

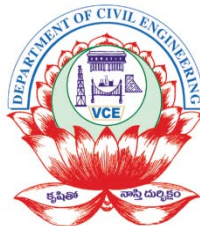
**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
IBRAHIMBAGH, HYDERABAD-31**

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 2023–2024  
(For the students admitted in 2021-22)**



**DEPARTMENT OF CIVIL ENGINEERING  
+91-40-23146010, 23146011  
Fax: +91-40-23146090  
Website: [www.vce.ac.in](http://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 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.

## ***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.

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**DEPARTMENT OF CIVIL ENGINEERING**  
**SCHEME OF INSTRUCTION AND EXAMINATION (R-21)**  
**BE (CIVIL ENGINEERING) V-SEMESTER ACADEMIC YEAR 2023 - 2024**  
**(Students Admitted in 2021-22)**

Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			Credits
		Hours per Week			Duration in Hrs	Maximum Marks		
		L	T	P/D		SEE	CIE	
<b>THEORY</b>								
U21HS510EH	Skill Development Course-V:(Communication Skills-II)	1	-	-	2	40	30	1
U21HS040EH	Economics & Finance for Engineers	2	-	-	3	60	40	2
U21PC510CE	Structural Analysis	3	1	-	3	60	40	4
U21PC520CE	Hydraulics and Hydraulic Machinery	3	-	-	3	60	40	3
U21PC530CE	Environmental Engineering	3	-	-	3	60	40	3
U21PC540CE	Reinforced Concrete Design	3	1	-	3	60	40	4
U21PE510CE	Skill Development Course-VI:(Technical Skills-II)	1	-	-	2	40	30	1
U21OE510CE	Open Elective-III	3	-	-	3	60	40	3
<b>PRACTICALS</b>								
U21PC521CE	Hydraulics and Hydraulic Machinery Lab	-	-	2	3	50	30	1
U21PC531CE	Environmental Engineering Lab	-	-	2	3	50	30	1
U21PC541CE	Concrete Lab	-	-	2	3	50	30	1
U21PC551CE	Surveying Camp	-	-	-	-	-	50	1
<i>Student should complete one NPTEL (8 weeks) certificate course equivalent to 2 credits by the end of VI semester</i>								
<b>Total</b>		<b>19</b>	<b>2</b>	<b>6</b>		<b>590</b>	<b>440</b>	<b>25</b>
<b>Grand Total</b>		<b>27</b>				<b>1030</b>		
<i>Note: Surveying Camp will be conducted for one week before the commencement of V-Semester.</i>								
<i>Note: The left over hours are to be allotted to ECA-II / CCA-III/Sports / Library / Mentor Interaction based on the requirement.</i>								

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES  
**SKILL DEVELOPMENT COURSE-V (COMMUNICATION SKILL-II)**

SYLLABUS FOR B.E.V SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:40	Course Code: U21HS510EH
Credits : 1	CIE Marks:30	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
<ol style="list-style-type: none"><li>1. Get students proficient in both receptive and productive skills</li><li>2. Enable students to build strategies for effective group interaction and help them in developing decisive awareness and personality while maintaining emotional balance.</li><li>3. To introduce students to an ideal structure for a presentation</li><li>4. To develop and improve writing and study skills needed for college work.</li></ol>	<ol style="list-style-type: none"><li>1. Participate in group and forum discussions by providing factual information, possible solutions, and examples</li><li>2. Present a topic by picking up the key points from the arguments placed.</li><li>3. Read between the lines and write informed opinions.</li><li>4. Prepare, present, and analyze reports</li></ol>

**UNIT-1: Delightful Discussions**

- 1.1 Six Thinking Hats
- 1.2 Group Discussion Techniques (Initiation Techniques, Generating Points, Summarization techniques)
- 1.3 Case Study Based Group Discussions

**UNIT-2: Powerful Presentations**

- Concise Cogent Presentation
- 2.1 Persuasion skills
  - 2.2 Toulmin Model
  - 2.3 BikerB - JAM and Extempore

### **UNIT-3: Fact, Observation and Inference**

- 3.1 Discernment of fact and opinion
- 3.2 Note making and Inference
- 3.3 Main idea identification
- 3.4 Logical Conclusions

### **UNIT- 4: Effective Technical Writing**

- 4.1 Report writing
- 4.2 Image Writing
- 4.3 Book Reviews
- 4.4 Movie Reviews

### **Learning Resources:**

1. How to Win Friends and Influence People by Dale Carnegie. ...
2. Crucial Conversations: Tools for Talking When Stakes Are High by Kerry Patterson, Joseph Grenny, Ron McMillan, and Al Switzler. ...
3. Difficult Conversations: How to Have Conversations that Matter the Most by Douglas Stone, Bruce Patton, Sheila Heen, and Roger Fisher.

### **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 Tests	:	90 Minutes			



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DEPARTMENT OF HUMANITIES & 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: U21HS040EH
Credits : 2	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. The course will enable the learners to: Understand the concepts and tools of economics, cost and finance that will equip them for decision making.	<ol style="list-style-type: none"><li>1. Gain a conceptual understanding economics as a discipline.</li><li>2. Construct a cost sheet and classify costs and make use of break-even analysis in decision making.</li><li>3. Evaluate the accounting cycle and explain its importance in recording business transactions</li><li>4. Interpret the ratios and dissect comparative and common size statements</li><li>5. Compare the sources of finance and evaluate them</li></ol>

**UNIT- I: Concepts in Economics:** Scarcity of Resources-Relevance of Economics for Engineers- Scope of Managerial Economics-Law of Demand-assumptions and exceptions -Price elasticity of demand(Application-oriented approach)

**UNIT- II: Cost Analysis and Profit Planning:** Concept of Cost -Costing – Classification of Costs –Preparation of Cost Sheet (Simple Problems) –Breakeven Analysis(Application-oriented approach)

**UNIT-III: Conceptual Understanding of Accounting:** Accounting Cycle-Journal-Subsidiary Books- Ledger-Trial Balance-Final Accounts (Manufacturing/Trading, Profit and Loss Account, Balance Sheet (Theory Only)

**UNIT-IV:Financial Statement Analysis:** Financial Statements- Meaning - Types –Purpose-Comparative and Common Size Statements-Ratio Analysis-Liquidity,Solvency, Activity & Profitability Ratios(including simple problems on Ratio Analysis)

**UNIT-V:Long Term Sources and Uses of Finance:** Long term sources of finance-Debt, Equity, Hybrid, Start- Up finances, Crowd Funding, Peer to Peer lending platforms. Capital Budgeting –Traditional and DCF Techniques (including simple problems)

**Learning Resources:**

1. S.P.Jain and K.L Narang., “Financial Accounting”, Kalyani Publishers – Latest edition.
2. S.P.Jain and K.LNarang., “Cost Accounting”, Kalyani Publishers, Latest edition.
3. M.Y.Khan and P.K. Jain., “Financial Management – Text, Problems and Cases”, McGraw Hill Education Private Limited, New Delhi.Latest edition
4. M. Kasi Reddy &Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, Latest edition.
5. Mehta P.L.,“Managerial Economics: Analysis, Problems and Cases”, Sultan Chand and Sons. Latest edition.
6. Narayanaswamy, “Financial Accounting: A Managerial Perspective”, Prentice Hall India
7. M. L. Seth., “Micro Economics”, *Lakshmi Narain Agarwal*. Latest edition
8. Dr. R.P. Rustagi., “Fundamentals of Financial Management”Taxmann Publications.Latest edition.

**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

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DEPARTMENT OF CIVIL ENGINEERING  
**STRUCTURAL ANALYSIS**

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3 : 1 : 0	SEE Marks:60	Course Code: U21PC510CE
Credit: 4	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 shall be point load(s) and uniformly distributed load-shear force and bending moment diagrams.

**UNIT-IV: Approximate methods** : Portal method and cantilever method.

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

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

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

### Learning Resources:

1. Vazirani V.N., Ratwani M.M, Duggal S.K., "Analysis of Structures-Vol. II Theory, Design and Details of Structures", Khanna Publishers, 16<sup>th</sup> Edition, 2015.
2. Thandavamoorthy T.S., "Structural Analysis", Oxford Higher Education, Second Edition, 2012.
3. Ramamrutham S., Narayan R., "Theory of Structures", Dhanpath Rai publications, 11<sup>th</sup> edition, 2020
4. Devdas Menon, "Structural Analysis", 2<sup>nd</sup> Edition, Narosa Book Distributors Pvt Ltd, 2018.
5. Reddy C.S., "Basic Structural Analysis", 3<sup>rd</sup> Edition, McGraw Hill, 2017.
6. Junarkar S.B., Shah, "Mechanics of Structures", Volume II, Charotar Pub. House, 24<sup>th</sup> edition, 2015.
7. Chu-Kia Wang, "Intermediate Structural Analysis (English) 1st Edition", McGraw Hill Education, 2017.
8. Hibbeler R.C., "Structural Analysis", 10/E, Prentice Hall, Higher Education, 2018.
9. Louis F. Geschwindner, Harry H. West, "Fundamentals of Structural Analysis", 2<sup>nd</sup> 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/>

### 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

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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: U21PC520CE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are to	Up on the completion of the course, students are expected to
<ol style="list-style-type: none"><li>1. Study various aspects of open channel flow.</li><li>2. Learn the concepts of boundary layer theory</li><li>3. Discuss the performance and design of hydraulic turbines and centrifugal pump.</li></ol>	<ol style="list-style-type: none"><li>1. Compute velocity, specific energy and critical depth in steady uniform flow through open channels</li><li>2. Determine water surface profiles, hydraulic jumps and surges in non-uniform flow through open channels</li><li>3. Explain growth and separation of boundary layer and evaluate drag &amp; lift forces for various shapes of bodies in a medium</li><li>4. Evaluate the performance characteristics and perform design of turbines for various conditions of head, discharges and power</li><li>5. Evaluate the performance characteristics and perform design of centrifugal pump for various conditions of head, discharges and power</li></ol>

**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 toflowin 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: Impact of Jets:** Force exerted by a jet on a stationary and moving plate; Force exerted on a curved plate and unsymmetrical plate; Force exerted by a jet of water on a series of straight plates and curved plates.

**UNIT-IV: Hydraulic Turbines:** Classification, specific speed, unit quantities velocity triangles, energy equation for hydraulic machine, 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. VenTeChow "Open-Channel Hydraulics" International Student Edition, McGraw-Hill, 2009.
2. Modi P.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 SrinivasaRaju and D Nagesh Kumar, "Fluid Mechanics problem solving using MATLAB" Prentice Hall of India, 2020
7. <http://nptel.ac.in/courses/105107059/Fluid>  
Mechanics <http://nptel.ac.in/courses/105103096/3>, Hydraulics

### 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

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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: U21PC530CE
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
<ol style="list-style-type: none"><li>1. Analyze water and waste water system and understand the concepts of demand, supply and distribution system and identify various public health elements</li><li>2. State the stages involved in water and sewage design treatment, mechanism and disposal</li><li>3. Describe the concept of sludge and solid waste management and air pollution.</li></ol>	<ol style="list-style-type: none"><li>1. Assess the water demand and understand the concept of water and wastewater conveyance.</li><li>2. Apprehend water quality, unit operations and processes involved in water treatment.</li><li>3. Understand the characteristics of domestic sewage and stages of sewage treatment.</li><li>4. Understand the biological methods of sewage treatment and natural sewage disposal methods.</li><li>5. Understand and the concepts of sludge, solid waste management and air pollution.</li></ol>

**UNIT-I:Water Demand and Forecasting Methods:** Water demand and per capita consumption, population forecasting approaches.

**Water distribution:** Water distribution systems and solution of a simple network using Hardy Cross method.

**Sewage conveyance:** Dry and wet weather flow, types of sewerage networks, sewer appurtenances, Velocity in sewers, Storm water estimation by rational method, Design of a simple sewerage system.

**UNIT-II:Water Quality:** Standards of potable water, Drinking water quality parameters and testing.

**Treatment of Water:** Introduction to unit operation and unit processes, Design of rectangular and circular sedimentation tanks, coagulation and flocculation, design of a flocculator. Filtration – types of filters and filter media. Design principles of slow and rapid sand filters, Disinfections –

necessity and methods, chlorination of water supplied, Removal of hardness, taste & odour control.

**UNIT-III: Waste water Characteristics:** Waste water sampling-significance and techniques; physical, chemical and biological characteristics of wastewater; Population equivalent; Relative Stability.

**Waste Water Treatment:** Stages of wastewater treatment, Preliminary and primary treatment: Screens: types, disposal. Grit chamber, oil and grease removal, primary and settling tanks, Equalization.

**UNIT-IV: Biological Treatment Process:** Suspended growth system - conventional activated sludge process and its modifications, Principle of stabilization ponds, oxidation ditch. Attached growth system – trickling filter, bio-towers and rotating biological contactors, secondary settling tank. Introduction to Sequential Batch Reactor (SBR) and Up flow Anaerobic Sludge Blanket (UASB) treatment methods.

**Natural Methods of sewage disposal:** Self-purification of streams, Oxygen sag Analysis, Dilution into sea, disposal by land treatment.

**UNIT-V: Sludge management:** Sludge characteristics and treatment, Sludge digesters (aerobic and anaerobic), thickeners and drying beds, Disposal of sludge.

Working principal and design of septic tanks for small community.

**Air Pollution:** Types of pollutants, their sources and impacts, air pollution control, air quality standards, Air quality Index and limits.

**Municipal Solid Wastes:** Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

### **Learning Resources:**

1. S.K.Garg, "Environmental Engineering vol-II, Water supply Engineering", Khanna Publishers, – New Delhi, 35th edition and 2022
2. S.K.Garg, "Environmental Engineering vol-I, Water supply Engineering Sewage Disposal and Air pollution engineering", Khanna Publishers, – New Delhi, 40<sup>th</sup> edition and 2022
3. B C Punmia, "Environmental Engineering vol-I& II", Laxmi Publications, 1<sup>st</sup> edition, 2021 (E-book).
4. Karia G.L., and Christian R.A, "Wastewater Treatment Concepts and Design Approach", Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017
5. Birdi G.S, "Water Supply and Sanitary Engineering", DhanpatRai& Sons, 2014
6. Peavy H.S., Rowe D.R., Tchobanoglous G., "Environmental Engineering", Tata McGraw Hills, New Delhi, 2017



7. Metcalf & Eddy M.C., "Waste Water Engineering – Treatment & Reuse", Tata McGraw Hill Publications, New Delhi, 2003
8. <http://nptel.ac.in/courses/105106119/>

**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		

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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: U21PC540CE
Credits : 4	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
<ol style="list-style-type: none"><li>1. Design philosophies of working stress method and limit state method.</li><li>2. Indian standard codes of practice for Reinforced Concrete</li><li>3. Design of concrete structural elements using limit state method as per Indian code of practice.</li></ol>	<ol style="list-style-type: none"><li>1. Understand design philosophies of concrete and design beams for flexure with working stress method according to IS: 456 -2000.</li><li>2. Design beams for flexure with limit state method according to IS: 456-2000.</li><li>3. Design beams for shear, torsion and compute deflections with limit state design philosophy according to IS: 456-2000.</li><li>4. Perform yield line analysis of slabs and design slabs with limit state method according to IS: 456-2000.</li><li>5. Design columns and footings with limit state method according to IS: 456-2000.</li></ol>

**UNIT-I: Introduction to Reinforced Cement Concrete:** Need for Reinforcement in Concrete – Basic requirements of an RC Structure-stability, Strength, Service ability 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 Service ability:** 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 load. 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-ways 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. Pillai and menon, Reinforced Concrete Design, Narosha publications, 4<sup>th</sup> edition, 2021
2. Unnikrishna Pillai S and Devdas Menon, "Reinforced Concrete Design", McGrawHill Education India Pvt Ltd., 2017.
3. Varghese P.C., "Limit State Design of Reinforced Concrete", Prentice Hall of India, 2008.
4. Subramanian N., "Design of Reinforced Concrete Structures", Oxford University Press, 2013.
5. Robert Park and Thomas Paulay, "Reinforced Concrete structure", Wiley India Pvt. Ltd, 2013.
6. Shah H.J., "Reinforced Concrete", Vol.1, Charotar Publishing House, 2016.
7. Punmia B.C., Ashok K. Jain, Arun K. Jain, "Limit State Design of Reinforced Concrete", Laxmi Publications (P) Ltd. 2016.
8. Ramamrutham, "Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Co., 2016.
9. Nptel.ac.in /courses/105105105, Design of Reinforced Concrete Structures.

10. IS:456-2000, Code of Practice for Plain and Reinforced Concrete, Bureau of Indian Standards, New Delhi, India.
11. SP16:Design Aids for Reinforced Concrete to IS456:1978,Bureau of Indian Standards, New Delhi, India
12. 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
13. SP34:Hand bookon Concrete Reinforcement and Detailing (With Amendment1), Bureau of Indian Standards, NewDelhi, India
14. 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

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

DEPARTMENT OF CIVIL ENGINEERING  
**SKILL DEVELOPMENT COURSE-VI (TECHNICAL SKILL-II)**

SYLLABUS FOR B.E.V SEMESTER

L : T : P (Hrs./week):1:0:0	SEE Marks:40	Course Code: U21PE510CE
Credits : 1	CIE Marks:30	Duration of SEE: 3 Hrs

BIM concepts / Industry standard coding practices through C or other programming languages / Applications of spread sheets in engineering

**Introduction to BIM Concepts**

1. Introduction to BIM
2. Draw and modify walls & Complex Walls
3. Add and modify wall profiles
4. Place Doors, windows & Components
5. Dimensions and Constraints
6. Create Floor, roofs and Ceilings
7. Curtain walls, grids and mullions
8. Railing, Stairs & Ramps
9. Conceptual models
10. Annotations, legends and Schedules
11. Sheets and Title Blocks
12. Materials and lighting
13. Views, camera, Walk – through, Render & Solar study
14. In place families and families creations
15. Massing and Site Design
16. Link projects & collaboration
17. Realistic presentations
18. Import & Export

The content of technical skills may be altered based on the industry requirements and third party technical expertise available.

**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	: 5
3 No. of Quizzes	: -	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  
**HYDRAULICS & HYDRAULICS MACHINERY LAB**

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):0:0:2	SEE Marks:50	Course Code:U21PC521CE
Credits: 1	CIE Marks:30	Duration of SEE:3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
Objectives of this course are to	Upon the completion of the course, students are expected to
<ol style="list-style-type: none"><li>1. Manning's rugosity coefficient and super elevation in open channels.</li><li>2. Impact coefficient on different types of vanes and drag and lift force in wind tunnel</li><li>3. Pre and post jump depths and calculate loss of energy in hydraulic jump.</li><li>4. Familiarize with the procedures of calculating over all efficiency of different types of pumps and turbines.</li></ol>	<ol style="list-style-type: none"><li>1. Determine Manning's rugosity coefficient and measure super elevation in an open channel and estimate loss of energy in hydraulic jump.</li><li>2. Evaluate impact coefficient for different types of vanes.</li><li>3. Evaluate the overall efficiency of various pumps and turbines and draw performance characteristic curves.</li><li>4. Practice working as a team member and lead a team.</li><li>5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively.</li></ol>

**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 vanes
4	Centrifugal pump	Determination of efficiency and performance characteristics.
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	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%](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)  
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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:U21PC531CE
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The objectives of the course are to	Upon the completion of the course, students are expected to
<ol style="list-style-type: none"><li>1. Familiarize with the procedures of water quality analysis.</li><li>2. Estimate the Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) for sewage samples.</li><li>3. Calculate the coagulant dosage for Reduction of turbidity and disinfection dosage.</li><li>4. Practice working of flame photometer.</li></ol>	<ol style="list-style-type: none"><li>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.</li><li>2. Estimate the Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) in sewage samples.</li><li>3. Calculate the coagulant dosage for reducing the turbidity and disinfection dosage.</li><li>4. Practice working as a team member and lead a team</li><li>5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively</li></ol>

**LISTOF EXPERIMENTS**

1. Determination of Variation of pH.
2. Determination of Chlorides.
3. Determination of Acidity.
4. Determination of Dissolved Oxygen
5. Determination of Biochemical Oxygen Demand (B.O.D.)
6. Determination of total solids
7. Determination of residual chlorine.



8. Determination of turbidity
9. Determination of Nitrates and Sulphates using UV Spectrophotometer
10. Determination of coagulant dose –Jar test.
11. Determination of Chemical Oxygen Demand (C.O.D.)
12. Determination of Sludge Volume Index (SVI)
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:U21PC541CE
Credits:1	CIE Marks:30	Duration of SEE:3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
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 work ability 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 TEST ON AGGREGATE:**

- 5 (a) Specific gravity of fine aggregate.
- (b) Bulk density of fine aggregate
- (c) 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 TEST 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 Port land 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 Port land Cement, 53 Specifications, Bureau of Indian Standards, New Delhi.
4. IS: 650-2008, Indian Standard Code of Practice for Standards and for Testing Cement-Specifications (Second Revision), Bureau of Indian Standard, 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:U21PC551CE
Credits: 1	CIE Marks: 30	Duration of SEE: ---

<b>COURSEOBJECTIVES</b>	<b>COURSEOUTCOMES</b>
The objectives of the course are to	Upon the completion of the course, students are expected to
1. Field exercise with modern surveying equipment including GPS and Total Station. 2. All aspects of executing and plotting of field surveys. 3. Capturing top of graphical 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 member.

**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 30 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 BE V-SEMESTER**

<b>Dept</b>	<b>Title</b>	<b>Code</b>	<b>credits</b>
Civil	Spatial Information Technology	U21OE510CE	3
CSE	Web Designing	U21OE510CS	3
CSE	Fundamentals of Object Oriented Programming	U21OE520CS	3
ECE	Introduction to Biomedical Electronics	U21OE510EC	3
ECE	Introduction to Communication Systems	U21OE540EC	3
EEE	Solar Power and applications	U21OE510EE	3
Mech.	Introduction to Robotics	U21OE510ME	3
Mech.	Introduction to Automobile Engineering	U21OE520ME	3
Mech.	Basics of Entrepreneurship	U21OE530EH	3
IT	Introduction to Database Management Systems	U21OE510IT	3
IT	Introduction to Statistical Programming	U21OE520IT	3
Phy.	Thin Film Technology and Applications	U21OE510PH	3
H&SS	Design Thinking	U21OE530EH	3
HSS	Technical Writing and Professional Presentations	U21OE020EH	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:U21OE510CE
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, Areas of GIS application, Components of GIS, Overview of GIS Software packages, Current issues and Trends in GIS. Variables-Point, line, polygon, 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. BasudebBhatta, 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. ThanappanSubash., 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 McGraw 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 COMPUTER SCIENCE & ENGINEERING  
**WEB DESIGN**  
(OPEN ELECTIVE-III)  
(COMMON FOR CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:U21OE510CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Develop web application using HTML, CSS, JavaScript and PHP.	1 Design static web pages. 2 Apply styles to the web pages. 3 Create dynamic web pages using JavaScript. 4 Design DTD and schema for a given XML file. 5 Develop server side components using PHP.

**UNIT-I:** Web Basics and overview: Introduction to Internet, World Wide Web, Web Browsers, Web Servers, URL, MIME, HTTP, Web Programmers Tool Box, Introduction to HTML Purpose of HTML and XHTML, Text Formatting, Hypertext Links, Images, Lists, Tables, Forms and Frames.

**UNIT-II:** Cascading Style Sheets- Levels of Stylesheet, Style Specification Formats, Selector Formats, Property Value Forms, Font Properties, List Properties, Alignment of Text, Box Model, Background Images, Borders, div and span tags, Conflict Resolution.

**UNIT-III:** JavaScript - Object Orientation and JavaScript, Primitives, Operations, Expressions, Control Statements, Object Creation, Arrays, Functions- Introduction, Program Modules in JavaScript, Programmer-Defined Functions, Function Definitions, Random-Number Generation, Scope Rules, JavaScript Global Functions, Recursion, Constructors, Regular

Expressions, DOM Model, Events, Event Handling in JavaScript, JavaScript objects.

**UNIT-IV:** Introduction to XML, Syntax of XML, XML Document Structure, Document type Definition, Namespaces and Schemas.

Client-Server Architecture, Multi-tier Architecture, Web server.

**UNIT-V:** PHP- Overview of PHP, General Syntactic Characteristics, Primitives, Operations, and Expressions, Output, Control Statements, Arrays, Functions, Pattern Matching, Form Handling, Cookies and Session Tracking.

**Learning Resources:**

1. Robert W. Sebesta, "Programming the World Wide Web", 4<sup>th</sup> edition, Pearson Education
2. Uttam K.Roy, "Web Technologies", Oxford publishers.
3. <http://www.w3schools.com>
4. <https://www.php.net/manual/en/tutorial.php>

**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 COMPUTER SCIENCE & ENGINEERING  
**FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING**  
(OPEN ELECTIVE-III)  
(COMMON FOR CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks:60	Course Code :U21OE520CS
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Apply object oriented principles for developing an application using Java constructs.	1.Adopt the fundamentals of Object oriented system development for developing a application.
2 Design GUI using existing Java classes and interfaces.	2.Apply basic features of OOP to design an application. 3.Employ runtime error handling, concurrent programming practices to develop a parallel processing application. 4.Perform string handling, read and write operations using console and files IO streams. 5.Design GUI for a java application using AWT classes.

**UNIT-I: Object Oriented System Development:** Understanding Object Oriented Development, Understanding Object Concepts, Benefits of Object Oriented Development.

**Java Programming Fundamentals:** Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements.

**UNIT-II: Building blocks of OOP:** Classes and Methods, Constructor, Parameterized constructor, Garbage Collection, this, static, final keywords, Inheritance, types of inheritance, Method Overriding, Abstract class, Nested class, Interface, Package.

**UNIT-III: Exception Handling:** try, catch, throw, throws, finally, creating user defined exceptions

**Multithreaded Programming:** Types of Thread creation, multiple threads, isalive, join, thread priority, Thread Synchronization, Inter process communication.

**UNIT-IV:String Handling:** String constructors, operations, character extraction, comparison, search, modification. StringBuffer, methods, StringBuilder, StringTokenizer

**Util:** Date, Calendar, Random, Timer, Observable

**IO:** Files and Directories, I/O Classes and Interfaces, Byte Streams classes and Character Stream classes

**UNIT-V: Applet:** Applet Class, Applet architecture

**Event Handling:** The Delegation Event Model, Event Classes, Source of Events, Events Listener Interfaces

**GUI Development:** AWT: Classes, Working with Graphics, Frames, Menu, Layout Managers.

### **Learning Resources:**

1. Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill 2005.
2. P. Radha Krishna, Object Oriented Programming through Java, Universities Press, 2007.
3. Sachin Malhotra, Saurabh Choudhary, Programming in Java, 2nd Edition, Oxford Press, 2014.
4. <https://docs.oracle.com/javase/tutorial/java>

### **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  
**INTRODUCTION TO BIOMEDICAL ELECTRONICS**  
**(Open Elective - III)**

SYLLABUS FOR B.E. V – SEMESTER (Civil, CSE, IT, EEE& Mechanical)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U21OE510EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
To provide fundamental knowledge of biomedical signals, transducers and various instruments.	On completion of the course, students will be able to 1. recite the basic need of biomedical signals and basic instruments. 2. comprehend the principles of basic bioelectric signals, electrodes and transducers in biomedical electronics. 3. demonstrate the principle of various therapeutic, prosthetic and non invasive instruments for use and prediction of diseases. 4. understand the mathematical, physical and computational principles underlying modern medical imaging system for visualization and analysis of medical image data.

**UNIT - I : Basics of Biomedical Electronics:** Physiological systems of the body, sources of biomedical signals, basic medical instrumentation system, performance requirements of medical instrumentation systems, Intelligent medical instrumentation systems, General constraints in design of medical instrumentation systems.

**UNIT - II : Bioelectric Signals, Electrodes, Transducers:** Origin of bioelectrical signals, recording electrodes, electrodes for ECG, EEG, EMG, micro-electrodes. Transducer: Introduction, classification of transducers, performance characteristics of transducers, displacement position and motion transducers, pressure transducers, photoelectric transducer.

**UNIT - III : Therapeutic and Prosthetic Devices:** Cardiac pacemaker, defibrillators, hemodynamic & haemodialysis, ventilators, infant incubators, surgical instruments, therapeutic applications of laser.

**UNIT - IV : Non-invasive Instrumentation:** Temperature measurements, principles of ultrasonic measurements and its applications in medicine, medical thermography, physics of thermography infrared detectors and thermographic detectors.

**UNIT - V : Modern Medical Imaging System:** Radiography: Production of X-rays, units of X-radiation, block diagram of X-ray machine, MRI, computed tomography: Block diagram and working.

**Learning Resources:**

1. L. Cromwell, Biomedical Instrumentation and Measurements, Prentice Hall.
2. Handbook of Biomedical Instrumentation by R.S. Khandpur.
3. S.K. Venkata Ram, Bio-medical Electronics and Instrumentation, Galgotia Publications, Pvt. 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 Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING  
**INTRODUCTION TO COMMUNICATION SYSTEMS**  
(Communication Engineering Stream: Open Elective-III)

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

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U22OE540EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSEOBJECTIVES	COURSEOUTCOMES
To introduce basic concepts of various communication systems.	On completion of the course, students will be able to 1. Identify the Radio frequency spectrum and the bands of different types of radio systems. 2. Determine the specifications of a radio receiver. 3. Estimate the signal degradation in optical fiber cable.

**UNIT -I: Introduction to Electronic Communication:** Communication systems, Types of Electronic Communication, The Electromagnetic Spectrum, Bandwidth, Gain and Attenuation definitions, Information, Transmitter, Receiver, Channel

Lab activity: Gain, Bandwidth, Attenuation calculations usingMATLAB

**UNIT-II: Radio transmitters and Receivers:** Classification of transmitters: High level and low level AM transmitters, FM transmitters.

Receiver characteristics: Sensitivity, Selectivity, Fidelity.

Tuned radio frequency (TRF) and super heterodyne receivers, Intermediate frequency, AGC, Image frequency, IFRR.

**Lab activity:** Image frequency and IFRR calculations usingMATLAB

**UNIT -III: Optical Fiber Communication (OFC):** Overview, Optical spectral bands, Key elements of Optical fiber systems, Basic optical laws and definitions, optical fiber modes and configurations. Signal degradation in optical fibers: Attenuation, Scattering losses, bending losses

**Lab activity:** Estimation of optical losses usingMATLAB



**UNIT-IV : Microwave Engineering:** Importance of Microwave Engineering in modern communication, Microwave frequency band designations, Different Microwave signal generators: Klystron, Magnetron, Gunn diode, Introduction to microwave transmission lines: wave guides, microstrip lines

**Lab Activity:** Determination of wavelength of a microwave signal in dominant mode, Characteristics of microstrip line using MATLAB

**UNIT -V: Satellite Communication:** Benefits of Satellite Communication. Historical evolution of Satellites, Types of satellites, Satellite frequencies, Principles of Operation: Keplers's laws, orbital parameters, Satellite orbits uplink and down link, Telemetry tracking and control, Satellite Communication in India. Introduction to Global Positioning System

**Lab Activity :** Verification of Kepler's 2nd law using MATLAB

### **Learning Resources:**

1. Electronic Communication Systems by George Kennedy, 5<sup>Th</sup> edition.
2. WayneTomas,ElectronicCommunicationsSystems,5<sup>th</sup>Edition,PearsonEducation.
3. Satellite Communication: by R.N Mutagi, Oxford University Press, 2016
4. Microwave Engineering: By Anapurna Das and Sisir K Das, 4th Edition, 2020, Mc Graw Hill
5. Optical Fiber Communications Principles 3Rd Edition by SENIOR, PEARSON INDIA
6. <https://nptel.ac.in/syllabus/syllabus.php?subjectId=117102059>
7. <https://nptel.ac.in/courses/117101051/12>

### **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**

SYLLABUS FOR B.E. V SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U21OE510EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The course will enable the students to:	On completion of the course, students will be able to
To impart the basics of solar energy harnessing and solar panel and array.	<ol style="list-style-type: none"><li>1. Compare different energy resources.</li><li>2. Identify and choose proper type of meter for solar radiation measurement.</li><li>3. Use proper solar thermal system according to the load requirements.</li><li>4. Categorize and compare photovoltaic cells.</li><li>5. Apply the knowledge of solar energy.</li></ol>

**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.

**Learning Resources:**

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

**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 MECHANICAL ENGINEERING  
**INTRODUCTION TO ROBOTICS**

SYLLABUS FOR B.E. V-SEMESTER

L:T:P(Hrs./week):3	SEE Marks : 60	Course Code: U21OE510ME
Credits : 3	CIE Marks: : 40	Duration of SEE: 3 Hours

Course objectives	Course Outcomes
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.	On completion of the course, the student will be able to <ol style="list-style-type: none"><li>1. understand the anatomy of the robot and various robot configurations for it's selection depending on the task.</li><li>2. classify the end effectors , understand different types of joints, various types of robot drive systems for carrying out the assigned job effectively.</li><li>3. analyze a planar manipulator through forward kinematics and understand the control of robot manipulator for better reliability and efficiency using python programming.</li><li>4. Classify the various sensors used in robots for proper selection to an application.</li><li>5. summarize various industrial and non-industrial applications of robots for their selection to a particular task.</li></ol>

**UNIT-I :ROBOT BASICS:** Robot-Basic concepts, Definition, Need, Law, History, Anatomy, specifications.

Robot configurations-cartesian, cylindrical, polar ,articulated and SCARA, Serial manipulator &Parallel Manipulator

Robot wrist mechanism, Precision and accuracy of robot.

**UNIT-II: ROBOT ELEMENTS:** End effectors-Classification, Robot drive system types: Electrical, pneumatic and hydraulic. Robot joints and links-Types, Motion interpolation, Robot trajectories 2D and 3D Transformation-Scaling, Rotation and Translation, Homogeneous transformation

**UNIT-III :ROBOT KINEMATICS AND CONTROL:** Robot kinematics – Basics of direct and inverse kinematics. 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 methods. Introduction to Solve any robotic kinematic problem using python programming.

**UNIT-IV: ROBOT SENSORS:** Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors, Light sensors, Pressure sensors, position and velocity feedback devices.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. Mikell P. 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 Hill Publishing 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 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 MECHANICAL ENGINEERING  
**INTRODUCTION TO AUTOMOBILE ENGINEERING**

SYLLABUS FOR B.E. V-SEMESTER

Instruction : 3Hours	SEE Marks : 60	Course Code : U21OE520ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: 1. familiarize the student with the different types of automobiles and engine components along with its working. 2. impart adequate knowledge in fuel supply, cooling, lubrication and ignition of IC engines. 3. understand the steering geometry, steering mechanism and types of suspension systems. 4. gain the knowledge about working of clutch, gear box mechanism, and brakes 5. make the student conversant with types of wheels, tyres and pollution control techniques.	On completion of the course, the student will be able to: 1. identify types of Automobiles and engine components and describe its working. 2. describe the engine fuel Supply system in petrol and Diesel engines, cooling system, and lubrication systems. 3. describe the steering mechanism, suspension systems 4. describe 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 and working 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, 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:** wheel alignment, Ackermann steering mechanism, 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.

**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.

**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", 10<sup>th</sup> Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2007.
2. Kirpal Singh, "Automobile Engineering", Vol. I & II, 13<sup>th</sup> Edition, Standard Publishers, New Delhi 2013.
3. R.B Gupta, "Automobile Engineering" 7<sup>th</sup> Edition, SatyaPrakashan, New Delhi, 2015.
4. Joseph Heitner, "Automotive Mechanics", 2<sup>nd</sup> Edition, Affiliated East West Pvt. Ltd., 2013.
5. C.P. Nakra, "Basic Automobile Engineering", 7<sup>th</sup> 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 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 AND SOCIAL SCIENCES  
**BASICS OF ENTREPRENEURSHIP**

SYLLABUS FOR B.E V Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U21OE530EH
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

<b>Course objectives</b>	<b>Course Outcomes</b>
The objectives of this course are to: 1. Deeply understand and discover entrepreneurship 2. Build a strong foundation for the students to start, build, and grow a viable and sustainable venture 3. Develop an entrepreneurial mind-set equipped with the critical skills and knowledge required	On completion of the course the student will be able to: 1. Take-up entrepreneurship as a career choice 2. Create and Validate business models. Build a Minimum Viable Product (MVP). 3. Identify various costs and revenue streams for a venture. 4. Build successful teams and acquire sales skills. 5. Understand the business regulations and various Government schemes available..

**UNIT-I: Introduction to Entrepreneurship:** Definition of Entrepreneurship, Entrepreneurship as a career choice, Benefits and Myths of Entrepreneurship; Characteristics, Qualities and Skills of an Entrepreneur. Impact of entrepreneurship on the Economy and Society.

**Opportunity and Customer Analysis:** Identify your Entrepreneurial Style, Identify Business Opportunities, Methods of finding and understanding Customer Problems, Process of Design Thinking, Identify Potential Problems, Customer Segmentation and Targeting, Customer Adoption Process, Crafting your Value Proportions, Customer-Driven Innovation.

**UNIT-II: Business Model and its Validation:** Types of Business Models, Lean Approach, the Problem-Solution Test, Solution Interview Method, Difference between Start-up Venture and small Business, Industry Analysis, Identify Minimum Viable Product (MVP), Build-Measure-Learn Feedback Loop, Product-market fit test.



**UNIT-III: Economics and Financial Analysis:** Revenue streams and pricing, Income analysis and Cost Analysis-Product Cost and Operation Cost, Basics of Unit Costing, Profit Analysis, Customer Value Analysis, Different Pricing Strategies, Investors' Expectations, Pitching to Investors and Corporate.

**UNIT-IV: Team Building and Project Management:** Leadership Styles, Team Building in Venture, Role of good team in Venture, Roles and Responsibilities, Explore Collaboration Tools and Techniques-brainstorming, Mind Mapping. Importance of Project Management, Time Management, Work Flow, Network Analysis Techniques.

**UNIT-V: Marketing & Business Regulations:** Positioning, Positioning Strategies, Building Digital Presence and Leveraging Social Media, Measuring effectiveness of Channels, Customer Decision-making Process, Sales plans and Targets, Unique Sales Proposition (USP), Follow-up and Close Sales. Business Regulations of starting and operating a Business, Start-up Ecosystem, Government schemes.

### **Learning Resources:**

1. Robert D. Hisrich, Michael P Peters, "Entrepreneurship", Sixth edition, McGraw-Hill Education.
2. Thomas W. Zimmerer, Norman M. Scarborough, "Essentials of Entrepreneurship and small business Management", Fourth edition, Pearson, New Delhi, 2006.
3. Alfred E. Osborne, "Entrepreneurs Toolkit", Harvard Business Essentials, HBS Press, USA, 2005
4. MadhurimaLall and ShikhaSahai, "Entrepreneurship", Excel Books, First Edition, New Delhi, 2006
5. Web Resource: <http://www.learnwise.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 INFORMATION TECHNOLOGY  
**INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS**  
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code :U21OE510IT
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
Apply the concepts of database management systems and design relational databases.	<ol style="list-style-type: none"><li>1. Understand functional components of the DBMS and develop ER model for a given problem and map ER it to Relational model</li><li>2. Understand Relational model and basic relational algebra operations.</li><li>3. Devise queries using SQL.</li><li>4. Design a normalized database schema using different normal forms.</li><li>5. Understand transaction processing and concurrency control techniques.</li></ol>

**UNIT– I: Introduction:** Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Architecture, Database Users and Administrators.

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

**UNIT–II: Relational Model:** Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Fundamental Relational-Algebra Operations.

**UNIT–III: Structured Query Language:** Introduction, Data Definition, Basic Structure of SQL Queries, Modification of the Database, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Join Expressions, Views.

**UNIT–IV: Relational Database Design:** Features of Good Relational Design, Normalization-Decomposition Using Functional Dependencies, Functional-Dependency Theory.

**UNIT–V: Transactions:** Transaction Concepts, Transaction State, Concurrent Executions, Serializability

**Concurrency Control:** Lock-Based Protocols, Timestamp-Based Protocols.

**Learning Resources:**

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, Database System Concepts, 6th Edition, McGraw-Hill International Edition, 2011.
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill International Edition, 2003.
3. Elmasri, Navathe, Somayajulu and Gupta, Fundamentals of Database System, 6<sup>th</sup> Edition, Pearson Education, 2011.
4. Patric O’Neil, Elizabeth O’Neil, Database-principles, programming, and performance, Morgan Kaufmann Publishers, 2001.
5. Peter Rob, Carlos coronel, Database Systems, (2007), Thomson.
6. <https://nptel.ac.in/courses/106105175/>

**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 INFORMATION TECHNOLOGY  
**INTRODUCTION TO STATISTICAL PROGRAMMING**  
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS OF B.E V- SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code : U21OE520IT
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
The course will enable the students to apply the statistical programming concepts and techniques using Python libraries in the analysis of Statistical data.	<ol style="list-style-type: none"><li>1. Understands the basics of statistical concepts and various data types in Numpy, Pandas.</li><li>2. Cleans and Analyzes the data with descriptive statistics and EDA.</li><li>3. Visualizes the data with matplotlib, seaborn graphic libraries.</li><li>4. Analyzes data with various statistical inference techniques using Hypothesis testing.</li><li>5. Understands and applies various data distributions, sampling and simulation of random variables.</li><li>6. Applies various statistical models like linear regression, ANOVA to the data.</li></ol>

**UNIT-I: Introduction to Statistical computing and Python libraries:**

Intro to statistics: Samples and Population, Descriptive statistics; intro to Computational statistics, Data analysis, knowledge discovery in Data, Various data types.

Intro to statistical computing software: Python libraries & R.

**UNIT-II: Data Collection, Cleaning and Exploratory Data Analysis using Pandas:** Data types in Numpy, Pandas: list, vector, matrix, array, tensor, DataFrame. Operations on Data Types.

Data import using Pandas, Data cleaning, imputation, EDA case studies using Pandas.

**UNIT-III: Data Visualization with matplotlib and Seaborn:** Intro to matplotlib and Seaborn graphic libraries, basic visualizations using matplotlib, Advanced visualizations with Seaborn, Data correlation chart. Case studies on visualizations.

**UNIT-IV: Data distributions, Statistical Inference using Hypothesis testing:** Understanding various data distributions: Bernoulli, Binomial, Exponential, Poisson & Gaussian.

Intro to Hypothesis testing: p-value, critical value, interpretation of test results.

Types of Hypothesis testing using Scipy.stats: Normality tests, Correlation tests, Comparing samples.

**UNIT- V: Simulations and Statistical models:** Random variables, sampling and simulation of data distributions.

Statistical models: Linear algebra, Optimizations, Linear regression, Intro to Statistical or Machine learning.

### Learning Resources:

1. [https://machinelearningmastery.com/statistics\\_for\\_machine\\_learning/](https://machinelearningmastery.com/statistics_for_machine_learning/)
2. <https://scipy-lectures.org/packages/statistics/index.html>
3. Udemy: Python for Statistical Analysis
4. courseera: Statistics with Python specialization
5. <https://numpy.org/>
6. <https://pandas.pydata.org/>
7. <https://matplotlib.org/>
8. <https://seaborn.pydata.org/>
9. <https://www.statsmodels.org/stable/index.html>
10. <https://scikit-learn.org/stable/>
11. A first Course in Statistical Programming with R, W. John Braun, Duncan J. Murdoch, Cambridge University Press, 2007.
12. <https://cran.r-project.org/manuals.htm>

### 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 PHYSICS  
**THIN FILM TECHNOLOGY AND APPLICATIONS**

SYLLABUS FOR B.E. V-SEMESTER

L:T:P(Hrs./week):3	SEE Marks : 60	Course Code: U21OE510PH
Credits : 3	CIE Marks: : 40	Duration of SEE: 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The course will enable the students to:	On completion of the course, students will be able to
1. Learn the fundamental atomistic mechanisms.	1. State fundamental definitions of thin film technology
2. Narrate thin film deposition techniques	2. Describe thin film deposition techniques
3. Acquire knowledge on thin film devices	3. Illustrate thin film devices and their use
4. Appreciate applications of thin films	4. Apply thin films coatings for a variety industrial applications

**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, Laser ablation- spin coating- molecular beam epitaxy (MBE), Film thickness measurement-ellipsometry, quartz crystal oscillator techniques.

**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).

**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 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 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

L:T:P(Hrs/Week):3:0:0	SEE Marks:60	Course Code:U21OE530EH
Credits: 3	CIE Marks:40	Duration of SEE:3Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The course will enable the students to:	On completion of the course, students will be able to
<ol style="list-style-type: none"><li>1. Understand the critical design thinking skills needed to either improve an existing product or thinking design a new product.</li><li>2. Learn to identify customer needs and draft customer needs statements as your first step toward user innovations.</li><li>3. Learn how to translate user needs into product specifications quantitatively, and how establishing product metrics can help to define those specifications.</li><li>4. Learn to apply creativity, brainstorming, and concept generation process in designing needs solutions.</li><li>5. Learn to select and implement a product development process that's aligned with your project needs. Explore prototyping methods, strategies, and real-life examples where these have been applied to create a design that represents customer needs and product specifications.</li></ol>	<ol style="list-style-type: none"><li>1. Learn the concepts that drive design thinking.</li><li>2. Submit project ideas around user Innovations.</li><li>3. Identify prospective customer needs and user groups.</li><li>4. Translate needs into product specifications</li><li>5. Build out the product architecture, Create a prototype and present the prototype.</li></ol>



## **Unit 1: Design Thinking Skills**

Understand the critical design thinking skills needed to either improve an existing product or design a new product.

- 1.1 The Need for Design Thinking
- 1.2 What makes design thinking unique?
- 1.3 Design thinking checklist

## **Unit 2: Identifying Customer Needs**

Learn to identify customer needs and draft customer needs statements as your first step towards user innovations.

- 2.1 Think Users' First
- 2.2 Users' inherent needs
- 2.3 Empathy and Design Thinking
- 2.4 Asking the Right Questions
- 2.5 Persona Empathy map

## **Unit 3: Product Specifications**

Learn how to translate user needs into product specifications quantitatively, and how establishing product metrics can help define those specifications

- 3.1 Creating a Design Brief Template
- 3.2 Stakeholder map template
- 3.3 Customer journey template
- 3.4 Context map template
- 3.5 Opportunity map template

## **Unit 4: Applied Creativity**

Learn to apply creativity, brainstorming, and concept generation process in designing needs solutions.

- 4.1 The need to ideate
- 4.2 The Rules of ideation
- 4.3 Participating in an ideation session
- 4.4 Building a Creative Culture
- 4.5 Divergent—5 common ideation techniques

## **Unit 5: Product Development Processes and Prototyping**

Learn to select and implement a product development process that's aligned to your project needs. Explore prototyping methods, strategies, and real-life examples where these have been applied to create a design that represents customer needs and product specifications.

- 5.1 The need for a prototype
- 5.2 The Need to Test and how to conduct a structured test
- 5.3 How to conduct the observers' debrief

## **METHODOLOGY**

- Case Studies
- Demonstration
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

## **ASSESSMENTS**

- Online assignments
- Individual and Group

### **Suggested Books**

The Art of Innovation, by Tom Kelley\*  
Insight Out, by Tina Seelig\*  
Change by Design, Tim Brown  
Weird Ideas That Work, by Robert Sutton\*  
Wired to Care, by DevPatnaik  
Rapid Viz, by Kurt Hanks and Larry Belliston

### **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 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:U21OE020EH
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<p><b>The course will enable the learners to:</b></p> <ol style="list-style-type: none"><li>1. Understand the principles and mechanics of technical writing for students of engineering.</li><li>2. Identify different kinds of business correspondences and the dos and don'ts for each of them.</li><li>3. Make effective presentations as part of today's workplace demands.</li><li>4. Recognize the need for Video and Written CVs with focus on specific elements.</li><li>5. Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs</li></ol>	<p><b>At the end of the course the learners will be able to: -</b></p> <ol style="list-style-type: none"><li>1. Write effective reports.</li><li>2. Articulate business correspondences based on need.</li><li>3. Make persuasive presentations.</li><li>4. Design their videos CVs.</li><li>5. Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose</li></ol>

**UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS**

- 1.1 Informal Report Formats
- 1.2 Project and Research Reports
- 1.3 Formal Report Components, Feasibility Reports, Evaluation reports
- 1.4 Analytical and Informational reports
- 1.5 Executive summaries.

**UNIT 2: BUSINESS CORRESPONDENCE**

- 2.1 Electronic communication
- 2.2 Effective emails
- 2.3 Instant and text messaging guidelines

### **UNIT 3: PROFESSIONAL PRESENTATIONS**

- 3.1 Paper presentations & Poster presentations
- 3.2 PowerPoint presentations
- 3.3 Storyboard writing

### **UNIT 4: RESUME & CVs**

- 4.1 Technical Resume
- 4.2 Cover letter, resume format
- 4.3 Video CVs

### **UNIT 5: WRITING PROPOSALS & SOPs**

- 5.1 Types of proposals
- 5.2 Request for proposals
- 5.3 Stating your objective.

### **METHODOLOGY**

- Case Studies
- Demonstration
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

### **ASSESSMENTS**

- Online assignments
- Individual and Group

### **LEARNING RESOURCES**

[learn.talentsprint.com](https://learn.talentsprint.com)

1. Read Me First!: A Style Guide for the Computer Industry by Sun Technical Publications
2. Eats, Shoots and Leaves Paperback – 18 February 2010 by Lynne Truss
3. Don't Make Me Think, Revisited: A Common Sense Approach to Web & Mobile Usability | Third Edition | By Pearson Paperback –
4. The Design of Everyday Things: Revised and Expanded Edition Paperback Illustrated,
5. November 2013 by Don Norman (Author)

#### **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-21)**  
**BE (CIVIL ENGINEERING) VI-SEMESTER ACADEMIC YEAR 2023 - 2024**  
**(Students Admitted in 2021-22)**

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	
<b>THEORY</b>								
U21HS630EH	Skill Development Course-VII (Aptitude-III)	1	-	-	2	40	30	1
U21PC610CE	Design of Steel Structures	3	-	-	3	60	40	3
U21PC620CE	Soil Mechanics	3	-	-	3	60	40	3
U21PC630CE	Highway Engineering	3	-	-	3	60	40	3
U21PC640CE	Construction Management and Administration	3	-	-	3	60	40	3
U21PE610CE	Skill Development Course-VIII (Technical Skills-III)	1	-	-	2	40	30	1
U21OE610CE	Open Elective-IV	3	-	-	3	60	40	3
<b>PRACTICALS</b>								
U21PC621CE	Soil Mechanics Lab	-	-	2	3	50	30	1
U21PC631CE	Computer Aided Structural Engineering Lab	-	-	2	3	50	30	1
U21PC641CE	Highway Engineering Lab	-	-	2	3	50	30	1
U21PW619CE	Theme Based Project	-	-	2	-	50	30	1
	NPTEL Certificate Course	-	-	-	-	-	-	2
<i>Student should complete one NPTEL (8 weeks) certificate course equivalent to 2 credits by the end of VI semester</i>								
<b>Total</b>		<b>17</b>	<b>-</b>	<b>8</b>		<b>580</b>	<b>380</b>	<b>23</b>
<b>Grand Total</b>		<b>25</b>				<b>960</b>		
Note: The left over hours are to be allotted to ECA-III / Sports / Library / Mentor Interaction based on the requirement.								

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

DEPARTMENT OF CIVIL ENGINEERING  
**SKILL DEVELOPMENT COURSE-VII: (APTITUDE-III)**

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):2 : 0 : 0	SEE Marks:40	Course Code: U21HS630EH
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<p><b>The course will enable the learners to:</b></p> <ol style="list-style-type: none"><li>1. Introduce students to higher order thinking and problem solving via vocabulary and its various components</li><li>2. Train students to understand context &amp; theme and use it to complete sentences.</li><li>3. Train students to identify the structure of sentences &amp; paragraphs</li><li>4. Train students to analyze text, e.g., simple outlining and note taking, summarize, draw conclusions, and apply information to personal experiences</li><li>5. Train students to improve the quality of sentences by fixing errors</li></ol>	<p><b>At the end of the course the learners will be able to: -</b></p> <ol style="list-style-type: none"><li>1. Use vocabulary as a tool to solve questions in verbal ability</li><li>2. Identify meanings of words using theme and context</li><li>3. Solve questions based on jumbles- sentences and paragraphs</li><li>4. Develop skills to critically analyze texts and then the ability to identify its theme</li><li>5. Improve the quality of their writing by being aware of the common errors</li></ol>

**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.

- 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.

- 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.

- 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.

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.

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](https://learn.talentsprint.com)

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	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 Tests : 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:U21PC610CE
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The objectives of the course are to	Upon the completion of the course, students are expected to
<ol style="list-style-type: none"><li>1. Understand the design philosophies of steel structures.</li><li>2. Design the bolted connections and welded connections including detailing.</li><li>3. Design tension members, compression members and beams by limit state design as per IS:800-2007.</li><li>4. Estimate the loads on roof trusses and design the members of roof truss.</li></ol>	<ol style="list-style-type: none"><li>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</li><li>2. Design tension members using limit state design according to IS:800-2007</li><li>3. Design compression members and column bases using limit state design according to IS:800-2007</li><li>4. Design laterally supported beams using limit state design according to IS:800-2007</li><li>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</li></ol>

**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 limit stated 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 angles sections, bracings of roof trusses.

### **Learning Resources:**

1. Duggal S.K., "Limit state Design of Structures", 3<sup>rd</sup> Edition, McGrawHill Education, 2019
2. Shiykar, M.R "Limit state design in structural steel" , 3<sup>rd</sup> edition, 2017, PHI learning private limited.
3. Gambhir M.L., "Fundamentals of Structural Steel Design", McGrawHill Education (India) Pvt. Ltd., New Delhi, 2013
4. Bhavikatti S.S., "Limits state Design of steel Structures", 5<sup>th</sup> Edition, Dream tech Press 2019.
5. Subramanian N., "Design of Steel Structures (Limit State methods)", 2<sup>nd</sup> 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 Hand book No.1 or Steel Tables by Bhavikatti S S
9. <http://nptel.ac.in/courses/105103094/>
10. [www.steel-insdag.org](http://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:U21PC620CE
Credits : 3	CIE Marks:40	Duration of SEE:3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
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 methods. 2. To comprehend effective stress under different hydraulic conditions 3. Learn concepts of compaction and consolidation of soils 4. Estimate shear strength parameters	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 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, Classification of Rocks, weathering of rocks, 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: 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:** 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. Seepage force- downward and upward flow conditions, Quicksand phenomena- Remedial measures.

**Two dimensional flow in soil**-Laplace equation, qualitative representation of flownets under defined boundary conditions-flownets and their applications-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, influence of compaction on engineering properties. 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-Terzaghi'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 model-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, Vaneshear test. Stress-strain behavior of soils-Stress path-Skempton's pore water parameters

### **Learning Resources:**

1. GopalRanjan, Rao A.S., "Basic and Applied Soil Mechanics", Wiley Eastern

Limited, third edition, 2016.

2. Murthy V.N.S., "A Textbook of Soil Mechanics & Foundation Engineering", CBS Publishers, 2018.
3. Venkatramaiah C., "Geotechnical 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, 2017
6. Craig's, R.F., "Soil Mechanics" Ninth edition, 2020
7. Karl Terzaghi, Ralph B. Peck, Gholamreza Mesri., "Soil Mechanics in Engineering Practice" John Wiley & Sons, 07-Feb-1996-imported version.
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,
11. IS Code: IS-2720, Methods of tests for Soils.
12. <http://nptel.ac.in/courses/105101084/>
13. <https://ocw.mit.edu/courses/1-361-advanced-soil-mechanics-fall-2004/pages/syllabus/>

### **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:U21PC630CE
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	1. Given the basic information on geometrical features, design horizontal and vertical alignment of highways/roads complying with IRC standards.
2. Evaluate the fundamental theories and methods of traffic and transportation engineering, including traffic flow fundamentals, geometric design of highways, and pavement design.	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 and Indo-HCM 2018.

**Traffic regulation and control** – Traffic signs, signals, markings and channelization. Principles of design of at-grade intersections – Simple layouts. Design of isolated signal by 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, simulation of short term aging using RTFOT, simulation of long term aging using PAV. Introduction to 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, FAILURES 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 and stone asphalt and pervious pavements.

**Pavement failures and maintenance** – Introduction to Pavement evaluation, 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, 2018.
3. Roger P. Roess, Elena S. Prassas, William R. McShane "Traffic engineering" Pearson, 3rd Edition, 2010 (Freely downloadable).
4. Nicholas J. Garber Lester A. Hoel, Traffic and Highway Engineering- III edition, Cengage publication Indian edition 2014.
5. Yoder E.J., Witczak M.W., Principles of Pavement Design, John Wiley & Sons –Indian edition. 2012
6. Srinivasa Kumar R., Pavement design, Orient BlackswanPvt. Ltd., New Delhi, 2013
7. IRC:37 : 2018 : Guidelines for the design of flexible pavements
8. IRC 58 :2015: Guidelines for the design of plain jointed rigid pavements
9. IRC MORT&H- Specifications for road and bridge works, 2013 (Fifth Revision)
10. 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)
11. Indian Highway capacity manual (Indo-HCM) 2018, by CSIR, New Delhi
12. [www.pavementinteractive.org](http://www.pavementinteractive.org)
13. <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  
**CONSTRUCTION MANAGEMENT AND ADMINISTRATION**

SYLLABUS FOR B.E.VI SEMESTER

L : T : P (Hrs./week):3:0:0	SEE Marks:60	Course Code: U21PC640CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
<ol style="list-style-type: none"><li>1. Learn the concept of construction management along with functions and objectives.</li><li>2. Understand the various techniques used for construction planning such as bar charts, CPM, PERT and crashing of networks</li><li>3. Acquire knowledge on various types of construction contracts, tenders and acts related to construction and construction safety</li><li>4. Understand the concept of Linear Programming in Construction along with application of Graphical and Simplex methods.</li></ol>	<ol style="list-style-type: none"><li>1. Identify and report the importance and necessity of construction management.</li><li>2. Employ bar charts, networks to determine the critical path and alter the construction schedules accordingly.</li><li>3. Interpret the terms related to costs and time, and there by solve problems on crashing of networks.</li><li>4. Categorize various construction contracts, acts and examine various documents related to construction.</li><li>5. Interpret the concept of Linear Programming in Construction, and solve problems on Graphical and Simplex methods.</li></ol>

**UNIT-I: Significance of Construction Management:** Objectives and functions of construction management, construction management team, principles of organization and types of organization.

**UNIT-II: Construction Planning:** Construction planning, bar charts, network techniques in construction 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, Earned value Management, simple problems of civil engineering works.

**UNIT-IV: Contracts:** Introduction, types of construction contracts and their advantages and disadvantages, conditions of contracts, Introduction to Indian contract act.

**Tender:** Tender form, Tender Documents, Tender Notice, e-tendering, Government e-procurement system, GEM (Government e Market) procurement, Work orders, Earnest money, Security Deposit, Arbitration.

**Safety in construction:** Safety measures, workmen compensation act, construction labour act. Demolition of buildings – safety measures.

**UNIT-V: Linear programming and optimization in construction:** Introduction to optimization – Linear programming, Importance of optimization in construction, Simple problems on formulation of LP, Graphical method, Simplex method.

### Learning Resources:

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, 2016.
4. Gahloj. P.S. and Dhiv. B.M., Construction Planning and Management, Wiley Eastern Ltd., 2018.
5. Kumar NeerajJha., Construction Project Management: Theory and Practice, Pearson Education, India, 2015.
6. Seetharaman S., Construction Engineering and Management, Umesh Publications, 2012.

### 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  
**SKILL DEVELOPMENT COURSE-VIII: (TECHNICAL SKILLS-III)**

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):1: 0 : 0	SEE Marks:40	Course Code:U21PE610CE
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**

**UNIT-I**

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

**UNIT-II**

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

**UNIT-III**

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

**Building Information Modelling**

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

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

- Door
- Window
- Floor
- Ceiling
- Roof

## Project Management Software

scheduling

- Constraints

### UNIT-IV

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

### UNIT-V

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

## Building Information Modelling

- Components

- 3D modelling
- Stair
- Railing

- 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  
**SOIL MECHANICS LAB**

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week): 0 : 0 : 2	SEE Marks: 50	Course Code: U21PC621CE
Credits : 1	CIE Marks: 30	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
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	1. Determine the index properties of soils and classify soils. 2. Determine shear strength of a soil sample 3. Determine Permeability and 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, Determination of Specific Gravity & water content using "Pycnometer" method.
2. Determination of Liquid limit using Casagrande's and Cone Penetration standard LL device.
3. Determination of Shrinkage and Plastic limits
4. Sieve Analysis including Hydrometer Analysis for plotting Particle size distribution curve
5. Determination of Field Density using Core cutter Method
6. Determination of Field Density using Sand Replacement Method

## **DETERMINATION OF ENGINEERING PROPERTIES**

7. Determination of Compaction Characteristics by Standard Proctor test
8. Determination of Laboratory California Bearing Ratio (CBR) value
9. Determination of Co-efficient of Permeability by Constant Head Permeameter test and Variable Head Permeameter tests
10. Determination of shear strength parameters by Direct Shear Test
11. Determination of Shear Strength of Cohesive soils by "vane shear test"
12. Determination of Shear Strength by conducting "UCC Test"

## **DEMONSTRATION OF TEST PROCEDURES:**

13. Standard Penetration Test
14. Swell pressure test on expansive soils
15. Determination of Co-efficient of Consolidation
16. Bio-cementation of Soil -Determination of Calcium carbonate content using Calcimeter.
17. Determination of Shear Strength by conducting "Triaxial 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:U21PC631CE
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
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.	<ol style="list-style-type: none"><li>1. Perform analysis and design of RCC beams and frames subjected to various loads using a structural design software.</li><li>2. Design of G + 2 residential building subjected to dead load and live load combination using software.</li><li>3. Design an RCC multi-storeyed building subjected to DL, LL and wind load combination using software.</li><li>4. Perform analysis and design of an RCC multi-storeyed building subjected to DL, LL, WL and seismic load combination using software</li><li>5. Perform analysis and design of steel trusses and frames subjected to various loads using software.</li></ol>

**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  
**HIGHWAY ENGINEERING LAB**

SYLLABUS FOR B.E. VI SEMESTER

L : T : P (Hrs./week):0: 0 : 2	SEE Marks:60	Course Code:U21PC641CE
Credits: 1	CIE Marks:40	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
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

**B) Tests on bitumen**

**Tests on bitumen**

6. Ductility Test

7. Softening point Test
8. Specific gravity Test
9. Viscosity Test
10. Flash and fire point Test

**C) Traffic Studies**

11. Classified Traffic volume study at mid blocks
12. Spot Speed Study
13. Origin & Destination studies

**D) Miscellaneous Tests (demonstration only)**

14. Job mix formula by Rothfuch Method
15. Design of Bitumen mixture by Marshall stability test as per AST 6927-15
16. Bitumen extraction 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		

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

DEPARTMENT OF CIVIL ENGINEERING  
**THEMEBASED PROJECT**

SYLLABUS FOR B.E. VI-SEMESTER

L : T : P (Hrs./week):0 : 0 : 2	SEE Marks:50	Course Code:U21PW619CE
Credits: 1	CIE Marks:30	Duration of SEE: ---

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Solve a real life societal problem through research based approaches.	1. Formulate an analytical model for a civil engineering problem and obtain its solution with necessary tools. 2. Design a civil engineering structure with due consideration for public health and safety. 3. Perform and manage as an individual or as a member of a team with ethical values. 4. Examine the concepts environment and sustainability. 5. Write effective reports and communicate effectively on civil engineering problems. 6. Present the conclusions in a way to benefit the society.

**Instructions to Students:**

Faculty members should prepare project briefs (giving scope and references) well in advance. The project may be classified based on the specialization. It may comprise any elements such as analysis, design, synthesis. The department will appoint a project coordinator who will coordinate the following.

1. Grouping of students ( a maximum of 3 in a group)
2. Allotment of projects and project guides
3. Project monitoring at regular intervals.

All projects allotments are to be completed by the 2<sup>nd</sup> week of VI semester, so

that students get sufficient time for completion of the project. All projects will be monitored at least twice in a semester through students' presentation. Sessional marks should be based on the grades / marks, awarded by a monitoring committee of faculty members and also marks given by the supervisor.

The students are required to carry out a theme based project by selecting any one of the themes specified by the Project monitoring committee in any area relevant to Civil engineering. Students are required to submit a report on the theme based project at the end of the semester. The evaluation is based on CIE and SEE. CIE will be made based on the progress of the work developed on the rubrics. SEE is evaluated by external examiner through the group presentation given by the group members followed by the viva.

**OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN  
B.E. V SEMESTER**

<b>Dept</b>	<b>Title</b>	<b>Code</b>	<b>credits</b>
Civil	Project Management	U21OE610CE	3
CSE	Introduction to Data Bases	U21OE610CS	3
CSE	Introduction to Operating Systems	U21OE620CS	3
ECE	Internet of Things and Applications	U21OE610EC	3
ECE	Introduction to Wireless Communications	U21OE620EC	3
EEE	Mathematical Programming for Numerical Computation	U21OE610EE	3
IT	Web application development & Security	U21OE610IT	3
IT	Introduction to Machine Learning	U21OE620IT	3
IT	Fundamentals of Machine Learning	U21OE630IT	3
Mech.	Additive Manufacturing and its Applications	U21OE610ME	3
Mech.	Alternative Fuels and Energy Systems	U21OE620ME	3
Mech.	Industrial Administration and Financial Management	U21OE630ME	3
Mech.	Advanced Course in Entrepreneurship	U21OE620EH	3

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

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

SYLLABUSFORB.E.VI-SEMESTER

L:T:P(Hrs/Week):3:0:0	SEE Marks:60	CourseCode:U21OE610CE
Credits: 3	CIEMarks:40	DurationofSEE:3Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
<ol style="list-style-type: none"><li>1. Learn the concept of project management along with function and objectives.</li><li>2. Understand the various techniques used for project planning such as bar charts, CPM, PERT and crashing of networks.</li><li>3. Acquire knowledge on various types of contracts, tenders.</li></ol>	<ol style="list-style-type: none"><li>1. Understand the objectives, functions and principles of management in projects.</li><li>2. Practice the network techniques like CPM and PERT for better planning and scheduling of engineering works.</li><li>3. Analyse the importance of cost and time in network analysis and planning the work accordingly.</li><li>4. Knowledge on Contracts, Tenders, and Work orders related to the projects.</li><li>5. Interpret the concept of Linear Programming and solve problems by Graphical and Simplex methods.</li></ol>

**UNIT-I: Significance of Project Management:** Importance of Project Management, Types of projects, Project Management Cycle, Objectives and functions of project management, management team, principles of organization and types of organization.

**UNIT-II: 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.

**Learning Resources:**

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, 2016.
4. Gahloj. P.S. and Dhiv. B.M., Construction Planning and Management, Wiley Eastern Ltd., 2018.
5. Kumar NeerajJha., Construction Project Management: Theory and Practice, Pearson Education, India, 2015.
6. Seetharaman S., Construction Engineering and Management, Umesh Publications, 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 Tests : 90 Minutes



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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
**INTRODUCTION TO DATA BASES**  
(COMMON FOR CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code :U21OE610CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Identify different issues involved in the design and implementation of a database system.	1 Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram
2 Understand transaction processing.	2 Transform a conceptual data model into a relational model 3 Design database using normalization techniques 4 Apply indexing and hashing techniques for effective data retrieval 5 Explain transaction processing.

**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.

**UNIT-III: Relational Database Design:** Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies.

**UNIT-IV: Indexing and Hashing: Basic** Concepts, Ordered Indices, B+ Tree Index Files, 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, 6<sup>th</sup> 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. Ramez Elmasri, 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 Tests : 90 Minutes

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
**INTRODUCTION TO OPERATING SYSTEMS**  
(COMMON FOR CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U21OE620CS
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Understand different Operating system Structures and Services.	1 Explain Operating system structures and internal structure of a process 2 Compare CPU scheduling algorithms. Analyze Disk scheduling algorithms 3 Apply different techniques for Main memory management. 4 Describe file management techniques. 5 Describe deadlock handling methods.

**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.

**UNIT-II: CPU Scheduling:** Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Round Robin

**Device Management:** Disk Scheduling algorithms: FCFS, SSTF, SCAN.

**UNIT –III: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 –IV:File System Interface:** File Concept, Access Methods: Sequential, Indexed, and Direct

**File System Implementation:** File-System Structure, Allocation Methods: Contiguous, Linked and Indexed.

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

### Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 9<sup>th</sup> Edition (2016), Wiley India.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2<sup>nd</sup> Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhare.M, *Operating System-concept based approach*, 3<sup>rd</sup> edition (2009), Tata McGraw Hill, Asia
4. Robert 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>
7. <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 Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
IBRAHIMBAGH, HYDERBAD-500031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING  
**INTERNET OF THINGS AND APPLICATIONS**

**(Open Elective - IV)**

SYLLABUS FOR B.E. VI- SEMESTER (EEE & Mechanical)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U21OE610EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<ol style="list-style-type: none"><li>1. The purpose of this course is to impart knowledge on IoT Architecture, practical constraints.</li><li>2. To study various protocols And to study their implementations</li></ol>	<p>On completion of the course, students will be able to</p> <ol style="list-style-type: none"><li>1. Understand the Architectural Overview of IoT</li><li>2. Enumerate the need and the challenges in Real World Design Constraints</li><li>3. Compare various IoT Protocols.</li><li>4. Build basic IoT applications using Raspberry Pi.</li><li>5. Understand IoT usage in various applications.</li></ol>

**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 - IV : Device for IoT**  
Choice of Microcontroller, Introduction to Raspberry Pi, Features of Pi,  
Programming platform, Python 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 Tests: 90 Minutes

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING  
**INTRODUCTION TO WIRELESS COMMUNICATIONS**  
**(Open Elective - IV)**

SYLLABUS FOR B.E. VI - SEMESTER (CSE & IT)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U21OE620EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<ol style="list-style-type: none"><li>1. To understand the technology trends changing from generation to generation.</li><li>2. To have an insight into the various propagation models and the effects of fading.</li><li>3. To understand the multiple access techniques and Mobile communication system specifications.</li></ol>	<p>On completion of the course, students will be able to</p> <ol style="list-style-type: none"><li>1. Identify key concepts related to frequency reuse, handoff strategies, and channel assignment in cellular networks.</li><li>2. Explain the architecture, services, and features of 2G wireless systems, specifically the Global System for Mobile (GSM)</li><li>3. Analyze the benefits of MIMO and OFDM in enhancing data rates and spectral efficiency in 4G and beyond.</li><li>4. Compare and contrast the evolution of 3G, 4G, and 5G technologies, highlighting their advancements and implications.</li><li>5. comprehend the architecture of 5G networks, including the New Radio (NR) standard, standalone and non-standalone modes, massive MIMO</li></ol>

**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:2G Wireless Systems and Standards:** Global System for Mobile (GSM) – Services and features, System architecture, GSM Radio subsystem, channel types, Frame structure for GSM.

**UNIT - III: Evolution from 3G to 4G:** 3G UMTS, W-CDMA, HSPA, HSPA+, 3G services and data rates; IMT advanced: 4G, LTE, VoLTE, OFDM, MIMO, LTE Advanced Pro (3GPP release 12+); IMT2020: 5G enhancements in comparison to IMT advanced.

**UNIT -IV:Basics of 5G:** 5G potential and applications; Usage scenarios: enhanced mobile broadband (eMBB), ultra reliable low latency communications (URLLC), massive machine type communications (MMTC), D2D communications, V2X communications; Spectrum for 5G, spectrum access/sharing; millimeter Wave communication, channels and signals/waveforms in 5G, carrier aggregation, small cells, dual connectivity.

**UNIT -V:5G Network:** New Radio (NR), Standalone and non-standalone mode; non-orthogonal multiple access (NOMA); massive MIMO, beam formation, FAPI: PHY API specification, flexible frame structure, Service Data Adaptation Protocol (SDAP); centralized RAN, open RAN; multi-access edge computing (MEC); software defined networking (SDN), network function virtualization (NFV); network slicing; restful API for service-based interface; private networks.

**Learning Resources:**

Theodore S. Rappaport, Wireless Communications Principles and Practices, 2<sup>nd</sup> edition, Pearson Education.

4G, LTE-Advanced Pro and The Road to 5G by Erik Dahlman.

5G NR: Architecture, Technology, Implementation, and Operation of 3GPP New Radio.

Fundamentals of 5G Mobile Networks Hardcover, by Jonathan Rodriguez, Wiley.

Introduction to Wireless and Cellular Communications

Course url: [https://swayam.gov.in/nd1\\_noc19\\_ee48/preview](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 Tests: 90 Minutes



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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING  
**MATHEMATICAL PROGRAMMING FOR NUMERICAL COMPUTATION**

SYLLABUS FOR B.E. VI SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:U21OE610EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The course will enable the students to:	On completion of the course, students will be able to
To provide fundamental knowledge of programming language for solving problems.	<ol style="list-style-type: none"><li>1. Generate arrays and matrices for numerical problems solving.</li><li>2. Represent data and solution in graphical display.</li><li>3. Write scripts and functions to easily execute series of tasks in problem solving.</li><li>4. Use arrays, matrices and functions in Engineering applications</li><li>5. Design GUI for basic mathematical applications.</li></ol>

**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 4<sup>th</sup> 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 RudraPratap, Oxfordpublications.
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 Mathworks.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy SiauAlexandreBayen,Elsevier-18th April2014.
5. <https://nptel.ac.in/courses/103106118/2>

### 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 MECHANICAL ENGINEERING  
**ADDITIVE MANUFACTURING AND ITS APPLICATIONS**

SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U210E610ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to:	On completion of the course the student will be able to:
Understand the fundamentals of various additive manufacturing technologies and their applications in Engineering Industry.	<ol style="list-style-type: none"><li>1. Understand the fundamentals of prototyping and the various data formats used in Additive Manufacturing.</li><li>2. Study the principle, process, advantages, limitations and case studies of liquid based AM systems.</li><li>3. Study the principle, process, advantages, limitations and case studies of solid based AM systems.</li><li>4. Study the principle, process, advantages, limitations and case studies of powder based AM systems.</li><li>5. Study the applications of AM in various engineering industries as well as the medical field.</li></ol>

**UNIT-I: Introduction:** Prototyping fundamentals, Historical development, Advantages of AMT, Commonly used terms, **Fundamental Automated Processes**, process chain, 3D modeling, Data Conversion, and transmission, Checking and preparing, Building, Post processing, RP data formats, **Newly Proposed formats**, Classification of AMT process.

**Unit-II: Liquid based systems:** Stereo lithography apparatus (SLA): Models and specifications, process, working principle, photopolymers, photo polymerization, 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 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 Systems:** Selective laser sintering (SLS): Models and specifications, process, **materials**, working principle, applications, advantages and disadvantages, case studies.

Three dimensional printing (3DP): Models and specification, process, working principle, applications, advantages and disadvantages, case studies.

**UNIT-V: Applications of AM systems:** Applications in **Design**, 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. and LIM C.S Rapid prototyping: Principles an Applications, World Scientific publications, 3rdEd., 2010
2. D.T. Pham and S.S. Dimov, "Rapid Manufacturing", Springer, 2001
3. Terry Wohlers, " Wholers Report 2000", Wohlers Associates, 2000
4. Paul F. Jacobs, " Rapid Prototyping and Manufacturing"–, ASME Press, 1996
5. Ian Gibson, Davin Rosen, Brent Stucker "Additive Manufacturing Technologies, Springer, 2nd Ed, 2014.

### 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 MECHANICAL ENGINEERING  
**ALTERNATIVE FUELS AND ENERGY SYSTEMS**

SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U210E620ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Out comes
The objectives of this Course are: To broaden the knowledge of alternate fuels and energy system and to understand the manufacturing and operating characteristics of alternative fuels.	On completion of the Course, the student will be able to: 1. Identify the need for alternative fuels. 2. Explain the characteristic features of bio-fuels. 3. Elucidate the properties of biogas, LPG & CNG. 4. Identify the merits and challenges of hydrogen and fuel cell based vehicles. 5. Explain the characteristics of electric and hybrid vehicles.

**UNIT – I: Need for Alternative Fuels:** Working of I.C. Engine; Properties of Fuels; Fuel Rating; Study of various performance parameters related to properties of different types of fuels; Fossil Fuels: Sources, scope of availability; Need for Alternative Fuels; Effects of constituents of Exhaust gas emission on environment; Green house effect, Factors affecting green house effect.

**UNIT – II: Alcohols:** Sources of Methanol and Ethanol, methods of it's production. Properties of methanol & ethanol as engine fuels, Use of alcohols in S.I. and C.I. engines, performance of blending methanol with gasoline. Emulsification of alcohol and diesel. Dual fuel systems. Improvement / Change in emission characteristics with respect to % blending of Alcohol.

**Bio-diesels:** Base materials used for production of Bio-diesel; Properties of Diesel blended with vegetable oils and difference in performance characteristics of Engine.

**Synthetic Alternative Fuels:** Di-Methyl Ether (DME), P-Series, Eco-friendly Plastic fuels (EPF).

**UNIT – III: Biogas:** Introduction to Biogas system; Extraction process; Factors affecting biogas formation; Usage of Biogas in SI engine & CI engine;  
**LPG & CNG:** Properties of LPG & CNG as engine fuels, fuel metering systems, combustion characteristics, effect on performance, emission, cost and safety.

**UNIT – IV: Hydrogen:**Hydrogen as a substitute fuel; Properties, Sources and methods of Production of Hydrogen; Storage and Transportation of hydrogen; Advantages of hydrogen (Liquid hydrogen) as fuel for IC engine/ hydrogen car; Layout of a hydrogen car;

**Fuel Cells:** Concept of fuel cells based on usage of Hydrogen and Methanol; Power rating and performance; Layout of fuel cell vehicle.

**UNIT – V: Electric & Hybrid Vehicles:** Layout of an electric vehicle; Systems and components; electronic controlled systems; high energy and power density batteries; Types of hybrid vehicles; advantages & limitations.

**Solar Powered Vehicles:**

Solar cells for energy collection, Storage batteries; Layout of solar powered automobiles; Advantages and limitations.

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

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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 MECHANICAL ENGINEERING  
**INDUSTRIAL ADMINISTRATION AND FINANCIAL MANAGEMENT**

SYLLABUS FOR B.E VI Semester

Instruction: 3 Hrs / week	SEE Marks:60	Course Code : U21OE630ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

<b>Course objectives</b>	<b>Course Out comes</b>
<p>The objectives of this course are to:</p> <ol style="list-style-type: none"> <li>1. aware about types of business forms, organization structures, plant layouts, merits, demerits and applications.</li> <li>2. understand method study procedure, PME, time study techniques and wage incentives.</li> <li>3. importance of PPC and improving quality by control charts and sampling plants.</li> <li>4. optimization of inventory to minimize total cost and other optimization techniques like LPP, project management techniques.</li> <li>5. estimate selling price of a product, TVM and budgeting techniques, depreciation methods.</li> </ol>	<p><i>On completion of the course, the student will be able to:</i></p> <ol style="list-style-type: none"> <li>1. understand business forms, organization structures and plant layouts.</li> <li>2. implementation of method study and estimation of standard time.</li> <li>3. understand types of production, functions of PPC, quality control by charts and sampling.</li> <li>4. implement optimization techniques like LPP, assignment and project management techniques.</li> <li>5. understand BEA, estimation of depreciation, selling price of a product and capital budgeting techniques.</li> </ol>

**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: Kinds and Types, objectives of inspection, Sampling inspection quality control by chart and sampling plans. Quality circles.

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

**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. Purchasing procedure of a material for an industry Duties of purchase manager and Stores department. Determination of economic order quantities. Types of materials purchase.

**UNIT – V:** Cost accounting: elements of cost. Various costs. Types of overheads, calculation of selling price. 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.

### 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. Everette E Admaa & Ronald J Ebert, "production and Operations Management", 5<sup>th</sup> Ed., PHI, 2005
4. S N Chary, "Production and Operations Management", 3<sup>rd</sup> Ed., Tata McGraw Hill, 2006
5. Pannerselvam, "production and Operations Management", Pearson Education, 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-31

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES  
**ADVANCED COURSE IN ENTREPRENEURSHIP**

SYLLABUS FOR B.E.VI-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: U20OE620EH
Credits :03	CIE Marks:40	Duration of SEE: 03Hours

<b>Course Objectives</b> <i>The objectives of this course are to</i>	<b>Course Outcomes</b> <i>On completion of the course the</i>
<ol style="list-style-type: none"><li>1. Acquire additional knowledge and skills for developing early customer traction into a repeatable business.</li><li>2. They will learn the tools and methods for achieving sustainable growth, such as refining the product or service and business models,</li></ol>	<ol style="list-style-type: none"><li>1. Develop an A-team</li><li>2. Refine business models and expand customer segments, brand strategy and create digital presence, channel strategy for customer outreach</li><li>3. Develop strategies to grow revenues and markets, understand Advance Concepts</li></ol>

**Unit I: Pivoting and New Business Model:** Introduction to Advance Course and Recapping the key concepts; Revisit of idea/ solution, business model and team members, Need for a mentor; Pivoting and its need; Types of Business models; Refining business model; Analyzing the Business Model of Competitors; Adding new customer segments to existing business model.

**Unit II: Business Planning:** Product Management: Need for a product management with examples; Making a sales plan; Building sales organization: Entrepreneur interview, Hiring sales team; Making a people plan for the venture; Introduction and understanding financial planning and forecasting template; Discussing financial planning and revisiting business model; Creating a procurement plan; Negotiation.

**Unit III: Customer Life cycle and Building the A-team:** Customer life cycle; identifying secondary revenue streams; Funding Landscape: Funding options for an entrepreneur; Investor hunt: Creating funding plan and designing the pitch deck; Attracting right talent – I: Intro to building the A-team; Examples; Setting the team for success.

#### **Unit IV: Branding and Channel Strategy, Leveraging Technologies:**

Creating brand Strategy: Drawing venture's golden circle; Defining the positioning statement: values; Creating a Public Image and Presence of the Venture; Identifying the right channel; Platforms for Marketing and Promotion; Platforms for Communication and Collaboration; Making the Tech Plan.

#### **Unit V: Measuring Progress, Legal Matters and Role of Mentors & Advisors:**

Metrics for Customer Acquisition and Retention; Financial Metrics: Finding new revenue streams based on key financial metrics; Re-forecasting financial plan to increase margin; Professional Help and Legal & Compliance Requirements; Selecting IP for organization; Identifying mentors and advisors; Scouting board of directors; Capstone Project.

#### **Learning Resources:**

1. <http://www.learnwise.org>
2. Clancy, Ann L. & Binkert, Jacqueline, "Pivoting- A coach's guide to igniting substantial change" Palgrave Macmillan US 2017
3. Porter, Michael, E., "Competitive Advantage: Creating and Sustaining Superior Performance", Free press, 1<sup>st</sup>edi.
4. Schwetje, Gerald & Vaseghi Sam, "The Business Plan", Springer-Verlag Berlin Heidelberg.
5. LeMay, Matt, "Product Management in Practice", O'Reilly Media Inc.
6. Smart, Geoff & Randy, Street., "Who: The A method of hiring", Ballantine books, 2008.
7. Blokdyk, Gerardus., "Customer Lifecycle Management - A complete guide", 5starcooks, 2018

#### **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 INFORMATION TECHNOLOGY  
**WEB APPLICATION DEVELOPMENT AND SECURITY**  
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E VI- SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U21OE610IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
<ol style="list-style-type: none"><li>1. Acquire basic skills for designing static and dynamic Web Applications using HTML, CSS, Java Script, Bootstrap and XML.</li><li>2. Acquire fundamental knowledge of Web Security concepts</li></ol>	<ol style="list-style-type: none"><li>1. Design a static web pages using HTML, CSS.</li><li>2. Create dynamic web pages and client side validation using JavaScript.</li><li>3. Develop responsive web applications using Bootstrap.</li><li>4. Build an application using an MVC Framework and XML</li><li>5. Analyze and evaluate web security attacks.</li></ol>

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

**UNIT-III: Bootstrap: Bootstrap:** The Grid system, Layout components: Tables, Images, alerts, buttons, badges, progress bars, cards, drop downs, pagination, Collapse, Navbar, Carousel.

**UNIT-IV: XML:** The Syntax of XML, XML Document Structure, Document Type Definitions.

## **Introduction to MVC - Introduction to Model View Controller Architecture**

**UNIT-V: Web Security Fundamentals:** Web Hacking Basics, HTTP & HTTPS URL, Evolution of Web Applications - Web Application Security - Core Defence Mechanisms - Handling User Access - Handling User Input- Handling Attackers - Managing the Application, Introduction to Web 2.0

### **Learning Resources:**

1. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.
2. "Web Technologies", 7th Edition, Uttam K.Roy,2012.
3. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
4. <http://getbootstrap.com/>

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

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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 INFORMATION TECHNOLOGY  
**INTRODUCTION TO MACHINE LEARNING**  
(Common for ECE & EEE)

SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code: U210E620IT
Credits: 3	CIE Marks: 40	Duration of SEE :3Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
Introduce the fundamental concepts, techniques and modern tools in Artificial intelligence and Machine Learning field to effectively apply it to the real-world problems.	<ol style="list-style-type: none"><li>1. Demonstrate knowledge of the Artificial intelligence and machine learning literature.</li><li>2. Understand and apply latest Python libraries for Machine learning models.</li><li>3. Apply an appropriate algorithm for a given problem.</li><li>4. Apply machine learning techniques in the design of computer systems.</li><li>5. Explain the relative strengths and weaknesses of different machine learning methods and approaches.</li></ol>

**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.

**Introduction to Python and ML libraries:** intro to python data types, control flow, loops, functions, modules & packages. Intro to NumPy & Scikit-learn.

**UNIT-II: Supervised learning:** ML Task, ML Experience or Data, ML Performance metric, Linear Regression, Linear regression Simulator, Logistic Regression.

**Supervised Non-parametric learning:** Introduction to Decision Trees, K-Nearest Neighbor, Feature Selection.

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

**UNIT-IV: Supervised Parametric learning:** Support Vector Machine, Kernel function and Kernel SVM.

**Supervised Parametric Bayesian learning:** Introduction, Naive Bayes Classification, Bayesian Network.

**UNIT-V: Unsupervised learning:** 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. Ethem Alpaydin, 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/>
6. <https://www.w3schools.com/python/>
7. <https://www.w3schools.com/python/numpy/default.asp>
8. <https://scikit-learn.org/stable/>
9. [Linear Regression Simulator \(mladdict.com\)](http://mladdict.com)
10. [Neural Network Playground simulator](http://mladdict.com)
11. <https://www.mladdict.com/neural-network-simulator>

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Duration of Internal Tests : 90 Minutes

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

DEPARTMENT OF INFORMATION TECHNOLOGY  
**FUNDAMENTALS OF MACHINE LEARNING**  
(Common for CIVIL & MECH)

SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code: U21OE630IT
Credits: 3	CIE Marks: 40	Duration of SEE :3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
Introduce the fundamental concepts, techniques and modern tools in Artificial intelligence and Machine Learning field to effectively apply it to the real-world problems.	<ol style="list-style-type: none"><li>1. Demonstrate knowledge of the Artificial intelligence and machine learning literature.</li><li>2. Understand and apply latest Python libraries for Machine learning models.</li><li>3. Apply an appropriate algorithm for a given problem.</li><li>4. Apply machine learning techniques in the design of computer systems.</li><li>5. Explain the relative strengths and weaknesses of different machine learning methods and approaches.</li></ol>

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

**UNIT-IV: Supervised Parametric learning:** Support Vector Machine.

**Supervised Parametric Bayesian learning:** Introduction, Naive Bayes Classification.

## **UNIT-V: Unsupervised learning: 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. Ethem Alpaydin, 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/>
6. <https://www.w3schools.com/python/>
7. <https://www.w3schools.com/python/numpy/default.asp>
8. <https://scikit-learn.org/stable/>
9. Linear Regression Simulator ([mladdict.com](http://mladdict.com))
10. Neural Network Playground simulator
11. <https://www.mladdict.com/neural-network-simulator>

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Duration of Internal Tests : 90 Minutes



