreading, sewage discharge, Recharge through pits and shafts, Recharge through well, Induced recharge. Sea water intrusion in coastal aquifers; occurrence, Ghyben-Herzberg relation, space of fresh – salt water interface, length of the intruded sea water wedge, prevention and control of sea water intrusion.

UNIT-V: Ground Water Basin Management: Conjuctive use of surface and ground waters, Hydrologic balance equation. Ground water analog models-sand models, electric analog models, viscuous flow models.

Learning Resources:

1. Todd D.K., Ground Water Hydrology, John Wiley & Sons, Inc., 2011.
2. Ragunath H.M., Ground Water, Wiley Eastern Limited, 2006.
3. Karnath K.P., Ground Water Ananment, Development and Management, Tata McGraw Hill Publishing Company, 2017.
4. Bouwer, Ground Water Hydrology, McGraw Hill, 1979.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF CIVIL ENGINEERING
QUALITY CONTROL AND ASSURANCE IN CONSTRUCTION
SYLLABUS FOR B.E. VI-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U18PE714CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Apply total quality management in civil construction. 2. Know the process to check the quality in civil construction works.	1. Use various standard codes in civil construction works for better quality assurance and control 2. Understand the process of quality control at site 3. Inspect various construction projects built with reinforced concrete, masonry and steel works 4. Apply statistical analysis for the data collected on various tests

UNIT-I: Construction Projects - Agencies involved in Construction Projects, mutual relationship, quality control at site.

UNIT-II:ISO / IS Requirements IS 9000 (Parts 1 to 4) (Pt 1; 1994, Pt 2; 1993, Pt 3; 1991, Pt 4; 1993) for Total Quality Management. ISO 14000 – 1988 for environment – Impact of large construction projects.

Unit-III: Quality Control on Construction Projects, Inspection of reinforced concrete, masonry and steel works, testing techniques and quality at reports.

UNIT-IV: Statistical Analysis, Sampling frequencies, statistical and reliability analysis, optimum sample size.

UNIT-V: Quality Assurance in constructions

Learning Resources:

1. ISO 9000 in Construction – Nee, Paul A. (Wiley Interscience Publication, 1996)
2. IS: 14000 – Quality System – Guidelines for Selection and Use of Standards on Quality System 1988.
3. ISO 9000 in Construction – Wah, L.S., Min., L.C. & Ann, T.W. (McGraw Hill Book Company, 1996)
4. Construction Engineering and Management – S. Seetaraman (Umesh Publication)

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
SOIL MECHANICS LAB

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):0 : 0 : 2	SEE Marks:50	Course Code: U19PC621CE
Credits : 1	CIE Marks:30	Duration of SEE: 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. Demonstrate professional behaviour in conducting the 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. Determination of Co-efficient of Consolidation

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

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
COMPUTER AIDED STRUCTURAL ENGINEERING LAB

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):0:0: 2	SEE Marks:50	Course Code: U19PC631CE
Credits: 1	CIE Marks:30	Duration of SEE: 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.

LISTOF EXPERIMENTS

Introduction of a structural analysis and designs of ware 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

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
TRANSPORTATION ENGINEERING LAB

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):0: 0 : 2	SEE Marks:60	Course Code: U19PC641CE
Credits: 1	CIE Marks:40	Duration of SEE: 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 aggregates
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)

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

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18

Duration of Internal Test: 2 Hours

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. VI SEMESTER (2020-21)

Dept	Title	Code	credits
Civil	Project Management	U19OE610CE	3
CSE	Introduction To Databases	U19OE610CS	3
CSE	Introduction To Operating Systems	U19OE620CS	3
ECE	Internet Of Things And Applications	U19OE610EC	3
ECE	Introduction To Mobile Communications	U19OE620EC	3
IT	Introduction To Web Application Development	U19OE610IT	3
IT	Introduction To Machine Learning	U19OE620IT	3
Mech.	Additive Manufacturing And Its Applications	U19OE610ME	3
Mech.	Industrial Administration And Financial Management	U19OE620ME	3
H&SS	English For Competitive Examinations	U19OE610EH	3

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF CIVIL ENGINEERING
PROJECT MANAGEMENT (Open Elective-IV)

SYLLABUS FOR B.E.VI-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE610CE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able 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. 5. Interpret the concept of Linear Programming and solve problems by

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 Expected likely, pessimistic and optimistic time, normal distribution curve and network problems of PERT

UNIT-III

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

UNIT-V

Linear programming and optimization Techniques: Introduction to optimization – Linear programming, Importance of optimization, Simple problems on formulation of LP, Graphical method, Simplex method.

LearningResources:

1. Srinath L.S., PERT and CPM: Principles and Application, East-West Press, 2001.
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, 2006.
4. http://nptel.ac.in/courses/

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
INTRODUCTION TO DATABASES (OPEN ELECTIVE-IV)

SYLLABUS FOR B.E. VI-SEMESTER
(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE610CS**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Identify different issues involved in the design and implementation of a database system. 2. Understand transaction processing.	1. Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram 2. Transform a conceptual data model into a relational model 3.Design database using normalization techniques 4.Apply indexing and hashing techniques

UNIT-I

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Architecture, Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, the E-R Model, Constraints, E-R Diagrams.

UNIT-II

Relational Model: Structure of Relation Database, Relational Algebra Operations, Modification of the Database.

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, Join Expressions.

UNIT-III

Relational Database Design: Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies, functional Dependency Theory.

UNIT-IV

Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, B-Tree

Files, Multiple – Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.

UNIT-V

Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
2. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
3. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
4. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
5. Peter rob, Carlos coronel, Database Systems, (2007), Thomoson.
6. http://nptel.ac.in/courses/106106093/

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
INTRODUCTION TO OPERATING SYSTEMS (OPEN ELECTIVE-IV)

SYLLABUS FOR B.E. VI-SEMESTER
(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE620CS**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Understand different Operating system Structures and Services	1. Compare CPU scheduling algorithms and Operating system structures 2. Apply different techniques for Main memory management. 3.Describe file management techniques. 4. Describe deadlock handling methods 5. Analyze Disk scheduling algorithms and I/O operation implementation techniques

UNIT-I:
Introduction to operating systems: Definition, User view and System view of the Operating system, Operating system structure, Operating system services.
Process: Process concept, Process Control block, Context switching.
CPU Scheduling: Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Round Robin

UNIT-II:
Memory Management: Swapping, Contiguous memory allocation: Fixed Partitioning, Variable Partitioning. Non-Contiguous memory allocation: Paging.
Virtual memory: Demand paging, Page replacement Algorithms: FIFO, Optimal, LRU.

UNIT –III:
File System Interface: File Concept, Access Methods: Sequential, Indexed, and Direct
File System Implementation: File-System Structure, Allocation Methods: Contiguous, Linked and Indexed.

UNIT –IV:
Deadlocks: System model, deadlock characterization: Mutual Exclusion, Hold and Wait, Non pre-emption, Circular wait. Deadlock Prevention, Deadlock Avoidance: Banker's algorithm.

UNIT-V:
Device Management: Disk Scheduling algorithms: FCFS, SSTF, SCAN.
I/O System: I/O hardware, Application I/O Interface.

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 9th Edition (2016), Wiley India.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
4. Robet Love: *Linux Kernel Development*, (2004)Pearson Education
5. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
6. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php
https://nptel.ac.in/courses/106106144/

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Internet of Things and Applications (OPEN ELECTIVE – IV)

SYLLABUS FOR B.E.VI-SEMESTER (for other branches)

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE610EC**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. The purpose of this course is to impart knowledge on IoT Architecture, practical constrains. 2. To study various protocols And to study their implementations	1. Understand the Architectural Overview of IoT 2. Enumerate the need and the challenges in Real World Design Constraints 3. Compare various IoT Protocols. 4. Build basic IoT applications using Raspberry Pi. 5. Understand IoT usage in various applications.

UNIT - I : OVERVIEW

Introduction to IoT – Improving Quality of life.

IoT-An Architectural Overview, M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT.

UNIT - II :Real-World Design Constraints

Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Power Management in IoT device, Power conditioning using energy harvesting.

UNIT - III : IOT PROTOCOLS

Introduction to MQTT, Quality of services in MQTT,standards and security in MQTT.

Introduction and implementation of AMQP, Implementation of CoAP and MDNS.

UNIT - IV : Device for IoT

Choice of Microcontroller, Introduction to Raspberry Pi ,Features of Pi, Programming platform, Phython programming for Pi. Building basic IoT Applications using Raspberry Pi.

UNIT - V : IoT case studies

Smart Cities and Smart Homes, Connected Vehicles, Agriculture, Healthcare, Activity Monitoring.

Learning Resources:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1 st Edition, Academic Press, 2014.
2. Peter Waher, “Learning Internet of Things”, PACKT publishing, BIRMINGHAM – MUMBAI
3. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Daniel Minoli, “Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications”, ISBN: 978-1-118- 47347-4, Willy Publications
5. https://nptel.ac.in/courses/106105166/5
6. https://nptel.ac.in/courses/108108098/4

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Introduction to Mobile Communications (OPEN ELECTIVE - IV)
SYLLABUS FOR B.E. VI - SEMESTER (for other branches)

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE620EC**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. To understand the technology trends changing from generation to generation. 2. To have an insight into the various propagation models and the effects of fading. 3. To understand the multiple access techniques and Mobile communication system specifications.	1. Analyze various methodologies to improve the cellular capacity. 2. Identify various Propagation effects. 3. Identify the effects of fading and multi path propagation. 4. Categorize various multiple access techniques for Mobile Communications. 5. Analyze the specifications of GSM based

UNIT - I:

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communications, Examples of Wireless Communications Systems, Trends in Cellular Radio and Personal Communication Systems.

The Cellular Concept – System Design Fundamentals: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Improving Coverage and Capacity in Cellular Systems.

UNIT - II:

Mobile Radio Propagation - Large Scale Path Loss: Introduction to Radio wave Propagation, Free Space Propagation Model, Reflection, Ground Reflection (Two-Ray) Model, Diffraction, Scattering.

UNIT - III:

Mobile Radio Propagation - Small Scale Fading and Multipath: Small Scale Multipath Propagation, Small – Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of Small-Scale Fading, Rayleigh and Ricean Distributions.

UNIT -IV:

Multiple Access Techniques for Wireless Communications: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), Space Division Multiple Access (SDMA).

UNIT -V:

Wireless Systems and Standards: Global System for Mobile (GSM) – Services and features, System architecture, GSM Radio subsystem, channel types, Frame structure for GSM.

Learning Resources:

1. Theodore S. Rappaport, Wireless Communications Principles and Practices, 2nd edition, Pearson Education.
2. David Tse, Pramodh Viswanath, Fundamentals of Wireless Communication, 2005, Cambridge University Press.
3. Name of the course: Introduction to Wireless and Cellular Communications
4. Course url: https://swayam.gov.in/nd1_noc19_ee48/preview

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF INFORMATION TECHNOLOGY
INTRODUCTION TO WEB APPLICATION DEVELOPMENT (OPEN ELECTIVE-V)

SYLLABUS FOR B.E.VI-SEMESTER (Common for CIVIL, ECE, EEE & MECH)

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE610IT**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
Acquire basic skills for designing static and dynamic Web Applications using HTML, CSS , Java script and PHP.	1. Design a static web pages using HTML, CSS. 2. Use JavaScript for creating dynamic web pages and client side validation. 3. Use built-in functions of PHP to perform server side validations and sending emails. 4. Use built-in functions of PHP to connect , query and fetch results from a database. 5. Build a PHP application using an MVC Framework.

UNIT-I: Introduction

Introduction: World Wide Web, Web Browsers, Web Servers, URL, HTTP, TCP Port. HTML: Standard HTML document structure, Basic Tags, Images, Hypertext Links, Lists, Tables, Frames. CSS: In-line style sheets, Internal Style sheets and External Style sheets.

UNIT-II: Basics of JavaScript

JavaScript: Introduction, Basics of JavaScript-variables, data types and operators, Control Structures, Arrays, Functions, HTML Forms, Events and event handling.

UNIT-III: Basics of PHP

Basics of PHP: Data Types, Variables and Operators, Control Structures: If else, Switch Case. Loop: For, ForEach, While, Do While. Functions in PHP, PHP Forms, Cookies & Sessions, File Processing.

UNIT-IV: Advanced PHP

Advanced PHP: PHP E-Mail, Filters, Database Access, OOPS in PHP. Application using PHP.

UNIT-V: Introduction to MVC

Introduction to Model View Controller Architecture, Building Application using a PHP Framework, Testing and Deploying a PHP application.

Learning Resources:

1. "Web Technologies", 7th Edition, UttamK.Roy,2012.
2. "Internet & World Wide Web How to Program", 5/e, Paul J. Deitel, Harvey M. Deitel, Abbey Deitel,2012.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO MACHINE LEARNING (OPEN ELECTIVE-V)
SYLLABUS FOR B.E VI- SEMESTER (Common for CIVIL, ECE, EEE & MECH)

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE620IT**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
Introduce the fundamental concepts and approaches in Artificial intelligence and Machine Learning field to effectively apply techniques to the real-world problems.	1. Demonstrate knowledge of the Artificial intelligence and machine learning literature. 2. Apply an appropriate algorithm for a given problem. 3. Apply machine learning techniques in the design of computer systems. 4. Prove basic results in the theory of learning 5. Explain the relative strengths and

UNIT-I:
Introduction to AIML: Foundations of AI, Sub areas of AI, Applications. Introduction to learning, Types of Learning: Supervised Learning, Unsupervised Learning, Reinforcement Learning.
Supervised learning: Linear Regression, Logistic Regression.

UNIT-II:
Supervised Non-parametric learning: Introduction to Decision Trees, K-Nearest Neighbor, Feature Selection.
Supervised Parametric learning: Support Vector Machine, Kernel function and Kernel SVM.

UNIT-III:
Supervised Parametric learning (Neural networks): Perceptron, Multilayer Neural Network, Backpropagation.

UNIT-IV:
Supervised Parametric Bayesian learning: Introduction, Naive Bayes Classification, Bayesian Network.

UNIT-V:
Unsupervised leaning: Clustering, K-means Clustering, DBSCAN

Learning Resources:

1. Tom Mitchell, Machine Learning, First Edition, McGraw-Hill, 1997
2. Christopher Bishop. Pattern Recognition and Machine Learning. Second Edition.
3. EthemAlpaydin , Introduction to Machine Learning, Second Edition
4. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
5. http://nptel.ac.in/courses/106106139/

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF MECHANICAL ENGINEERING
Additive Manufacturing and its Applications (Open Elective-IV)

SYLLABUS FOR B.E.VI-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE610ME**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
understand the fundamentals of various additive manufacturing technologies and their applications in Engineering Industry.	1. understand the fundamentals of prototyping. 2. study the principle, process, advantages and limitations of liquid based AM systems. 3. study the principle, process, advantages and limitations of solid based AM systems. 4. study the principle, process, advantages and limitations of powder based AM

UNIT-I
Introduction, Prototyping fundamentals, Historical development, Fundamentals of rapid prototyping, Advantages of Rapid prototyping, Commonly used terms, Rapid prototyping process chain, 3D modelling, Data Conversion, and transmission, Checking and preparing, Building, Post processing, AM data formats, Classification of AM process

UNIT-II
Liquid based AM systems: Stereolithography Apparatus(SLA): Models and specifications, Process, Working principle, photopolymers, Photopolymerisation, Layering technology, laser and laser scanning, Applications, Advantages and disadvantages, Case studies
Solid ground curing(SGC): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies

UNIT-III
Solid based AM systems: Laminated object manufacturing(LOM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.
Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.

UNIT-IV
Powder based AM systems: Selective laser sintering(SLS): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.
Three dimensional printing (3DP): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.

UNIT-V

Applications of AM systems: Applications in aerospace industry, automotive industry, jewellery industry, coin industry, GIS Application, arts and architecture.

RP medical and bio engineering Application: planning and simulation of complex surgery, customized implant and prosthesis , design and production of medical devices, forensic science and anthropology, visualization of bio-molecules.

Learning Resources:

1. Chua C.K., Leong K.F. abd LIM C.S., "World Rapid prototyping : Principles and Applications", 2nd Editon, Scientific Publications, 2004
2. D.T.Pham and S.S.Dimov, "Rapid Manufacturing", Springer, 2001.
3. AmithabaGhose, "Rapid prototyping", Eastern Law House, 1997.
4. Paul F.Jacobs, "Stereolithography and other RP & M Technologies", ASME Press, 1996.
5. Paul F.Jacobs, "Rapid Prototyping & Manufacturing", ASME Press, 1996.

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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF MECHANICAL ENGINEERING
Industrial Administration and Financial Management (Open Elective-IV)

SYLLABUS FOR B.E.VI-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U19OE620ME**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. aware about types of business forms, organization structures, plant layouts, merits, demerits and applications. 2. understand method study procedure, PME, time study techniques and wage incentives. 3. importance of PPC and improving quality by control charts and sampling plants. 4. optimization of inventory to minimize total cost and other optimization techniques like LPP, project management techniques. 5. estimate selling price of a product, TVM	1. understand business forms, organization structures and plant layouts. 2. implementation of method study and estimation of standard time. 3. understand types of production, functions of PPC, quality control by charts and sampling. 4. implement optimization techniques like LPP, assignment and project management techniques. 5. understand BEA, estimation of depreciation, selling price of a product

UNIT – I

Industrial Organization : Types of various business organisations. Organisation structures and their relative merits and demerits. Functions of management.

Plant location and layouts: Factors affecting the location of plant and layout. Types of layouts and their merits and demerits.

UNIT – II

Work study: Definitions, Objectives of method study and time study. Steps in conducting method study. Symbols and charts used in method study. Principles of motion economy. Calculation of standard time– by– time study and work sampling. Performance rating factor. Types of ratings. Jobs evaluation and performance appraisal. Wages, incentives, bonus, wage payment plans.

UNIT – III

Inspection and quality control: Types and objectives of inspection S.Q.C., its principles quality control by chart and sampling plans. Quality circles, introduction to ISO.

Production planning and control: Types of manufacture. Types of production. Principles of PPC and its function. Production control charts.

UNIT – IV

Optimisation: Introduction to linear programming and graphical solutions. Assignment problems.

Project Management: Introduction to CPM and PERT. Determination of critical path.

Material Management: Classification of materials. Materials planning. Duties of purchase manager. Determination of economic order quantities. Types of materials purchase.

UNIT – V

Cost accounting: elements of cost. Various costs. Types of overheads. Break even analysis and its applications. Depreciation. Methods of calculating depreciation fund. Nature of financial management. Time value of money. Techniques of capital budgeting and methods. Cost of capital. financial leverage.

Learning Resources:

1. Pandey I.M., "Elements of Financial Management", Vikas Publ. House, New Delhi, 1994
2. Khanna O.P., "Industrial Engineering and Management", Dhanapat Rai & Sons.
3. Everrete E Admaa& Ronald J Ebert , "production and Operations Management", 5th Ed. , PHI , 2005
4. S N Chary, "Production and Operations Management", 3rdEd. , Tata McGraw Hill, , 2006
5. Pannerselvam, "production and Operations Management", Pearson Education, 2007

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VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
(OPEN ELECTIVE) - B.E 3/4 -VI SEMESTER

ENGLISH FOR COMPETITIVE EXAMINATIONS
(Common to all branches)

L: T: P (Hrs/Week): 3:0:0	SEE Marks: 60	Course Code: U19OE610EH
Credits: 3	CIE Marks: 40	Duration of SEE: Hours: 3

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	**On completion of the course, students will be able to:**
➢ To familiarise the students to various types of competitive examinations.	➢ The student will be able to solve various types of questions in competitive English examinations effectively.
➢ To practice questions and prepare for GATE, GRE, CAT, TOEFL.	➢ Provide logical conclusions for the questions on aptitude and reasoning within the stipulated time.

GATE :

- Concentrating on English grammar
- Recognizing suitable option in sentence completion
- Solving verbal analogies
- Categorizing word groups
- Ignoring distractions in critical reasoning questions
- Providing reasoning in verbal deduction

GRE :

VERBAL REASONING:

- Analysing and drawing add value to incomplete data; identify the perception of the author
- Identifying vital points and differentiating between relevant and irrelevant points
- Understanding and summarising the structure of a text
- Understanding the given words, sentences and entire texts; ability to focus on the meaning of the entire sentence
- Understanding relationships among words and concepts

ANALYTICAL WRITING:

- Articulating complex ideas effectively and with clarity

- Supporting ideas with relevant reasons and examples
- Examining claims and accompanying evidence
- Sustaining a well-focused, coherent discussion

CAT :

VERBAL ABILITY AND READING COMPREHENSION:

- Reading comprehension (antonyms/synonyms)
- Sentence correction
- Fill in the blanks & cloze passage
- Jumbled sentences
- Jumbled paragraph (word meaning based questions)
- Analogies
- Para odd one out
- Summary (facts, assumptions, judgements
- Verbal reasoning (paragraph formation)

TOEFL:

- Basic understanding, speed and accuracy, learning from reading, pronoun reference, author's point of view.
- Good delivery including clarity of speech, fluidity, natural pacing and correct intonation patterns.
- Correct use of language showing a good grasp of grammar, vocabulary and speech structures.
- Topic development in which you are able to show a well-structured. organized response that effectively connects ideas with enough support for each point you are making.
- Writing strategy and format execution skills.

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