

**VASAVI COLLEGE OF ENGINEERING  
(AUTONOMOUS)  
Ibrahimbagh, Hyderabad-31**  
Approved by A.I.C.T.E., New Delhi and  
Affiliated to Osmania University, Hyderabad-07

**Sponsored  
by  
VASAVI ACADEMY OF EDUCATION  
Hyderabad**



**SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR  
B.E. (CSE) V and VI Semesters  
With effect from 2021-22  
(For the batch admitted in 2019-20)  
(R-19)**



**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
Phones: +91-40-23146020, 23146021  
Fax: +91-40-23146090**

### **Institute Vision**

Striving for a symbiosis of technological excellence and human values

### **Institute Mission**

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

### **Department Vision**

To be a center for academic excellence in the field of Computer Science and Engineering education to enable graduates to be ethical and competent professionals

### **Department Mission**

To enable students to develop logic and problem solving approach that will help build their careers in the innovative field of computing and provide creative solutions for the benefit of society.

.

**B.E (CSE) Program Educational Objectives (PEO's)**

Graduates should be able to utilize the knowledge gained from their academic program to:

<b>PEO I</b>	Solve problems in a modern technological society as valuable and productive engineers.
<b>PEO II</b>	Function and communicate effectively, both individually and within multidisciplinary teams.
<b>PEO III</b>	Be sensitive to the consequences of their work, both ethically and professionally, for productive professional careers.
<b>PEO IV</b>	Continue the process of life-long learning.

<b>B.E. (CSE) PROGRAM OUTCOMES (PO's)</b>	
<b>Engineering Graduates will be able to:</b>	
<b>PO1</b>	<b>Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO2</b>	<b>Problem Analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO3</b>	<b>Design/development of solutions:</b> 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.
<b>PO4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO5</b>	<b>Modern tool usage:</b> 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.
<b>PO6</b>	<b>The engineer and society:</b> 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.
<b>PO7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>P10</b>	<b>Communication:</b> 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.
<b>P11</b>	<b>Project management and finance:</b> 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.
<b>P12</b>	<b>Lifelong learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

<b>B.E (CSE) PROGRAM SPECIFIC OUTCOMES (PSO's)</b>	
<b>PSO I</b>	Graduates will have knowledge of programming and designing to develop solutions for engineering problems.
<b>PSO II</b>	Graduates will be able to demonstrate an understanding of system architecture, information management and networking.
<b>PSO III</b>	Graduates will possess knowledge of applied areas of computer science and engineering and execute them appropriately.

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
SCHEME OF INSTRUCTION AND EXAMINATION(R-19)  
FOR B.E 2019-20 ADMITTED BATCH V SEMESTER (A.Y 2021-22)**

<b>B.E (CSE) V Semester</b>									
<b>Course Code</b>	<b>Name of the Course</b>	<b>Scheme of Instruction</b>			<b>Scheme of Examination</b>				
		<b>Hours per Week</b>			<b>Duration in Hrs</b>	<b>Maximum Marks</b>		<b>Credits</b>	
		<b>L</b>	<b>T</b>	<b>P/D</b>		<b>SEE</b>	<b>CIE</b>		
<b>THEORY</b>									
U19PC510CS	Database Management Systems	3	-	-	3	60	40	3	
U19PC520CS	Computer Networks	3	-	-	3	60	40	3	
U19PC530CS	Web Programming and Services	3	-	-	3	60	40	3	
U19PC540CS	Machine Learning	3	-	-	3	60	40	3	
U19HS040EH	Economics and Finance for Engineers	2	-	-	3	60	40	2	
U19OE5XXXX	Open Elective-III	3	-	-	3	60	40	3	
U19HS510EH	Skill Development – III : Soft Skills	1	-	-	2	40	30	1	
U19PE510CS	Skill Development - III : Technical Skills	1	-	-	2	40	30	1	
U19HS020EH	Human Values and Professional Ethics-II	1	-	-	2	40	30	1	
<b>PRACTICALS</b>									
U19PC511CS	Database Management Systems Lab	-	-	2	3	50	30	1	
U19PC521CS	Computer Networks Lab	-	-	2	3	50	30	1	
U19PC531CS	Web Programming and Services Lab	-	-	2	3	50	30	1	
<b>TOTAL</b>		<b>20</b>	<b>0</b>	<b>6</b>		<b>630</b>	<b>420</b>	<b>23</b>	
<b>GRAND TOTAL</b>		<b>26</b>				<b>1050</b>			
<b>Student should acquire one online certification course during III Semester to VII Semester</b>									
<b>Left over hours are allocated for Extra Curricular Activities / Co-Curricular Activities / Sports / Library / Mentor Interaction / CC / RC / TC</b>									

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**  
DATABASE MANAGEMENT SYSTEMS

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: <b>U19PC510CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

**UNIT-I:**

**Introduction:** Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Design, Data Storage and Querying, Data Mining and Information retrieval, Database Architecture , Database Users and Administrators.

**Database Design and E-R Model:** Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Extended E-R features, Reduction to Relational Schemas.

**UNIT-II:**

**Relational Model:** Structure of Relation Database, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations, Modification of the Database, Relational Calculus.

With effect from the Academic Year 2021-22

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

**UNIT-III:**

**Advanced SQL:** SQL Data Types, Integrity constraints Authorization, Functions and Procedural Constructs, Recursive Queries, Triggers, JDBC, ODBC and Embedded SQL.

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

**UNIT-IV:**

**Indexing and Hashing: Basic** Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Files, Multiple – Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.

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

**UNIT-V:**

**Concurrency Control:** Lock Based Protocols, Timestamp – Based Protocols Validation Based Protocols, Multiple Granularity, Multi version Schemes, Deadlock Handling.

**Recovery System:** Failure Classification, Storage Structure Recovery and Atomicity, Log Based Recovery, Recovery with Concurrent Transactions, Advanced Recovery Techniques and Remote Backup Systems.

**Learning Resources:**

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



With effect from the Academic Year 2021-22

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**  
**COMPUTER NETWORKS**

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: <b>U19PC520CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
	<i>On completion of the course, students will be able to</i>
1 Apply networking concepts to work on networked systems using the existing protocols and evaluate the role of security for developing end user applications	1 Compare OSI and TCP/IP reference models and explain functionalities of Data Link Layer 2 Explain MAC protocols and networking devices. 3 Analyze the design issues of network layer 4 Describe the services of transport layer 5 Apply application layer protocols for providing network services to the end user

**UNIT-I:**

**Introduction:** Network Hardware, Network Software, Reference Models, Comparison of the OSI and TCP/IP Reference Models

**Physical Layer:** Guided transmission media, Wireless transmission media.

**Data Link Layer:** Design Issues, Error Detection and Correction, Elementary Data Link Layer Protocols, Sliding Window Protocols

**UNIT-II:**

**Multiple Access Protocols :** ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

**UNIT-III:**

**Network Layer:** Network Layer Design Issues.

**Routing Algorithms:** Shortest path routing, flooding, distance vector routing, link state routing.

**IP Addresses:** IPV4, Subnetting, Supernetting, CIDR, NAT, IPV6.

**Internet Control Protocols:** ICMP, ARP, DHCP.

With effect from the Academic Year 2021-22

**UNIT-IV:**

**Transport Layer:** The Transport Service, Elements of Transport Protocols  
**The Internet Transport Protocols (TCP and UDP):** UDP, TCP: Introduction, The TCP service model, The TCP protocol, The TCP Segment Header, TCP connection establishment, connection release, TCP sliding window, TCP Timer management, TCP Congestion control, Performance issues.

**UNIT-V:**

**Application Layer:** Domain Name System -DNS Name Space, Domain Resource Records, Name Servers, FTP, TELNET

**Network Security:** Cryptography, Symmetric Key Algorithms: DES, AES, Cipher modes.

**Public Key Algorithms:** RSA. Digital Signatures, Management of Public Keys.

**Learning Resources:**

1. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, 5th Edition Pearson, 2012.
2. Data Communications and Networking, 4th Edition, Behrouz Forouzan, Tata McGraw Hill, 2011
3. James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 5th Edition, Addison-Wesley, 2012
4. Chwan-Hwa (John) Wu, J. David Irwin, Introduction to Computer Networks and Cyber Security, CRC Press, 2013
5. Alberto Leon-Garcia and Indra Widjaja, Communication Networks: Fundamental Concepts and Key Architectures, Tata McGraw-Hill, 2004.
6. <http://nptel.ac.in/courses/106105081/1>
7. <https://www.youtube.com/watch?v=WabdXYzCAOU>

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**  
WEB PROGRAMMING & SERVICES

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: <b>U19PC530CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Develop web applications using technologies like HTML, XML, JavaScript, Servlet, JSP & PHP.	1 Apply HTML, CSS & JavaScript to design web pages.
2 Develop and publish web services.	2 Develop applications using JDBC API to connect to a database. Design XML documents and apply styles using XSLT.
	3 Explain architectural styles and develop dynamic web applications using Servlets.
	4 Design and develop server side programs using JSP & PHP.
	5 Publish web services and explain serverless computing.

**UNIT-I:**

**Web Basics and Overview:** Evolution of the Internet and World Wide Web, Web Basics, Introduction to HTML5, HTML5 Validation Service, Forms, HTML5 Form input Types, Cascading Style Sheets (Part-1).

**JavaScript:** Introduction to Scripting Functions, Arrays, Objects.

**UNIT-II:**

**XML:** XML Basics, XML Document Structure, XML Namespaces, XSL Transformations.

**Working with JDBC 4.0:** JDBC Drivers, JDBC Processes with java.sql package: Types of Statements, Retrieving Meta information from Database and ResultSet.

With effect from the Academic Year 2021-22  
JDBC Processes with javax.sql package: JDBC Data Sources, Connection Pooling, Working with Transactions.

### **UNIT-III:**

**JavaEE Platform:** Enterprise Architecture Types, JavaEE7 Architecture, Micro services Architecture

**Working with Servlet 3.1:** Java Servlet API, Servlet Life Cycle, Servlet Implementation, Request and Response Scope.

Handling Sessions: Approaches to Session Tracking, Session Tracking with Java Servlet API.

### **UNIT-IV:**

**JSP:** Introduction to JSP, Architecture, JSP Lifecycle, JSP Elements: Directives, Scripting Elements, Action Tags, JSP Expression Language.

JSP Tag Extensions: Tag Extensions, Tag Extension API, Writing Tag Handlers.

**PHP:** Introduction, Conversion between Data Types, Arithmetic Operators, Manipulating Arrays, String Processing, Form Processing and Business Logic, Reading from Database, Using Cookies.

### **UNIT-V:**

**Web Services:** Web Services Technologies - SOAP, REST, JSON, Web Services Architecture, Publishing and Consuming SOAP-Based WCF Web Service, Publishing and Consuming REST-Based XML Web Service, Publishing and Consuming REST- Based JSON Web Service. Web RTC

**Serverless Computing:** AWS services, AWS Lambda, Use-Cases, Web application Deployment in Cloud.

### **Learning Resources:**

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
2. David R. Heffelfinger, Java EE 8 Application Development, Packt Publishers, 2017
3. Java Server Programming Java EE7 (J2EE 1.7): Black Book, (2014), Dreamtech Press.
4. Uttam K. Roy, Web Technologies, (2012), Oxford Publishers.
5. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.
6. <https://www.w3schools.com/html/>
7. <https://javaee.github.io/tutorial/toc.html>
8. <https://www.javatpoint.com/php-tutorial>
9. <https://docs.microsoft.com/en-us/aspnet/web-forms/index>
10. <https://aws.amazon.com/lambda/>

With effect from the Academic Year 2021-22

11. <https://webrtc.org/>

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

MACHINE LEARNING

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: <b>U19PC540CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVE</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
To formulate machine learning problems corresponding to an application.	<ol style="list-style-type: none"><li>1 Explain the basics of concept learning and inductive learning.</li><li>2 Design decision tree neural network solve classification problems.</li><li>3 Comprehend probabilistic methods for learning.</li><li>4 Explain the instance based learning and reinforcement learning.</li><li>5 Build optimal classifiers using Genetic Algorithm and deep learning.</li></ol>

**UNIT-I:**

**Introduction:** Well-Posed Learning Problems, Designing a Learning System, Issues in Machine Learning.

**The Concept Learning:** A concept Learning Task, General –to- Specific Ordering of Hypothesis, Find-S, The List-Then-Eliminate Algorithm, Candidate Elimination Learning Algorithm, Inductive bias.

**UNIT-II:**

**Decision Tree Learning:** Introduction, Decision Tree Representation, The Basic Decision Tree Algorithm, Hypothesis space search in Decision Tree Learning, Issues in Decision Tree Learning.

**Artificial Neural Networks:** Introduction, Neural Network Representation, Perceptrons, Gradient descent and the Delta rule, Multilayer Networks, Derivatives of back propagation rule. Back propagation algorithm- Convergence, Generalization.

**Evaluating Hypotheses:** Estimating hypotheses Accuracy, Basics of sampling theory, Comparing learning algorithms.

With effect from the Academic Year 2021-22

### UNIT-III:

**Bayesian Learning:** Introduction, Bayes Theorem, Concept Learning, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief networks, EM algorithm.

**Computational Learning Theory:** Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Spaces, Sample Complexity for Infinite Hypothesis Spaces, The Mistake Bound Model of Learning.

### UNIT-IV:

**Instance-based Learning:** Introduction, k-Nearest Neighbor-Distance Weighted Nearest Neighbor Algorithm, Locally Weighted Regressions, Radial Basis Functions, Case –based learning.

**Reinforcement Learning:** Introduction, Learning Task, Q Learning.

### UNIT-V:

**Genetic Algorithms:** Motivation, Genetic Algorithm-Representing Hypotheses, Genetic Operators, Fitness Function and Selection, An Illustrative Example, Hypothesis Space Search, Genetic programming, Models of Evolution and Learning.

**Deep Learning:** Convolutional neural networks, recurrent neural networks.

### Learning Resources:

1. Tom Mitchell, "Machine Learning", McGraw-Hill Science, First edition.
2. Christopher Bishop, "Pattern Recognition and Machine learning", Springer (2006).
3. Stephen Marsland, "Machine Learning –an algorithmic perspective", CRC Press.
4. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville, "Deep learning ", An MIT Press book in preparation (2015).
5. Daniela witten, Trevor Hastie Robert Tibshirani and Gareth James, "An introduction to statistical Learning with applications in R, Springer 2013
6. [https://onlinecourses.nptel.ac.in/noc18\\_cs26/preview](https://onlinecourses.nptel.ac.in/noc18_cs26/preview)
7. <https://www.coursera.org/learn/machine-learning>
8. <http://www.holehouse.org/mlclass>
9. <https://in.udacity.com/course/intro-to-machine-learning--ud120>
10. <https://github.com/JannesKlaas/MLiFC>

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>
	Duration of Internal Tests	:	1 Hour 30 Minutes			



With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
 IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Humanities and Social Sciences**

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

L:T:P(Hrs/Week): 2:0:0	SEE Marks : 60	Course Code: <b>U19HS040EH</b>
Credits: 2	CIE Marks : 40	Duration of SEE : 03 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
The objective of the Course is to equip the prospective engineers with the concepts and tools of economics, finance, cost and taxes for business decisions	<ol style="list-style-type: none"> <li>1. Enable students to identify the essential components such as production quantity limits, elasticity, demand and supply in business decision making.</li> <li>2. Facilitate students in calculation of cost components to enable control of costs.</li> <li>3. Make better investment decisions both in short and long run by understanding the financial viability of given investment proposals.</li> <li>4. Analyze the given financial statements of a firm to understand the past performance and to make decisions for future.</li> <li>5. Identify the impact of the new tax policies on the company's financial structure/ individual's incomes</li> </ol>

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

With effect from the Academic Year 2021-22

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

**Unit III:** Sources and uses of Finance: RBI and its role - Commercial Banks - Functions -Capital Budgeting -Discounting and Non discounting Techniques (including simple problems) - Working Capital Management - Concepts and Components of Working Capital –determinants of working capital - Operating Cycle - estimation of working capital.

**UNIT IV:** Understanding Financial Statements: Financial Statements-Meaning - Types -Purpose - Ratios(Liquidity, Solvency & Profitability Ratios including problems)

**Unit V:**Direct & Indirect Taxes: Heads of Income - Income from Salaries - Income from House Property - Income from Business - Income from Capital Gains -Income from Other Sources –old and new regime tax rates and calculation of tax - Latest Tax Rates - GST -CGST - SGST - IGST - GST network.

**Learning Resources:**

1. S.P.Jain and K.LNarang., "Cost Accounting", Kalyani Publishers, Twentieth Edition Revised– 2008.
2. S.P.Jain and K.L Narang., "Financial Accounting", Kalyani Publishers – 2002.
3. Mehta P.L., "Managerial Economics: Analysis, Problems and Cases", Thirteenth Edition, Sultan Chand and Sons, Nineteenth Edition - 2013.
4. M.Y.Khan and P.K. Jain., "Financial Management – Text, Problems and Cases", Mc Graw Hill Education Private Limited, New Delhi.
5. Vinod K Singhanian and Kapil Singhanian., "Direct Taxes Law and Practice", Taxmann Publications, Sixtieth Edition - 2018.
6. Dr, Vinod K Singhanian., "Students' Guide to GST and Customs Law", Taxmann Publications, Edition - 2018.
7. Muralidharan., "Modern Banking", Prentice Hall of India.
8. Accounting for Managers by Narayana swamy

With effect from the Academic Year 2021-22

**Reference Books:**

1. *M. L. Seth., "Micro Economics",* Lakshmi Narain Agarwal.
2. Dr. R.P. Rustagi., "Fundamentals of Financial Management"Taxmann Publications.
3. Dr. D.M. Mithani, "Money Banking International Trade & Public Finance", Himalaya Publishing House - 2014.
4. Rajesh., "Banking Theory and Practice", Tata Mc Graw Hill Publishing

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 20 Minutes

With effect from the Academic Year 2021-22

**OPEN ELECTIVES OFFERED IN B.E. V SEMESTER (2021-22)**

<b>Dept</b>	<b>Title (Open Elective-III)</b>	<b>Code</b>	<b>Credits</b>
Civil	Spatial Information Technology	U19OE510CE	3
CSE	Principles of Data Structures	U19OE510CS	3
	Data Structures and Algorithms	U19OE520CS	3
ECE	Sensors for Engineering Applications	U19OE510EC	3
	Mathematical Programming for Engineers	U19OE010EC	3
EEE	Solar Power and applications	U19OE510EE	3
Mech	Introduction to Robotics	U19OE510ME	3
	Introduction to Automobile Engineering	U19OE520ME	3
Maths	Numerical Methods	U19OE510MA	3
Physics	Thin Film Technology and Applications	U19OE520PH	3
H&SS	Technical Writing and Professional Presentations	U19OE520EH	3

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
**IBRAHIMBAGH, HYDERABAD – 500 031**

DEPARTMENT OF CIVIL ENGINEERING

**SPATIAL INFORMATION TECHNOLOGY**  
**(Open Elective-III)**

SYLLABUS FOR B.E. V SEMESTER

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

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
Objectives of this course are to	Upon the completion of the course, students are expected to
1. To provide fundamental knowledge on geo spatial technology such as Remote sensing GPS and GIS.	1. Select the type of remote sensing technique/data, identify and analyze the earth surface features from the satellite images. 2. Identify GPS components, interpret the navigational message and signals received by the GPS satellites, Identify the error sources and apply corrections for accurate positioning. 3. Analyse the basic components of GIS, process spatial and attribute data, identify and rectify mapping inaccuracies and prepare thematic maps

**Unit-I: Introduction and Basic Concepts of Remote Sensing**  
:Introduction, Basic concepts of remote sensing, Airborne and space born

With effect from the Academic Year 2021-22  
sensors, Passive and active remote sensing, EMR Spectrum, Energy sources and radiation principles, Energy interactions in the atmosphere, Energy interactions with earth surface features, Atmospheric windows, Spectral reflectance curves

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

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

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

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

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

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

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

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

**Learning Resources:**

1. James B. Campbell & Randolph H. Wynne., Introduction to Remote Sensing, The Guilford Press, 2011
2. Lillesand, Kiefer, Chipman., Remote Sensing and Image Interpretation, Seventh Edition, 2015
3. Leick, A., GPS Satellite Survey, John Wiley: NJ, 2015
4. Hofmann, B., Lichtenegger H. and Collins J., Global Positioning System: Theory and Practice, Springer: Berlin, 2011.
5. Basudeb Bhatta, Remote Sensing and GIS, Oxford University Press, 2011.
6. Hofmann-Wellenhof, 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

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**  
**PRINCIPLES OF DATA STRUCTURES (OPEN ELECTIVE-III)**

SYLLABUS FOR B.E. V-SEMESTER  
(COMMON FOR CIVIL & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U190E510CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
<ol style="list-style-type: none"><li>1. Understand Basic linear and non-linear data structures and learn techniques of recursion</li><li>2. Understand concepts of Linked lists</li><li>3. Understand Concepts of Stacks and queues</li><li>4. Understand Concepts of Trees</li><li>5. Understand Concepts of Graphs and different sorting and searching techniques and their complexities.</li></ol>	<ol style="list-style-type: none"><li>1. Understand the basic concepts of data structures.</li><li>2. Understand the notations used to analyze the performance of algorithms.</li><li>3. Choose and apply an appropriate data structure for a specified application.</li><li>4. Understand the concepts of recursion and its applications in problem solving.</li><li>5. Demonstrate a thorough understanding of recursion.</li></ol>

### **UNIT-I**

**Introduction:** Data Types, Data structures, Types of Data Structures, Operations, ADTs, Algorithms, Comparison of Algorithms, Complexity, Time-space tradeoff.

**Recursion:** Introduction, format of recursive functions, recursion Vs. Iteration, examples.

### **UNIT-II**

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



### UNIT-III

**Stacks and Queues:** Introduction to stacks, applications of stacks, implementation, and comparison of stack implementations. Introduction to queues, applications of queues and implementations, Priority Queues and applications.

### UNIT-IV

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

### UNIT-V

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

### Textbooks:

1. Narasimha Karumanchi, "Data Structures and Algorithms MadeEasy", Career Monk Publications, 2017
2. Horowitz E, Sahni S., and Susan Anderson-Freed, " Fundamentals of Data structures in C", Silicon Pr; 2 edition (1 August 2007)
3. ReemaThareja, "Data Structures using C", Oxford, 2014.

### Reference Books:

1. Kushwaha D. S. and Misra A. K, "Data structures A Programming Approach with C", PHI.
2. Seymour Lipschutz," Data Structures with C", McGraw Hill Education,2017.

### Learning Resources:

1. [https://www.tutorialspoint.com/data\\_structures\\_algorithms/index.htm](https://www.tutorialspoint.com/data_structures_algorithms/index.htm)
2. <https://www.edx.org/course/foundations-of-data-structures>
3. <https://sites.google.com/site/merasemester/data-structures>

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

1 No. of Internal Tests :  Max. Marks for each Internal Tests :

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

**PRINCIPLES OF DATA STRUCTURES LAB**

SYLLABUS FOR B.E. V-SEMESTER  
(COMMON FOR CIVIL & MECH)

Each Department will conduct under Technical Skills

<b>Course Objectives</b>	<b>Course Outcomes</b>
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Design and implement abstractions of various data structures and their practical applications.	<ol style="list-style-type: none"><li>1. Perform operations on Abstractions like stacks, queues, linked lists.</li><li>2. Implement problems involving trees and graphs.</li><li>3. Choose the right data structure based on the requirements of the problem.</li></ol>

1. Menu driven program that implements Stacks using arrays for the following operations  
a) create            b)push            c)pop            d) peek
2. Implementation of Infix to Postfix Conversion and evaluation of postfix expression.
3. Menu driven program that implements Queues using arrays for the following operations  
a)create            b)insert            c)delete            d) display
4. Menu driven program that implements Circular Queues for the following operations  
a)create            b)Insert            c)delete            d) display
5. Implementation of Singly Linked List, Stack using Singly Linked List, Queue using Singly Linked List.

With effect from the Academic Year 2021-22

6. Implementation of polynomial operations using Linked List.
7. Implementation of Doubly Linked List, Circular linked list.
8. Implementation of Operations on Binary Tree  
(Insert, Delete, Level Order, Search)
9. Implementation of Recursive and Iterative Traversals on Binary Trees.
10. Implementation of Operations on Binary Search Tree.
11. Implementation of Quick Sort.
12. Implementation of merge Sort.

### **Suggested Reading:**

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

### **Online Resources:**

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

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
**IBRAHIMBAGH, HYDERABAD – 500 031**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**DATA STRUCTURES AND ALGORITHMS**  
**(OPEN ELECTIVE-III)**

SYLLABUS FOR B.E. V SEMESTER  
Common for ECE and EEE

L : T : P(Hrs./week): 3	SEE Marks:60	Course Code: <b>U19OE520CS</b>
Credits: 3	CIE Marks :40	Duration of SEE: 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
Objectives of this course are	At the end of the course, students will be
1. Understand Basic linear and non-linear data structures and learn techniques of recursion	1. Understand the basic concepts of data structures.
2. Understand concepts of Linked lists	2. Understand the notations used to analyze the performance of algorithms.
3. Understand Concepts of Stacks and queues	3. Choose and apply an appropriate data structure for a specified application.
4. Understand Concepts of Trees	4. Understand the concepts of recursion and its applications in problem

**Unit I**

**Algorithm Specification-** Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations.

**Arrays:** Arrays - ADT, Polynomials, Sparse matrices

**Unit II**

**Strings-ADT, Pattern Matching, Linked Lists:** Singly Linked Lists and Chains, Linked Stacks and Queues, Polynomials, Operations for Circularly linked lists, Equivalence Classes, Sparse matrices, Doubly Linked Lists.

### Unit III

**Stacks and Queues:** Stacks, Stacks using dynamic arrays, Queues, Circular Queues using dynamic arrays, A Mazing Problem, Evaluation of Expressions – Evaluating Postfix Expression, Infix to Postfix.

### Unit IV

**Sorting:** Insertion Sort, Quick sort, Merge sort, Heap sort, Sorting on Several Keys, List and Table Sorts. **Hashing** :Introduction, Static Hashing, Hash tables, Hash functions, Overflow handling.

### Unit V

**Trees:** Introduction, Binary Trees, Binary Tree Traversals, Heaps, Binary Search trees (BST): Definition, Searching a BST, Insertion into a BST, Deletion from a BST. **Graphs:** The Graph ADT, Elementary graph operations, Minimum Cost Spanning Trees- Kruskal's Algorithm, Prim's Algorithm.

### Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press.
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, 2nd Edition (2002), Pearson.
3. Kushwaha D. S and Misra A.K, Data Structures A Programming Approach with C, Second Edition(2014), PHI.,
4. Gilberg R. F and Forouzan B. A, Data Structures: A Pseudocode Approach with C, Second Edition(2007), Cengage Learning
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos>
9. <http://nptel.ac.in/courses/106106127/>
10. <http://www.nptel.ac.in/courses/106102064>

With effect from the Academic Year 2021-22

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

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

1 No. of Internal Tests :  Max. Marks for each Internal Tests :

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22  
**VASAVICOLLEGE OF ENGINEERING (Autonomous)**  
IBRAHIMBAGH, HYDERABAD- 500 031

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**DATA STRUCTURES AND ALGORITHMS LAB  
(OPEN ELECTIVE-III)**

SYLLABUS FOR B.E. V SEMESTER  
Common for ECE and EEE

Each Department will conduct under Technical Skills

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

**Programming Exercise:**

1. Implementation of Formula based representation.
2. Implementation of Singly Linked List, Doubly Linked List and Circular Linked List.
3. Implementation of Polynomial Arithmetic using Linked List.
4. Implementation of String Matching algorithms.
5. Implementation of Stacks, Queues. (Using both Arrays and Linked Lists)
6. Implementation of Infix to Postfix Conversion, Postfix Expression Evaluation.
7. Implementation of Recursive and Iterative Traversals on Binary Tree.
8. Implementation of Binary Search Tree.
  
9. Implementation of Operations on Binary Tree

With effect from the Academic Year 2021-22  
(Delete Entire Tree, Copy Entire Tree, Mirror Image, Level Order, Search for a Node etc.)

10. Implementation of Traversal on Graphs.
11. Implementation of Selection, Merge, Quick, Heap, and Insertion Sort.
12. Implementation of Binary Search and Hashing
13. Develop application using appropriate data structures.

### **Learning Resources:**

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2<sup>nd</sup> Edition(2008), Universities Press
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition(2002), Pearson
3. Kushwaha D. S and Misra A.K, Data structures A Programming Approach with C, Second Edition(2014), PHI.,
4. Gilberg R. F and Forouzan B. A, Data structures: A Pseudocode Approach with C, Second Edition(2007), Cengage Learning
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. Yedidyah Langsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos>
9. <http://nptel.ac.in/courses/106106127/>
10. <http://www.nptel.ac.in/courses/106102064>



With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
 IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
 ENGINEERING**  
**SENSORS FOR ENGINEERING APPLICATIONS (OPEN ELECTIVE-III)**  
 SYLLABUS FOR B.E. V - SEMESTER (for other branches)

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

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<ol style="list-style-type: none"> <li>1. The student will come to know the various stimuli that are to be measured in real life instrumentation.</li> <li>2. He will be able to select the right process or phenomena on which the sensor should depend on</li> <li>3. He will be aware of the various sensors available for measurement and control applications.</li> </ol>	<p style="text-align: center;"><i>On completion of the course, students will be able to</i></p> <ol style="list-style-type: none"> <li>1. Appreciate the operation of various measuring and control instruments which they encounter in their respective fields.</li> <li>2. Visualize the sensors and the measuring systems when they have to work in areas of interdisciplinary nature and also think of sensors and sensors systems when for a new situation they encounter in their career</li> <li>3. Identify and select the right process or phenomena on which the sensor should depend on.</li> <li>4. Know various stimuli that are to be measured in real life instrumentation.</li> </ol>

**UNIT - I**

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

**UNIT – II**

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

### UNIT – III

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

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

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

### UNIT – IV

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

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

### UNIT – V

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

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

MEMs and MEM based sensors.

### Learning Resources :

Doebelin, "Measurement Systems: Application and Design", McGraw Hill Kogakusha Ltd.

Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim "Microsensors, MEMS and Smart Devices", New York: Wiley, 2001.

Henry Bolte, "Sensors – A Comprehensive Sensors", John Wiley.

Jacob Fraden," Handbook of Modern Sensors, Physics, Designs, and Applications", Springer.

Manabendra Bhuyan," Intelligent Instrumentation Principles and Applications", CRC Press.

Randy Frank," Understanding Smart Sensors", Second edition, Artech House.

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

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Tests	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22  
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING**

**MATHEMATICAL PROGRAMMING FOR ENGINEERS**

(OPEN ELECTIVE-III)

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

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

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

**UNIT - I : Introduction:**

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

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

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

With effect from the Academic Year 2021-22

## **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 polyval and polyfit, cubic fit using least square method. Finding roots of a polynomial -roots function, Newton-Raphson Method.

## **UNIT - V :**

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

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

### **Learning Resources:**

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

With effect from the Academic Year 2021-22

5. <https://nptel.ac.in/courses/103106118/2>

6. <https://www.udemy.com/numerical-methods/>

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

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22  
**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: <b>U19OE510EE</b>
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

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

**Unit – I**

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

**Unit – II**

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

With effect from the Academic Year 2021-22

### Unit – III

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

### Unit – IV

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

### Unit – V

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

### Suggested Reading:

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

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

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

With effect from the Academic Year 2021-22  
**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

Instruction : 3 Hours	SEE Marks: 60	Course Code : <b>U19OE510ME</b>
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hours

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

**UNIT-I**

**ROBOT BASICS**

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



With effect from the Academic Year 2021-22

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 HillPublishing Company Limited, 2010.
3. KlafterR.D, Chmielewski T.A, and Negin. M, "Robotic Engineering: An Integrated Approach", Prentice Hall of India Pvt. Ltd.,1994.

With effect from the Academic Year 2021-22

4. K.S. Fu, R.C. Gonzalez and C.S.G. Lee, "Robotics control, sensing, vision and intelligence", Tata McGraw-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		

With effect from the Academic Year 2021-22  
**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 : <b>U19OE520ME</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>Course objectives</b>	<b>Course Outcomes</b>
<p>The objectives of this course are to:</p> <ol style="list-style-type: none"><li>1.familiarize the student with the different types of automobiles and engine components along with its working.</li><li>2.impart adequate knowledge in fuel supply, cooling, lubrication and ignition of IC engines.</li><li>3.understand the steering geometry, steering mechanism and types of suspension systems.</li><li>4.gain the knowledge about working of clutch, gear mechanism, brakes</li><li>5.make the student conversant with types of wheels, tyres and pollution control techniques.</li></ol>	<p>On completion of the course, the student will be able to:</p> <ol style="list-style-type: none"><li>1. identify types of Automobiles and engine components and describe its working.</li><li>2. describe the engine fuel system in petrol and Diesel engines, cooling, lubrication systems.</li><li>3. describe the steering mechanism, suspension systems</li><li>4. describe the working principle and operation of clutch, gear mechanism and brakes.</li><li>5. know the pollutants from automobile and pollution control techniques and identify the types of wheels, tyres.</li></ol>

**UNIT-I**

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

## UNIT-II

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

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

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

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

## UNIT-III

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

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

## UNIT –IV

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

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

## UNIT –V

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

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

### Learning Resources:

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

With effect from the Academic Year 2021-22

5. C.P. Nakra, "Basic Automobile Engineering", 7<sup>th</sup> Edition, Dhanpat Rai Publishing C (P) Ltd., 2016.

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

1	No. of Internal Tests:	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				

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
**IBRAHIMBAGH, HYDERABAD – 500 031**

**DEPARTMENT OF MATHEMATICS**

**COURSE NAME: NUMERICAL METHODS**

OPEN ELECTIVE –III, B.E. V Semester  
Common to all Branches

L:T: P (Hrs/Week):3	SEE Marks:60	Course Code: <b>U19OE510MA</b>
Credits: 3	CIE Marks:40	Duration of SEE:Hours:03

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<i>The course will enable the students to:</i>	<i>At the end of the course students will be able to:</i>
<ol style="list-style-type: none"><li><b>1. Study</b> various numerical methods to solve Algebraic and Transcendental equations.</li><li><b>2. Understand</b> the methods to solve linear system of equations.</li><li><b>3. Understand</b> the numerical methods in interpolation and extrapolation.</li><li><b>4. Understand</b> the numerical methods in interpolation using central differences.</li><li><b>5. Understand</b> numerical methods in solving ordinary differential equations.</li></ol>	<ol style="list-style-type: none"><li><b>1. Apply</b> numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods</li><li><b>2. Solve</b> linear system of equations using direct and iteration methods.</li><li><b>3. Use</b> various numerical methods in interpolation and extrapolation.</li><li><b>4. Use</b> various numerical methods in interpolation using central differences.</li><li><b>5. Find</b> numerical solutions of ordinary differential equations.</li></ol>

**Unit – I: (8 Hours)**

**Solution of Algebraic and Transcendental equations:**

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

With effect from the Academic Year 2021-22

### **Unit – II: (8 Hours)**

#### **Solution of linear system of equations:**

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

### **Unit – III: (8 Hours)**

#### **Numerical differences-I**

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

### **Unit – IV: (8 Hours)**

#### **Numerical differences-II**

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

### **Unit – V: (8 Hours)**

#### **Numerical Solutions of Ordinary Differential Equations**

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta Method of 4<sup>th</sup> order (without proofs).

#### **Text Books:**

1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K.Iyengar, Narosa publishing house.

#### **Reference Books:**

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

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

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

**DEPARTMENT OF PHYSICS**

**THIN FILM TECHNOLOGY AND APPLICATIONS**  
**(Open Elective-III)**

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs/Week):3:0:0	SEE Marks:60	Course Code: <b>U21OE510PH</b>
Credits: 3	CIE Marks:40	Duration of SEE:Hours:03

<b>Course Objectives</b>	<b>Course Outcomes</b>
<b><i>Students are able to</i></b> <ol style="list-style-type: none"><li>1. Learn the fundamental atomistic mechanisms.</li><li>2. Narrate thin film deposition techniques</li><li>3. Acquire knowledge on thin film devices</li><li>4. Appreciate applications of thin films</li></ol>	<b><i>The students acquire the ability to</i></b> <ol style="list-style-type: none"><li>1. State fundamental definitions of thin film technology</li><li>2. Describe thin film deposition techniques</li><li>3. Illustrate thin film devices and their use</li><li>4. Apply thin films coatings for a variety industrial applications</li></ol>

**UNIT-I: THIN FILM GROWTH**

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

**UNIT-II: DEPOSITION TECHNIQUES**

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

**UNIT-III: THIN FILM MATERIAL CHARACTERIZATION TECHNIQUES**

Characterization techniques: X-Ray Diffraction (XRD), working principles of Scanning Electron Microscopy (SEM), working of Transmission



With effect from the Academic Year 2021-22  
Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM).

#### **UNIT-IV: PROPERTIES OF THIN FILMS**

#### **UNIT-V: THIN FILM DEVICES AND APPLICATIONS**

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

#### **Learning resources:**

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

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES**

**TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS**

OPEN ELECTIVE-III, B.E. V Semester  
(Common to all branches)

L:T:P(Hrs/Week):3:0:0	SEE Marks:60	Course Code: <b>U19OE520EH</b>
Credits: 3	CIE Marks:40	Duration of SEE:Hours:03

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The course will enable the students to:	At the end of the course students will be able to:
Understand the principles and mechanics of technical writing for students of engineering	Write effective reports
Identify different kinds of business correspondences and the dos and don'ts for each of them	Articulate business correspondences based on need
Make effective presentations as part of today's workplace demands	Make persuasive presentations
Recognize the need for Video and Written CVs with focus on specific elements	Design their videos CVs
Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs	Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose

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

- Informal Report Formats
- Project and Research Reports
- Formal Report Components, Feasibility Reports, Evaluation reports
- Analytical and Informational reports

With effect from the Academic Year 2021-22

- Executive summaries.

### **UNIT 2: BUSINESS CORRESPONDENCE**

- Electronic communication
- Effective emails
- Instant and text messaging guidelines

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

- Paper presentations & Poster presentations
- PowerPoint presentations
- Storyboard writing

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

- Technical Resume
- Cover letter, resume format
- Video CVs

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

- Types of proposals
- Request for proposals
- Stating your objective

<b>METHODOLOGY</b> <ul style="list-style-type: none"><li>- Case Studies</li><li>- Demonstration</li><li>- Presentations</li><li>- Expert lectures</li><li>- Writing and Audio-visual lessons</li></ul>	<b>ASSESSMENTS</b> <ul style="list-style-type: none"><li>- Online assignments</li><li>- Individual and Group</li></ul>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------

### **LEARNING RESOURCES**

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

With effect from the Academic Year 2021-22

**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 Tests:	90	Minutes	

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES**

Skill Development-III (Soft Skills)

SYLLABUS FOR B.E. V-SEMESTER

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

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

**UNIT 1 QUANTITATIVE APTITUDE - NUMERICAL ABILITY**

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

**UNIT 2 QUANTITATIVE APTITUDE- ARITHMETIC ABILITY FOUNDATION**

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

With effect from the Academic Year 2021-22

### **UNIT 3 REASONING ABILITY – GENERAL REASONING PART 1**

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

### **UNIT 4 REASONING ABILITY- GENERAL REASONING PART 2**

- Analogies
- Classification
- Alphabet test
- Blood Relations

### **UNIT 5 REASONING ABILITY- ARITHMETIC REASONING**

- Mathematical operations
- Ranking
- Ages
- Clocks & Calendars

#### **Learning Resources:**

1. [scoremore.talentsprint.com](https://www.scoremore.talentsprint.com)

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="20"/>
2	No. of Assignments	:	<input type="text" value="2"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="2"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

SKILL DEVELOPMENT-III: TECHNICAL SKILLS

Industry Standard Coding Practices - 2022

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week):1:0:0	SEE Marks : 40	Course Code: <b>U19PE510CS</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
<ol style="list-style-type: none"><li>1. Understand importance of problem solving approaches for programming complex data structure problems.</li><li>2. Understand importance of optimized solutions for problems solving and its relevance to industry.</li><li>3. Implement mathematical and logical understanding approaches to implement test driven development practices.</li><li>4. Start participating in global coding competitions relevant to the syllabus.</li></ol>	<ol style="list-style-type: none"><li>1. Able to understand test and development aspects of programming by solving problems at Industry standards.</li><li>2. Able to identify and implement appropriate algorithm for a given problem.</li><li>3. Able to learn and apply string algorithms to optimize solutions to problems relevant to industry</li><li>4. Able to solve scenario based problems using trees</li><li>5. Able to code efficiently implementing the sorting algorithms for quick search operations</li></ol>

**Review of Abstract Data structures** (theory + practice)

Coding implementation of stacks using array and linked list, Problem Solving using stack data structure, coding implementation of queues using array and linked list, Problem Solving using queue data structure

**Sorting Algorithms**(theory + practice)

Coding solutions for Search operations implementing linear/binary search. Problem solving using Sorting algorithms: Bubble Sort, Selection Sort,

With effect from the Academic Year 2021-22  
Insertion Sort, Evaluation of sorting Algorithms. Problem solving using Quick Sort, Merge Sort,  $O(n \log n)$  algorithms. Scenario based problem solving using sorting techniques

**Non-linear Data structures: Binary Trees**(theory + practice)

Problem solving approaches using Non-linear data structures, Coding problems on the height of a binary tree, Size of a binary tree, Tree order traversals, Formation of binary trees, problem solving using Binary trees

**Non-linear Data structures: Binary Search Trees**(theory + practice)

Problems solving on key search on binary search trees, Time comparison and analysis on Binary Search Trees, Coding on a binary search tree problems, Search/probe sequence validation, Significance of height balancing the tree, Balancing by rotations

**Tree Algorithms**(theory + practice)

Problem solving using Tree algorithms, right view of a tree, top view of a tree, mirror tree, tree comparison

**Algorithms – Greedy Methods -1**(theory + practice)

Greedy Strategy, Problem solving on greedy problems: coin change, Activity selection problem, Examples

**Technical Aptitude**(theory + practice)

Company Specific Technical Aptitude questions on:

1. Debugging Skills on Language
2. Pseudo code Questions
3. Data Structures

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

1	No. of Internal Tests	:	<table border="1"><tr><td>1</td></tr></table>	1	Max. Marks for each Internal Test	:	<table border="1"><tr><td>30</td></tr></table>	30
1								
30								

Duration of Internal Tests : 1 Hour 30 Minutes



With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Humanities & Social Sciences**

HUMAN VALUES AND PROFESSIONAL ETHICS-II

SYLLABUS FOR B.E. - V SEMESTER  
(COMMON FOR ALL BRANCHES)

L:T: P(Hrs/Week): 1:0:0	SEE Marks : 40	Course Code: <b>U19HS020EH</b>
Credits:1	CIE Marks : 30	Duration of SEE : 2 Hours

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

**UNIT-1 NORMATIVE ETHICS & SOCIETAL ETHICS**

This unit deals with normative ethics, the branch of moral philosophy, or ethics, concerned with criteria of what is morally right and wrong. It includes the formulation of moral rules that have direct implications for

With effect from the Academic Year 2021-22 what human actions, institutions, and ways of life should be like. This unit also covers societal ethics which is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.

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

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

### **UNIT- 3 - PRIVACY**

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

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

### **UNIT-4- MEDIA AND MEDICAL ETHICS**

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

### **MODE OF DELIVERY**

<ul style="list-style-type: none"><li>● <b>Questionnaires</b></li><li>● <b>Quizzes</b></li><li>● <b>Case-studies</b></li><li>● <b>Observations and practice</b></li><li>● <b>Home and classroom assignments</b></li></ul>	<ul style="list-style-type: none"><li>● <b>Discussions</b></li><li>● <b>Skits</b></li><li>● <b>Short Movies/documentaries</b></li><li>● <b>Team tasks and individual tasks</b></li><li>● <b>Research based tasks</b></li><li>● <b>Project</b></li></ul>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### **Relevant Websites, CD's and Documentaries**

- <https://plato.stanford.edu/>

With effect from the Academic Year 2021-22

**Learning Resources:**

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

The break-up of marks for CIE:

- |                            |                                       |
|----------------------------|---------------------------------------|
| 1. No. of Internal Test: 1 | Max. Marks for each Internal Test: 20 |
| 2. No. of Assignment: 2    | Max. Marks for each Assignment: 5     |
| 3. No. of Quiz: 2          | Max. Marks for each Quiz Test: 5      |

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

DATABASE MANAGEMENT SYSTEMS LAB

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: <b>U19PC511CS</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Apply SQL commands on a database. 2 Develop an application using forms, reports and PL/SQL.	1 Design and implement a database schema. 2 Apply DDL, DML, DCL and TCL commands on a database. 3 Create database by applying normal forms. 4 Implement PL/SQL programs for creating stored procedures, cursors & triggers. 5 Design and implement an application using forms and reports.

**Programming Exercise:**

**I. SQL**

1. Creation of database (Exercising the commands like DDL, DML, DCL and TCL)
2. Creating tables using combination of constraints.
3. Usage of Stored Functions.
4. Exercising all types of Joins.
5. Creating tables in I Normal, II Normal, III Normal Form.
6. Exercising complex Queries.
7. Usage of file locking, Table locking facilities in Applications.

## II. PL/SQL

1. Demonstration of Blocks, Cursors, functions and Packages.
2. Demonstrate Exception Handling.
3. Usage of Triggers to perform operation on Single and Multiple Tables.
4. PL/SQL Procedures for data validation.

## III. FORMS

1. Creation of forms for colleges Information System, Library Information System and Recruitment Cell.

## IV. REPORTS

1. Creation of Reports based on different queries.
2. Creation of full-fledged Database Application.

### Learning Resources:

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle,4th Edition, PBP Publications.
2. NileshShah, Database Systems Using Oracle, 2nd Edition(2007), PHI.
3. Rick F Van der Lans, Introduction to SQL, 4thEdition(2007), Pearson Education.
4. Benjamin Rosenzweig Elena Silvestrova, Oracle PL/SQL by Example, 3rdEdition(2004), Person Education.
5. Albert Lulushi, Oracle Forms Developer's Handbook, 1st Edition(2006), Pearson Education.
6. <https://www.lynda.com/Access-tutorials/Welcome/195854/373426-4.html>

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2021-22

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

**Department of Computer Science & Engineering**  
COMPUTER NETWORKS LAB

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : <b>U19PC521CS</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Implement major functions of TCP/IP protocol stack with suitable algorithms.	1 Implement functionalities of TCP/IP protocol stack
2 Develop client server application using socket API.	2 Develop iterative and concurrent echo server using socket API.
	3 Implement cryptographic algorithms.
	4 Design wired and wireless topologies using NS3.
	5 Simulate networking protocols using NS3.

**Programming Exercise:**

1. Understanding and using the following commands: ifconfig, netstat, ping, arp, telnet, tftp, ftp, nslookup and dig.
2. Implementation of Data Link Framing Methods- Bit, Byte and Character Stuffing.
3. Implementation of 16-bit CRC Error Detection Technique.
4. Implementation of Sliding Window Protocol.
5. Implementation of Dijkstra's Algorithm for computing the shortest path in a graph.
6. Implementation of Distance vector routing algorithm.
7. Implementation of Iterative and Concurrent Echo Server using Connection Oriented Protocol (TCP) and Connection Less Protocol (UDP).
8. Implementation of Leaky Bucket congestion control algorithm.

With effect from the Academic Year 2021-22

9. Implementation of Establishing a Shared key: The Diffie-Hellman key exchange.
10. Implementation of RSA algorithm for Encryption and Decryption in C.
11. Simulate a three nodes point – to – point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets dropped.
12. Simulation of routing protocols.

**Learning Resources:**

1. W. Richard Stevens, Unix Network Programming – The Sockets Networking, Volume I – 3rd Edition (2003), Pearson Education, India
2. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, 5th Edition (2012), Pearson Education, India
3. Cryptography & Network Security: Principles and Practices, 6th Edition (2013), Pearson India
4. James F. Kurose, Computer Networking: A Top-Down Approach, 5th Edition (2012), Pearson Education.
5. Data Communications & Networking, Behrouz. A. Forouzan, 5th Edition (2012), Tata McGraw Hill.
6. <https://www.isi.edu/nsnam/ns/> With effect from the A.Y 2018-19

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2021-22  
**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**  
WEB PROGRAMMING & SERVICES LAB

SYLLABUS FOR B.E. V-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : <b>U19PC531CS</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Develop web applications. 2 Publish web services.	1 Design a website using HTML, CSS, XML & JavaScript 2 Develop dynamic web applications using Servlets. 3 Develop dynamic web applications using JSP's, PHP with DB connectivity. 4 Create and publish Web Services. 5 Develop and deploy web application on to the cloud

**Programming Exercise:**

1. Creation of Static Web Site using HTML.
2. Creation of Static Web Site using HTML Forms.
3. Apply CSS to the Static Web Site.
4. Validation of Static Web Site using Java Script.
5. Providing data store support using JDBC.
6. Creation of dynamic content in a Web Site using Servlets.
7. Demonstration of Servlet Collaboration in Web Applications.
8. Demonstrate Session handling in Web Applications using Cookies.
9. Demonstrate Session handling in Web Applications using HttpSession.
10. Creation of dynamic content in a Web Application using JSP.



With effect from the Academic Year 2021-22

11. Creation of dynamic content in a Web Application using PHP.
12. Publishing and Consuming a Web Service using SOAP.
13. Publishing and Consuming a Web Service using REST.
14. Develop a web application and deploy on to the cloud.
15. Develop a web application for given problem statement.

### **Learning Resources:**

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
2. David R. Heffelfinger, Java EE 8 Application Development, Packt Publishers, 2017
3. Java Server Programming Java EE7 (J2EE 1.7): Black Book, (2014), Dreamtech Press.
4. Uttam K. Roy, Web Technologies, Oxford Publishers.
5. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.
6. <https://www.w3schools.com/html/>
7. <https://javaee.github.io/tutorial/toc.html>
8. <https://spring.io/docs>
9. <https://azure.microsoft.com/>

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)  
SCHEME OF INSTRUCTION AND EXAMINATION(R-19)**

**FOR B.E 2019-20 ADMITTED BATCH VI SEMESTER (A.Y 2021-22)**

B.E VI Semester								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			Credits
		Hours per Week			Duration in Hrs	Maximum Marks		
		L	T	P/D		SEE	CIE	
<b>THEORY</b>								
U19PC610CS	Internet of Things	3	-	-	3	60	40	3
U19PC620CS	Software Engineering	3	-	-	3	60	40	3
U19PC630CS	Artificial Intelligence	3	-	-	3	60	40	3
U19PE6XXCS	Professional Elective-I	3	-	-	3	60	40	3
U19OE6XXXX	Open Elective-IV	3	-	-	3	60	40	3
U19HS610EH	Skill Development-IV : Soft Skills	1	-	-	2	40	30	1
U19PE610CS	Skill Development-IV : Technical Skills	1	-	-	2	40	30	1
<b>PRACTICALS</b>								
U19PC611CS	Internet of Things Lab	-	-	2	3	50	30	1
U19PC621CS	Software Engineering Lab	-	-	2	3	50	30	1
U19PC631CS	Artificial Intelligence and Machine Learning Lab	-	-	2	3	50	30	1
U19PW619CS	Theme Based Project	-	-	2	-	-	30	1
<b>TOTAL</b>		<b>17</b>	<b>0</b>	<b>8</b>		<b>530</b>	<b>380</b>	<b>21</b>
<b>GRAND TOTAL</b>		<b>25</b>				<b>910</b>		
<b>Student should acquire one online certification course during III Semester to VII Semester</b>								
<b>Left over hours are allocated for Co-Curricular Activities / Sports / Library / Mentor Interaction / CC / RC / TC</b>								

With effect from the Academic Year 2021-22

<b>B. E. List of Professional Electives - Stream wise</b>									
		Artificial Intelligence & Data Engineering		Systems & Networks		Software Engineering		Applications	
		Course Code	Title	Course Code	Title	Course Code	Title	Course Code	Title
<b>Sem -VI</b>	PE -I	U18PE610CS	Neural Networks	U18PE 620CS	Advanced Computer Architecture	U18PE 630CS	Software Project Management	U18PE640CS	<b>Image Processing</b>

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING(Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

INTERNET OF THINGS

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U19PC610CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Explore IoT technologies, architectures and standards. 2 Develop IoT solutions for a given problem	1 Describe IoT architecture. 2 Develop applications using Raspberry PI. 3 Apply wireless protocols to develop an IoT solution 4 Integrate IoT application with Cloud. 5 Recognize IoT opportunities in the industry.

**UNIT-I:**

**Internet of Things (IoT)** : Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment, Sensors and Actuators, Envisioning the Internet of Things Era, Emergence of the IoT Platform as a Service (PaaS) ,Emerging IoT Flavors.

**M2M and IoT Technology Fundamentals** : Devices and Gateways, Local and Wide Area Networking, Data Management, Business Processes in IoT,Everything as a Service (XaaS), M2M and IoT.

**UNIT-II:**

**Raspberry Pi**: Board Components, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry Pi with Python. Arduino Uno Platform, Interfacing with Uno.

With effect from the Academic Year 2021-22

**IoT Ecosystem Using Wireless Technologies** : Architecture for IoT Using Mobile Devices, Mobile Technologies, 5G, Software-Defined Networking, Ultra Wide Band Technology, Near Field Communication Technology, Low Power Wide Area Networking Technologies – Sigfox, Weightless, LoRa.

**UNIT-III: Infrastructure and Service Discovery Protocols for the IoT Ecosystem** : Layered Architecture for IoT, Protocol Architecture of IoT, IEEE 802.15.4, IPv6 over Low-Power Wireless Personal Area Networks (6LoWPAN), Bluetooth Low Energy, Long Term Evolution-Advanced, RFID, Z-Wave, Zigbee, Device or Service Discovery for IoT- Bluetooth Beacons, Wi-Fi aware, Open Hybrid.

**UNIT-IV:**

**Integration Technologies and Tools for IoT Environments** : Sensor and Actuator Networks, Sensor-to-Cloud Integration, IoT Device Integration Concepts, Standards, and Implementations – Service Oriented Device Architecture, Device Profile for Web Services, Open Service Gateway Initiative (OSGi), REST Paradigm, Message Queue Telemetry Transport (MQTT), Advanced Message Queuing Protocol (AMQP), Constrained Application Protocol (CoAP).

**Next-Generation Clouds for IoT Applications and Analytics** : Hybrid and Federated Clouds, Edge or Fog Clouds, Software-Defined Clouds, Cognitive Clouds, Amazon Web services for IoT.

**UNIT-V:**

**Industry 4.0:** Industrial Internet of Things (IIoT), Reference Architecture, Characteristics of Industry 4.0.

**Case Studies:** Introduction, Smart Cities, Smart Homes, Smart Lighting, Smart Transportation, Industrial Automation, Smart Healthcare, Agriculture.

**Learning Resources:**

1. Pethuru Raj and Anupama C. Raman , "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press.
2. ArshdeepBahga, Vijay Madiseti, "Internet of Things: A Hands-on Approach", Universities Press, 2014.
3. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1<sup>st</sup> Edition, Academic Press, 2014.
4. Srinivasa K.G., Siddesh G.M., Hanumantha Raju R., "Internet of

With effect from the Academic Year 2021-22

- Things", 1<sup>st</sup> Edition, Cengage, 2018.
5. "IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things", Pearson, 2017.
  6. Jean-Philippe Vasseur, Adam Dunkles, "Interconnecting Smart Objects with IP", Morgan Kaufmann, 2010.
  7. Peter Waher, "Learning Internet of Things", PACKT Publishing, 2015.
  8. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", Springer
  9. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", Wiley Publications.
  10. <https://www.postscapes.com/internet-of-things-protocols/>
  11. <https://nptel.ac.in/courses/106105166/>

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

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

**Department of Computer Science & Engineering**

SOFTWARE ENGINEERING

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: <b>19PC620CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Understand the concepts involved in the lifecycle of software development 2 learn the best practices to be employed for the design, development, testing and maintenance of a software project	1 Explain the software development lifecycle models for a software system development. 2 Build the prototype for software business case and estimate the cost for software project development. 3 Analyze the behavioral and architectural models using UML for the designed object oriented system. 4 Design the behavioral and architectural models using UML. 5 Identify verification and validation methods in a software engineering project and implement testing methods at various phases of SDLC

**UNIT-I:**

**Introduction to Software Engineering**

**The Nature of Software:** Defining Software, Software Application Domain, Legacy Software, The changing Nature of the software : WebApps, Mobile Applications, Cloud Computing, Product line software

With effect from the Academic Year 2021-22

**Software Engineering** : The Process Frame work, Umbrella Activities, Process Adaption, Software development myths

**The Software Process:** Defining framework activities, Identifying a task set, Process patterns, Process Assessment and improvement

**Process Models:** Prescriptive models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process, personal software process, Team Software Process.

## **UNIT-II:**

**Agile Development:** What is Agility, Agility and the cost of change, What is an Agile Process, Agile Process Extreme programming, SCRUM, Dynamic Systems Development Method, Agile Unified Process.

**Requirements Engineering:** Establishing the ground work, Eliciting requirements, Developing use cases, Building the Analysis model, Negotiating Requirements, Requirement Monitoring, Validating Requirements.

**Design concepts:** The Design Process, Design Concepts, The Design Model.

## **UNIT-III:**

**Object oriented Modeling & design using UML:** Introduction to UML.

**Structural Modeling:** Classes and Advanced Classes, Relationships and Advanced Relationships, Common Mechanisms, Class Diagrams, Interfaces, Types and Roles, Packages.

**Behavioural Modelling:** Interactions, Interaction diagrams, Use Cases, Use Case Diagrams, Activity diagrams, Events and Signals, Processes and Threads, State Machines, State chart Diagrams.

**Architectural Modelling:** Artifacts, Deployment, Collaborations, Artifact diagrams, Deployment diagrams.

## **UNIT-IV:**

**Testing Strategies:** A Strategic approach to software testing ,Strategic issues, Test strategies for Object Oriented Software, Test strategies for WebApps, Test strategies for MobileApps, Validation testing, System testing, the art of debugging.



With effect from the Academic Year 2021-22

**Testing Conventional Applications:** Software testing fundamentals, Black box and White box testing, Basis path testing, Control Structure, O-O testing methods, Class level testing methods, Inter class test case design, Testing for specialized environments, architectures and Applications testing patterns.

**UNIT-V:**

**Security Engineering:** Analyzing Security Requirements, Security and Privacy in an Online World, Security Engineering Analysis, Security Assurance, Security Risk Analysis, Verification of Trustworthy Systems

**Software Configuration Management :** Software Configuration Management, The SCM Repository, The SCM process, Configuration Management for Web and Mobile Apps

**Product Metrics:** Software quality, A frame work for Product metrics , Metric for the analysis model, Metrics for the Design Model , Metrics for Source code, Metrics for testing, Metrics for maintenance

**Learning Resources:**

1. Roger S. Pressman, Software Engineering: A Practitioner’s Approach, 8th Edition (2005), Tata McGrawHill.
2. Grady Booch, James Rumbagu, Ivor Jacobson, The Unified Modeling Language-User guide, (Covering UML 2.0) ,2nd Edition (2007), Pearson Education, India.
3. Shari Lawrence Pfleeger, Software engineering Theory and Practices, 4th Edition (2011), Pearson Education, India.
4. Pankaj Jalote, An Integrated Approach to Software Engineering, 3rd Edition (2005), Narosa Publishing House.
5. <http://nptel.ac.in/courses/106101061/>
6. <http://freevidelectures.com/Course/2318/Software-Engineering>
7. <http://www.ece.rutgers.edu/~marsic/books/SE/instructor/slides/>
8. <https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-355j-software-engineering-concepts-fall-2005/lecture-notes/>

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>
Duration of Internal Tests		:	1 Hour 30 Minutes			

With effect from the Academic Year 2021-22

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

**Department of Computer Science & Engineering**

ARTIFICIAL INTELLIGENCE

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: <b>U19PC630CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVE</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
Understand issues and techniques involved in the creation of intelligent systems.	<ol style="list-style-type: none"><li>1 Solve searching problems using A*.</li><li>2 Develop an algorithm for playing games. Represent the knowledge using propositional logic.</li><li>3 Create logical agents to do inference using first order logic.</li><li>4 Perform planning and solve problem with constraints.</li><li>5 Explain Bayesian Networks to do probabilistic reasoning</li></ol>

**UNIT I:**

**Introduction:** Introduction to AI

**Intelligent Agents:** Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

**Solving Problems By Search:** Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Depth-first search, Depth limited search, Iterative deepening depth first search, Informed (Heuristic) Search Strategies: Greedy best-first search, A\* Search: Minimizing the total estimated solution cost, Heuristic Functions, Local Search Algorithms and Optimization Problems.

## **UNIT II:**

**Adversarial Search:** Games, Optimal decisions in games, Alpha-Beta Pruning, Imperfect real time decisions.

**Logical Agents** – Knowledge-Based agents, The Wumpus World, Logic, Propositional Logic: A Very Simple Logic, Propositional theorem proving.

## **UNIT III:**

**First Order Logic:** Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

**Inference In First Order Logic:** Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

## **UNIT IV:**

**Constraint Satisfaction Problems:** Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

**Classical Planning:** Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

## **UNIT V:**

**Uncertainty:** Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and its Use.

**Probabilistic Reasoning** – Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distribution, Exact Inference in Bayesian Networks, Approximate Inference in Bayesian Networks.

## **Learning Resources:**

1. Stuart Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Third Edition (2019), Pearson
2. Nils J. Nilsson, Artificial Intelligence: A New Synthesis, (1998), Elsevier
3. Daniela Witten, Gareth James, Robert Tibshirani, and Trevor Hastie, An Introduction to Statistical Learning with Applications in R (Springer Texts in Statistics)

With effect from the Academic Year 2021-22

4. George F Luger , Artificial Intelligence, Structures and strategies for Complex Problem Solving, Sixth Edition,(2009), Pearson
5. Elaine Rich, Kevin Knight, Shivashankar B Nair, Artificial Intelligence, Third Edition(2009), Tata McGraw Hill
6. <http://www.nptel.ac.in/courses/106105077>
7. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-spring-2005>
8. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos>

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

IMAGE PROCESSING  
(Professional Elective-I)

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: <b>U19PE640CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
<ol style="list-style-type: none"><li>1 Understand the fundamentals of image processing algorithms.</li><li>2 Apply image processing algorithms to solve real problems.</li></ol>	<ol style="list-style-type: none"><li>1 Distinguish sampling and quantization processes in obtaining digital images from continuously sensed data and describe the steps in image processing.</li><li>2 Apply techniques in spatial domain to enhance and segment digital images.</li><li>3 Apply Fourier transformation and other transformation techniques to enhance digital image.</li><li>4 Describe methods to encode raw image data into standard compressed image format.</li><li>5 Demonstrate most commonly applied image restoration and color models and their use in basic image processing.</li></ol>

**UNIT-1:**

Introduction to Digital Image Processing, Origins and Applications of Digital Image Processing. Fundamental Steps in Digital Image Processing, Components of Digital Image Processing System. Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization.

**UNIT-II:**

**Intensity Transformations and Spatial Filtering:** Histogram Processing, Fundamental of Spatial Filtering, Smoothing and Sharpening Spatial Filters. **Image Segmentation:** Point, Line and Edge Detection, Thresholding, Region-Based Segmentation.

**UNIT-III: Filtering in the Frequency Domain:**

Preliminary Concepts, Sampling and the Fourier Transform of Sampled Functions, The Discrete Fourier Transform (DFT) of One Variable, Extension to Function of Two Variables, Image Smoothing and Sharpening using Frequency Domain Filters.

**UNIT-IV:**

**Image Compression:** Fidelity Criteria, Image Compression Models, Image Formats, Containers and Compression Standards, Compression Methods: Huffman Coding, Golomb Coding, Arithmetic Coding, LZW Coding, Run-Length Coding.

**UNIT-V:**

**Restoration:** Noise Models, Inverse filtering, Least squares filtering.

**Color Image Processing:** Color fundamentals, Color models, Pseudocolor Image Processing , Basics of full color image processing.

**Learning Resources:**

1. Gonzalez R.C., Woods R.E, Digital Image Processing, Third Edition (2007), Prentice Hall, USA.
2. Jayaraman S, Esakkirajan S, Veerakumar T, Digital image processing, 13<sup>th</sup> reprint (2014), McGraw Hill Education, New Delhi.
3. William K. Pratt, Digital Image Processing, 3<sup>rd</sup> Edition (2001) , John Wiley & Sons Inc, UK.
4. McAndrew, Introduction to Digital Image Processing, (2004), Cengage Learning.
5. Sonka, Hlavac, Boyle, Digital Image Processing and Computer Vision, (2008), Cengage Learning.
6. Rosenfeld A. Kak AC, Digital Picture Processing Vol.I & II Acad, Press, 2nd Edition.
7. <https://ocw.mit.edu/resources/res-6-008-digital-signal-processing- spring-2011/introduction/>.
8. <http://freevideolectures.com/Course/2316/Digital-Image-Processing-IIT-Kharagpur>

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>
	Duration of Internal Tests	:	1 Hour 30 Minutes			

With effect from the Academic Year 2021-22

**OPEN ELECTIVES OFFERED IN B.E. VI SEMESTER (2021-22)**

Dept	Title Open Elective -IV	Code	Credits
Civil	Project Management	U19OE610CE	3
CSE	Introduction to Databases	U19OE610CS	3
	Introduction to Operating Systems	U19OE620CS	3
ECE	Internet of Things and Applications	U19OE610EC	3
	Introduction to Mobile Communications	U19OE620EC	3
EEE	Electrical Installation and Safety	U18OE610EE	3
Mech	Additive manufacturing and its applications	U19OE610ME	3
	Alternative Fuels and Energy Systems	U19OE620ME	3
	Industrial Administration and Financial Management	U19OE630ME	3
IT	Introduction to Web Application Development	U19OE610IT	3
	Introduction to Machine Learning	U19OE620IT	3
H&SS	English for Competitive Examinations	U19OE610EH	3

With effect from the Academic Year 2021-22

**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	Course Code: <b>U190E610CE</b>
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

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

**UNIT-I**

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

**UNIT-II**

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



### **UNIT-III**

**Time Cost Analysis:** Cost time analysis in network planning, updating. Earned value Management.

### **UNIT-IV**

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

**Tender:** Tender form, Tender Documents, Tender Notice, Work Order.

### **UNIT-V**

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

#### **Learning Resources:**

1. Srinath L.S., PERT and CPM: Principles and Application, East-West Press, 2001.
2. Kumar Neeraj Jha., Construction Project Management: Theory and Practice, Pearson Education, India, 2015.
3. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2019.
4. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 2016.
5. Choudhary S., Project Management: Tata McGraw Hill Publishing Company Limited, New Delhi-.
6. <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 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

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING(Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

INTRODUCTION TO DATABASES (OPEN ELECTIVE-IV)

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U19OE610CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

**UNIT-I**

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

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

**UNIT-II**

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

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

### **UNIT-III**

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

### **UNIT-IV**

**Indexing and Hashing: Basic** Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Files, Multiple – Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.

### **UNIT-V**

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

#### **Learning Resources:**

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

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

- |   |                       |   |                                |                                    |   |                                 |
|---|-----------------------|---|--------------------------------|------------------------------------|---|---------------------------------|
| 1 | No. of Internal Tests | : | <input type="text" value="2"/> | Max. Marks for each Internal Tests | : | <input type="text" value="30"/> |
| 2 | No. of Assignments    | : | <input type="text" value="3"/> | Max. Marks for each Assignment     | : | <input type="text" value="5"/>  |
| 3 | No. of Quizzes        | : | <input type="text" value="3"/> | Max. Marks for each Quiz Test      | : | <input type="text" value="5"/>  |

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

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

**Department of Computer Science & Engineering**

**INTRODUCTION TO OPERATING SYSTEMS (OPEN ELECTIVE-IV)**

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U19OE620CS</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

**UNIT-I:**

**Introduction to operating systems:** Definition, User view and System view of the Operating system, Operating system structure, Operating system services.

**Process:** Process concept, Process Control block, Context switching.

**CPU Scheduling:** Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Round Robin

**UNIT-II:**

**Memory Management:** Swapping, Contiguous memory allocation: Fixed Partitioning, Variable Partitioning. Non-Contiguous memory allocation: Paging.

**Virtual memory:** Demand paging, Page replacement Algorithms: FIFO, Optimal, LRU.

**UNIT –III:**

**File System Interface:** File Concept, Access Methods: Sequential, Indexed, and Direct

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

**UNIT –IV:**

**Deadlocks:** System model, deadlock characterization: Mutual Exclusion, Hold and Wait,

Non pre-emption, Circular wait. Deadlock Prevention, Deadlock Avoidance: Banker’s algorithm.

**UNIT-V:**

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

**I/O System:** I/O hardware, Application I/O Interface.

**Learning Resources:**

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

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

1 No. of Internal Tests :  Max. Marks for each Internal Tests :

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

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

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING**

**INTERNET OF THINGS AND APPLICATIONS (OPEN ELECTIVE-IV)**

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

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: <b>U190E610EC</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

**UNIT - I : OVERVIEW**

Introduction to IoT – Improving Quality of life.

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

**UNIT - II : Real-World Design Constraints**

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

**UNIT - 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", 1 st Edition, Academic Press, 2014.
2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
5. <https://nptel.ac.in/courses/106105166/5>
6. <https://nptel.ac.in/courses/108108098/4>

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

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
IBRAHIMBAGH, HYDERABAD – 500 031  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION**  
**ENGINEERING**  
**INTRODUCTION TO MOBILE COMMUNICATIONS**  
(OPEN ELECTIVE-IV)  
SYLLABUS FOR B.E. VI - SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: <b>U190E620EC</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<ol style="list-style-type: none"><li>1. To understand the technology trends changing from generation to generation.</li><li>2. To have an insight into the various propagation models and the effects of fading.</li><li>3. To understand the multiple access techniques and Mobile communication system specifications.</li></ol>	<p>On completion of the course, students will be able to</p> <ol style="list-style-type: none"><li>1. Analyze various methodologies to improve the cellular capacity.</li><li>2. Identify various Propagation effects.</li><li>3. Identify the effects of fading and multi path propagation.</li><li>4. Categorize various multiple access techniques for Mobile Communications.</li><li>5. Analyze the specifications of GSM based Mobile Communication Systems.</li></ol>

**UNIT - I:**

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

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

**UNIT - II:**

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



**UNIT - III:**

**Mobile Radio Propagation - Small Scale Fading and Multipath:**

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

**UNIT -IV:**

**Multiple Access Techniques for Wireless Communications:**

Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), Space Division Multiple Access (SDMA).

**UNIT -V:**

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

**Learning Resources:**

1. Theodore S. Rappaport, Wireless Communications Principles and Practices, 2<sup>nd</sup> edition, Pearson Education.
2. David Tse, Pramodh Viswanath, Fundamentals of Wireless Communication, 2005, Cambridge University Press.
3. Name of the course: Introduction to Wireless and Cellular Communications  
Course url: [https://swayam.gov.in/nd1\\_noc19\\_ee48/preview](https://swayam.gov.in/nd1_noc19_ee48/preview)

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

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

Electrical Installation and Safety

Open Elective-IV

SYLLABUS FOR B.E. VI SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: <b>U19OE610EE</b>
Credits:3	CIE Marks: 40	Duration of SEE: 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The course will enable the students to:	On completion of the course, students will be able to
Have a fair knowledge about the fundamentals of wiring systems, electrical safety procedures, Estimation of lighting & Power loads.	<ol style="list-style-type: none"><li>1. Identify and choose the proper type wiring for domestic &amp; industrial applications.</li><li>2. Identify and choose the proper type wiring Accessories for domestic &amp; industrial applications.</li><li>3. Apply and implement the Electrical safety procedures for repairs &amp; hazards.</li><li>4. Design and Estimate the domestic lighting installation.</li><li>5. Design and Draw the wiring layout for a big office building, electrical laboratory, big industry and big hotel with lift arrangement</li></ol>

**Unit – I**

**Wiring Systems:** Introduction, size of wires, standard wires, types of wires, CTC, PVC, Lead sheathed VIR, weather proof wires, flexible wires different types of cable wires – Types and Installation of House Wiring Systems or Methods of installing wiring.

## **Unit – II**

**Wiring Accessories:** - Clips, screws -round blocks switch boards, sockets socket pins - CTS wiring - Installation of surface conduit wiring.Rigid conduits, flexible conduits – Conduit accessories - elbows bushings - reducers, conduit box saddles, PVC conduit wiring - Concealed wiring.

## **Unit – III**

**Safety Devices:** Distribution fuse boards - Main switches – Different types of fuses and fuse carriers, MCB, ELCB & MCCB.

Safety procedures – Electric shock and first aid, causes for fire hazards in Electrical installations

## **Unit – IV**

**Estimation of Lighting:** Estimation of domestic lighting installation service main - types of wire - specification - quantity of materials required for service main – estimation and selection of interior wiring system suitable to a given building - number of circuits - quantity of accessories required - estimates of materials for execution of the domestic wiring installation.

## **Unit – V**

**Estimation of power loads:** Power wiring installation - Drawing wiring layout for a big office building, electrical laboratory, big industry, big hotel with lift arrangement and a residential building with 2 bed room house.- estimation upto 20 kVA calculation of load current based on ratings of various equipment's to be installed - size of wire.

## **Learning Resources:**

- 1.J.B.Gupta –A course in Electrical installation Estimating & costing-9<sup>th</sup> edition 2014, S.K.Kataria& Sons.
- 2.S.L.Uppal-Electrical Wiring ,Estimating& costing Electrical wiring
- 3.Balbir Singh-Electrical Drawing
- 4.Arora -Electrical wiring
- 5.BVS Rao -Maintenance and Operation of Electrical Equipment –Vol-I-TMH
- 6.S.Rao -Testing, Commissioning Operation & Maintenance of Electrical equipment -TMH
- 7.CRDargar -Electrical Installation design and drawing -New Asian publishers.

With effect from the Academic Year 2021-22

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

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

With effect from the Academic Year 2021-22

**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

Instruction: 3 Hours / week	SEE Marks:60	Course Code: <b>U19OE610ME</b>
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

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

**Unit-I**

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

**Unit-II**

**Liquid based systems:** Stereo lithography apparatus (SLA): Models and specifications, process, working principle, photopolymers, photo

polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages, case studies.

Solid ground curing (SGC): Models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

### **UNIT III**

**Solid based systems:** Laminated object manufacturing (LOM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.

Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.

### **Unit-IV**

**Powder Based Systems:** Selective laser sintering (SLS): Models and specifications, process, **materials**, working principle, applications, advantages and disadvantages, case studies.

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

### **UNIT-V**

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

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

### **Learning Resources:**

1. Chua C.K., Leong K.F. and LIM C.S Rapid prototyping: Principles and Applications, World Scientific publications, 3rdEd., 2010
2. D.T. Pham and S.S. Dimov, "Rapid Manufacturing", Springer, 2001
3. Terry Wohlers, " Wohlers 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.

With effect from the Academic Year 2021-22

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2021-22

**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

Instruction: 3 Hours / week	SEE Marks:60	Course Code : <b>U19OE620ME</b>
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

<b>Course objectives</b>	<b>Course Out comes</b>
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.



With effect from the Academic Year 2021-22

**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.

### **Learning Resources:**

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

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

Duration of Internal Test: 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

**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 Hours / week	SEE Marks:60	Course Code : <b>U19OE630ME</b>
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

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

**UNIT – I**

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

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

**UNIT – II**

Work study: Definitions, Objectives of method study and time study. Steps in conducting method study. Symbols and charts used in method study. Principles of motion economy. Calculation of standard time– by– time

With effect from the Academic Year 2021-22

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", 5<sup>th</sup> Ed. , PHI , 2005
4. S N Chary, "Production and Operations Management", 3<sup>rd</sup> Ed. , Tata McGraw Hill, , 2006
5. Pannerselvam, "production and Operations Management", Pearson Education, 2007

With effect from the Academic Year 2021-22

**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		

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**INTRODUCTION TO WEB APPLICATION DEVELOPMENT**

(OPEN ELECTIVE-IV) (Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E VI- SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U19OE610IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
Acquire basic skills for designing static and dynamic Web Applications using HTML, CSS , Java script and PHP.	<ol style="list-style-type: none"><li>1. Design a static web pages using HTML, CSS.</li><li>2. Use JavaScript for creating dynamic web pages and client side validation.</li><li>3. Use built-in functions of PHP to perform server side validations and sending emails.</li><li>4. Use built-in functions of PHP to connect , query and fetch results from a database.</li><li>5. Build a PHP application using an MVC Framework.</li></ol>

**UNIT-I: Introduction**

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

**UNIT-II: Basics of JavaScript**

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

With effect from the Academic Year 2021-22

**UNIT-III: Basics of PHP**

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

**UNIT-IV: Advanced PHP**

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

**UNIT-V: Introduction to MVC**

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

**Learning Resources:**

“Web Technologies”, 7<sup>th</sup> Edition, Uttam K.Roy,2012.

“Internet & World Wide Web How to Program”, 5/e, Paul J. Deitel, Harvey M. Deitel, Abbey Deitel,2012.

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

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

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**INTRODUCTION TO MACHINE LEARNING**

(OPEN ELECTIVE-IV) (Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code: <b>U19OE620IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE :3Hrs

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

**UNIT-I:**

**Introduction to AIML:** Foundations of AI, Sub areas of AI, Applications. Introduction to learning, Types of Learning: Supervised Learning, Unsupervised Learning, Reinforcement Learning.

**Supervised learning:** Linear Regression, Logistic Regression.

**UNIT-II:**

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

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

**UNIT-III:**

**Supervised Parametric learning (Neural networks):** Perceptron, Multilayer Neural Network, Backpropagation.

**UNIT-IV:**

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

**UNIT-V:**

**Unsupervised learning:** Clustering, K-means Clustering, DBSCAN

**Learning Resources:**

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

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

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



With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING(Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES**

(OPEN ELECTIVE) - B.E 3/4 -VI SEMESTER

**ENGLISH FOR COMPETITIVE EXAMINATIONS**

(Common to all branches)

L:T: P (Hrs/Week):3	SEE Marks:60	Course Code: <b>U19OE610EH</b>
Credits: 3	CIE Marks:40	Duration of SEE:Hours:03

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
<p>The course will enable the students to:</p> <p>To familiarise the students to various types of competitive examinations.</p> <p>To practice questions and prepare for GATE, GRE, CAT, TOEFL.</p>	<p>On completion of the course, students will be able to:</p> <ol style="list-style-type: none"><li>1. The student will be able to solve various types of questions in competitive English examinations effectively.</li><li>2. Provide logical conclusions for the questions on aptitude and reasoning within the stipulated time.</li></ol>

**GATE :**

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

**GRE :**

**VERBAL REASONING:**

- Analysing and drawing add value to incomplete data; identify the perception of the author
- Identifying vital points and differentiating between relevant and irrelevant points
- Understanding and summarising the structure of a text

With effect from the Academic Year 2021-22

- Understanding the given words, sentences and entire texts; ability to focus on the meaning of the entire sentence
- Understanding relationships among words and concepts

**ANALYTICAL WRITING:**

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

**CAT :**

**VERBAL ABILITY AND READING COMPREHENSION:**

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

**TOEFL:**

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

**METHODOLOGY ASSESSMENTS**

- |                                    |                        |
|------------------------------------|------------------------|
| - Case Studies                     | - Online assignments   |
| - Demonstration                    | - Individual and Group |
| - Presentations                    | - Expert lectures      |
| - Writing and Audio-visual lessons |                        |

**LEARNING RESOURCES**

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

With effect from the Academic Year 2021-22

**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 Tests: 90 Minutes

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING(Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES**

Skill Development-IV (Soft Skills)

SYLLABUS FOR B.E. VI-SEMESTER

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

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

**UNIT 1 QUANTITATIVE APTITUDE- ARITHMETIC ABILITY  
ADVANCED**

- Time speed and distance
- Time and work
- Interest calculations

**UNIT 2 REASONING ABILITY- LOGICAL REASONING**

- Arrangements- Linear; Circular; Complex
- Puzzles
- Venn diagrams
- Syllogism
- Cubes & Cuboids
- Dices

### **UNIT 3 REASONING ABILITY- NON VERBAL REASONING**

- Figure Series
- Figure Completion
- Mirror Images
- Water Images
- Paper Cutting
- Paper Folding
- Embedded Images

### **UNIT 4 REASONING ABILITY- CRITICAL REASONING PART 1**

- Statement Assumptions
- Statement Arguments

### **UNIT 5 REASONING ABILITY- CRITICAL REASONING PART 2**

- Course of Action
- Cause & Effect
- Inferences

#### **Learning Resources:**

1. [scoremore.talentsprint.com](http://scoremore.talentsprint.com)

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

1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="20"/>
2	No. of Assignments	:	<input type="text" value="2"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="2"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

Skill Development-IV (Technical Skills)

Industry Standard Coding Practices – 2023

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: <b>U19PE610CS</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
<ol style="list-style-type: none"><li>1.Understand importance of problem solving approaches for programming complex data structure problems.</li><li>2.Understand importance of optimized solutions for problems solving and its relevance to industry.</li><li>3.Implement mathematical and logical understanding approaches to implement test driven development practices.</li><li>4.Start participating in global coding competitions relevant to the syllabus</li><li>5.Write Efficient coding solutions using appropriate algorithm</li></ol>	<ol style="list-style-type: none"><li>1. Choose the right data structure based on the requirements of the problem.</li><li>2. Design algorithm for a given problem by choosing appropriate design technique and provide optimal solution.</li></ol>

**Algorithms – Greedy Methods - II**

Review of Greedy Strategies, Problem solving on greedy problems: Job sequencing solutions, Activity selection problem, Scenario based problem solving implementing Greedy Methods

**Algorithms - Dynamic Programming - I**

Introduction to Dynamic programming, Coding solutions to form Sub structures, Problem solving on Dynamic Knapsack, Trip optimization problem, Scenario based problem solving using Dynamic Programming approaches, Coding solutions on Coin-change sub structure, Comparison of Greedy Vs DP for Coin change, Sum of sub sets problem

With effect from the Academic Year 2021-22

### **Algorithms - Dynamic Programming - II**

Problem solving using Grid Memo, Problem solving on Longest Common Sub string, Longest Common subsequence, Minimum Edit Distance problems, Longest Increasing Sub sequences, Min sum path matrix, Max sum Sub square, Scenario based problem solving using Dynamic Programming approaches

**Non-Linear Data structures – Graph Theory** Introduction to Graphs Problems, Types of graphs, Problem solving on graph traversals, Checking the degree sequence, , DFS, BFS, Scenario based problem solving implementing graphs, Practice Problems

### **Non-Linear Data structures – Graph Algorithms**

Problem solving on Graph Coloring, Introduction to DAG, Topological sorting on DAGs, Spanning Tree, Graph Reduction, Kahn’s Algorithm, Practice Problems

### **Backtrack Algorithms**

Introduction to Backtracking, Differences between backtracking and brute force methods, State space diagram, N Queens problem, Finding a way, Solving Grid based backtracking problems, practice problems

### **String Algorithms**

TRIE Data structure, Finite state machine for pattern matching, KMP algorithm, Example problem solving

### **Operating Systems**

Operating Systems Overview, Process Management, CPU Scheduling algorithms, Deadlocks, Memory Management, Examples.

### **Networking**

The OSI Model, The TCP/IP Model, Network typologies and Ethernet, Internet Protocol v4 and v6, Media Access Control and Address Resolution Protocols, IP Addressing, Examples.

### **Introduction to Java and Expressions and control Statements**

Introduction to Java, Java Setup, first Java program, Variable and data type, Primitive Data Types, String basics, Type casting, Operators in Java, Control Statements: If Statements, Switch case, For loop, While loop, Do while loop, Break and continue, Nested loops, Modulo operator, Methods

With effect from the Academic Year 2021-22

parameters and return type, Method overloading, Naming convention, BigDecimal class

### **Object Oriented Programming Through Java - 1**

Orientation to Object oriented programming, Classes, Constructors, introducing inheritance, Type of inheritance, Composition Introduction Encapsulation, Polymorphism, Concepts of Java: Interfaces, Abstract class, Example Problems

### **Object Oriented Programming Through Java - 2**

Introduction, Multiple inheritance using interfaces, Inner classes, Types of nested class, Local inner class, Anonymous object, Anonymous inner class, Advantages of inner class, User input, Static elements, Final keyword, Final keyword with method and class, Packages, Access modifier

### **Exception Handling through Java**

Introduction to Exception handling, Multiple catch blocks, Finally block, Throw and throws, User defined exception, Checked and unchecked exceptions

### **Strings through Java**

Introduction to Strings, Difference between String literal and String Object, String methods, String formatting, String functions, manipulating strings, example problems

### **DBMS**

Introduction to DBMS, SQL Queries, ER And Relational Models, Data Definition And Querying, Transactions And Concurrency, Normalization, case studies, Example Problems.

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

1	No. of Internal Tests	:	<input type="text" value="1"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
	Duration of Internal Tests	:	1 Hour 30 Minutes			



With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

INTERNET OF THINGS LAB

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: <b>U19PC611CS</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Develop programs to interface sensors & actuators with Raspberry PI and Arduino Uno.	1 Implement programs on Arduino Uno board 2 Develop application programs to interface sensors and actuators with Raspberry PI.
2 Develop applications for smart home.	3 Implement programs to demonstrate communication protocols 4 Develop applications to publish data on to the cloud 5 Build an IoT prototype

**Programming Exercise:**

1. Experiments using Arduino Uno Board
2. Programming Raspberry PI to read data from onboard sensors
3. Interfacing ultrasonic, IR sensors to Raspberry PI
4. Interfacing Soil Moisture sensor for Agriculture based Application
5. Developing Control applications to interface servo motor
6. Developing Control applications to interface stepper motor
7. Demonstrate communication protocol Bluetooth
8. Demonstrate communication protocol LoRa
9. Develop an application using MQTT Protocol
10. Demonstration of Zigbee protocol for IoT applications

With effect from the Academic Year 2021-22

11. Publishing data on to the Cloud

12. Develop a project that addresses a specific domain.

**Learning Resources:**

1. ArshdeepBahga, Vijay Madiseti, "Internet of Things: A Hands-on Approach", Universities Press, 2014.
2. <https://www.raspberrypi.org/>.
3. <https://www.arduino.cc/>.
4. <http://electronicsforu.com/resources/embedded-systems-overview/>.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

SOFTWARE ENGINEERING LAB

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks :50	Course Code: <b>U19PC621CS</b>
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Apply software engineering principles for analyzing, visualizing, specifying, constructing for software intensive system.	1 Identify the functional and non functional requirements and estimate effort /cost for the given system.
2 Document the artifacts of software system.	2 Design the Data/Work/Control flow in the modules of the intended system. 3 Construct the Structural, Behavioural, Interaction & State aspects for the intended system. 4 Develop the artifacts of the intended system through forward and reverse engineering. 5 Build test cases and evaluate the software project quality.

**Programming Exercise:**

**Select one large information system/Approach and device the following using CASE TOOL.**

1. Systems software Requirements and related analysis documents as per the guidance in ANSI/IEEE Std 830-1984.
2. Design documents representing the complete design of the software system using Data flow diagram.
3. Functional Decomposition and structure.

With effect from the Academic Year 2021-22

4. Behavioral Modeling- use case diagram demonstration using UML.
5. Behavioral Modeling- Interaction diagram demonstration using UML.
6. Behavioral Modeling- State machine diagram demonstration using UML.
7. Structural Modeling- Class diagram demonstration using UML.
8. Familiarization of Forward and reverse engineering the class diagram using tools.
9. Architectural Modeling-component and deployment diagram demonstration using UML.
10. Simple exercises on effort, cost and resource estimation.
11. Familiarization of Software Configuration Management tool.
12. Test case Generation, Verification.
13. Demonstration on functional testing using RFT.
14. Evaluation of project quality using RQM.
15. Build a design model for a given application.

**Learning Resources:**

1. Roger S. Pressman, Software Engineering: A Practitioner’s Approach, 6th Edition, (2005) Tata McGrawHill.
2. Grady Booch, James Rumbagu, Ivor Jacobson, The Unified Modeling Language-User guide , 2nd Edition, (2007), Pearson Education, India.
3. James Rumbagu, Ivor Jacobson, Grady Booch, The Unified Modeling Language-Reference Manual, (2004), 2ndEdition, Pearson Education, India.
4. [http://www.nyu.edu/classes/jcf/g22.2440-001\\_sp09/handouts/UMLBasics.pdf](http://www.nyu.edu/classes/jcf/g22.2440-001_sp09/handouts/UMLBasics.pdf)
5. <https://courses.cs.washington.edu/courses/cse403/11sp/lectures/lecture08-uml1.pdf>
6. <http://www.conceptdraw.com/examples/online-uml-class-diagram-of-material-management-system>

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**  
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LAB

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks:50	Course Code: <b>U19PC631CS</b>
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

<b>COURSE OBJECTIVES</b>		<b>COURSE OUTCOMES</b>
		<i>On completion of the course, students will be able to</i>
1	Understand issues and techniques involved in the creation of intelligent systems	<ol style="list-style-type: none"><li>1 Design python programs for various learning algorithms.</li><li>2 Identify and apply machine learning algorithms to solve real world problems.</li><li>3 Implement uninformed and informed search to solve the search problems.</li><li>4 Implement the Game playing algorithm such as Minimax and AlphaBeta pruning</li><li>5 Build Neural network to solve classification problems.</li></ol>

**Programming Exercise:**

- Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a CSV file.
- Write a program to implement k-Nearest Neighbor algorithm to classify the iris dataset. Print both correct and wrong predictions Python MLlibrary classes can be used for this problem.
- Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
- Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the

With effect from the Academic Year 2021-22

results of these two algorithms and comment on the quality of clustering. You can add Python ML library classes/API in the program.

- Write a machine learning program for the perception model and calculate the Error for the back propagation.
- Implement an AI program on Uninformed search algorithm Breadth first search, Depth First search ,IDFS.
- Implement an AI program for Water jug problem.
- Implement an AI program on 8-Puzzle problem using A\*
- Implement an AI program on 8-queens problem.
- Implement an AI program for Alpha beta pruning.
- Implement an AI Program for the TIC TACTOE using minimax method.
- Implement an AI program for missionaries and cannibals Problem.

### **Learning Resources:**

1. Tom Mitchell, "Machine Learning", McGraw-Hill Science, First edition.
2. Stuart Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Third Edition (2015),
3. Daniela Witten, Gareth James, Robert Tibshirani, and Trevor Hastie, An Introduction to Statistical Learning with Applications in R (Springer Texts in Statistics).
4. George F Luger , Artificial Intelligence, Structures and strategies for Complex Problem Solving, Sixth Edition,(2009), Pearson
5. Elaine Rich, Kevin Knight, Shivashankar B Nair, Artificial Intelligence, Third Edition(2009), Tata McGraw Hill
6. <http://www.nptel.ac.in/courses/106105077>
7. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-spring-2005>
8. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos>

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2021-22

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**

IBRAHIMBAGH, HYDERABAD – 500 031

**Department of Computer Science & Engineering**

THEME BASED PROJECT

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : -	Course Code: <b>U19PW619CS</b>
Credits : 1	CIE Marks : 30	Duration of SEE : -

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
1 Develop an application in the relevant area of Computer Science	1 Review the literature survey to identify the problem.
2 Learn contemporary technologies.	2 Design a model to address the proposed problem. 3 Develop and test the solution. 4 Demonstrate the work done in the project through presentation and documentation. 5 Adapt to contemporary technologies.

The students are required to carry out a theme based project by selecting any one of themes like Smart Home, Smart Parking, Smart Transport, Smart Waste Management, Smart Healthcare, Smart Agriculture, Smart Lighting, Smart Logistics and Smart Security in the area of Internet of Things or themes in any other area relevant to Computer Science.

Students are required to submit a report on the theme based project at the end of the semester.