

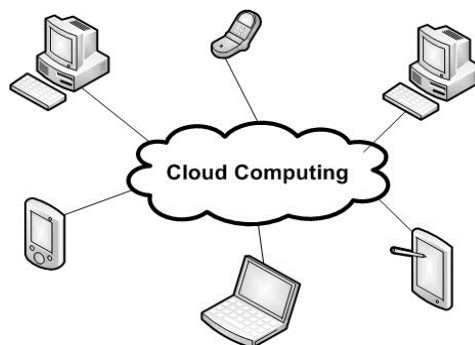
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD-500 031
ACCREDITED BY NAAC WITH A++ GRADE

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 2023-2024
(For the batch admitted in 2021-22)
(R-21)



DEPARTMENT OF INFORMATION TECHNOLOGY
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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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

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

Vision

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

Mission

- 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.



VASAVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

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IBRAHIMBAGH, HYDERABAD-500 031

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.

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-21)

B.E. – INFORMATION TECHNOLOGY : FIFTH SEMESTER (2023 - 2024)

B.E (IT) V-SEMESTER								
Course Code	Course Name	Scheme of Instruction			Scheme of Examination			
		Hours per week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
U21PC510IT	Microprocessors & Interfacing	3	-	-	3	60	40	3
U21PC520IT	Data Communications and Computer Networks	3	1	-	3	60	40	4
U21PC530IT	Operating Systems	3	-	-	3	60	40	3
U21PC540IT	Artificial Intelligence and Machine Learning	3	-	-	3	60	40	3
U21OE5XXXX	Open Elective - III	3	-	-	3	60	40	3
U21HS510EH	Skill Development Course – V (Communication Skills in English – II)	1	-	-	2	40	30	1
U21PE510IT	Skill Development Course – VI (Technical Skills – III)	1	-	-	2	40	30	1
PRACTICALS								
U21PC511IT	Microprocessors & Interfacing Lab	-	-	2	3	50	30	1
U21PC521IT	Computer Networks Lab	-	-	2	3	50	30	1
U21PC531IT	Operating Systems Lab	-	-	2	3	50	30	1
U21PC541IT	Artificial Intelligence and Machine Learning 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	-	580	380	22
Grand Total		26			-	960		

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

MICROPROCESSORS AND INTERFACING
SYLLABUS FOR V-SEMESTER

L: T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code: U21PC510IT
Credits: 3	CIE Marks :40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
understand the architectural features of 8085 and 8086 microprocessors and use them in assembly language programming and interfacing with different peripherals.	<ol style="list-style-type: none"> 1. Understand the architectural features of 8085 processor and write assembly language programs. 2. Apply architectural features of 8086 processor for developing assembly languages programs. 3. Analyze programmable parallel peripheral interface (8255) and programmable keyboard and display controller (8279) architectures and design interfacing circuits for interfacing memory and I/O. 4. Design interfacing circuits using programmable interrupt controller (8259) and programmable interval timer (8253). 5. Develop interfacing circuits with USART (8251) and DMA controller (8257).

UNIT – I:

General definitions of microprocessors and microcontrollers, micro processor architecture and its operations, 8085 microprocessor Architecture and signal descriptions, 8085 instructions and addressing modes , Instruction cycle, machine cycle, T-states, counters and time delays, stacks and subroutines, assembly language programming examples

UNIT – II:

8086/8088 Architectures, pin diagrams and timing diagrams: Register Organization, Architecture, signal descriptions, physical memory organization, General bus operation, I/O Addressing capability, Minimum and Maximum mode of 8086 System and Timings.

8086/8088 Instruction set and assembler directives: Instruction formats, Addressing modes of 8086, Instruction set of 8086/8088, Assembler directives and operators, Assembly language programming with 8086/8088

Special architectural features and related programming: Stack, Stack Structure of 8086/8088, Interrupts and ISRs, Interrupt cycle, Maskable and Non maskable Interrupts, procedures and macros, Coprocessor.

UNIT – III:

Basic peripherals and their interfacing with 8086/8088: Semiconductor memory Interfacing, Dynamic RAM interfacing, Interfacing I/O ports, PIO 8255, modes of operation of 8255, Interfacing ADC, DAC, Stepper Motor, The Keyboard/ Display controller 8279, programming examples.

UNIT – IV:

Programmable Peripheral devices and their Interfacing with 8086: 8259A programmable interrupt controller, 8253 programmable interval timer, DOS and BIOS function calls.

UNIT – V:

Programmable communication Interface 8251 USART, DMA Controller 8257. DMA Transfers and operations, Introduction to advanced processors.

Learning Resources:

1. Ramesh S. Gaonkar, Microprocessor Architecture, Programming and Applications with the 8085, 5/E, Prentice Hall, 2002.
2. A.K.Ray and K.M.Bhurchandi, Advanced Microprocessors and peripherals 2nd edition Tata McGrawHill, 2006.

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

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)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**DATA COMMUNICATIONS AND COMPUTER NETWORKS**

Syllabus for B.E V-SEMESTER

L:T:P(Hrs./week): 3:1:0	SEE Marks :60	Course Code: U21PC520IT
Credits : 4	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to</i>
1. Introduce the fundamental concepts of Data Communications and computer networks.	1. Compare ISO-OSI with TCP/IP models and understand data transmission in physical layer.
2. Describe the layers, protocols and services in ISO-OSI and TCP/IP Models.	2. Examine various techniques and protocols of data link layer to enable node to node delivery.
	3. Analyse different routing protocols and algorithms to enable end-to-end connectivity.
	4. Analyse 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:

Introduction: Data communication, network applications, Data flow, network types, topologies, Protocols and standards, OSI and TCP/IP Protocol Suite.

Physical Layer: Introduction to Data and Signals, Transmission media (wired and wireless), Switching.

UNIT II:

Data Link Layer: Design issues, framing, error detection and correction, parity, LRC, CRC, hamming code, elementary data link protocols- Stop-and-wait, sliding window protocols.

Medium Access sublayer: ALOHA, CSMA/CD, LAN Standards: IEEE 802.3, IEEE 802.11.

UNIT III:

Network Layer: Network layer design issues, routing algorithms- Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, IPV4, IPV6, Internet, Internet Control protocols - ARP, RARP, DHCP.

UNIT IV:

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Congestion control algorithms, Quality of Service.

UNIT V:

Application Layer: Domain Name System (DNS), EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP.

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. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India
4. James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Sixth Edition, Pearson Education, 2012.

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>

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

OPERATING SYSTEMS

Syllabus for B.E V- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U21PC530IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
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.

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, Network Structure, Security.

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://nptel.ac.in/courses/106108101/>
9. <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)
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: U21PC540IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 Learning: 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), 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 : U21HS510EH
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

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

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

Unit 2: Powerful Presentations

Concise Cogent Presentation

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

Unit 3: Fact, Observation and Inference

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

Unit 4: Effective Technical Writing

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

Learning Resources:

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

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

1	No. of Internal tests	:	<table border="1"><tr><td>2</td></tr></table>	2	Max. Marks	:	<table border="1"><tr><td>20</td></tr></table>	20
2								
20								
2	No. of assignments	:	<table border="1"><tr><td>2</td></tr></table>	2	Max. Marks	:	<table border="1"><tr><td>5</td></tr></table>	5
2								
5								
3	No. of Quizzes	:	<table border="1"><tr><td>2</td></tr></table>	2	Max. Marks	:	<table border="1"><tr><td>5</td></tr></table>	5
2								
5								
Duration of Internal Tests		:	90 Minutes					

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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: U21PE510IT
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:
<ul style="list-style-type: none"> ❖ 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 	<ul style="list-style-type: none"> ❖ 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 redundant computation. ❖ 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.

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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: U21PC511IT
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to</i>
1. Write assembly language programs using 8085 and 8086 microprocessors and develop Interfacing circuits	1. Write basic assembly language programs for 8085 processor. 2. Write basic assembly language programs for 8086 processor. 3. Develop interfacing circuits for different microprocessors.

1. Assembly Language programming with 8085, 8086 .
2. Interfacing and programming of 8255.
3. Interfacing and programming of 8253/8254.
4. Interfacing and programming of 8279.
5. A/D and D/A converter interface.
6. Stepper motor interface.
7. Display interface

Note: Adequate number of programs covering all the instructions of 8085 & 8086 instruction set. Experiments should be done on the 8085, 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			

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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: U21PC521IT
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to</i>
1. Discuss the client/server application development using socket API. 2. Demonstrate various tools for network monitoring.	1. Demonstrate the usage of socket APIs 2. Develop Client Server applications using TCP and UDP 3. Develop Client Server applications using RPC. 4. Analyze the network performance using iPerf, tc, wireshark.

1. Understanding and using of commands like ifconfig, DNS, netstat, ping, arp, telnet, ftp, finger, traceroute, whois etc.
2. Usage of elementary socket system calls[socket(),bind(),listen(), accept(),connect(),send(), recv(), sendto(), recvfrom()].
3. Implementation of Connection oriented iterative service (TCP).
4. Implementation of Connection oriented concurrent service (TCP).
5. Implementation of Connectionless Iterative service (UDP).
6. Implementation of Connectionless concurrent service (UDP).
7. Implementation of Time service and Date service using RPC.
8. Implementation of Ping service.
9. Implement CRC, bit stuffing, byte stuffing.
10. Measure TCP throughput between two hosts in a network using **iPerf**.
11. Use the **tc** Linux utility to control bandwidth, delay, loss, Observe impact on measured throughput. Experiment with multiple applications running concurrently to generate congestion
12. Use **Wireshark** to capture packets when browsing the Internet. Examine the structure of packets: the various layers, protocols, headers, payload.

Note: Implement programs in C programming using LINUX platform.

Content Beyond Syllabus:

1. Implementation of HTTP.
2. Implementation of Concurrent chat server(current Logged in users)

Learning Resources:

1. W. Richard Stevens, "Unix Network Programming", Prentice Hall, Pearson Education, 2009.
2. Douglas E. Comer, "Hands-on Networking with Internet Technologies", Pearson Education.
3. <https://nptel.ac.in/courses/106105183/25>
4. <http://www.nptelvideos.in/2012/11/computer-networks.html>
5. <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

OPERATING SYSTEMS LAB
SYLLABUS FOR B.E. V SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks :50	Course Code: U21PC531IT
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

Course Objective:	Course Outcomes:
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
1. Explain the usage of system calls. 2. Discuss the concepts of inter process communication and process synchronization.	1. Write programs to implement system call APIs. 2. Implement programs for Inter-Process Communication 3. Implement programs for process synchronization. 4. Write programs to implement threads.

1. Familiarity and usage of system calls of Linux on
 - a) File management (open,close, read, write, open dir, readdir, stat etc)
 - b) Process management (fork, exec ,getpid, wait exit etc)
2. Implement a program to get and set the environment variables using system calls.
3. Implementation of Echo server using pipes.
4. Implementation of Echo server using shared memory.
5. Implementation of Echo server using messages.
6. Implementation of Producer Consumer Problem using semaphores.
7. Implementation of Producer Consumer Problem using message passing.
8. Implementation of Reader-writer problem using semaphores.
9. Implementation of Dining philosophers problem using semaphores.
10. Creating threads and manipulating under Linux platform.

Learning Resources:

1. W. Richard Stevens, Unix Network Programming, Prentice Hall/Pearson Education,2009.
2. 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)
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 : U21PC541IT
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
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 preprocessing, 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.

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			

**OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN
B.E. IT V SEMESTER
(OPEN ELECTIVE-III)**

Academic Year : 2023-24

S.No.	Dept.	Course Code	Name of the Course	Credits
1	Civil	U21OE510CE	Spatial Information Technology	3
2	ECE	U21OE510EC	Introduction to Biomedical Electronics (General Pool)	3
3	EEE	U21OE510EE	Solar Power and applications	3
4	Mechanical	U21OE510ME	Introduction to Robotics	3
5		U21OE520ME	Introduction to Automobile Engineering	3
6	H&SS	U21OE020EH	Technical Writing and Professional Presentations	3
7		U21OE530EH	Design Thinking	3
8		U21OE540EH	Basics of Entrepreneurship	3
9	Physics	U21OE510EH	Thin Film Technology and Applications	3

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

SPATIAL INFORMATION TECHNOLOGY
(Open Elective-III)

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week):3:0: 0	SEE Marks:60	Course Code: U21OE510CE
Credits: 3	CIE Marks:40	Duration of SEE:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to	Upon the completion of the course, students are expected to
To provide fundamental knowledge on geo spatial technology such as Remote sensing GPS and GIS.	<ol style="list-style-type: none"> 1. Select the type of remote sensing technique/data, identify and analyze the earth surface features from the satellite images. 2. Identify GPS components, interpret the navigational message and signals received by the GPS satellites, Identify the error sources and apply corrections for accurate positioning. 3. Analyse the basic components of GIS, process spatial and attribute data, identify and rectify mapping inaccuracies and prepare thematic maps

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

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

Unit-III: Global positioning Systems (GPS) :Overview of GNSS and Introduction to GPS, GLONASS, GALILEO, COMPASS, IRNSS systems , Applications of GPS.
GPS: Basic concepts, Functional system of GPS – Space segment, control segment and user segment, Working principle of GPS, Signal structure and code modulation, Pseudo-range measurements and navigation message

Unit-IV: Errors and Positioning methods of GPS: Errors and biases in GPS measurements, Accuracy of navigation position: UERE and DOP, Intentional degradation of GPS signals: Selective availability (SA) and Anti-spoofing (AS) Differential GPS: Space based augmentation systems (e.g., SBAS, GAGAN) and Ground based augmentation systems (e.g., WASS, EGNOS). GPS Carrier Phase measurements: Single Differencing, Double Differencing and Triple Differencing in GPS measurements.

Unit-V:Basic Concepts: Introduction to GIS, Areas of GIS application, Components of GIS, Overview of GIS Software packages, Current issues and Trends in GIS. Variables-Point, line, polygon, Map projections, Map Analysis.

GIS Data: Data types – spatial, non-spatial (attribute data) – data structure, data format – point line vector – Raster – Polygon

Data Input : Keyboard entry, Manual Digitizing, Scanner, Remotely sensed data, Existing Digital data Cartographic database, Digital elevation data

Data Editing: Detection and correction of errors, data reduction, edge matching

Learning Resources:

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

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

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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, IT, EEE & Mechanical)

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

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

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

UNIT - I :

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

UNIT - II :

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

UNIT - III :

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

UNIT - IV :

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

UNIT - V :

Modern Medical Imaging System: Radiography: Production of X-rays, units of X-radiation,

block diagram of X-ray machine, MRI, computed tomography: Block diagram and working.

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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

Solar Power and Applications

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

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

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

Unit – I

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

Unit – II

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

Unit – III

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

Unit – IV

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

Unit – V

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

Suggested Reading:

B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.

G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna Publications.

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

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

Duration of Internal Tests : 90 Minutes

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

INTRODUCTION TO ROBOTICS
(Open Elective-III)

SYLLABUS FOR B.E. V-SEMESTER

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

Course objectives	Course Outcomes
The objectives of this course are to: Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications.	On completion of the course, the student will be able to 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.

UNIT-I

ROBOT BASICS

Robot-Basic concepts, Definition, Need, Law, History, Anatomy, specifications.

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

Robot wrist mechanism, Precision and accuracy of robot.

UNIT-II

ROBOT ELEMENTS

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

UNIT-III

ROBOT KINEMATICS AND CONTROL

Robot kinematics – Basics of direct and inverse kinematics. D-H matrix. Forward kinematics for a 2-link RR planar manipulator.

Control of robot manipulators – Point to point and Continuous Path Control. Robot programming methods. Introduction to Solve any robotic kinematic problem using python programming.

UNIT-IV

ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors, Light sensors, Pressure sensors, position and velocity feedback devices.

Introduction to Machine Vision and Artificial Intelligence.

UNIT-V

ROBOT APPLICATIONS

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

Applications of Micro and Nanorobots, Future Applications of robots.

Learning Resources:

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

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

1	No. of Internal Tests:	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: 1 Hour 30 Minutes				

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

INTRODUCTION TO AUTOMOBILE ENGINEERING

(OE-III)

SYLLABUS FOR B.E. V-SEMESTER

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

Course objectives	Course Outcomes
<p>The objectives of this course are to:</p> <ol style="list-style-type: none"> familiarize the student with the different types of automobiles and engine components along with its working. impart adequate knowledge in fuel supply, cooling, lubrication and ignition of IC engines. understand the steering geometry, steering mechanism and types of suspension systems. gain the knowledge about working of clutch, gear box mechanism, and brakes make the student conversant with types of wheels, tyres and pollution control techniques. 	<p>On completion of the course, the student will be able to:</p> <ol style="list-style-type: none"> identify types of Automobiles and engine components and describe its working. describe the engine fuel Supply system in petrol and Diesel engines, cooling system, and lubrication systems. describe the steering mechanism, suspension systems describe the working principle and operation of clutch, gear mechanism and brakes. know the pollutants from automobile and pollution control techniques and identify the types of wheels, tyres.

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	1	1		1	2	2					3	3	2	3
CO2	3	2	2		2	2	2					3	3	2	3
CO3	3	2	2		1	2	2					3	3	2	3
CO4	3	1	2		2	2	2					3	3	2	3
CO5	3	1	2		2	2	3					3	3	2	3

UNIT-I

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

UNIT-II

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

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

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

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

UNIT-III

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

Steering system: wheel alignment, Ackermann steering mechanism, steering geometry: camber, caster, toe-in, toe-out, steering linkage for vehicle with rigid axle front suspension, steering linkage for vehicle with independent front suspension.

UNIT –IV

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

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

UNIT –V

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

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

Learning Resources:

1. Crouse & Anglin, "Automobile Engineering", 10th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2007.
2. Kirpal Singh, "Automobile Engineering", Vol.I& II, 13th Edition, Standard Publishers, New Delhi 2013.
3. R.B Gupta, "Automobile Engineering" 7th Edition, Satya Prakashan, New Delhi, 2015.
4. Joseph Heitner, "Automotive Mechanics", 2nd Edition, Affiliated East West Pvt. Ltd., 2013.
5. C.P. Nakra, "Basic Automobile Engineering", 7th Edition, Dhanpat Rai Publishing C (P) Ltd., 2016.

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

1	No. of Internal Tests:	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: **1 Hour 30 Minutes**

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

COURSE NAME-TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS
(Open Elective)
SYLLABUS FOR B.E –V SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U21OE020EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours
COURSE OBJECTIVES The course will enable the learners to: <ol style="list-style-type: none"> 1. Understand the principles and mechanics of technical writing for students of engineering. 2. Identify different kinds of business correspondences and the dos and don'ts for each of them. 3. Make effective presentations as part of today's workplace demands. 4. Recognize the need for Video and Written CVs with focus on specific elements. 5. Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs 		COURSE OUTCOMES At the end of the course the learners will be able to: - <ol style="list-style-type: none"> 1. Write effective reports. 2. Articulate business correspondences based on need. 3. Make persuasive presentations. 4. Design their videos CVs. 5. Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose

UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS

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

UNIT 2: BUSINESS CORRESPONDENCE

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

UNIT 3: PROFESSIONAL PRESENTATIONS

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

UNIT 4: RESUME & CVs

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

UNIT 5: WRITING PROPOSALS & SOPs

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

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

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

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

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

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

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

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

Course objectives	Course Outcomes
<p>The objectives of this course are to:</p> <ol style="list-style-type: none"> 1. Deeply understand and discover entrepreneurship 2. Build a strong foundation for the students to start, build, and grow a viable and sustainable venture 3. Develop an entrepreneurial mind-set equipped with the critical skills and knowledge required 	<p>On completion of the course the student will be able to:</p> <ol style="list-style-type: none"> 1. Take-up entrepreneurship as a career choice 2. Create and Validate business models. Build a Minimum Viable Product (MVP). 3. Identify various costs and revenue streams for a venture. 4. Build successful teams and acquire sales skills. 5. Understand the business regulations and various Government schemes available..

UNIT-I

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

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

UNIT-II

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

UNIT-III

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

UNIT-IV

Team Building and Project Management: Leadership Styles, Team Building in Venture, Role of good team in Venture, Roles and 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:

1. Robert D. Hisrich, Michael P Peters, "Entrepreneurship", Sixth edition, McGraw-Hill Education.
2. Thomas W. Zimmerer, Norman M. Scarborough, "Essentials of Entrepreneurship and small businessManagement", Fourth edition, Pearson, New Delhi, 2006.
3. Alfred E. Osborne, "Entrepreneurs Toolkit", Harvard Business Essentials, HBS Press, USA, 2005
4. MadhurimaLall and ShikhaSahai, "Entrepreneurship", Excel Books, First Edition, New Delhi,2006

Web Resource: <http://www.learnwise.org>

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: 1 Hour 30 Minutes				

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

DESIGN THINKING

(Open Elective) SYLLABUS FOR B.E. 3/4 – V SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U21OE530EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours
COURSE OBJECTIVES The course will enable the learners to: <ol style="list-style-type: none"> 1. Understand the critical design thinking skills needed to either improve an existing product or thinking design 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. 		COURSE OUTCOMES At the end of the course the learners will be able to: - <ol style="list-style-type: none"> 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.

Unit 1: Design Thinking Skills

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

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

Unit 2: Identifying Customer Needs

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

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

Unit 3: Product Specifications

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

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

Unit 4: Applied Creativity

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

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

Unit 5: Product Development Processes and Prototyping

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

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

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

Suggested Books

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

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 ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

THIN FILM TECHNOLOGY AND APPLICATIONS
Open elective Course (General Pool)

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U21OE510EH
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes	BTL
<i>Students are able to</i>	<i>The students acquire the ability to</i>	
1. Learn the fundamental atomistic mechanisms.	1. State fundamental definitions of thin film technology	1
2. Narrate thin film deposition techniques	2. Describe thin film deposition techniques	2
3. Acquire knowledge on thin film devices	3. Illustrate thin film devices and their use	3
4. Appreciate applications of thin films	4. Apply thin films coatings for a variety industrial applications	3

UNIT-I: THIN FILM GROWTH

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

UNIT-II: DEPOSITION TECHNIQUES

Thin film deposition techniques- simple thermal evaporation- Chemical vapor deposition technique-Advantages and disadvantages of Chemical Vapor deposition (CVD), physical vapour deposition electron beam evaporation- RF sputtering, Laser ablation- spin coating- molecular beam epitaxy (MBE), Film thickness measurement-ellipsometry, quartz crystal oscillator techniques.

UNIT-III: THIN FILM MATERIAL CHARACTERIZATION TECHNIQUES

Characterization techniques: X-Ray Diffraction (XRD), working principles of Scanning Electron Microscopy (SEM), working of Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM).

UNIT-IV: PROPERTIES OF THIN FILMS

Electrical conduction in continuous and discontinuous metallic thin films. Transport and optical properties of metallic, semiconducting and dielectric films.

UNIT-V: THIN FILM DEVICES AND APPLICATIONS

Anti-reflection coatings, fabrication of thin film gas sensors and temperature sensors. Thin film solar cells, Quantum well and Quantum dot solar cells. Application of thin films in different areas such as electronics, medical, defense, sports, automobiles, applications of thin films in various fields etc.

Learning resources:

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

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

1	No. of Internal tests	:	<table border="1"><tr><td>2</td></tr></table>	2	Max. Marks	:	<table border="1"><tr><td>30</td></tr></table>	30
2								
30								
2	No. of assignments	:	<table border="1"><tr><td>3</td></tr></table>	3	Max. Marks	:	<table border="1"><tr><td>5</td></tr></table>	5
3								
5								
3	No. of Quizzes	:	<table border="1"><tr><td>3</td></tr></table>	3	Max. Marks	:	<table border="1"><tr><td>5</td></tr></table>	5
3								
5								
Duration of Internal Tests		:	90 Minutes					

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-21)

B.E. – INFORMATION TECHNOLOGY : SIXTH SEMESTER (2023 - 2024)

B.E (IT) VI-SEMESTER								
Course Code	Course Name	Scheme of Instruction			Scheme of Examination			
		Hours per week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
U21PC610IT	Neural Networks and Deep Learning	3	-	-	3	60	40	3
U21PC620IT	Embedded Systems and IoT	3	-	-	3	60	40	3
U21PC630IT	Web Technologies	3	-	-	3	60	40	3
U21OE6XXXX	Open Elective - IV	3	-	-	3	60	40	3
U21HS040EH	Economics and Finance for Engineers	2	-	-	3	60	40	2
U21BS430EH	Skill Development Course – VII (Verbal Aptitude)	1	-	-	2	40	30	1
U21PE610IT	Skill Development Course – VIII (Technical Skills – IV)	1	-	-	2	40	30	1
PRACTICALS								
U21PC611IT	Neural Networks and Deep Learning Lab	-	-	2	3	50	30	1
U21PC621IT	Embedded Systems and IoT Lab	-	-	2	3	50	30	1
U21PC631IT	Web Technologies Lab	-	-	2	3	50	30	1
U21PW619IT	Theme Based Project	-	-	2	3	50	30	1
Library / Sports / Mentor Interaction		-	-	-	-	-	-	-
<ul style="list-style-type: none"> Student should acquire one NPTEL Certification Course equivalent to 2 credits (8 weeks) by the end of VI Semester. 								2
Total		16	-	8	-	580	380	22
Grand Total		24			-	960		

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 : U21PC610IT
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Understand activation functions and apply in multi-layer neural network models. 2. Apply appropriate regularization and optimization techniques for DL model training. 3. Implement and validate CNN models for classification problems in image. 4. Identify appropriate RNN architecture for sequence data analysis. 5. Develop DL models using Keras, Tensorflow and Pytorch libraries.

UNIT-I:

Introduction to Neural networks and Deep Learning: Perceptron, Sigmoid Neurons, Gradient descent, Multilayer Neural Network, Backpropagation, Convergence, Deep learning, Representation learning.

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, Adaptive 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 models, Applications.

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, Encoder-decoder seq-seq architecture, Applications.

UNIT-V:

DL programming: Intro to Keras API, Intro to TensorFlow, Google Net convolution algorithm, Transfer learning for Image classification. Intro to PyTorch, Neural machine translation algorithm.

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 INFORMATION TECHNOLOGY

EMBEDDED SYSTEMS and IOT
SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week):: 3:0:0	SEE Marks : 60	Course Code : U21PC620IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
<ol style="list-style-type: none"> 1. Explore theoretic aspects of the design and development of an embedded system 2. Familiarize in programming and interfacing concepts related to 8051 and advanced processors. 3. Develop IoT infrastructure for different applications and understand the concepts of Real time systems 	<ol style="list-style-type: none"> 1. Apply the architectural features of 8051 microcontroller in writing assembly language and Embedded C programs and explain various concepts related to Real Time systems. 2. Design interfacing circuits for various peripherals with 8051 and understand the architecture features of ARM and write simple programs using it. 3. Understand the architectural of IoT. 4. Develop IoT based real time applications. 5. Understand architectural features of SOC's and Develop Embedded system applications with SOC's.

UNIT – I:

Introduction, Complex Systems and Microprocessor, Embedded System Design Process
 Introduction to Real Time systems, Timing constraints, Real Time Task Scheduling, Classification of Real Time scheduling: clock driven, simple priority based, Features of Real time operating system, Case study: VxWorks.

8051 Architecture, signal functions, Instruction set, assembly language programming, Input/output Ports and Circuits, I/O port programming, External Memory interfacing, Counter and Timers: modes of operation, timer programming, Serial communication programming, Interrupts and interrupt programming.

UNIT – II:

Interfacing with 8051, keyboards, LEDs, LCDs, ADC, DAC, stepper motor.
 ARM architecture - ARM organization and implementation - The ARM instruction set - The thumb instruction set - Basic ARM Assembly language program - ARM CPU cores.

UNIT – III:

Introduction to Internet of Things- Definition & Characteristics of IoT, Sensors and Actuators, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, Wireless sensor Networks and its technologies, IoT Levels & Deployment Templates, Domain specific IoT's

UNIT – IV:

IoT Design Methodology, Case study on IoT system, Basic building blocks of an IoT device, Bus protocols I2C, CAN, SPI, Raspberry Pi board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry Pi with Python, IoT Physical Devices and Endpoints Arduino UNO, Introduction to M2M, Differences between IoT and M2M, IoT platforms

UNIT – V:

IoT System On Chip, Embedded platforms for IoT: Zynq SOC Architecture, RF SOC architecture, Xilinx Vivado Design Flow, PYNQ open source platform for IoT embedded systems

Learning Resources:

1. Wayne Wolf, "Computers and Components", Elsevier.
2. KennethJ.Ayala, "The8051 Microcontroller", Third Edition, Thomson.
3. Muhammad Ali Mazidi, Janice Gillespie Mazidi, Rolin D. Mc Kinlay, The 8051 Microcontroller and Embedded Systems using Assembly and C, Second Edition, Pearson.
4. David E. Simon, "An Embedded Software Primer", Pearson Education
5. Raj Kamal, "Embedded Systems", Tata McGraw Hill.
6. FrankVahid, TonyGivargis, John Wiley, "Embedded System Design", Wiley Student Edition.
7. W.A. Smith, "ARM Microcontroller Interfacing: Hardware and Software, Eketor, 2010.
8. NPTEL Online Course on Microprocessors and Microcontrollers, Santanu Chattopadhyay.
9. Arshdeep Bahga, Vijay Madiseti, "Internet of Things: A Hands-on Approach", Universities Press.
10. Sirinivas K.G, Siddesh G.M , "Internet of Things" ,2017 Cengage Learning India Pvt Ltd.
11. Rajib Mall, "Real-Time Systems: Theory and Practice," Pearson, 2008.
12. Jane W. Liu, "Real-Time Systems" Pearson Education, 2001.
13. Krishna and Shin, "Real-Time Systems," Tata McGraw Hill. 1999.
14. <http://www.pyng.io/>
15. <https://www.xilinx.com/products/silicon-devices/soc/zynq-7000.html>
16. http://www.ioe.nchu.edu.tw/Pic/CourseItem/4468_20_Zynq_Architecture.pdf
17. <https://www.rfwireless-world.com/ApplicationNotes/loT-System-On-Chip.html>
18. <https://www.aldec.com/en/company/blog/185--enabling-tysom-zynq-based-embedded-development-board-for-aws-iot-greengrass>

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

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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 TECHNOLOGIES
SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week):: 3:0:0	SEE Marks : 60	Course Code: U21PC630IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
<ol style="list-style-type: none"> 1. Provide basic skills for designing static and dynamic Web Applications using HTML, CSS, Java script & frame works like Bootstrap 2. Demonstrate how to design and develop web applications using Microsoft .NET Technology, Node JS, React and Mongo DB. 	<ol style="list-style-type: none"> 1. Design static web pages using HTML and CSS. 2. Create dynamic web pages with client-side validations using XML and JavaScript. 3. Develop responsive web applications using Bootstrap and ASP.NET framework. 4. Build cross-platform single page applications using React. 5. Develop web applications using Node.js and MongoDB.

UNIT-I:

Introduction: World Wide Web, Web Browsers, Web Servers, URL, HTTP, TCP Port.

HTML & CSS: Standard HTML document structure, Basic Tags, Images, Hypertext Links, Lists, Tables, Frames. Introduction to Cascading style sheets.

UNIT-II

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

XML : XML: The Syntax of XML, XML Document Structure, Document Type Definitions.

UNIT-III

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

.Net Framework and ASP.NET:

.Net Framework Overview- Architecture, .Net Framework class Libraries, Introduction to Visual Studio. ASP.NET Benefits, ASP.NET Page Layout, Life Cycle, ASP.NET MVC Controllers, building an application using web form elements. Deploying an ASP.NET Core Application

UNIT-IV**React**

Introduction to React, Add React to a website, create a new React App, Introducing JSX, Rendering Elements, Components and Props, State and Lifecycle, Handling Events, Conditional Rendering, Lists and Keys, Forms. Building Single-Page applications with React.

UNIT-V**Application using Node JS and MongoDB:**

Introduction to Node.js-Installing Node.js- Using Events, Listeners, Timers, and Callbacks in Node.js, Introduction to Mongo DB - Accessing MongoDB from Node.js

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. Dino Esposito, Programming ASP.NET Core (Developer Reference),2018

5. Learning React Functional Web Development with React and Redux by Alex Banks, Eve Porcello, Alex Banks, Eve Porcello
6. Brad Dayley, Brendan Dayley and Caleb Dayley, Node.js, MongoDB and Angular Web Development The definitive guide to using the MEAN stack to build web applications, 2nd Edition, Pearson Education, 2018
7. <http://getbootstrap.com/>
8. <https://reactjs.org/>
9. <https://nodejs.org/en/>

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

1	No. of Internal Tests:	<table border="1"><tr><td>02</td></tr></table>	02	Max.Marks for each Internal Tests:	<table border="1"><tr><td>30</td></tr></table>	30
02						
30						
2	No. of Assignments:	<table border="1"><tr><td>03</td></tr></table>	03	Max. Marks for each Assignment:	<table border="1"><tr><td>05</td></tr></table>	05
03						
05						
3	No. of Quizzes:	<table border="1"><tr><td>03</td></tr></table>	03	Max. Marks for each Quiz Test:	<table border="1"><tr><td>05</td></tr></table>	05
03						
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

L:T:P (Hrs./week):: 2:0:0	SEE Marks: 60	Course Code: U21HS040EH
Credits: 2	CIE Marks:40	SEE: 3 hrs.

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

Unit I: Concepts in Economics

Scarcity of Resources-Relevance of Economics for Engineers- Scope of Managerial Economics
 Law of Demand- assumptions and exceptions -Price elasticity of demand(Application-oriented approach)

Unit II: Cost Analysis and Profit Planning

Concept of Cost -Costing –Classification of Costs –Preparation of Cost Sheet (Simple Problems)
 –Breakeven Analysis(Application-oriented approach)

Unit III: Conceptual Understanding of Accounting

Accounting Cycle-Journal-Subsidiary Books- Ledger-Trial Balance-Final Accounts
 (Manufacturing/Trading, Profit and Loss Account, Balance Sheet (Theory Only)

UNIT IV: Financial Statement Analysis

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

Unit V: Long Term Sources and Uses of Finance

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

Learning Resources 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, Problems 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, Problems 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" Taxmann Publications. 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 APTITUDE

(Common to all branches)

SYLLABUS FOR B.E. VI SEMESTER

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

<p>COURSE OBJECTIVES The course will enable the learners to:</p> <ol style="list-style-type: none"> 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 	<p>COURSE OUTCOMES At the end of the course the learners will be able to:</p> <ol style="list-style-type: none"> 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
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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

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

ASSESSMENTS

- Online assignments
- Individual and Group

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
	Duration of Internal Tests	:	90 Minutes			

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 : U21PC611IT
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 technique and use to improve the performance of a fully connected neural network model. 3. Apply CNN models, GANs and transfer learning for computer vision problems. 4. Implement RNNs for text and speech processing. 5. Use transformers for language translation.

1. Introduction to Kerans and 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 R-CNN with Pen-Fudan dataset for Pedestrians.
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 attention based RNN.
9. Speech recognition with commonVoice dataset for English.
10. Classifying videos using CNNs.
11. GAN: Generating images using DCGAN.
12. Transformers for language translation.

Learning Resources:

<https://pytorch.org/>

<https://www.tensorflow.org/>

Chollet, Francois. *Deep learning with Python*. Simon and Schuster, 2021.

Ketkar, Nikhil, and Eder Santana. *Deep learning with Python*. Vol. 1. Berkeley, CA: Apress, 2017.

<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

EMBEDDED SYSTEMS AND IOT LAB
SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week):: 0:0:2	SEE Marks : 50	Course Code : U21PC621IT
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
1. Learn Programming and interfacing different peripherals with ARM and 8051 microcontrollers and study VxWorks RTO's 2. Design and develop real time embedded system/IOT applications	1. Write Assembly and embedded C language programs for interfacing various peripherals with ARM/8051 microcontroller. 2. Write programs for interfacing various sensors and actuators with Raspberry Pi/Arduino. 3. Develop IoT applications with Wireless technologies like Bluetooth / Zigbee /LoRa. 4. Design and implement embedded system applications with SOC's. 5. Design real time applications using the Real Time Operating Systems concepts.

- I.** 8051/ARM programming and Interfacing (Using Keil simulator):
 1. Keil introduction and basic programs
 2. 8051 I/O port programming, Serial Communication programming, Timer programming, Interrupt programming
 3. Interfacing different peripherals to 8051 / ARM
- II.** Internet of Things:
 1. Interfacing different sensors and actuators with Raspberry Pi board/Arduino UNO
 2. Program to operate LED's using push buttons.
 3. Programs demonstrating communication protocol Bluetooth
 4. Programs demonstrating communication protocol Zigbee/LoRa
 5. programs for Publishing data on to cloud and read data from the cloud using MQTT protocol
 6. Data logs using UHF/WiFi
- III.** Programs with VxWorks RTO's
 1. multi-Tasking
 2. Semaphores
 3. Message Queues
- IV.** Experiments with SOC's and EDA (Electronic Design Automation) tool:
 1. Designing, Multiplexer, Counters, finite state machines
 2. Programs demonstrating image processing /speech processing /machine learning

Additional Experiments:

Projects on IoT/SOC's

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

WEB TECHNOLOGIES LAB
 SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week):: 0:0:2	SEE Marks : 50	Course Code : U21PC631iT
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objective:	Course Outcomes:
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
Demonstrate the frameworks and technologies to design and develop web applications.	1. Design and develop Web pages using HTML, CSS, javascript. 2. Develop Responsive web pages using frameworks. 3. Develop applications using ASP.NET. 4. Develop web applications using React, Node JS and MongoDB

I-HTML:

- Creation of HTML Document using basic tags.
- Creation of Menu using ordered and unordered list and other options.
- Creation of web page using table tags and their attributes
- Creation of web page using frames.
- Creation of document using CSS.

II-JAVASCRIPT & XML:

- Basic javascript programs using control statements, arrays and functions.
- Write a java script to validate the following fields in a registration page
 - i) Name (should contains alphabets and the length should not be less than 6 characters)
 - ii) Password(should not be less than 6 characters)
 - iii) E-mail(should not contain invalid addresses)
- Creation of XML document and validating it using DTD

III-BOOTSTRAP

- Design Responsive web pages using Bootstrap.

IV-.NET FRAMEWORK

- Develop an application for implementing Registration, validation, and Login using ASP.NET controls
- Create ASP.NET MVC App that does basic CRUD (create / read / update / delete operations)

V-NODE JS, REACT and MONGODB

- Develop web application using Node JS, React and Mongo DB

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. Dino Esposito, Programming ASP.NET Core (Developer Reference),2018

5. Learning React Functional Web Development with React and Redux by Alex Banks, Eve Porcello, Alex Banks, Eve Porcello
6. Brad Dayley, Brendan Dayley and Caleb Dayley, Node.js, MongoDB and Angular Web Development The definitive guide to using the MEAN stack to build web applications, 2nd Edition, Pearson Education, 2018
7. <http://getbootstrap.com/>
8. <https://reactjs.org/>
9. <https://nodejs.org/en/>

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)
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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 : U21PW619IT
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>At the end of the course student will be able to:</i>
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.

**OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN
B.E. VI SEMESTER
(OPEN ELECTIVE-IV)**

S.No.	Dept.	Course Code	Name of the Course	Credits
1	Civil	U21OE610CE	Project Management	3
2	ECE	U21OE610EC	Internet of Things and Applications (General Pool)	3
3		U21OE620EC	Introduction to Wireless Communications (General Pool)	3
4	EEE	U21OE610EE	Mathematical Programming For Numerical Computation	3
5	Mechanical	U21OE610ME	Additive Manufacturing and its Applications	3
6		U21OE620ME	Alternative Fuels and Energy Systems	3
7		U21OE630ME	Industrial Administration and Financial Management	3
8	H&SS	U21OE630EH	Advanced Course in Entrepreneurship	3

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

PROJECT MANAGEMENT
(Open Elective-IV)
SYLLABUS FOR B.E. VI-SEMESTER

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

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

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

UNIT-II: Planning: Project Planning, bar charts, network techniques in project management – CPM Expected likely, pessimistic and optimistic time, normal distribution curve and network problems of PERT.

UNIT-III: Time Cost Analysis: Cost time analysis in network planning, updating

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

Lender: Lender form, Lender documents, Lender notice, work order.

UNIT-V: Linear Programming and Optimization Techniques: Introduction to optimization-Linear programming, Importance of optimization, Simple problems on formulation of LP. Graphical method, Simplex method.

Learning Resources:

1. Srinath L.S., PERT and CPM., Principles and Application, East – West Press, 2001.
2. Peret, F., Construction Project Management an Integrated Approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2009.
3. Punmia B.C. and Khandelwal, PERT and CPM, Laxmi Publications, 2006
4. <http://nptel.ac.in/courses/>

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

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

Duration of Internal Tests : 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 & Mechanical)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U210E610EC
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, Local and wide area networking, Data management, Business processes in IoT.

UNIT - II : Real-World Design Constraints

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

UNIT - III : IOT PROTOCOLS

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

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

UNIT - IV : Device for IoT

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

UNIT - V : IoT case studies

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

Learning Resources:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatiskarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st 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
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Introduction to Wireless Communications

(Open Elective - IV)

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

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

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	On completion of the course, students will be able to
1. To understand the technology trends changing from generation to generation. 2. To have an insight into the various propagation models and the effects of fading. 3. To understand the multiple access techniques and Mobile communication system specifications.	1. Identify key concepts related to frequency reuse, handoff strategies, and channel assignment in cellular networks. 2. Explain the architecture, services, and features of 2G wireless systems, specifically the Global System for Mobile (GSM) 3. Analyze the benefits of MIMO and OFDM in enhancing data rates and spectral efficiency in 4G and beyond. 4. Compare and contrast the evolution of 3G, 4G, and 5G technologies, highlighting their advancements and implications. 5. comprehend the architecture of 5G networks, including the New Radio (NR) standard, standalone and non-standalone modes, massive MIMO

CO-PO Mapping

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

UNIT - I:

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

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

UNIT - II:

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

UNIT - III:

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

UNIT -IV:

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

UNIT -V:

5G Network: New Radio (NR), Standalone and non-standalone mode; non-orthogonal multiple access (NOMA); massive MIMO, beam formation, FAPI: PHY API specification, flexible frame structure, Service Data

Adaptation Protocol (SDAP); centralized RAN, open RAN; multi-access edge computing (MEC); software defined networking (SDN), network function virtualization (NFV); network slicing; restful API for service-based interface; private networks.

Learning Resources:

1. Theodore S. Rappaport, Wireless Communications Principles and Practices, 2nd edition, Pearson Education.
2. 4G, LTE-Advanced Pro and The Road to 5G by Erik Dahlman.
3. 5G NR: Architecture, Technology, Implementation, and Operation of 3GPP New Radio.
4. Fundamentals of 5G Mobile Networks Hardcover, by Jonathan Rodriguez, Wiley.
5. Introduction to Wireless and Cellular Communications

Course url: https://swayam.gov.in/nd1_noc19_ee48/preview

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

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

Duration of Internal Tests: 90 Min

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

MATHEMATICAL PROGRAMMING FOR NUMERICAL COMPUTATION

Open Elective-IV

SYLLABUS FOR B.E. VI SEMESTER

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

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

UNIT - I : Introduction:

Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on- line help, file types.

MATLAB Basics: Variables and Constants – Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating , Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if- else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions

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

UNIT - III : Numerical Methods Using MATLAB

Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration.

Linear Equations- Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations, Advanced topics.

UNIT - IV : Nonlinear Equations

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

UNIT - V :

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

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

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by RudraPratap, Oxfordpublications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt.Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Mathworks.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy SiauAlexandreBayen, Elsevier-18th April2014.
5. <https://nptel.ac.in/courses/103106118/2>

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

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

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

Additive Manufacturing and its Applications
(Open Elective-IV)
SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U21OE610ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The course will enable the students to:	On completion of the course the student will be able to:
The objectives of this course are to: understand the fundamentals of various additive manufacturing technologies and their applications in Engineering Industry.	<ol style="list-style-type: none"> 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.

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: **1 Hour 30 Minutes**

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

Alternative Fuels and Energy Systems

(Open Elective-IV)

SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U21OE620ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

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

UNIT – I

Need for Alternative Fuels:

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

UNIT – II

Alcohols:

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

Bio-diesels:

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

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

UNIT – III

Biogas:

Introduction to Biogas system; Extraction process; Factors affecting biogas formation; Usage of Biogas in SI engine & CI engine;

LPG & CNG: Properties of LPG & CNG as engine fuels, fuel metering systems, combustion characteristics, effect on performance, emission, cost and safety.

UNIT – IV

Hydrogen:

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

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

UNIT – V

Electric & Hybrid Vehicles:

Layout of an electric vehicle; Systems and components; electronic controlled systems; high energy and power density batteries; Types of hybrid vehicles; advantages & limitations.

Solar Powered Vehicles:

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

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VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING**Industrial Administration and Financial Management**

(Open Elective-IV)

SYLLABUS FOR B.E VI Semester

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

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

UNIT – I

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

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

UNIT – II

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

UNIT – III

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

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

UNIT – IV

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

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

Material Management: Classification of materials. Materials planning. Purchasing procedure of a material for an industry Duties of purchase manager and Stores department. Determination of economic order quantities. Types of materials purchase.

UNIT – V

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

Learning Resources:

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

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VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD-31
Department of H&SS

ADVANCED COURSE IN ENTREPRENEURSHIP

(OE-IV)

SYLLABUS FOR B.E.VI-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: U20OE630EH
Credits :03	CIE Marks:40	Duration of SEE: 03Hours

Course objectives <i>The objectives of this course are to</i>	Course Outcomes <i>On completion of the course the student will be able to</i>
1. Acquire additional knowledge and skills for developing early customer traction into a repeatable business. 2. They will learn the tools and methods for achieving sustainable growth, such as refining the product or service and business models, building brand strategy, making a sales and financial plan etc.	1. Develop an A-team 2. Refine business models and expand customer segments, brand strategy and create digital presence, channel strategy for customer outreach 3. Develop strategies to grow revenues and markets, understand Advance Concepts of business finance, do Financial Planning, find Funding for growth 4. Leverage technologies and platforms for growth stage companies 5. Develop key metrics to track progress, understand Basics of registering a company.

Unit I: Pivoting and New Business Model

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

Unit II: Business Planning

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

Unit III: Customer Life cycle and Building the A-team

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

Unit IV: Branding and Channel Strategy, Leveraging Technologies

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

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

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

Learning Resources:

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

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