VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD-500 031
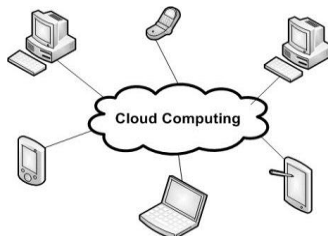*ACCREDITED BY NAAC WITH A++ GRADE*

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

Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad

**SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR
B.E. (IT) V and VI Semesters with effect from 2025-2026
(For the batch admitted in 2023-24)
(R-23)**

Cloud Computing

DEPARTMENT OF INFORMATION TECHNOLOGY
**+91-40-23146050, 23146051
Fax: +91-40-23146090
Website: www.vce.ac.in**

Vision

Striving for a symbiosis of technological excellence and human values.

Mission

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

Quality Policy

Education without quality is like a flower without fragrance. It is our earnest resolve to strive towards imparting high standards of teaching, training and developing human resources.

DEPARTMENT OF INFORMATION TECHNOLOGY

<u>Vision</u>

To be a center of excellence in the emerging areas of Information Technology.

<u>Mission</u>

- Provide a comprehensive learning experience on the latest technologies and applications.
- Equip the stakeholders with latest technical knowledge and leadership skills with collaboration to become competent professionals.
- Motivate innovation and contribute to the societal issues with human values and professional ethics.

DEPARTMENT OF INFORMATION TECHNOLOGY

Programme Educational Objectives (PEOs) for IT Program
A Graduate of Information Technology will be able to:

PEO1: Pursue higher studies in multidisciplinary areas with research orientation.

PEO2: Develop core IT competencies aligned with emerging industry trends to become global leaders with ethical values.

PEO3: Engage in continuous learning and address the societal problems with sustainable solutions.

Program Specific Outcomes (PSOs) for IT Program
Our students, upon graduation from the program, will be able to

PSO1: Identify and develop software solutions using programming languages, tools and AI/ML concepts.

PSO2: Design, develop and maintain secure stand-alone, embedded and networked systems.

PSO3: Analyze the architectures of autonomous or semi-autonomous intelligent systems and apply to real-time scenarios.

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Program Outcomes (POs) for IT Program

At the end of the program, the graduates will demonstrate

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)

B.E. – INFORMATION TECHNOLOGY : FIFTH SEMESTER (2025 - 2026)

			Scheme of Instruction			Scheme of Examination			
S No.	Course Code	Course Name	Hours per week			Duration in Hrs	Maximum Marks		Credits
			L	T	P/D		SEE	CIE	
THEORY									
1	U23PC510IT	Computer Networks	3	1	-	3	60	40	4
2	U23PC520IT	Artificial Intelligence and Machine Learning	3	-	-	3	60	40	3
3	U23PC530IT	Microprocessors & Interfacing	2	-	-	3	60	40	2
4	U23PC540IT	Operating Systems	3	-	-	3	60	40	3
5	U23OE5XXXX	Open Elective - III	3	-	-	3	60	40	3
6	U25HS570EH	**Design Thinking**	1	-	-	2	40	30	1
7	U23HS510EH	Skill Development Course –V (Communication Skills in English – II)	1	-	-	2	40	30	1
8	U23PE510IT	Skill Development Course – VI (Technical Skills – III)	1	-	-	2	40	30	1
PRACTICALS									
9	U23PC511IT	Computer Networks Lab	-	-	2	3	50	30	1
10	U23PC521IT	Artificial Intelligence and Machine Learning Lab	-	-	2	3	50	30	1
11	U23PC531IT	Microprocessors & Interfacing Lab	-	-	2	3	50	30	1
12	U23PC541IT	Operating Systems Lab	-	-	2	3	50	30	1
	Co-Curricular Activities-III (Paper Presentations)		-	-	-	-	-	-	-
	Extra-Curricular Activities-II		-	-	-	-	-	-	-
	Library / Sports / Mentor Interaction		-	-	-	-	-	-	-
• Student should acquire one NPTEL Certification Course equivalent to 2 credits (8 weeks) by the end of VI Semester.									
Total			**17**	**1**	**8**	**-**	**620**	**410**	**22**
Grand Total			**18 + 8 = 26**			**-**	**1030**		

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

COMPUTER NETWORKS
Syllabus for B.E V-SEMESTER

L:T:P(Hrs./week): 3:1:0	SEE Marks :60	Course Code:**U23PC510IT**
Credits : 4	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to*
1. To Introduce the fundamental concepts of Data communications and computer networks. 2. Describe the layers, protocols and services in ISO-OSI and TCP/IP Models.	1. Compare ISO-OSI with TCP/IP models and understand data transmission in physical layer. 2. Examine various techniques and protocols of data link layer to enable node to node delivery. 3. Analyze different routing protocols and algorithms to enable end-to-end connectivity. 4. Analyze different transport layer protocols and congestion control mechanisms to enable process to process delivery. 5. Illustrate different application layer protocols including DNS, EMAIL, FTP, HTTP and SNMP.

Unit-I: Data Communications: Components, Transmission media, analog and digital signals, Transmission impairments, Manchester encoding, and Modems.
Switching: Circuit Switching, Message Switching and Packet Switching.
Network types, Topologies, Concept of layering, Protocols and Standards, ISO / OSI model, TCP/IP.

Unit-II: Data Link Layer: Error Control: Error detection and correction (CRC and Hamming code for single bit correction).
Flow Control: stop and wait protocol, sliding window protocols- Go Back-N ARQ, selective repeat ARQ, Efficiency calculation.
MAC LAYER: ALOHA, CSMA/CD, CSMA/CA. LAN Standards: IEEE 802.3, IEEE 802.11.

Unit-III: Network Layer : Network Layer design issues, Internetworks – virtual circuit and Datagram approach, **Routing** – Distance Vector Routing ,Link State Routing , OSPF and BGP, IPv4 , addressing, Subnetting, CIDR, NAT,IPv6,ARP,RARP,ICMP and IGMP, DHCP protocols.

Unit-IV: Transport Layer: Services of transport layer, Multiplexing and crash recovery. User Datagram Protocol.
Transmission Control Protocol (TCP) – TCP window management, TCP Congestion Control, timer management.
Congestion Control Algorithms, Quality of service.

Unit-V: Application Layer: Domain Name Space (DNS), SMTP, FTP , WWW, HTTP,SNMP.
Introduction to network security: Elements of network security.

Learning Resources:
1.Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGrawHill.
2. Andrew S Tanenbaum, David J. Wetherall, Computer Networks, 5th Edition, Pearson, 2012.
3. James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Sixth Edition, Pearson Education, 2012.
 4. Larry L. Peterson and Bruce S. Davie, " Computer Networks a systems approach". Fifth Edition.Elsevier
5. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India
6. https://nptel.ac.in/courses/106105183/25
7.http://www.nptelvideos.in/2012/11/computer-networks.html
8. https://nptel.ac.in/courses/106105183/3

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

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

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SYLLABUS FOR B.E V - SEMESTER

L:T:P (Hrs./week):: 3:0:0	SEE Marks : 60	Course Code: **U23PC520IT**
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	*At the end of the course student will be able to:*
1. Introduce the fundamental concepts of logic programming, searching strategies in Artificial Intelligence. 2. Discuss supervised and unsupervised Machine Learning algorithms and evaluation metrics to validate the performance. 3. Introduce the basics of deep learning and reinforcement learning.	1. Apply appropriate search strategies for solving a given search problem. 2. Apply logic concepts to prove inferences from the given premises. 3. Apply appropriate parametric, non-parametric ML algorithm and ensemble learning for a given classification problem and validate. 4. Understand the fundamentals of deep learning and reinforcement learning and develop a multi-layer neural network to solve a classification problem. 5. Identify clusters from unlabelled data and validate.

UNIT-I:
Introduction to AI: Introduction, Intelligent Systems, Foundations of AI, Sub Areas of AI, Applications.
Problem solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches- BFS, DFS, DFID, Bidirectional. Heuristic Search Techniques- BB, Hill climbing, Beam search, Best first search, A*, Iterative-Deepening A*.

UNIT-II:
Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.
Introduction to Machine Learning: Types of Learning: Supervised Learning, Unsupervised Learning, Reinforcement Learning, Applications of ML.
Supervised Learning: Linear Regression, Logistic Regression, Bias-Variance Trade-Off, Data preprocessing– cleaning, integration, reduction, transformations.

Evaluation Metrics – MSE, RMSE. R-Squared, log-loss, Confusion matrix, Accuracy, Precision, Recall, F1-score, PR curve, ROC curve, AUC curve.

UNIT-III:
Supervised-Nonparametric Learning: Introduction to Decision Trees, The Basic Decision Tree Learning Algorithm-ID3, Overfitting in Decision Trees, k-Nearest Neighbor Learning,
Supervised-Parametric Learning: Support Vector Machine, The Dual Formulation, Nonlinear SVM and Kernel Functions.
Feature Selection – sequential, univariate, elimination. Feature Extraction- text features (tf, tf-idf), image features (patches, connectivity graph), Dimensionality reduction - PCA. Recommendation systems – Content based, Collaborative Filtering.

UNIT-IV:
Artificial Neural Networks: Introduction, The Perceptron, Learning Boolean Functions, Multilayer Perceptrons, Backpropagation. Model selection - cross validation, k-fold, stratified k-fold. Intro to deep learning.
Supervised-Parametric Bayesian Learning: Probability Basics and Bayes Theorem, MAP, Maximum likelihood, Naive Bayes Classifier, Bayesian Belief Networks.

UNIT-V:
Ensemble Learning: Bagging, Boosting-Ada Boost, Random Forests.
Unsupervised Leaning: Clustering, k-Means Clustering, Density-based Clustering-DBSCAN, Hierarchical Clustering.
Evaluation metrics – Rand, Adjusted rand, Completeness, Homogeneity, V-measure, mutual info, normalized mutual info.
Reinforcement Learning: Introduction, The Learning Task, Q Learning.

Learning Resources:
1. Saroj Kaushik, Artificial Intelligence, Cengage Learning, 2011.
2. Russell, Norvig, Artificial intelligence, A Modern Approach, Pearson Education, Second Edition, 2004
3. Tom Mitchell, Machine Learning , First Edition, McGraw-Hill, 1997
4. Christopher Bishop. Pattern Recognition and Machine Learning. Second Edition.
5. Ethem Alpaydin , Introduction to Machine Learning, Second Edition
6. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
7. http://nptel.ac.in/courses/106106139/
8. https://nptel.ac.in/courses/106/105/106105152/

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

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

MICROPROCESSOR AND INTERFACING
SYLLABUS FOR V-SEMESTER

L: T:P (Hrs./week): 2:1:0	SEE Marks :60	Course Code: **U23PC530IT**
Credits: 2	CIE Marks :40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
Understand the architectural features of 8086 microprocessor and use them in assembly language programming and interfacing with different peripherals with 8086 processor based system.	1. Explain the architectural features of 8086 processor. 2. Apply the architectural features of 8086 processor in writing Assembly language programs. 3. Interface different peripherals like memory, programmable Input Output (8255), DAC, ADC, and Stepper motor to 8086 based system. 4. Interface programmable interval timer (8253/8254), USART (8251), DMA controller (8257) to an 8086 based system.

UNIT – I: The INTEL 8086 Microprocessor
Register Organization of 8086, Architecture, Signal descriptions of 8086, Physical memory Organization, General Bus Operation, I/O Addressing capability, Special processor Activities, Minimum mode of 8086 and timings, Maximum mode of 8086 and timings

UNIT – II: 8086 Instruction set and Assembler Directives
Addressing modes of 8086, Instruction set of 8086, Assembler directives and Operators, Assembly language example programs, Stack structure of 8086, interrupts and Interrupt Service routines, Interrupt cycle of 8086, Maskable and Non maskable interrupts of 8086, and Interrupt programming

UNIT – III: Peripherals and their interfacing to 8086

Timing and delays, Semiconductor Memory Interfacing, Dynamic RAM Interfacing, Interfacing I/O ports, PIO 8255 (programmable Input-Output port), Modes of operation of 8255, Interfacing ADC and DAC, Stepper Motor Interfacing

UNIT – IV: Special purpose programmable peripherals and their interfacing

Programmable Interval Timer (8253/8254), Programmable Interrupt controller (8259A), Programmable Communication Interface (8251) USART, DMA Transfers and Operations, DMA controller 8257

RISC Architecture: A short history of RISC processors, Hybrid Architecture- RISC and CISC convergence, The Advantages of RISC, Basic features of RISC processors

<u>**Learning Resources:**</u>

1. A.K.Ray and K.M.Bhurchandi, Advanced Microprocessors and peripherals 2nd edition Tata McGrawHill, 2006.
2. Douglas V. Hall, Microprocessors and Interfacing: Programming and Hardware, Tata McGraw- Hill Publishing Company Limited, 2006.
3. Barry B.Brey,The Intel Microprocessors 8086, 8088, 80188, 80186, 80286, 80386, 80486, and Pentium Processors, Pearson Education, 8th Edition, 2009.
4. I. Liu, G. A. Gibson, Microcomputer Systems: The 8086/8088 Family, 2nd Ed., Prentice Hall, 1986.
5. N. Sentil Kumar, M. Saravanan, S. Jeevananthan, S.K. Shah, Microprocessors and Interfacing, Oxford University Press, 2012.
6. https://nptel.ac.in/courses/108105102/53

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

1	No. of Internal Tests:	02	x.Marks for each Internal Tests:	30
2	No. of Assignments:	03	x. Marks for each Assignment:	05
3	No. of Quizzes:	03	x. Marks for each Quiz Test:	05

  Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF INFORMATION TECHNOLOGY

OPERATING SYSTEMS

Syllabus for B.E V- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**U23PC540IT**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Demonstrate the principles of modern operating systems and functionalities. 2. Discuss the services of major operating systems such as Windows and Linux.	1. Understand the functionalities of Operating System, Process, threads and evaluate CPU scheduling algorithms. 2. Apply contiguous & non- contiguous techniques for main memory management. 3. Design solutions for classical problems of synchronization and strategies for deadlock handling. 4. Implement techniques for file organization, I/O operation, and system protection. 5. Compare and contrast key features and functionalities of Windows and LINUX, Android OS.

UNIT-I:
Introduction and Process Management: Operating System Functionalities, Types of Operating Systems, User Operating System Interface, System calls, System Boot. Process Concept: Overview, Threads. Process Scheduling - Uniprocessor scheduling algorithms, Multiprocessor and Real-time scheduling algorithms.

UNIT-II:
Memory Management: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation. Virtual Memory Management: Demand Paging, Page replacement algorithms, Thrashing, Allocating Kernel Memory.

UNIT-III:
Process Synchronization: Inter Process Communication, Process Synchronization - Peterson's Solution, Bakery Algorithm, Semaphores, Critical Section, Monitors. Classical problems of synchronization. Deadlocks: Deadlock prevention, deadlock avoidance and Deadlock Detection and Recovery - Bankers Algorithm.

UNIT-IV:
Storage and I/O Management: File System-Basic Concepts, File System Structure, File System Mounting, Directory Structure, Allocation Methods, Free

Space Management. I/O Management: Disk Structure, RAID Structure, Disk Scheduling, Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix.

UNIT-V

Case Study: Windows 10: Design Principles, System Components, Terminal Services & Fast User Switching, File System, Networking, Programmer Interface.

Case Study: The Linux System: Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File System, Input Output, Inter Process Communication.

Case Study: Introduction to Android OS, Android Stack, Android application structure, Activity Life Cycle, Understanding implicit and explicit intents. User Interface in Android: User Input Controls, Menus, Screen Navigation, Drawables, Themes and Styles, Material Design**.**

Learning Resources:

1. Operating System Concepts - Operating System Concepts, Tenth Edition, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, John Wiley & Sons Inc.
2. Modern Operating Systems- Andrew S Tanenbaum, Prentice Hall
3. Operating Systems - Operating System: Internals and Design Principles , William Stallings
4. Operating Systems - System Programming and Operating Systmes D M Dhamdhere, Tata Mc Graw Hill
5. Operating Systems - Operating Systems: A Modern Perspective, Gary Nutt, Addison Wesley
6. Operating Systems - Operating Systems, Achyut S Godbole, Tata Mc Graw Hill
7. Design of the Unix Operating System - Maurice Bach, Prentice Hall.
8. https://developer.android.com/studio/
9. https://nptel.ac.in/courses/106108101/
10. https://www.classcentral.com/course/udacity-introduction-to-operating-systems-3419

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

COURSE NAME-DESIGN THINKING

(Open Elective) SYLLABUS FOR B.E. 2/4 – IV SEMESTER

L:T:P (Hrs./week):: 1:0:0	SEE: 40	Course code: **U23OE530EH**
Credits: 1	CIE: 30	Duration of SEE: 2 Hours

COURSE OBJECTIVES **The course will enable the learners to:**	COURSE OUTCOMES **At the end of the course the learners will be able to: -**
1. Understand the critical design thinking skills needed to either improve an existing product or think about designing a new product. 2. Learn to identify customer needs and draft customer needs statements as your first step toward user innovations. 3. Learn how to translate user needs into product specifications quantitatively, and how establishing product metrics can help to define those specifications. 4. Learn to apply creativity, brainstorming, and concept generation process in designing needs solutions. 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.	1. Learn the concepts that drive design thinking. 2. Submit project ideas around user Innovations. 3. Identify prospective customer needs and user groups. 4. Translate needs into product specifications 5. Build out the product architecture, Create a prototype and present the prototype.

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		
CO2		3										
CO3			3									
CO4									3			
CO5												
CO6												

Summary (CO to PO Contribution)

CO1: Articulate the stages of design thinking and create empathy maps for user-centered solutions.
CO2: Use ideation tools and define clear, actionable problem statements.
CO3: Create low-fidelity prototypes and refine solutions based on feedback.
CO4: Demonstrate design thinking by creating innovative prototypes for specific challenges.

OVERVIEW:
- Enable innovative problem-solving with a user-centered approach.
- Promote hands-on experimentation and iteration.

UNIT 1: Introduction to Design Thinking
1.1 Stages of Design Thinking
1.2 Case Studies of Innovative Solutions
1.3 Empathy in Design

UNIT 2: Ideation and Problem Definition
2.1 Brainstorming Techniques
2.2 Framing the Right Problem Statement
2.3 Ideation Tools (Affinity Mapping)

UNIT 3:   Prototyping and Feedback
3.1 Creating Low-Fidelity Prototypes
3.2 Gathering and Implementing Feedback
3.3 Iterative Improvements

UNIT 4: Real-World Applications
4.1 Design Thinking in Business and Technology
4.2 Creating Solutions for Community Challenges
4.3 Group Project: Prototype a Solution

LEARNING RESOURCES
learn.talentsprint.com

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

1	No. of Internal tests	:	1	Max. Marks	:	20
2	No. of assignments	:	1	Max. Marks	:	5
3	No. of Quizzes	:	1	Max. Marks	:	5

Duration of Internal Tests   : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE-V – COMMUNICATION SKILLS IN ENGLISH-II
(Common to all branches)
SYLLABUS FOR B.E. - V SEMESTER

L:T:P (Hrs./week):: 1:0:0	SEE Marks : 40	Course Code : **U23HS510EH**
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to:	**At the end of the course the learners will be able to: -**
1. Get students proficient in both receptive and productive skills	1. Participate in group and forum discussions by providing factual information, possible solutions, and examples
2. Enable students to build strategies for effective group interaction and help them in developing decisive awareness and personality while maintaining emotional balance.	2. Present a topic by picking up the key points from the arguments placed.
3. To introduce students to an ideal structure for a presentation	3. Read between the lines and write informed opinions.
4. To develop and improve writing and study skills needed for college work.	4. Prepare, present, and analyze reports

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		
CO2										3		
CO3										3		
CO4				3								
CO5										3		
CO6												

Summary (CO to PO Contribution)

CO1: Use vocabulary as a tool to solve questions in verbal ability
CO2: Identify meanings of words using theme and context
CO3: Solve questions based on jumbles- sentences and paragraphs
CO4: Develop skills to critically analyze texts and then the ability to identify its theme
CO5: Improve the quality of their writing by being aware of the common errors

Unit 1: Delightful Discussions
Equips participants with group discussion strategies using Six Thinking Hats, point generation, and summarization techniques, along with case study-based discussions to enhance analytical thinking.
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
Develops the ability to deliver clear, persuasive, and structured presentations using the Toulmin model, with practical exposure to JAM (Just A Minute) and extempore speaking exercises.
2.1   Concise Cogent Presentation
2.2   Persuasion skills
2.3   Toulmin Model
2.4   Biker B - JAM and Extempore

Unit 3:   Fact, Observation and Inference
Builds critical reading and thinking skills to differentiate facts from opinions, make accurate inferences, identify main ideas, and draw logical conclusions from various texts.
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
Trains learners in crafting technical reports, descriptive image-based writing, and composing insightful book and movie reviews with clarity and coherence.
1.1   Report writing
1.2   Image Writing
1.3   Book Reviews
1.4   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	:	20
2	No. of assignments	:	2	Max. Marks	:	5
3	No. of Quizzes	:	2	Max. Marks	:	5

Duration of Internal Tests   :   90 Minutes

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

SKILL DEVELOPMENT COURSE-VI – TECHNICAL SKILLS-III
SYLLABUS FOR B.E V - SEMESTER

L:T:P (Hrs./week):: 1:0:0	SEE Marks : 40	Course Code: **U23PE510IT**
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course Objectives	Course Outcomes
The main objective of this course is to:	At the end of the course student will be able to:
❖ Understand various methods in applying algorithms. ❖ Prepare the students for the contests relative to the concepts learnt. ❖ Build confidence in coding using Graphs and String Algorithms	❖ Learn techniques used in computer science to solve problems by breaking them down into smaller subproblems and solving each subproblem only once, storing its solution in a table to avoid redundantcomputation. ❖ Learn to solve problems related to graphs, which are mathematical structures composed of nodes (vertices) connected by edges. ❖ Learn to solve methods used to solve problems related to manipulating and analyzing strings of characters.

Phase III

#13: Problem Solving with Algorithms – Dynamic Programming I

Dynamic programming features, the overlapping sub-problems, Exponential time Vs Polynomial Time, Exponential time illustration using staircase example, Formation of the substructure, Substructure using greedy coin change, Substructure for cloth cutting problem, Ways to translate, Longest Increasing Sub-sequence, Examples, Practice problems.

#14: Problem Solving with Algorithms – Dynamic Programming II

Problem solving on grids: 0/1 Knapsack, Trip Organization, Longest Common Sub-string, Longest Common Sub-sequence, Minimum Edit Distance, Examples, Sum of max sub square on a binary grid, Examples, Practice problems.

#15: Problem Solving implementing Backtracking Algorithms

The backtrack view, Applications of the backtracking, Iterative approach Vs Loop free approach, State Space tree illustration using 3-bit number problem, finding triplets exactly equal to a given sum, finding triplets less than or equal to a given sum, Grid Solution: N-Queens/Maze problems, Examples, Practice problems.

#16: Problem Solving using Graph Algorithms I

Graph Terminology, types of graphs, Storage and retrieval of graph data, adjacency matrix, incidence matrix, Handshaking Lemma, Algorithm to find a simple graph for a given input sequence, Graph Traversal Algorithms: Breadth First Search - Traversal – Examples, Graph Algorithms: Depth First Search - Traversal – Examples, Min Sum Path Matrix, Examples, Practice problems.

#17: Problem Solving implementing Graph Algorithms II

Spanning Trees, Minimum cost spanning trees, Connected Components in the graph, strongly connected points, Directed Acyclic Graphs, Kahn's Algorithm, Examples, Practice problems.

#18: Problem Solving implementing String Algorithms

Problem Solving implementing TRIE Data structure, Pattern matching algorithm, KMP algorithm, Examples, Practice problems.

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

COMPUTER NETWORKS LAB
SYLLABUS FOR B.E. V SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks :50	Course Code:**U23PC511IT**
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to*
1. Demonstrate various tools and algorithms of various networking protocols. 2. Discuss the client/server application development using socket API.	1. Examine the packets captured using packet sniffer. 2. Implement algorithms used in networking protocols 3. Develop Client Server applications using socket API, RPC 4. Implement various application layer services.

1. Understanding and using the following commands: ifconfig, netstat, ping, arp, telnet, tftp, ftp, traceroute, nslookup, and dig.
2. Using Wireshark capture the packets when browsing internet and Examine the structure of packets: the various layers, protocols, headers and payload.
3. Implementation of bit stuffing, byte stuffing.
4. Implementation of CRC.
5. Implementation of flow control and loss recovery using sliding window protocol.
6. Implementation of a Distance Vector Routing Algorithm for obtaining routing tables at each node.
7. Implementation of Echo Server using TCP (Iterative and Concurrent service).
8. Implementation of Echo Server using UDP (Iterative and Concurrent service).
9. Implementation of Time service and Date service using RPC.
10. Implementation of ping service.
11. Implementation of DNS Service.
12. Implementation of SMTP Service.
Virtual Lab:
13. Measuring Network Performance: http://vlabs.iitkgp.ac.in/ant/3/exercise/:

Note: Implement programs in C.

Content Beyond Syllabus:
1. Simulation of network topologies and evaluate performance under various conditions using network simulators like NS-2/NS-3/ OMNeT++/Cisco Packet Tracer.

Learning Resources:
1. W. Richard Stevens, "Unix Network Programming", Prentice Hall, PearsonEducation,2009.
2. Douglas E.Comer, "Hands-on Networking with Internet Technologies", Pearson Education.
3. https://www.isi.edu/websites/nsnam/ns/tutorial/
4. https://www.wireshark.org/download/docs/Wireshark%20User%27s%20Guide.pdf
5. https://nptel.ac.in/courses/106105183/25
6. http://www.nptelvideos.in/2012/11/computer-networks.html
7. https://nptel.ac.in/courses/106105183/3

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: 2Hours			

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

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LAB
SYLLABUS FOR B.E V- SEMESTER

L:T:P (Hrs./week):: 0:0:2	SEE Marks : 50	Course Code : **U23PC521IT**
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	*At the end of the course student will be able to:*
1. Introduce NumPy arrays, Matplotlib Scikit-Learn packages. 2. Analyse the performance of ML algorithms on benchmark datasets.	1. Implement python programs for storing and manipulating data using NumPy arrays, SciPy and Matplotlib. 2. Perform data prepossessing, analysis and visualizations using Pandas. 3. Apply supervised and unsupervised ML algorithms to real world problems. 4. Evaluate and compare the performance ML algorithms. 5. Choose an appropriate ML algorithm and design a solution for a given problem.

1. Python basics for ML using NumPy, Matplotlib and Scikit-Learn packages.
2. Data pre-processing, train, test splits and model evaluation metrics.
3. Predicting the Diabetes progression in a patient based on Age, Gender, BMI, BP and six blood serum measurements on Scikit-Learn Diabetes dataset using Linear Regression.
4. Classifying hand-written digits on Scikit-Learn Digits dataset using Logistic Regression.
5. Classifying different species of Iris flowers on Scikit-Learn Iris dataset using KNN.
6. Classifying hand-written digits on Scikit-Learn Digits dataset using SVM.
7. Classifying hand-written digits on Scikit-Learn Digits dataset using MLP neural network.
8. Detecting spam emails / Sentiment analysis on Movie reviews using Naïve Bayes classification.
9. Unsupervised learning: K-means clustering on scikit learn Iris dataset.
10. Unsupervised learning: DBSCAN clustering on scikit learn Iris dataset.

Virtual Lab:

11. Perceptron and mlp(experiments 3 &4): https://cse22-iiith.vlabs.ac.in/List%20of%20experiments.html

Learning Resources:

1. https://www.numpy.org/
2. https://www.scipy.org/
3. https://matplotlib.org/
4. https://pandas.pydata.org/
5. https://scikit-learn.org/stable/

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Day-to-day laboratory class work which will be awarded based on the average of assessment for each experiment considering at the end of the course			18
Duration of Internal Test: 2 Hours			

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

MICROPROCESSORS AND INTERFACING LAB
SYLLABUS FOR B.E. V SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks :50	Course Code: **U23PC531IT**
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to*
1. Write assembly language programs using 8086 microprocessors and develop Interfacing circuits	1. Write basic assembly language programs for 8086 processor. 2. Develop interfacing programs for different peripherals using an 8086 microprocessor based system.

1. Assembly Language programming with 8086.
2. Interfacing and programming of 8255.
3. Interfacing and programming of 8253/8254.
4. A/D and D/A converter interface.
5. Stepper motor interface.
6. Display interface

Note: Adequate number of programs covering all the instructions of 8086 instruction set. Experiments should be done on the 8086 microprocessor trainer kits and Assembler

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Day-to-day laboratory class work which will be awarded based on the average of assessment for each experiment considering at the end of the course			18
Duration of Internal Test: 2Hours			

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

OPERATING SYSTEMS LAB
SYLLABUS FOR B.E. V SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks :50	Course Code: U23PC541IT
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

Course Objective:	Course Outcomes:
The course will enable the students to:	**At the end of the course student will be able to:**
Learn the OS concepts by using or implementing operating system functionality in the areas of process management, file management, Inter-process communication & Synchronization.	1. Understand the OS functionality by executing shell commands. 2. Write programs to understand various CPU scheduling & Page replacement algorithms. 3. Write programs to demonstrate process creation, inter process communication mechanisms, multi-threaded programming. 4. Write programs for various classical problems to understand process synchronization. 5. Write programs to demonstrate usage of File System calls and disk scheduling algorithms.

1. Familiarity and usage of Linux user commands
   - File management (cp, cat, head, tail, stat, dir, mkdir, ls, mv, rm, rmdir, find, grep, diff, sort etc)
   - Process management (ps, top, kill, etc)
   - Protection (chmod, chown)
   - other (whereis, who, env, man)
2. Implement The following cases using Filesystem management calls
   - Implement cp, cat, stat command.
   - Implement ls command with or without search string.
   - Implement head / tail commands
3. Implement uniprocessor cpu scheduling algorithms FIFO, SJF, RR, Multi-level feedback Q and find out waiting time, turnaround time.
      Virtual Lab:
      https://ebootathon.com/labs/beta/csit/OS/exp2/references.html
4. Implement the following cases using Process Management System calls
   a) Find out total no of processes created when fork is used multiple times like below. Generalize it to n forks.
   b) Create a child process to execute command "ps -el" in child process and parent wait for the child to terminate.

    c) Create five child processes in some random hierarchy and print pid, parent pid in all the processes. Make sure you wait for the child to terminate in all the cases.

    d) Write a multithreaded program using POSIX threads – creation, termination, join etc.

5. Implement page replacement algorithms FIFO, OPT, LRU and find out number of page faults for the given reference string.

6. Implement the echo scenario between two processes using the following IPC mechanisms using system calls.

    a) Pipes

    b) Message passing with Message Queue

    c) Shared memory

7. Implement Producer Consumer Problem using following POSIX synchronization calls.

    a) Mutex

    b) Semaphore

    Virtual Labs: https://ebootathon.com/labs/beta/csit/OS/exp1/references.html

8. Implement Dining Philosopher Problem using following POSIX synchronization calls.

    a) Semaphore

    b) Monitor

9. Implement Reader/writer problem using following options with POSIX API.

    a) Reader preference

    b) Writer preference

10. Implement Disk scheduling algorithms FCFS, SCAN, C-SCAN and find out the total head movement required for the given case where Your program will service a disk with 5,000 cylinders numbered 0 to 4,999. The program will generate a random series of 1,000-cylinder requests and service them according to each of the algorithms listed above. The program will be passed the initial position of the disk head (as a parameter on the command line) and report the total amount of head movement required by each algorithm.

11. Install and setup Android Studio with specific Latest SDK in your system. Developing an Android app which displays "HelloWorld" message, testing and debugging

12. The simple calculator app that has two edit texts and four buttons. When you enter two numbers and a click button, the app performs the calculation for that button and displays the result.

Additional Experiment:

13. https://ebootathon.com/labs/beta/csit/OS/exp3/references.html (Banker's Algorithm)

Learning Resources:
1. W. Richard Stevens, Unix Network Programming, Prentice Hall/Pearson Education,2009.
2. https://www.kernel.org/doc/man-pages/
3. https://developer.android.com/studio/
4. http://profile.iiita.ac.in/bibhas.ghoshal/teaching_os_lab.html

| No. of Internal Tests: | 02 | Max. Marks for Internal Test: | 12 |

Day-to-day laboratory class work which will be awarded based on the average of assessment for each experiment considering at the end of the course   18

Duration of Internal Test: 2Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

OPEN ELECTIVES - III		
Department	**Code**	**Title**
Civil	U23OE510CE	Geo Spatial Information Technologies
CSE	U23OE510CS	Introduction to Operating Systems
MECH	U23OE520ME	Introduction to Robotics
IT	U23OE510IT	Essentials of Operating Systems
IT	U23OE520IT	Introduction to Artificial Intelligence (Stream based (AI&ML))
EEE	U23OE510EE	Modelling and Simulation of Basic Photovoltaic Systems
ECE	U23OE510EC	Introduction to Biomedical Electronics
ECE	U23OE530PH	Signal Engineering
MATHS	U23OE510MA	Transform Techniques
H&SS	U23OE530EH	Introduction to philosophy
H&SS	U23OE540EH	Basics of Entrepreneurship
Mathematics	U23OE510MA	Transform Techniques
Mathematics	U23OE520MA	Estimation Theory And Statistical Inference

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

DEPARTMENT OF CIVIL ENGINEERING
GEO 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: U23OE510CE
Credits : 3	CIE Marks:40	Duration of SEE:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to 1. To provide fundamental knowledge on geo spatial technology such as Remote sensing GPS and GIS.	Upon the completion of the course, students are expected to 1. Explain the fundamental principles of remote sensing, including EMR spectrum, radiation interactions, and spectral reflectance characteristics, and identify their applications in observing and analyzing earth surface features. 2. Identify and differentiate various remote sensing systems, satellite characteristics, image types, and digital data formats used in visual interpretation, and understand their applications in fields such as agriculture, water resources, urban planning, and disaster management. 3. Describe the structure and operational principles of GPS and other GNSS systems, and recognize their practical applications . 4. Analyze sources of GPS errors, evaluate position accuracy using DOP/UERE, apply differential and carrier phase positioning methods. 5. Explain the core concepts of GIS, spatial and non-spatial data types, map projections, and demonstrate methods of data input and editing, along with their applications in spatial analysis, infrastructure planning, and environmental monitoring.

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 of GIS: 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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

INTRODUCTION TO OPERATING SYSTEMS
(OPEN ELECTIVE-III)
SYLLABUS FOR B.E. V-SEMESTER (COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U23OE510CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES *On completion of the course, students will be able to*
1 Understand different Operating system Structures and Services.	1 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.

CO-PO and CO-PSO mapping														
CO	**PO**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2											3	2	
CO2	3	3		2									3	2	
CO3	3		2										2	3	
CO4	2				3					2			2	3	
CO5	3	2		2									3	2	

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

Essentials of Operating Systems
(GENERAL TRACK : OPEN ELECTIVE-III)
(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: **U23OE510IT**
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES *On completion of the course, students will be able to*
Learn the principles of modern operating systems i.e various functionalities provided by an operating system such as process management, memory management, Storage and I/O management.	1. Analyze the importance and its key principles by differentiating and categorizing the functionalities of an operatingsystem 2. Examine mechanisms involved in memory management to handle processes and threads. 3. Evaluate and solve deadlocks by assessing various handling strategies related to each of the conditions for deadlock. 4. Interpret the mechanisms adopted for storage organization and access. 5. Interpret the mechanisms adopted for I/O organization and access.

UNIT-I: Introduction and Process Management:
Operating System Functionalities, Types of Operating Systems, User Operating System Interface, System calls, System Boot. Process Concept: Overview, Threads. Process Scheduling - Uniprocessor scheduling algorithms, Multiprocessor and Real-time scheduling algorithms.

UNIT-II: Memory Management:
Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation. Virtual Memory Management: Demand Paging, Page replacement algorithms, Thrashing.

UNIT-III: Process Synchronization:
Inter Process Communication, Process Synchronization - Peterson's Solution, Bakery Algorithm, Semaphores, Critical Section, Monitors. Classical problems of synchronization. Deadlocks: Deadlock prevention, deadlock avoidance and Deadlock Detection and Recovery - Bankers Algorithm.

UNIT-IV: Storage Management:
File System-Basic Concepts, File System Structure, File System Mounting, Directory Structure, Allocation Methods, Free Space Management.

UNIT-V: I/O Management:

I/O Management: Disk Structure, RAID Structure, Disk Scheduling, Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix.

Learning Resources:
1. Operating System Concepts - Operating System Concepts, Tenth Edition, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, John Wiley & Sons Inc.
2. Modern Operating Systems- Andrew S Tanenbaum, Prentice Hall
3. Operating Systems - Operating System: Internals and Design Principles , William Stallings
4. Operating Systems - System Programming and Operating Systmes D M Dhamdhere, Tata Mc Graw Hill
5. Operating Systems - Operating Systems: A Modern Perspective, Gary Nutt, Addison Wesley
6. Operating Systems - Operating Systems, Achyut S Godbole, Tata Mc Graw Hill
7. https://nptel.ac.in/courses/106108101/
8. https://www.classcentral.com/course/udacity-introduction-to-operating-systems-3419

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 Artificial Intelligence
(AI&ML TRACK : OPEN ELECTIVE-III)
(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: **U23OE520IT**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
	On completion of the course, students will be able to
The objective of this course is to provide the necessary fundamentals, approaches in Artificial intelligence for problem solving for a goal-based single or multi agents with or without constraints and formalise soft computing techniques for better optimization for intelligent systems.	1. Investigate applications of AI techniques in intelligent agents. 2. Apply various search algorithms for demonstrating agents, searching and inferencing 3. Analyse searching beyond classical search and adversarial Techniques. 4. Identify problem types which might have constraints and evolutionary computation. 5. Define the fuzzy systems, ethics and risks of AI.

UNIT-I:
Introduction to AI: What is AI, Foundations of AI, History of AI, State of the Art, Applications of AI.
Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents.
UNIT-II:
Solving Problems by Search: Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies: Breadth first search, Depth-first search, Depth limited search, Iterative deepening depth first search
Informed (Heuristic) Search Strategies: Greedy best first search, A* Search, Optimality of A*, Heuristic Functions.
UNIT-III:
Beyond Classical Search: Local search and optimization problems, Local search in continuous spaces, Searching with non-deterministic actions and partial observations.
Adversarial Search: Games, Optimal decisions in games, Alpha-Beta Pruning, Imperfect real time decisions.

UNIT-IV:
Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.
Introduction to Evolutionary Computation: Representation – The Chromosome, Initial Population, Fitness Function, Selection, Reproduction Operators, Stopping Conditions, Evolutionary Computation versus Classical Optimization.
UNIT-V:
FUZZY Systems, Logic and Reasoning: Fuzzy Sets- Formal Definitions, Membership Functions, Fuzzy Operators, Fuzzy Set Characteristics, Fuzziness and Probability, Fuzzy Inferencing.
Philosophical foundations: Weak AI, Strong AI, Ethics of AI and Risks of AI.
Learning Resources:
1. Artificial Intelligence A Modern Approach Third Edition – Russell & Norvig
2. Computational Intelligence: An Introduction, 2nd Edition - Andries P. Engelbrecht
3. https://online.stanford.edu/courses/cs221-artificial-intelligence-principles-and-techniques
4. https://nptel.ac.in/courses/106105077
5. https://ocw.mit.edu/courses/6-034-artificial-intelligence-spring-2005/

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 Test: **90 Minutes**

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

INTRODUCTION TO ROBOTICS
(General Pool : (Open Elective-III)
SYLLABUS FOR B.E. V-SEMESTER

L:T:P(Hrs./week):3	SEE Marks : 60	Course Code: U23OE520ME
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 1.　understand the anatomy of the robot and various robot configurations for it's selection depending on the task. 2.　classify the end effectors , understand different types of joints, various types of robot drive systems for carrying out the assigned job effectively. 3.　analyze a planar manipulator through forward kinematics and understand the control of robot manipulator for better reliability and efficiency using python programming. 4.　Classify the various sensors used in robots for proper selection to an application. 5.　summarize various industrial and non-industrial applications of robots for their selection to a particular task.

CO-PO and CO-PSO mapping														
CO	PO mapping												PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2			1	2	2					2	3	1	2
CO2	3	2			1	2	2					2	3	1	2
CO3	3	2			1	2	2					2	3	1	2
CO4	3	2			1	2	2					2	3	1	2
CO5	3	2			1	2	2					2	3	1	2

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

UNIT-II ROBOT ELEMENTS

End effectors-Classification, Robot drive system types: Electrical, pneumatic and hydraulic. Robot joints and links-Types, Robot trajectories2D 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.

UNIT-IV ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors, Light
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 HillPublishing Company Limited, 2010.
3. KlafterR.D, Chmielewski T.A, and Negin. M, "Robotic Engineering: An Integrated Approach",   Prentice Hall of India Pvt. Ltd.,1994.
4. K.S. Fu,R.C. Gonzalez and C.S.G.Lee , "Robotics control, sensing, vision and intelligence",TataMcGraw-Hill Publishing Company Limited, 2008
5. R.K. Mittal and I.J.Nagrath"Robotics and Control", Tata McGraw-Hill Publishing Company Limited, 2003.

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

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

Modelling and Simulation of Photovoltaic Systems
(Open Elective-III)

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U23OE510EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Understand photovoltaic systems concepts, design criteria and conclusions, 2. Verify model of photovoltaic systems using PSpice.	1. Understand basics of solar radiation and PSpice software. 2. Use a simplified analytical model of solar cell which can be implemented in PSpice. 3. Examine basic equations of a solar cell and develop PSpice models 4. Describe the association of solar cells to form PV arrays and PV modules. 5. Interface PV systems to supply either DC or AC loads. 1. .

Unit-1 Introduction to Photovoltaic Systems and PSpice
Photovoltaic system: Introduction, Important definitions: irradiance and solar radiation, Learning some of PSpice basics, Using PSpice subcircuits to simplify portability, PSpice piecewise linear (PWL) sources and controlled voltage sources, Energy input to the PV system: solar radiation availability, Problems

Unit-2 Spectral Response and Short-Circuit Current
Introduction: Absorption coefficient and Reflectance, Analytical solar cell model, PSpice model for the short-circuit spectral current density, Short-circuit current, Effects of solar cell material, DC sweep plots and I(V) solar cell characteristics, Ideal circuit model: series and shunt resistances and recombination terms, Problems

Unit-3 Electrical Characteristics of the Solar Cell
Ideal equivalent circuit, PSpice model of the ideal solar cell, Open circuit voltage, Maximum power point, Fill factor (FF) and power conversion efficiency, Generalized model of a solar cell, Effects of the series resistance on the short-circuit current and the open-circuit voltage, Effects of the shunt resistance, Effects of the recombination diode, Temperature effects, Problems

Unit-4 Solar Cell Arrays, PV Modules and PV Generators
Introduction, Series connection of solar cells, Identical solar cells in series, Bypass diode in series strings of solar cells, Shunt connection of solar cells, Shadow effects, The terrestrial PV module, Photovoltaic arrays, Photovoltaic generators and PV plants, Problems

Unit-5 Interfacing PV Modules to Loads and Battery Modelling
DC loads directly connected to PV modules, Photovoltaic pump systems, DC series motor PSpice circuit, Centrifugal pump PSpice model, PSpice simulation of a PV array-series DC motor-centrifugal pump system, PV modules connected to a battery and load, Lead–Acid battery PSpice model, PSpice model to commercial batteries, Simplified PSpice battery model, Problems

Learning Resources:
1. Luis Castaner and Santiago Silvestre, Modelling Photovoltaic Systems using PSpice, John Wiley & Sons Ltd, 2002
2. Paul Tobin, PSpice for Circuit Theory and Electronic Devices, Morgan & Claypool Publishers, 2007.
3. Muhammad H. Rashid, Introduction to Pspice Using Orcad for Circuits and Electronics, Prentice-Hall of India Pvt.Ltd, 2004.
4. Orcad Capture User's Guide, Cadence Design Systems, Second edition 2000.

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
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, CSE (AI&ML), EEE, IT & Mechanical)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U23OE510EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To provide foundational knowledge of physiological systems and the origin of biomedical signals relevant to medical instrumentation. 2. To introduce the basic components and performance requirements of medical instrumentation systems, including intelligent and non-invasive systems. 3. To familiarize students with various electrodes and transducers used in biomedical applications, including their working principles and characteristics. 4. To develop understanding of therapeutic and prosthetic devices such as pacemakers, defibrillators, and ventilators, and their role in patient care. 5. To explore modern medical imaging technologies such as X-ray, CT, MRI, and thermography, and their applications in diagnostic medicine.	On completion of the course, students will be able to 1. Recognize the fundamental need for biomedical signal acquisition and describe the structure and function of basic biomedical instrumentation systems. 2. Explain the principles and applications of bioelectric signals, and evaluate the use of electrodes and transducers in biomedical measurements. 3. Demonstrate the working principles and clinical relevance of therapeutic, prosthetic, and non-invasive biomedical instruments used in diagnosis and treatment. 4. Apply mathematical, physical, and computational principles to interpret and analyze data from modern medical imaging systems such as X-ray, CT, and MRI. 5. Integrate knowledge of biomedical instrumentation systems to analyze constraints and design considerations for safe, reliable, and intelligent healthcare solutions.

CO-PO-PSO Mapping

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

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.

<u>Learning Resources:</u>
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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031
Signal Engineering
(Open Elective - III)
SYLLABUS FOR B.E. V – SEMESTER (CSE, CSE (AI&ML), ECE, EEE, IT & Mechanical)

L:T:P (Hrs./week) : 2:0:1	SEE Marks : 60	Course Code:**U23OE530PH**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To provide foundational knowledge of railway signaling systems and interlocking principles for the safe and efficient movement of trains. 2. To familiarize students with the operation and safety aspects of various signaling equipment such as signals, point machines, relays, and track circuits. 3. To impart an understanding of train working systems, station layouts, and modern interlocking techniques, supported by hands-on practical sessions at IRISET.	On completion of the course, students will be able to 1. Acquire knowledge on railway signaling principles. 2. Acquire the working of railway signals & their failsafe and safety aspects. 3. Understand various systems of train working, interlocking features and general requirements of signaling.

CO-PO/PSO Mapping

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

UNIT – I: Introduction to General Signaling (8 Hours)
Opening of Railways: Duties of Commissioners, Sanction to Open Railway for Public Carriage of Passengers, Requirements & Recommendations for Signaling and Interlocking Installations, Catechism for Signaling and Interlocking Installations, for 25KV AC, Spl layouts: Isolation, Ruling gradients, Slip, Catch sidings
Schedule of Dimensions: General, Station Yards, Electric Traction 25KV AC 50 Cycles, Clearances required for 25KV single phase AC Electric Traction.
General Rules: Definitions, Type of Signals; Adequate Distance, System of Working, Absolute Block system, Automatic Block System, Block Working, Level Crossings, Station Working Rules.

UNIT – II: Railway Signaling (6 Hours)

Station Layouts: MACLS, Signal Aspects, Location of Signals; Station Layouts: Single Line, Double Line, 2-Road, 3-Road, 4-Road.

Signaling Elements: Track Circuits & Axle Counters, Block Instruments, point machines, Relays, Relay Interlocking and Electronic Interlocking, Requirement of Signaling in 25KV AC Electrified Area.

Signaling Interlocking Plan: Essentials of Interlocking, Train Detection, Point Switching, Signal, Block Control, Aspect Control Chart.

UNIT – III: Signaling Equipment – I (8 Hours)

Details of Relays, Signal Cables. Signals, Control Panel & Operation – Safety features, Working.

Details of Point Machines – Components, Working, Circuit Progression, Testing, Safety features,

Level Crossing Gates – Working, Circuit Progression, Safety features

Details of Track Circuits, Axle Counters - Single section, Multi-section, Subsystems; Working and Application.

UNIT – IV: Signaling Equipment – II (8 Hours)

Details about Block Instruments – Types, Working, Circuit Progression, safety features Data Acquisition System – Interfaces, Fault Logic.

Details of Integrated Power Supply, CLS Panel, Lightning and Surge Protection.

Practicals at IRISET Laboratory (12 Hours)

1. Relays, Signal Cables. Signals, Control Panel & Operation.
2. Point Machines - Components, Working, Circuit Progression, Testing.
3. Level Crossing Gates - Working, Circuit Progression.
4. Track Circuits, Axle Counters - Single section, Multi-section, Subsystems; Working and Application.
5. Block Instruments - Types, Working, Circuit Progression.
6. Data Acquisition System - Interfaces, Fault Logic.
7. Integrated Power Supply, CLS Panel, Lightning and Surge Protection.

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)
Accredited by NAAC with A++ Grade
DEPARTMENT OF MATHEMATICS
TRANSFORM TECHNIQUES (OPEN ELECTIVE)
For B.E., V - Semester – CBCS (Common to CSE, AIML & IT Branches)

L:T: P (Hrs/Week): 3:0:0	SEE Marks: 60	Course Code: **U23OE510MA**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	At the end of the course students will be able to:
1. Understand the Definition of Laplace and its Properties.	1. Evaluate Laplace transforms of functions.
2. Understand the Definition of inverse Laplace Transforms-Properties.	2. Evaluate Inverse Laplace transforms of functions.
3. Understand the applications of Laplace Transforms.	3. Apply Laplace transforms to evaluate integrals and to solve ordinary differential equations arising in engineering problems.
4. Study the Definition of Z-Transforms and its properties.	4. Evaluate Z- transforms of Sequences
5. Understand the applications of Z-Transforms	5. Apply Z-transforms to solve ordinary difference equations arising in engineering problems.

UNIT – I: (8 Hours)
LAPLACE TRANSFORMS

 Introduction to Laplace transforms - Existence of Laplace Transform –Properties of Laplace Transform-First shifting theorem - Second shifting theorem -Change of scale property –Differentiation of Laplace transform –Integration of Laplace Transform – Laplace Transform of Derivatives - Laplace Transform of Integrals

UNIT – II: (8 Hours)
INVERSE LAPLACE TRANSFORMS

 Introduction to Inverse Laplace transforms -Properties of Inverse Laplace Transform-First shifting theorem - Second shifting theorem -Change of scale property- Multiplication with s - Division by s – Convolution Theorem (without proof).

UNIT – III: (8 Hours)
APPLICATIONS OF LAPLACE TRANSFORMS

Applications of Laplace transforms to Initial and Boundary Value Problems upto second order –Laplace transform of periodic functions – Triangular wave – Square wave – Saw tooth wave.

UNIT – IV: (8 Hours)

Z-TRANSFORMS

Introduction - Z-transforms of Standard sequences - Linearity Property – Scaling Property - Shifting Properties- Initial value theorem - Final value theorem – Differentiation of Z-transform.

UNIT – V: (8 Hours)
INVERSE Z-TRANSFORMS

Introduction –Inverse Z-transforms of Standard functions - Convolution Theorem – Application of Z-Transforms to solve Difference Equations.

Text Books:
1. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics, Dr.B.S Grewal   40th   Edition, Khanna Publishers.

Reference Books:
1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.

Online Resources:
https://onlinecourses.nptel.ac.in/noc24_ma17/preview

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
4	Duration of Internal	:	90 Minutes			

VASAVI COLLEGE OF ENGNEERING (AUTONOMOUS)
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO PHILOSOPHY
B.E-V SEMESTER GENERAL POOL-OE

Instruction: 3 Hrs/week	SEE Marks: 60	Course Code: U23OE330EH
Credits: 3	CIE Marks:40	SEE: 3 hrs.

Course Objectives	Course Outcomes
What the course aims to achieve	What students should be able to demonstrate after completing the course
1. To introduce students to the major branches, questions, and methods of philosophy.	1. Define and explain foundational philosophical concepts and theories.
2. To develop critical and logical thinking through philosophical analysis.	2. Analyze and critique philosophical arguments using logical reasoning.
3. To explore key philosophical texts and thinkers from various traditions.	3. Compare perspectives from different philosophical traditions and historical periods.
4. To encourage reflection on ethical, metaphysical, and epistemological issues.	4. Apply philosophical thinking to contemporary ethical and social issues.
5. To cultivate the ability to construct and evaluate arguments.	5. Formulate clear, coherent arguments in both oral and written form.

Unit 1: What Is Philosophy?
Definition and scope of philosophy
Branches of philosophy: metaphysics, epistemology, ethics, logic, aesthetics
Philosophical methods and the role of reasoning

Unit 2: Knowledge and Reality (Epistemology and Metaphysics)
What can we know? (Skepticism, rationalism, empiricism)
Appearance vs. reality
The mind-body problem

Unit 3: Ethics and Moral Philosophy
What is the good life?
Major ethical theories: utilitarianism, deontology, virtue ethics
Moral dilemmas and applied ethics

Unit 4: Political and Social Philosophy
The state and justice
Liberty, rights, and social contract theory
Civil disobedience and authority

Unit 5: Logic and Critical Thinking
Arguments, premises, and conclusions
Fallacies and sound reasoning
Introduction to symbolic logic

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

1	No. of Internal tests	:	2	Max.Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests   : 90 Minutes

VASAVI COLLEGE OF ENGINEEING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of H & SS

Basics of Entrepreneurship
(Open Elective-III) SYLLABUS FOR B.E V Semester

L:T: P (Hrs./week):3: 0 : 0	SEE: 60	Course Code: U23OE540EH
Credits: 3	CIE: 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:
1. Deeply understand and discover entrepreneurship	1. Take-up entrepreneurship as a career choice
2. Build a strong foundation for the students to start, build, and grow a viable and sustainable venture	2. Create and Validate business models. Build a Minimum Viable Product (MVP).
3. Develop an entrepreneurial mind-set equipped with the critical skills and knowledge required	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-Lean 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 Respondents, 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:
4. Robert D. Hisrich, Michael P Peters, "Entrepreneurship", Sixth edition, McGraw-Hill Education.
5. Thomas W. Zimmerer, Norman M. Scarborough, "Essentials of Entrepreneurship and small businessManagement", Fourth edition, Pearson, New Delhi, 2006.
6. Alfred E. Osborne, "Entrepreneurs Toolkit", Harvard Business Essentials, HBS Press, USA, 2005
7. MadhurimaLall and ShikhaSahai, "Entrepreneurship", Excel Books, First Edition, New Delhi,2006
8. **Web Resource:** http://www.learnwise.org

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

1	No. of Internal tests	:	2	Max.Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

9. Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderbad-500031
DEPARTMENT OF MATHEMATICS

TRANSFORM TECHNIQUES
(OPEN ELECTIVE)

For B.E., V - Semester – CBCS
(Common to CSE, AIML & IT Branches)

Instruction: 3 Hours	SEE Marks: 60	Course Code: **U23OE510MA**
Credits:3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	**At the end of the course students will be able to:**
1. **Understand** the Definition of Laplace and its Properties. 2. **Understand** the Definition of inverse Laplace Transforms-Properties 3 **Understand** the applications of Laplace Transforms. 4 **Study** the Definition of Z-Transforms and its properties 5 **Understand** the applications of Z- Transforms	1. **Evaluate** Laplace transforms of functions. 2. **Evaluate** Inverse Laplace transforms of functions. 3. **Apply** Laplace transforms to evaluate integrals and to solve ordinary differential equations arising in engineering problems. 4. **Evaluate** Z- transforms of Sequences 5. **Apply** Z-transforms to solve ordinary difference equations arising in engineering problems.

UNIT – I: (8 Hours)
LAPLACE TRANSFORMS
Introduction to Laplace transforms - Existence of Laplace Transform –Properties of Laplace Transform-First shifting theorem - Second shifting theorem -Change of scale property –Differentiation of Laplace transform –Integration of Laplace Transform – Laplace Transform of Derivatives - Laplace Transform of Integrals

UNIT – II: (8 Hours)
INVERSE LAPLACE TRANSFORMS
Introduction to Inverse Laplace transforms -Properties of Inverse Laplace Transform-First shifting theorem - Second shifting theorem -Change of scale property- Multiplication with s - Division by s – Convolution Theorem (without proof).

UNIT – III: (8 Hours)
APPLICATIONS OF LAPLACE TRANSFORMS

Applications of Laplace transforms to Initial and Boundary Value Problems upto second order –Laplace transform of periodic functions – Triangular wave – Square wave – Saw tooth wave.

UNIT – IV: (8 Hours)
Z-TRANSFORMS

Introduction - Z-transforms of Standard sequences - Linearity Property – Scaling Property - Shifting Properties- Initial value theorem - Final value theorem – Differentiation of Z-transform.

UNIT – V: (8 Hours)
INVERSE Z-TRANSFORMS

Introduction –Inverse Z-transforms of Standard functions - Convolution Theorem – Application of Z-Transforms to solve Difference Equations.

Text Books:
1. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics, Dr.B.S Grewal   40th Edition, Khanna Publishers.

Reference Books:
1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.

Online Resources:
https://onlinecourses.nptel.ac.in/noc24_ma17/preview

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
4	Duration of Internal	:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderbad-500031
DEPARTMENT OF MATHEMATICS

ESTIMATION THEORY AND STATISTICAL INFERENCE
(OPEN ELECTIVE)
For B.E., V- Sem., (CBCS)
(Common to CSE, AIML & IT Branches)

Instruction:3 Hours	SEE Marks: 60	Course Code: **U23OE520MA**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :	*At the end of the course students should be able to:*
1. ***Study*** the concepts and application of sampling distribution	1. Apply Central Limit Theorem to the real-world problems and calculate and interpret, in testing one sample mean (σ known).
2. ***Describe*** the role of the point estimation, interval estimation and Bayesianestimation about a parameter.	2. ***Apply*** various estimators for estimating the parameters of standard distributions.
3. ***Study*** various methods of testing large samples.	3. ***Infer*** properties of population conducting tests on samples
4. ***Analyze*** standard statistical tests employed for small samples.	4. ***Interpret*** planned and unplanned comparisons for the one-way ANOVA.
5. ***Study*** the difference between non-parametric and parametric tests.	5. ***Solve*** problems on the Sign test, Wilcoxon Signed test, Mann- Whitney U-test.

UNIT – I: (8 Hours)
SAMPLING DISTRIBUTION
Sampling distribution of Mean (σ known)-Sampling distribution of Mean (σ unknown)-Sampling distribution of the Variance-Sampling distribution of differences and sums- Central Limit Theorem and its applications.

UNIT – II: (7 Hours)
ESTIMATION
Introduction- Point estimation- Interval estimation- Bayesian estimation.

UNIT – III: (7 Hours)
TESTING OF HYPOTHESIS FOR LARGE SAMPLES
 Introduction -Test of significance for single proportion-Test of significance for two proportions-Standard deviation tests for two samples.

UNIT – IV: (7 Hours)
TESTING OF HYPOTHESIS FOR SMALL SAMPLES
Introduction- Paired Sample t-test- Chi- square test for independence of attributes- Analysis of Variance (ANOVA)

UNIT – V: (7 Hours)
NON-PARAMETRIC TESTS
The Sign test- Wilcoxon Signed Rank test- Mann-Whitney U- test.

Text Books:
1. Miller & Freund's Probability and Statistics for Engineers.
2. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand & sons, New Delhi.
3. Applied Statistics and Probability for Engineers by Douglas C. Montgomery and George C. N Runger, International Student Version, 6th Edition, 1 January 2016.
Reference Books:
1   R.K. Jain & S.R.K. lyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2   Higher Engineering Mathematics, Dr.B. S Grewal   40th Edition, Khanna Publishers.
3   Advanced Engineering Mathematics, Kreyszig E, 8th Edition, John Wiley & Sons Ltd, 2006.
4   A text book of Engineering Mathematics by N.P. Bali& Manish Goyal, Laxmi Publication.
Online Resources:
   https://onlinecourses.nptel.ac.in/noc24_ma39/preview

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
4	Duration of Internal	:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-23)

B.E. – INFORMATION TECHNOLOGY : SIXTH SEMESTER (2025 - 2026)

S No.	Course Code	Course Name	Scheme of Instruction			Scheme of Examination			Credits
			Hours per week			Duration in Hrs	Maximum Marks		
			L	T	P/D		SEE	CIE	
THEORY									
1	U23PC610IT	Software Engineering	3	-	-	3	60	40	3
2	U23PC620IT	Distributed Systems & Cloud Computing	3	1	-	3	60	40	4
3	U23PC630IT	Neural Networks and Deep Learning	3	-	-	3	60	40	3
4	U23OE6XXXX	Open Elective - IV	3	-	-	3	60	40	3
5	U23HS040EH	Economics and Finance for Engineers	2	-	-	3	60	40	2
6	U23HS630EH	Skill Development Course – VII (Verbal Ability)	1	-	-	2	40	30	1
7	U23PE610IT	Skill Development Course – VIII (Technical Skills –IV)	1	-	-	2	40	30	1
PRACTICALS									
8	U23PC611IT	Software Engineering Lab	-	-	2	3	50	30	1
9	U23PC621IT	Distributed Systems & Cloud Computing Lab	-	-	2	3	50	30	1
10	U23PC631IT	Neural Networks and Deep Learning Lab	-	-	2	3	50	30	1
11	U23PW619IT	Theme Based Project	-	-	2	3	50	30	1
		Library / Sports / Mentor Interaction	-	-	-	-	-	-	-
•		Student should acquire one NPTEL Certification Course equivalent to 2 credits (8 weeks) by the end of VI Semester.							-
		Total	**16**	**1**	**8**	**-**	**580**	**380**	**21**
		Grand Total	**17 + 8 = 25**			**-**	**960**		

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

SOFTWARE ENGINEERING

SYLLABUS FOR B.E VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U23PC610IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	*At the end of the course student will be able to:*
1. Understand the various SDLC models and stages in Software design lifecycle. 2. Understand the different types of Software Testing.	1. Select the most suitable software process model out of several, for the development of a given software project. 2. Develop the ability to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project. 3. Apply the software design principles. 4. Compare software quality techniques 5. Apply various testing techniques.

UNIT-I

Introduction to Software Engineering: Definition ofSoftware Engineering, application areas of software engineering, Process Framework, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process. CMMI, ISO 9000 Quality Standards

Process Models: Prescriptive Models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, and the Unified Process.

Agile view of Process: What is Agility. What is an Agile Process, and Agile Process Models.

UNIT-II

Understanding Requirements, Requirements Engineering. Components of SRS. Cost estimation.

Data Modeling Concepts, Scenario-Based Modeling, Flow-Oriented Modeling, Class-Oriented Modeling, Creating a Behavioral Modeling.

Design Engineering: Design within the context of SE, Design Process, Design Concepts, and the Design Model.

UNIT-III

Architectural Design: Software Architecture, Architecture Genres, Architecture Styles, Architectural Design.

Component level Design: What is a Component, Designing Class-Based Components, Conducting Component-Level Design, Component-Based development and Object Constraint Language.

Performing User Interface Design: The Golden rules, User Interface Analysis and Design, Interface Design Steps, and design Evaluation.

UNIT-IV

Software Quality Assurance(SQA) . Elements of SQA

Software Testing Concepts:Error,Fault and Failure

Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Validation Testing, System Testing, Levels of Testing, Types of Testing .

Testing Process-Test Plan, Test Case Design, Test Scripts, Test case Execution.

UNIT-V

Black-box Testing – Equivalence class Partitioning, Boundary Value Analysis, Pair-Wise Testing

White-box testing, Control flow based Criteria, Test case generation and Tool support.

Risk Management: Software Risks, Reactive Vs Proactive Risk Strategies, Risk Mitigation, Monitoring and management.

Emerging Trends in Software Engineering, Introduction to DevOps, DevOps lifecycle

Learning Resources:

1. Roger S.Pressman, Software Engineering: A Practitioners Approach, Seventh Edition, McGraHill, 2009.
2. Pankaj Jalote "An Integrated Approach to Software Engineering, Third Edition, Narosa Publishing house, 2008.
3. James F.Peters, WitoldPedrycz, Software Engineering-An engineering Approach, John Wiley Inc., 2000.
4. Ali Behforoz and Frederic J.Hadson, Software Engineering Fundamentals, Oxford University Press, 1997.
5. Salman Abdul Moiz, Software Engineering,AICTE, February2024.
6. Software Testing Techniques by Bories Beizer,Second Edition, Dream Tech Press
7. https://www.atlassian.com/devops
8. https://onlinecourses.nptel.ac.in/noc20_cs68/preview
9. https://onlinecourses.nptel.ac.in/noc22_cs61/preview

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031
DEPARTMENT OF INFORMATION TECHNOLOGY
DISTRIBUTED SYSTEMS AND CLOUD COMPUTING
SYLLABUS FOR B.E.- VI SEMESTER

L:T:P(Hrs./week):3:1:0	SEE Marks : 60	Course Code : **U23PC620IT**
Credits : 4	CIE Marks : 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Examine state-of-the-art distributed systems. 2. Provide an overview of distributed resource management. 3. Provide the fundamentals and essentials of Cloud Computing. 4. Describe the importance of virtualization in Cloud Computing. 5. Explore some important cloud computing environments such as Google Apps, Microsoft Azure and Amazon Web Services.	1. Understand the principles of distributed system. 2. Illustrate the basic concepts of synchronization. and communication mechanisms used in distributed systems. 3. Compare the strengths and limitations of Cloud computing. 4. Analyse advantages and disadvantages of virtualization technology. 5. Identify the appropriate cloud services for a given application.

UNIT I
Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the web, Challenges; Hardware concepts; Software Concepts
System Models: Introduction, Architectural models, Fundamental models.
Time and Global States: Introduction, Clocks events and process states, synchronizing physical clocks, Logical Clocks, Global states, Distributed debugging.
UNIT-II
Coordination and Agreement: Introduction, distributed mutual exclusion, Election, Multicast communication, Consensus and related problems.
Replication: Introduction, System model and group communication, Fault-tolerant services.
Distributed File Systems: Introduction; File service architecture; Case study: Sun Network File System;
UNIT-III
Introduction to Cloud Computing, Cloud Computing Architecture: Essential Characteristics, Service Models, Deployment Models, Pros and Cons of Cloud Computing. Scalable Computing over the Internet, Technologies for Network-based Systems, System Models for Distributed and Cloud Computing, Software Environments for Distributed Systems and Clouds.
UNIT-IV

Virtual Machines and Virtualization of Clusters and Data Centers: Implementation levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Virtualization of CPU Memory and I/O devises, Virtual Clusters and Resource Management, Virtualization for Data Center Automation

Case Studies: Xen Virtual machine monitors - Xen API. VMware - VMware products- VMware Features.

Containers: Container Architecture, Virtualization Vs. Containers, Overview of Dockers, Docker Components and Docker Commands.

UNIT-V

Cloud Platform Architecture over Virtualized Data Centers: Data Center Design and interconnection networks, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms: Google App Engine (GAE), Amazon Web Services (AWS), Microsoft Windows Azure. Inter-cloud Resource Management, Cloud Security and Trust Management

Learning Resources:

1. Colouris, Dollimore, Kindberg, " Distributed Systems concepts and Design" 5th Ed. Pearson Education, 2011
2. Kai Hwang, Geoffrey C Fox, Jack J. Dongarra, "Distributed and cloud Computing", Morgan Kaufmann
3. Andrew S. Tanenbaum, Van Steen, " Distributed Systems ", Pearson Education, 2010.
4. Rajkumar Buyya, James Broberg, Andrzej M Goscinski "Cloud Computing: Principles & Paradigms, Wiley Series on Parallel and Distributed computing, 2011
5. Singhal M, Shivratari N.G, "Advanced Concepts Introduction, Operating Systems" McGraw Hill, 2001
6. Pradeep K Sinha, " Distributed Opearating Systems: Concepts and Design", Pearson Education Asia India, 2007.
7. https://onlinecourses.nptel.ac.in/noc23_cs89/preview
8. https://onlinecourses.nptel.ac.in/noc23_cs72/preview

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

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

NEURAL NETWORKS AND DEEP LEARNING
SYLLABUS FOR B.E VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U23PC630IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	*At the end of the course student will be able to:*
1. Introduce the fundamental concepts to Neural networks and deep learning. 2. Introduce Keras, Tensorflow and Pytorch libraries. 3. Explore the applications of CNN and RNN.	1. **Understand** foundational neural network models and implement DL programs using Keras, TensorFlow, and PyTorch. 2. **Apply** regularization and optimization techniques to improve deep learning model performance. 3. **Implement** CNN architectures for solving image classification problems using transfer learning. 4. **Design** RNN and LSTM models for sequence modelling and time series data. 5. **Analyze** transformer-based models and apply compression and distillation techniques for efficient deployment.

UNIT-I:
Introduction to Neural networks and Deep Learning: Perceptron, Sigmoid Neurons, Gradient descent, Multilayer Neural Network, Backpropagation, Convergence, Deep learning, Representation learning.
DL programming: Keras Sequential and Functional API, TensorFlow Data Pipeline (tf.data), PyTorch Tensors and Autograd, Model Training Loop, Loss Functions and Optimizers, Saving and Loading Models, GPU Acceleration.

UNIT-II:
Regularization and Optimization techniques: L1 and L2 regularization, Early stopping, Dataset augmentation, Parameter sharing, Bagging and Ensemble, Dropout and Adversarial training.
Challenges in optimization, Basic algorithms: SGD, Momentum, Nesterov Momentum; Parameter initialization strategies, Adaptative learning algorithms: RMSProp, Adam.

UNIT-III:
Convolutional Neural networks (or CNN): Convolution operation, Motivation, Pooling, Convolution and pooling as an infinitely strong prior, Convolution variants, AlexNet, GoogleNet and ResNet models, Applications, Transfer learning for Image classification.

UNIT-IV:
Recurrent neural networks (or RNN): Intro, unfolding graph, Basic architecture, Backpropagation through time (BPTT), Long term dependencies, Vanishing and exploding gradients, Optimization for Long-term dependency challenge, LSTM, GRU.

UNIT-V:
Encoder-decoder seq-seq architecture, Transformer Architecture: Attention mechanism, Self-attention, Cross-Attention, Positional encoding.
Model Compression Techniques: Pruning, Quantization, Low-rank factorization.
Knowledge Distillation: Teacher-student paradigm.
Applications - Neural machine translation.

Learning Resources:
1. Deep learning, MIT Press by Ian Goodfellow and Yoshua Bengio and Aaron Courville.
2. https://www.cse.iitm.ac.in/~miteshk/CS7015.html
3. https://www.deeplearningbook.org/
4. https://keras.io/
5. https://www.tensorflow.org/
6. https://pytorch.org/

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ECONOMICS AND FINANCE FOR ENGINEERS
SYLLABUS FOR B.E VI-SEMESTER

L:T:P (Hrs./week):: 2:0:0	SEE Marks: 60	Course Code: **U23HS040EH**
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	Course Outcomes
The course will enable the learners to: Understand the concepts and tools of economics, accounting and finance that will equip them for decision making.	At the end of the course the learner will be able to : 1. Gain a conceptual understanding of economics as a discipline. 2. Construct a cost sheet and classify costs and make use of Marginal cost analysis in decision making. 3. Understand the accounting process and its importance. 4. Analyze the financial position of business firm through calculation and interpretation of ratios. 5. Conceptual understanding of Financial Management and evaluate Long term investment decisions in business.

Unit I: Concepts in Economics
Definition of Managerial Economics - Scope of Managerial Economics - Relevance of Economics for Engineers - Demand function - Determinants of Demand - Law of Demand - assumptions and exceptions – Elasticity of demand (Price, Income and cross elasticity)- numericals on elasticity of demand - Application-oriented approach of Elasticity - Law of supply - Introduction to market structures.

Unit II: **Cost Analysis and Profit Planning**
Concept of Cost - Classification of Costs - Cost sheet (simple numericals) – Marginal Costing Analysis (simple numericals) - Application oriented approach (Make or buy, continue or shutdown decisions - Theory)

Unit III: **Conceptual Understanding of Accounting**
Accounting Cycle – Principles of Accounting - Journal - Subsidiary Books – Ledger - Trial Balance (Theory Only)

Preparation of Trading and Profit and Loss Account and Balance Sheet (numericals with adjustments for closing stock, outstanding expenses, prepaid expenses, accrued incomes, incomes received in advance, depreciation, bad debts and provision for bad debts) – Introduction to Corporate Balance Sheet

UNIT IV: **Financial Statement Analysis**
Ratio Analysis - uses and limitations - Liquidity, Solvency, Activity & Profitability Ratios (simple numericals)

Unit V: **Financial Management decisions**
Financing decisions - Dividend decisions - Investment decisions - Long term – Capital budgeting – Traditional and DCF Techniques (Numericals on capital budgeting techniques namely PBP, ARR, NPV, PI and IRR) – Short term - Introduction to working capital.

Learning Resources for students:
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, Numericals and Cases", Mc Graw Hill Education Private Limited, New Delhi.Latest edition
4. M. Kasi Reddy &Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, Latest edition.

Reference books:
1. Mehta P.L.,"Managerial Economics: Analysis,Numericals and Cases", Sultan Chand and Sons. Latest edition.
2. Narayanaswamy, "Financial Accounting: A Managerial Perspective", Prentice Hall India
3. *M. L. Seth., "Micro Economics", Lakshmi Narain Agarwal.* Latest edition
4. Dr. R.P. Rustagi., "Fundamentals of Financial Management"TaxmannPublications.Latest edition

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

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE VII – VERBAL ABILITY
(Common to all branches)
SYLLABUS FOR B.E. VI SEMESTER

L:T:P (Hrs./week):: 1:0:0	SEE Marks: 40	Course Code: **U23HS630EH**
Credits: 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES **The course will enable the learners to:**	COURSE OUTCOMES **At the end of the course the learners will be able to:**
1. Introduce students to higher order thinking and problem solving via vocabulary and its various components 2. Train students to understand context & theme and use it to complete sentences. 3. Train students to identify the structure of sentences & paragraphs 4. Train students to analyze text, e.g., simple outlining and note taking, summarize, draw conclusions, and apply information to personal experiences 5. Train students to improve the quality of sentences by fixing errors	1. Use vocabulary as a tool to solve questions in verbal ability 2. Identify meanings of words using theme and context 3. Solve questions based on jumbles- sentences and paragraphs 4. Develop skills to critically analyze texts and then the ability to identify its theme 5. Improve the quality of their writing by being aware of the common errors

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

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

1	No. of Internal tests	:	2	Max. Marks	:	20
2	No. of assignments	:	2	Max. Marks	:	5
3	No. of Quizzes	:	2	Max. Marks	:	5

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

SOFTWARE ENGINEERING LAB
SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week):: 0:0:2	SEE Marks : 50	Course Code : **U23PC611IT**
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*At the end of the course student will be able to:*
1. Illustrate the concepts related to analysis, design, development and testing techniques related to Object Oriented Software development.	1. Develop system requirements specification. 2. Apply fundamental concepts of object-oriented techniques of systems analysis and design. 3. Use computer based tools to aid in software development 4. Generate and run test cases for various levels of testing by applying different testing methods.

List of Experiments:

Do the following 12 exercises for any one project given in the list of sample projects or any other projects:
1. Development of problem statement.
2. Requirements management, Preparation of Software Requirement Specification Document.
3. Configuration Management: Preparation of Software Configuration Management related document.
4. Perform the user's view analysis for the system: Use case diagram.
5. Model the structural view for the system: Class diagram
6. Model the behavioral view for the system: Sequence diagram, Collaboration diagram
7. Model the advanced behavioral view for the system : State-chart diagram, Activity diagram
8. Model the implementation view and deployment view for the system: Component diagram, Deployment diagram.
9. Software Development: Application and web modelling, content management.
10. Develop test cases for various white box testing techniques.
11. Perform unit testing, Functional Testing for a sample code of the suggested system using the testing tool.
12. Perform load Testing, bug tracking for a sample code of the suggested system using the testing tool.

Virtual Lab:

13. Estimation of Project Metrics: http://vlabs.iitkgp.ernet.in/se/2/exercise/

Sample Projects:
1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

Content Beyond Syllabus:
1. Prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Learning Resources:
1. Grady Booch, James Rumbaugh, Ivor Jacobson, The Unified Modeling Language-User Guide(Covering UML 2.0), Second Edition, Pearson Education, India,2007.
2. Ivor Jacobson, Grady Booch, James Rumbaugh, The Unified Software Development Process, Pearson Education, India, 2008.
3. Software Testing Techniques by Bories Beizer,Second Edition, Dream Tech Press
4. http://nptel.ac.in/courses/106105153/
5. http://vlabs.iitkgp.ac.in/se/

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: 2Hours			

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERBAD-500031
DEPARTMENT OF INFORMATION TECHNOLOGY

DISTRIBUTED SYSTEMS & CLOUD COMPUTING LAB
SYLLABUS FOR B.E.- VI SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : **U23PC621IT**
Credits : 1	CIE Marks : 30	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	**On completion of the course, students will be able to:**
1. Demonstrate client server application in distributed environment. 2. Illustrate cluster environment and execute distributed application. 3. Provide hands on experience to create virtual machines and hosting of a website in public cloud environments.	1. Design and develop distributed client server applications using socket programming concepts. 2. Design and develop distributed applications using MPI cluster. 3. Create and manage virtual machines using Type 1 and Type II virtualizations 4. Write a distributed application using Map Reduce. 5. Deploy a website in the cloud environment.

1. Write a program for command line based client server Java application using TCP protocol.
2. Write a program for command line based client server Java application using UDP protocol.
3. Write a program for Message Passing Interface (MPI) Cluster for matrix multiplication of order 5000 x 5000.
4. Implementation of Type II virtualization using Oracle Virtual Box and installing Linux OS.
5. Write a Map Reduce application and execute it on Hadoop environment.
6. Using Microsoft Azure Cloud environment create a virtual machine and host a simple website.
7. Using Amazon Web Services (AWS) Academy Sandbox environment:
   i)   Create an Amazon Elastic Compute Cloud (Amazon EC2) instance and host a website.
   ii)   Create an Amazon Simple Storage Service (Amazon S3) bucket to host a static webpage.
8. Create Docker on a EC2 instance and write a simple hello world application.
9. Creating and managing a relational database using Amazon AWS RDS Service.
10. Deploy a Scalable website using Kubernetes.

Additional Experiments:
1. Write a program for implementation of Network Time Protocol (NTP) client server for clock synchronization.
2. Create a virtual machine using open stack.

Learning Resources:
1. AMAZON WEB SERVICES: The Complete Guide From Beginners For Amazon Web Services, Richard Derry, Amazon
2. Learning AWS, by Aurobindo Sarkar, Amit Shah, 2015, Packt Publishing Digital Services LLC, 2019
3. Colouris, Dollimore, Kindberg, " Distributed Systems concepts and Design" 5th Ed. Pearson Education, 2011
4. Rajkumar Buyya, James Broberg, Andrzej M Goscinski "Cloud Computing: Principles & Paradigms, Wiley Series on Parallel and Distributed computing, 2011
5. Herbert Schildt, "Java : the complete reference" McGraw-Hill Education, 2019
6. azure.microsoft.com

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: 2 Hours			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

NEURAL NETWORKS AND DEEP LEARNING LAB
SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week):: 0:0:2	SEE Marks : 50	Course Code : **U23PC631IT**
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*At the end of the course student will be able to:*
1. Introduce Tensorflow, Keras and Pytorch to implement DL models. 2. Explore different CNN architectures for Image Analysis. 3. Discuss different types of RNNs for text and speech processing applications. 4. Introduce GANS and Transformers with suitable applications.	1. Implement single layer Perceptron, multi payer perceptron and test the efficiency of multilayer neural network with different activation functions. 2. Identify appropriate regularization and optimization techniques and use to improve the performance of a fully connected neural network model. 3. Apply CNN models for transfer learning for computer vision problems. 4. Implement RNNs for text and speech processing. 5. Use transformers for language translation.

1. Introduction to Keras, TensorFlow and PyTorch.

2. Implementation of the perceptron algorithm for two-dimensional data.

3. Implement multilayer neural networks for classification and regression with different activation functions, regularization techniques and optimization techniques on MNIST data.

4. Build CNN Models for image classification on CIFAR10 and Fashion-MNIST datasets.

5. Segmentation and object detection using the latest Deep Convolution models (FCN/UNet/DeepLab).

6. Transfer learning for any image classification.

7. Classification of person names with their identity using character level

RNN.

8. Language translation with seq-to-seq encoder-decoder based RNN.

9. Language translation with seq-to-seq attention based RNN.

10. Language translation with Transformer or pretrained models from Hugging Face.

Learning Resources:
1. https://pytorch.org/
2. https://www.tensorflow.org/
3. Chollet, Francois. Deep learning with Python. Simon and Schuster, 2021.
4. Ketkar, Nikhil, and Eder Santana. Deep learning with Python. Vol. 1. Berkeley, CA: Apress, 2017.
5. https://d2l.ai/

No. of Internal Tests:	02	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: 2Hours			

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

THEME BASED PROJECT
SYLLABUS FOR B.E. VI SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks :50	Course Code : **U23PW619IT**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*At the end of the course student will be able to:*
1. Promote project-based learning by working on societal problems. 2. Encourage individual and teamwork, communication, life-long learning and follow professional ethics.	1. Review the existing literature/ models to identify the scope for extension. 2. Apply technical knowledge to develop novel solutions for real life problems. 3. Plan and execute projects by following effective software development life cycle. 4. Design and demonstrate the prototypes. 5. Practice professional ethics, teamwork and lifelong learning.

Continuous Internal Evaluation (CIE) – 30 marks : To be evaluated by the Internal Examiner

Assesment-1 : **[5 Marks]**
To be conducted on week-2 : Review of problem Statement, Motivation, Introduction, Use cases and Techstack.

Assesment-2: [10 Marks]
To be conducted on week-7: Review of low level design details for all end-to-end use cases.

Assesment-3: [15 Marks]
To be conducted on week-15 : Review of final implementation / demonstration of all use cases, presentation and report.

Semester End Examination (SEE) – 50 marks: To be evaluated by the External Examiner

Evaluation is done based on the following deliverables:

PowerPoint Presentation	[10 Marks]
Demonstration of the application	[20 Marks]
Project report	[10 Marks]
Viva Voce	[10 Marks]

External Examiner should be appointed from other Institutes or from the industry.

Virtual Lab:

Basics of HTML: https://html-iitd.vlabs.ac.in/List%20of%20experiments.html

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

OPEN ELECTIVES - IV		
Department	Code	Title
Civil	U23OE610CE	Project Management
CSE	U23OE610CS	Fundamentals of Database Management System
MECH	U23OE610ME	Industry 4.O (Stream: Robotics)
MECH	U23OE620ME	Additive Manufacturing and its Applications (General Pool)
IT	U23OE610IT	Web application development & Security
IT	U23OE620IT	Introduction to Machine Learning (Stream based (AI&ML))
EEE	U23OE610EE	Introduction to Batteries and Battery management System
ECE	U23OE610EC	Internet of Things and Applications
ECE	U23OE630PH	Automatic Train Protection System – Kavach
MATHS	U230E610MA	Advanced Probability and Statistical Methods
H&SS	U23OE630EH	Introduction to Psychology
H&SS	U23OE630EH	Advanced course in Entrepreneurship

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: U23OE610CE
Credits: 3	CIEMarks:40	DurationofSEE:3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Learn the concept of project management along with function and objectives. 2. Understand various techniques used for project planning such as bar charts, CPM, PERT and crashing of networks. 3. Acquire knowledge on various types of contracts, tenders.	1. Understand the objectives, functions and principles of management in projects. 2. Practice the network techniques like CPM and PERT for better planning and scheduling of engineering works. 3. Analyse the importance of cost and time in network analysis and planning the work accordingly. 4. Knowledge on Contracts, Tenders, and Work orders related to the projects. 5. Interpret the concept of Linear Programming and solve problems by Graphical and Simplex methods.

UNIT-I: Significance of Project Management: Importance of Project Management, Types of projects, Project Management Cycle, Objectives and functions ofproject 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, Vision IAS, 2020.
2. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2019
3. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 2022.
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, 2017.

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Computer Science & Engineering
FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEM
(OPEN ELECTIVE-IV)
SYLLABUS FOR B.E. VI-SEMESTER
(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code :**U23OE610CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES		COURSE OUTCOMES *On completion of the course, students will be able to*	
1	Identify different issues involved in the design and implementation of a database system.	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.

CO-PO and CO-PSO mapping															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2		2									1	1		2
CO2	2	1	2										1		2
CO3	2	1	2		2							2	2	2	2
CO4	2	1	2		2							1	2	2	2
CO5	2	1	1									1	2	2	2

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

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal 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 : 1 Hour 30 Minutes

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

INDUSTRY 4.O
(Open Elective-IV)
SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U23OE610ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course is to	On completion of the course, students will be able to
provide an overview of Industry 4.O and its impact on modern manufacturing and develop skills for implementing industry 4.O technologies in production processes.	1. analyse the basic principles and technologies for smart factories and identify their applications in modern manufacturing. 2. evaluate the concepts of Cyber-Physical Systems (CPS) and Cyber-Physical Production Systems (CPPS) and their role in creating new business models. 3. apply the concepts of Digital Twins and Assistance Systems in production processes and their benefits. 4. develop strategies for ensuring safety and security in networked production environments and analyse the challenges and opportunities of Human-Robot Collaboration (HRC). 5. analyse the benefits and challenges of Cloud Manufacturing and the Connected Factory and develop strategies for implementing smart work pieces.

UNIT – I
Introduction
Definition of Industry 4.0, Comparison of Industry 4.0 Factory and today's Factory, Difference between conventional automation and Industry 4.0.
Basic principles and technologies of a Smart Factory
Internet of Things (IoT) & Industrial Internet of Things (IIoT) & Internet of Services, Big Data, Cyber-Physical Systems, Value chains in manufacturing companies, Customization of products, Digital Twins, Cloud Computing / Cloud Manufacturing, Security issues within Industry 4.0 networks.

UNIT – II

Cyber-Physical Systems (CPS) and Cyber-Physical Production Systems (CPPS)
Definition of Cyber-Physical System, Core elements of Cyber-Physical Systems and Cyber-Physical Production Systems, Control theory and real-time requirements, Self-organization principles, Communication in cyber-physical systems, Design Methods for Cyber-physical Systems, Applications for cyber-physical systems.

Cyber-Physical Systems and new Business Models
How CPS can induce new Business Models, The Role of horizontal and vertical value streams, New Business Models for the Smart Factory, Characteristics of Business Models within the Smart Factory, Examples of new Business Models: Service provider, Data provider, Technology provider, Platform provider.

UNIT – III
Digital Twins in Production
Basic concepts of Digital Twins, Benefits, impact and challenges of Digital Twins, Features and Implementation of Digital Twins, Types of Digital Twins, Digital Twin use cases, Applications for digital twins in production.

Assistance systems for production
The connected worker within the Industry 4.0 scenario, Diversity-driven workplaces, Human-and task-centered assistance systems, Technical tools ("Ambient Assisted Working" (AAW)), Mobile information technologies, Shop floor information systems, Production line support systems, Manipulator systems and intelligent chairs, Human work support by using exoskeletons, Applications of assistance systems in production.

UNIT –IV
Human-Robot Collaboration
Human-Robot Collaboration in Industry, Collaborative Robots: tasks, examples, Types of Human-Robot Collaboration, Safety of Human-Robot Collaboration, Applications with Collaborative Robots.

Safety and Security in networked Production Environments
Definition of Safety with Industry 4.0, Safety for connected Machines and Systems, Safety in Human Robot cooperation, Optimizing Safety with Industry 4.0, Security & Security Risks with Industry 4.0.

UNIT – V
Cloud Manufacturing and the connected factory
Virtualization, Cloud Platforms, Big data in production, Cloud-based ERP and MES solutions, Connected factory applications, IT security for cloud applications.

The smart work piece

Intelligent work piece, Work piece tagging, QR codes and RFID, Communication between work piece and environment, Multi-agent systems in production, Applications for smart work pieces.

Learning Resources:
1. Alasdair Gilchrist, Industry 4.0: The Industrial Internet of Things, Apress, 2016.
2. Ibrahim Garbie, Sustainability in Manufacturing Enterprises: Concepts, Analyses and Assessments for Industry 4.0, Illustrated Edition, Springer, 2016.
3. Klaus Schwab, The Fourth Industrial Revolution, Crown, 2017.

The break-up of CIE: Internal Tests + Assignments + Quizzes
1   No. of Internal Tests: 02   Max. Marks for each Internal Test: 30
2   No. of Assignments: 03   Max. Marks for each Assignment: 5
3   No. of Quizzes: 03   Max. Marks for each Quiz Test: 5
    Duration of Internal Test: 90 Minutes

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

ADDITIVE MANUFACTURING AND ITS APPLICATIONS
(General Pool)
(Open Elective-IV)
SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U23OE620ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: understand the fundamentals of various additive manufacturing technologies and their applications in Engineering Industry.	On completion of the course the student will be able to: 1. Understand the fundamentals of prototyping and the various data formats used in Additive Manufacturing. 2. Study the principle, process, advantages, limitations and case studies of liquid based AM systems. 3. Study the principle, process, advantages, limitations and case studies of solid based AM systems. 4. Study the principle, process, advantages, limitations and case studies of powder based AM systems. 5. Study the applications of AM in various engineering industries as well as the medical field.

CO-PO and CO-PSO mapping															
CO	PO mapping												PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	3	2		2	1									
CO2	3	2	2		3	2									
CO3	3	2	2		3	2									
CO4	3	2	2		3	2									
CO5	1	3	3		3	3									

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:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
	Duration of Internal Test: 90 Minutes			

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY
WEB APPLICATION DEVELOPMENT AND SECURITY
(GENERAL TRACK : OPEN ELECTIVE-IV)
(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 : **U23OE610IT**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES *On completion of the course, students will be able to*
1) Acquire basic skills for designing static and dynamic Web Applications using HTML, CSS, Java Script, Bootstrap and XML. 2) Acquire fundamental knowledge of Web Security concepts	1. Design a static web pages using HTML, CSS. 2. Create dynamic web pages and client side validation using JavaScript. 3. Develop responsive web applications using Bootstrap. 4. Build an application using an MVC Framework and XML 5. Analyze and evaluate web security attacks.

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

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

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

UNIT-IV: XML
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

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 MACHINE LEARNING
(AI&ML TRACK : OPEN ELECTIVE-IV)
(Common for ECE, EEE, MECH & CIVIL)
SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code: **U23OE620IT**
Credits: 3	CIE Marks: 40	Duration of SEE :3Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
Introduce the fundamental concepts, techniques and modern tools in Artificial intelligence and Machine Learning field to effectively apply it to the real-world problems.	1. Demonstrate knowledge of the Artificial intelligence and machine learning literature. 2. Understand and apply latest Python libraries for Machine learning models. 3. Apply an appropriate algorithm for a given problem. 4. Apply machine learning techniques in the design of computer systems. 5. Explain the relative strengths and weaknesses of different machine learning methods and approaches.

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 leaning: Clustering, K-means Clustering, DBSCAN

Learning Resources:
1. Tom Mitchell, Machine Learning,First Edition, McGraw-Hill, 1997
2. Christopher Bishop. Pattern Recognition and Machine Learning. Second Edition.
3. EthemAlpaydin , Introduction to Machine Learning, Second Edition
4. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
5. http://nptel.ac.in/courses/106106139/
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)
10. Neural Network Playground simulator
11. https://www.mladdict.com/neural-network-simulator

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 ELECTRICAL AND ELECTRONICS ENGINEERING

Introduction to Batteries and Battery management System

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

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U23OE610EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	COURSE OUTCOMES On completion of the course, students will be able to
The objective of this course is to introduce learner to batteries, its parameters, modelling and charging requirements. The course will help learner to develop battery management algorithms for batteries.	1. 1 Interpret the role of battery management system. 2. Identify the requirements of Battery Management System. 3. Interpret the concept associated with battery charging / discharging process. 4. Calculate the various parameters of battery and battery pack. 5. Design the model of battery pack

UNIT -I: Introduction to Battery Management System:
Cells & Batteries, Nominal voltageand capacity, C rate, Energy and power, Cells connected in series, Cells connected in parallel, Electrochemical and lithium-ion cells, Rechargeable cell, Charging and Discharging Process, Overcharge and Undercharge, Modes of Charging.

UNIT -II: Battery Management System Requirement:
Introduction and BMS functionality, Battery pack topology, BMS Functionality, Voltage Sensing, Temperature Sensing, Current Sensing, High-voltage contactor control, Isolation sensing, Thermal control, Protection, Communication Interface, Range estimation, State-of-charge estimation, Cell total energy and cell total power.

UNIT –III: Battery State of Charge and State of Health Estimation, Cell Balancing:
Battery state of charge estimation (SOC), voltage-based methods to estimate SOC, Model-based state estimation, Battery Health Estimation, Lithium-ionaging: Negative electrode, Lithium-ion aging: Positive electrode, Cell Balancing, Causes of imbalance, Circuits for balancing.

UNIT –IV: Modelling and Simulation:

Equivalent-circuit models (ECMs), Physics-based models (PBMs), Empirical modelling approach, Physics-based modelling approach, simulating an electric vehicle, Vehicle range calculations, simulating constant power and voltage, Simulating battery packs.

UNIT -V: Design of battery BMS:
Design principles of battery BMS, Effect of distance, load, and force on battery life and BMS, energy balancing with multi-battery system.

Learning Resources:
1. Plett, Gregory L. Battery management systems, Volume I: Battery modeling. ArtechHouse, 2015.
2. Plett, Gregory L. Battery management systems, Volume II: Equivalent-circuitmethods. Artech House, 2015.
3. Bergveld, H.J., Kruijt, W.S., Notten, P.H.L "Battery Management Systems - Design byModelling" Philips Research Book Series 2002.
4. Davide Andrea," Battery Management Systems for Large Lithium-ion Battery Packs"Artech House, 2010.

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)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Internet of Things and Applications
(Open Elective - IV)
SYLLABUS FOR B.E. VI - SEMESTER (EEE & IT)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U23OE610EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO Mapping

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

UNIT - I : OVERVIEW
Introduction to IoT – Improving Quality of life.
IoT-An Architectural Overview, M2M and IoT Technology Fundamentals-Devices and gateways, Data management, Introduction to cloud IOT platforms like MS Azure, AWS IOT, Google Cloud IOT, Thingworx, Business processes in IoT, IoT Enabling Technologies, IoT Levels & Deployment.

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

UNIT - III : IOT PROTOCOLS
Introduction to MQTT, Quality of services in MQTT,standards and security in

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

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

UNIT - V : IoT case studies
Smart Cities and Smart Homes, Connected Vehicles, Agriculture, Healthcare, Activity Monitoring.

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

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

1. No. of Internal Tests   : 2 Max. Marks for each Internal Test   : 30

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031
Automatic Train Protection System - Kavach
SYLLABUS FOR B.E. VI – SEMESTER (CSE, CSE(AI&ML), ECE, EEE, IT & Mechanical)

L:T:P (Hrs./week) : 2:0:1	SEE Marks : 60	Course Code:**U23OE630PH**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To provide students with a comprehensive understanding of automatic train protection technologies, focusing on the architecture and working of the Kavach system. 2. To impart knowledge about the components and subsystems of Kavach, including both onboard and wayside equipment, communication protocols, and signaling interfaces. 3. To equip students with the skills required to explain layout-specific plans, diagrams, and implementation strategies for deploying Kavach systems in railway networks. 4. To enable students to simulate, test, and validate Kavach configurations using testbench environments to ensure functionality, reliability, and safety compliance.	On completion of the course, students will be able to 1. Acquire knowledge about the Train Protection Systems in general and Kavach - Indian Railways Automatic Train Protection System in detail. 2. Acquire knowledge about various elements, subsystems associated with Kavach, those on the ground - wayside, those on the train - onboard and related concepts. 3. Illustarte various plans & diagrams required for implementation of Kavach for typical station layout. 4. Simulate, test, and evaluate the performance of the Kavach system using testbench environments, ensuring correctness of configuration, data validation, and compliance with safety standards.

CO-PO/PSO Mapping

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

UNIT – I: Introduction to Train Protection Systems (8 Hours)
Train Protection Systems: Auxiliary Warning Systems, European Train Control Systems Communication Based Interlocking System, Spot and Continuous Relay of Information
Working of Train Protection System – Kavach: Overview of Kavach and its Working, Features, Subsystems, Communication Interfaces, Signalling Interfaces
Subsystem: Onboard Kavach: Driver Machine Interlocking, Braking Interface, Radio Equipment, Onboard Computer, Transponder Receiver, Odometry, GNSS, GPRS, GSM
Subsystem: Stationary Kavach Station Kavach, Track Side Equipment, Signalling Interface, Radio & Tower, GNSS, Transponders, Network Monitoring

System

UNIT – II: (6 Hours)
Concepts : Location Referencing - Train position, Modes of Onboard subsystem, Train Characteristics, Mode Transitions, Braking Curves, Speed Profiles, Speed Limits, Speed Monitoring, Target Speed, Target Distance, Movement Authority, Communication Protocols, Key Management System (KMS), Messages & Language

UNIT – III: Design –Kavach: (8 Hours)
Survey, Assessment & Estimation: Station Layout, Radio Signal Strength, Tower Location, Power Requirement, Cable Survey, Loco Fitment Survey
Station Design: Kavach Scheme Plan, Kavach Control Table, Signalling Interface Diagram, Connectivity Plans for Remote Interface Units (RIUs), Power Supply Plan
Tower Design: Soil Testing, Foundation design, Super Structure Design

UNIT – IV: Installation, Deployment & Testing (8 Hours)
Stationary Kavach: Interlocking Interface, RFID Tags, Station Master Operation Console Indication Panel (SM_OCIP), GPS/GSM Antennas, Pre-commissioning Checklist, Testing
Onboard Kavach: DMI, Speed Sensors, RFID Reader, Onboard Computer, Brake Interface Unit, Pre-commissioning Checklist, Testing

Practicals at IRISET Laboratory (12 Hours)
1. Testbench, Preparation and deployment of Stationary Kavach Data : Configuration involving Topographical Information - Arrangement of Signals/Markers, Transponders, Inter signal Distances, Signal Routes, Gradients, Speed Restrictions
2. Verification and Validation of Onboard Data – Ceiling

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)
Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderbad-500031
DEPARTMENT OF MATHEMATICS

ADVANCED PROBABILITY & STATISTICAL METHODS
(OPEN ELECTIVE)
For B.E., VI - Semester – CBCS
(Common to CSE, AIML & IT Branches)

Instruction: 3 Hours	SEE Marks: 60	Course Code: U230E610MA
Credits:3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	**At the end of the course students will be able to:**
1. **Understand** fitting of a straight line to a given data and measuring Correlation between variables. 2. **Study** the concepts and application of Time series. 3. **Distinguish** the various methods of Designs of Experiments 4. **Provide** the knowledge to the students about Prediction and control by statistical methods Regression and SQC. 5. **Learn** the concept of pure birth and death models of Queuing theory.	1. **Solve** problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems. 2. **Apply** concept of Time series to solve the real time problems. 3. **Apply** the methods of Designs of Experiments 4. **Evaluate** the performance measures of the systems in networks, transportation systems, production lines. 5. **Apply** the comprehensive levels of Queuing theory for calculating service time, traffic intensity, queue length etc. in special and general queues.

UNIT – I: (8 Hours)
CORRELATION AND REGRESSION ANALYSIS Correlation –Scatter diagrams-Spearman's Rank of Correlation-Curve fitting by the Method of Least Squares - Fitting of Straight line - Parabola - Exponential curves: $y = a\,e^{bx}$ & $y = a\,b^x$- – Regression - Lines of Regression - Multiple Regression - Curvilinear regression.

UNIT – II: (8 Hours)
TIME SERIES: Time series and Forecasting: Introduction-Moving averages, weighted average method smoothening of curves forecasting models and Methods.

UNIT – III: (8 Hours)
DESIGN OF EXPERIMENTS: Introduction to Design of experiments - Aim of the Design of experiments - Randomized Block Design (R.B.D) - Latin Square Design (L.S.D) - Comparison of RBD and LSD - Related problems.

UNIT – IV: (8 Hours)
QUEUEING THEORY: Introduction- Input pattern - service pattern- queue discipline - Queue behavior- Kendal's notation, Pure Birth and Death Models - Traffic intensity; (M/M/1: ∞/FIFO)-Model: (M/M/1: N/FIFO)-Model.

UNIT – V: (8 Hours)
STATISTICAL QUALITY CONTROL
Introduction, Methods for preparing control charts, variable charts – mean and range charts, Attribute charts- np, p and c charts.

TEXT BOOKS:
1. Probability, Statistics and Random Processes, T Veera Rajan, Tata McGraw-Hill companies
   (Seventh edition)
2. Probability & statistics and Random Processes; K.Murugesan & P.Gurusamy -Anuradha publishers
3. Probability & Statistics for Engineers, Miller& John E. Freund, Prentice Hall of India (Third edition)

REFERENCE BOOKS:
1. T.K.V. Iyengar et al, Probability and Statistics, S. Chand Publications, Revised edition.
2. Probability & Statistics for Engineers, Antony J. Hayter, CENGAGE Learning (India edition)

ONLINE SOURCES:
1. https://onlinecourses.nptel.ac.in/noc24_ch03
https://onlinecourses.nptel.ac.in/noc24_ma28

VASAVI COLLEGE OF ENGNEERING (AUTONOMOUS)
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
SYLLABUS FOR B.E-VI SEMESTER

COURSE TITLE: **INTRODUCTION TO PSYCHOLOGY**
ACADEMIC YEAR 2025-26
GENERAL POOL - OE

Instruction: 3 Hrs/week	SEE Marks: 60	Course Code: U23OE630EH
Credits: 3	CIE Marks:40	SEE: 3 hrs.

Course Objectives: The course aims to:	Course Outcomes: By the end of the course, students will be able to:
1. Introduce students to the foundational concepts, theories, and branches of psychology.	1. Explain core psychological theories and their relevance to everyday life.
2. Develop an understanding of human behaviour and mental processes through scientific approaches.	2. Analyze behaviour using major psychological perspectives (e.g., behavioural, cognitive, humanistic, etc.).
3. Encourage critical thinking and analytical reasoning in the study of psychological phenomena.	3. Apply psychological principles to real-world situations such as learning, motivation, and social interaction.
4. Foster awareness of the biological, cognitive, and socio-cultural influences on behaviour.	4. Demonstrate basic skills in psychological research, including hypothesis formulation, data collection, and analysis.
5. Equip students with basic research skills and ethical considerations in psychological practice.	5. Evaluate ethical issues and cultural factors that influence psychological practice and research.

Course Description:
This course provides an overview of psychology as a scientific discipline. Students will explore the biological, cognitive, social, and developmental foundations of human behaviour. No prior knowledge is required.

Unit 1: Foundations of Psychology
1. History of psychology (structuralism, functionalism, behaviourism, etc.)
2. Major perspectives (biological, cognitive, behavioural, humanistic, psychodynamic)
3. Research methods in psychology

Unit 2: Biological Bases of Behaviour
1. The nervous system and the brain
2. Neurotransmitters and hormones

       3. Sleep and consciousness

Unit 3: Development across the Lifespan
       1. Cognitive and emotional development (Piaget, Erikson)
       2. Social development
       3. Nature vs. nurture debate

Unit 4: Learning and Memory
       1. Classical and operant conditioning
       2. Observational learning
       3. Memory processes and types

Unit 5: Social and Abnormal Psychology
       1. Attitudes, conformity, and group behaviour
       2. Psychological disorders and diagnosis (DSM overview)
       3. Basic treatment approaches (CBT, psychotherapy)

Textbook:
"Psychology" by Saundra K. Ciccarelli& J. Noland White
The break-up of CIE: Internal Tests   + Assignments + Quizzes

1	No. of Internal tests	:	2	Max.Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests   : 90 Minutes
Duration for SEE   : 180 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD-31
Department of Humanities & Social Sciences

ADVANCED COURSE IN ENTREPRENEURSHIP
(Open Elective-IV)
SYLLABUS FOR B.E.VI-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: U23OE630EH
Credits :03	CIE Marks:40	Duration of SEE: 03Hours

Course Objectives	Course Outcomes
The objectives of this course are to	On completion of the course the student will be able to
1. Develop an A-team 2. Refine business models and expand customer segments. 3. Develop strategies to grow revenues and markets, understand Financial Planning 4. Leverage technologies and platforms for growth stage companies 5. Develop key metrics to track progress.	1. Build and manage a high-performing startup team. 2. Refine business models and identify new customer segments. 3. Formulate revenue growth strategies and apply financial planning principles. 4. Utilize digital tools and platforms to scale growth-stage ventures. 5. Define and track key performance metrics for business progress.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									2	1					
CO2			1								1				1
CO3											2			1	
CO4					2								1		
CO5											1				
Avg.			1		2				2	1	1.3		1	1	1

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

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes