

# **VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

IBRAHIMBAGH, HYDERABAD-500 031

***ACCREDITED BY NAAC WITH A++ GRADE***

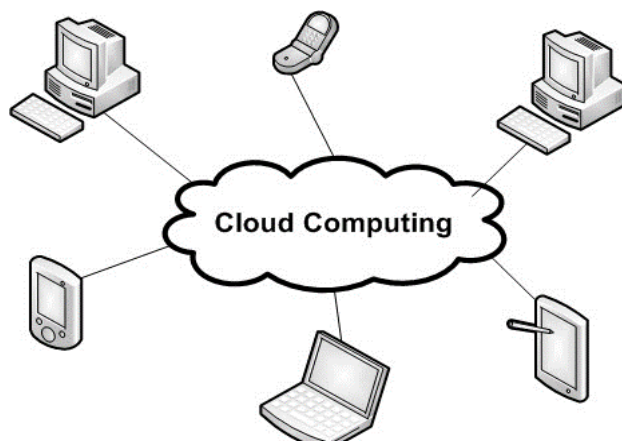
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Affiliated to Osmania University, Hyderabad-07

**Sponsored by  
VASAVI ACADEMY OF EDUCATION  
Hyderabad**



**SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR  
B.E. (IT) VII and VIII Semesters with effect from 2021-22  
(For the batch admitted in 2018-19)**

**(R-18)**



**DEPARTMENT OF INFORMATION TECHNOLOGY**

**+91-40-23146050, 23146051**

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# **VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

**IBRAHIMBAGH, HYDERABAD-500 031**

## **Vision**

Striving for a symbiosis of technological excellence and human values.

## **Mission**

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

## **Quality Policy**

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

## **DEPARTMENT OF INFORMATION TECHNOLOGY**

### **Vision**

To be a centre of excellence in core Information Technology and multidisciplinary learning and research, where students get trained in latest technologies for professional and societal growth.

### **Mission**

To enable the students acquire skills related to latest technologies in IT through practice- oriented teaching and training.



# **VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**

**IBRAHIMBAGH, HYDERABAD-500 031**

## **DEPARTMENT OF INFORMATION TECHNOLOGY**

### **Programme Educational Objectives (PEOs) for IT Program**

The Programme will produce graduates

- PEO1. With theoretical and practical knowledge to obtain employment or pursue higher studies and solve problems in Information Technology.
- PEO2. With effective written and oral communication skills that will help them to work in diversified and dynamic working environments.
- PEO3. With competence to succeed in their professional lives with ethical values.

### **Program Specific Outcomes (PSOs) for IT Program**

The Students will demonstrate

- PSO1. Competency in programming using different programming languages to implement algorithms.
- PSO2. Competency in the analysis and design of a software solution using different modelling tools.
- PSO3. Competency in Electronic Design and Embedded System Design using different simulation tools.

### **Program Outcomes (POs) for IT Program**

At the end of the program, the graduates will demonstrate

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet

the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**SCHEME OF INSTRUCTION AND EXAMINATION (R-18)**  
**B.E. – INFORMATION TECHNOLOGY : SEVENTH SEMESTER (2021 - 2022)**

B.E (IT) VII-SEMESTER								
Course Code	Course Name	Scheme of Instruction			Scheme of Examination			
		Hours per week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
U18PC710IT	Compiler Construction	3	-	-	3	60	40	3
U18PC720IT	Distributed Systems & Cloud Computing	3	-	-	3	60	40	3
U18PE7XXIT	Professional Elective – I	3	-	-	3	60	40	3
U18PE7XXIT	Professional Elective – II	3	-	-	3	60	40	3
U18PE7XXIT	Professional Elective – III	3	-	-	3	60	40	3
U18PE7XXIT	Professional Elective – IV	3	-	-	3	60	40	3
PRACTICALS								
U18PC711IT	Compiler Construction Lab	-	-	2	3	50	30	1
U18PC721IT	Distributed Systems & Cloud Computing Lab	-	-	2	3	50	30	1
U18PW719IT	Project Seminar	-	-	2	-	-	30	1
Student should acquire one online certification course equivalent to 2 credits during III-VII Semesters.								
Total		18	-	6	-	460	330	21
Grand Total		24			-	790		

<b>Professional Elective – I</b>	<b>Professional Elective – II</b>
U18PE710IT: Data Mining	U18PE750IT: Data Analytics
U18PE720IT: Software Quality and Assurance	U18PE760IT: Software Testing
U18PE730IT: Graph Theory	U18PE770IT: Advanced Algorithms
U18PE740IT: Cryptography and Network Security	U18PE780IT: Information Security

<b>Professional Elective – III</b>	<b>Professional Elective – IV</b>
U18PE790IT : Neural Networks and Deep Learning	U18PE742IT: Digital Image Processing
U18PE712IT: Software Reuse Techniques	U18PE752IT: Object Oriented Analysis and Design
U18PE722IT: Parallel and Distributed Algorithms	U18PE762IT: Queuing Theory and Modeling
U18PE732IT: Information Storage and Management	U18PE772IT: Information Retrieval Systems

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

**COMPILER CONSTRUCTION**  
**SYLLABUS FOR B.E.- VII SEMESTER**

L:T:P (Hrs./week):3:0:0	SEE Marks :60	Course Code: <b>U18PC710IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hrs

<b>Course Objective:</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>
Introduce the major concept areas of language translation, and to enrich the knowledge in various phases of compiler and its use.	<ol style="list-style-type: none"><li>1. Define the purpose and implementation approach of each phase of compilation, and also apply the knowledge of LEX tool to develop a Scanner.</li><li>2. Design top-down and bottom-up parsers.</li><li>3. Implement semantic rules for specifying the syntax and semantics of programming languages, and also transform an AST into intermediate representation.</li><li>4. Apply various optimization techniques on the Intermediate Representation.</li><li>5. Generate target code from the Intermediate Representation.</li></ol>

### **UNIT-I**

**Introduction to Compilers:** Introduction, Language Processors, The Structure of a Compiler.

**Lexical Analysis** – The Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, The Lexical-Analyzer Generator-LEX.

### **UNIT-II**

**Syntax Analysis:** Introduction, Context-Free Grammars.

**Top-Down Parsing:** Recursive Descent Parsing, Predictive Parsing, LL(1) Grammars. **Bottom-Up Parsing:** Shift-Reduce Parsing, Introduction to LR Parsing- SLR, More Powerful LR Parsers- CLR and LALR, Using Ambiguous Grammars, The Parser Generator- YACC.

### **UNIT-III**

**Syntax Directed Translation:** Introduction, Syntax Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax Directed Translation.

**Intermediate Code Generation:** Variants of Syntax Trees, Three-Address Code, Types and Declarations, Translation of Expressions, Type Checking.

#### UNIT-IV

**Run-Time Environments:** Storage Organization, Stack Allocation of Space, Access to Non-local Data on the Stack, Heap Management, Introduction to Garbage Collection.

**Code Optimization:** Introduction, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Machine Independent Optimizations – The Principal Sources of Optimizations.

#### UNIT-V

**Code Generation:** Introduction, Issues in the Design of a Code Generator, The Target Machine, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, DAG for register allocation.

#### Suggested Reading:

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman – Compilers: Principles, Techniques & Tools – Pearson Education, Second Edition, 2007
2. Leland L Bech, System Software: An Introduction to Systems Programming, Pearson Education Asia, 1997.
3. Kenneth C. Loudon, Compiler Construction: Principles and Practice, Thompson Learning, 2003.
4. J.P. Bennet, Introduction to Compiler Techniques, Second Edition, Tata McGraw-Hill, 2003.

#### Online Resources:

1. <https://nptel.ac.in/courses/106108052/>
2. <http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=Compilers>

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

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

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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**DISTRIBUTED SYSTEMS AND CLOUD COMPUTING**  
**SYLLABUS FOR B.E.- VII SEMESTER**

L:T:P(Hrs./week):3:0:0	SEE Marks : 60	Course Code : <b>U18PC720IT</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. Examine state-of-the-art distributed systems</li><li>2. Understand distributed resource management</li><li>3. provide students with the fundamentals and essentials of Cloud Computing.</li><li>4. Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing.</li><li>5. Explore some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.</li></ol>	<ol style="list-style-type: none"><li>1. Explain the principles of distributed system .</li><li>2. Illustrate the basic concepts of synchronization and communication mechanisms used in distributed systems;</li><li>3. Compare the strengths and limitations of Cloud computing</li><li>4. Identify the appropriate cloud services for a given application.</li><li>5. Evaluate the comparative advantages and disadvantages of virtualization technology;</li></ol>

**UNIT I**

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the web, Challenges; Hardware concepts; Software Concepts

System Models: Introduction, Architectural models, Fundamental models.

Time and Global States: Introduction, Clocks events and process states, synchronizing physical clocks, Logical Clocks, Global states, Distributed debugging.

**UNIT-II**

Coordination and Agreement: Introduction, distributed mutual exclusion, Election, Multicast communication, Consensus and related problems.

Replication: Introduction, System model and group communication, Fault-tolerant services.



Distributed File Systems: Introduction; File service architecture; Case study: Sun Network File System;

### **UNIT-III**

Introduction to Cloud Computing, Cloud Computing Architecture: Essential Characteristics, Service Models, Deployment Models, Pros and Cons of Cloud Computing. Scalable Computing over the Internet, Technologies for Network-based Systems, System Models for Distributed and Cloud Computing, Software Environments for Distributed Systems and Clouds.

### **UNIT-IV**

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

Case Studies: Xen Virtual machine monitors - Xen API. VMware - VMware products- VMware Features, Microsoft Virtual Server- Features of Microsoft Virtual Server

### **UNIT-V**

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

### **Learning Resources:**

1. Colouris, Dollimore, Kindberg, " Distributed Systems concepts and Design" 5th Ed. Pearson Education, 2011
2. Kai Hwang, Geoffrey C Fox, Jack J. Dongarra, "Distributed and cloud Computing", Morgan Kaufmann
3. Andrew S. Tanenbaum, Van Steen, " Distributed Systems ", Pearson Education, 2010.
4. Rajkumar Buyya, James Broberg, Andrzej M Goscinski "Cloud Computing: Principles & Paradigms, Wiley Series on Parallel and Distributed computing, 2011
5. Singhal M, Shivratri N.G, "Advanced Concepts Introduction, Operating Systems" McGraw Hill, 2001
6. Pradeep K Sinha, " Distributed Operating Systems: Concepts and Design", Pearson Education Asia India, 2007.
7. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-172-performance-engineering-of-software-systems-fall-2010/video-lectures/lecture-20-distributed-systems>
8. <http://nptel.ac.in/downloads/106106107/>
9. [https://onlinecourses.nptel.ac.in/noc17\\_cs23/preview](https://onlinecourses.nptel.ac.in/noc17_cs23/preview)

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

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Duration of Internal Test: <b>90 Minutes</b>				

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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**DATA MINING**  
**(Professional Elective-I)**  
**SYLLABUS FOR B.E.- VII SEMESTER**

L:T:P (Hrs./week):3:0:0	SEE Marks : 60	Course Code : <b>U18PE710IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Highlighting the importance of Data Mining concepts and techniques for uncovering interesting data patterns hidden in large data sets.	Preform data cleaning, summarization, integration, transformation on the data using various data preprocessing techniques. Apply various kinds of frequent mining methods to generate strong association rules. Compare and classify the data and evaluate the accuracy of classifier and predictor. Do the cluster analysis using various clustering techniques and identify and eliminate the outliers from large data bases. Perform mining on spatial data, multimedia data, text data, and World Wide Web data.

**UNIT – I**

Introduction: What is Data Mining, Data Mining Functionalities, Classification of Data Mining Systems, and Major Issues in Data Mining.

Data Preprocessing: Preprocessing, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

**UNIT – II**

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture and Implementation, from Data Warehousing to Data Mining.

Mining Frequent Patterns, Associations Rules: Basic Concepts, Efficient and Scalable Frequent Item Set Mining Methods, Mining various kinds of Association Rules.

**UNIT – III**

Classification and Prediction: Introduction, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification,

and Rule based Classification, Classification by Back Propagation, Associative classification, Prediction, and Evaluate the Accuracy of a Classifier and Predictor.

#### **UNIT – IV**

Cluster Analysis: Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid Based Methods, Model Based Clustering Methods, and Outlier Analysis.

#### **UNIT – V**

Mining Object, Spatial, Multimedia, Text, and Web Data: Spatial Data Mining, Multimedia Data Mining, Text Mining, and Mining the World Wide Web.

#### **Learning Resources :**

1. Han J & Kamber M, Data Mining: Concepts and Techniques, Third Edition, Elsvier, 2011.
2. Pang-Ning Tan, Michael Steinback, Vipin Kumar, Introduction to Data Mining, Pearson Education, 2008.
3. Arun K Pujari, Data mining Techniques, Second Edition, University Press, 2001.
4. Margaret H Dunham, S.Sridhar, Data mining: Introductory and Advanced Topics, Pearson Education, 2008.
5. Humphires, Hawkins, Dy, Data Warehousing: Architecture and Implementation, Pearson Education, 2009.
6. Anahory, Murray, Data Warehousing in the Real World, Pearson Education, 2008.
7. Kargupta, Joshi, etc., Data Mining: Next Generation Challenges and Future Directions, Prentice Hall of India Pvt Ltd, 2007.
8. <http://freevideolectures.com/Course/2280/Database-Design/35>
9. <http://freevideolectures.com/Course/2668/Database-Management-System/31>
10. [http://nptel.ac.in/syllabus/syllabus\\_pdf/106106105.pdf](http://nptel.ac.in/syllabus/syllabus_pdf/106106105.pdf)

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

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3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

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IBRAHIMBAGH, HYDERBAD-500031  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E VII-SEMESTER**

**SOFTWARE QUALITY AND ASSURANCE**  
**(PROFESSIONAL ELECTIVE-I)**

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U18PE720IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hours

<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>
Understand the basic concepts related to Software Quality and the relationship with project lifecycle.	<ol style="list-style-type: none"><li>1. Understand the basic tenets of software quality and quality factors.</li><li>2. Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components.</li><li>3. Understand of how the SQA components can be integrated into the project life cycle.</li><li>4. Be familiar with the software quality infrastructure.</li><li>5. Be exposed to the management components of software quality.</li></ol>

**UNIT I : INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE**  
Need for Software quality – Quality challenges – Software quality assurance (SQA) – Definition and objectives – Software quality factors- McCall's quality model – SQA system and architecture – Software Project life cycle Components – Pre project quality components – Development and quality plans.

**UNIT II : SQA COMPONENTS AND PROJECT LIFE CYCLE**  
Software Development methodologies – Quality assurance activities in the development process- Verification & Validation – Reviews – Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components – Quality assurance tools – CASE tools for software quality – Software maintenance quality – Project Management.

**UNIT III : SOFTWARE QUALITY INFRASTRUCTURE**  
Procedures and work instructions – Templates – Checklists – 3S development – Staff training and certification Corrective and preventive

actions – Configuration management – Software change control – Configuration management audit -Documentation control – Storage and retrieval.

#### **UNIT IV : SOFTWARE QUALITY MANAGEMENT & METRICS**

Project process control – Computerized tools – Software quality metrics – Objectives of quality measurement – Process metrics – Product metrics – Implementation – Limitations of software metrics – Cost of software quality – Classical quality cost model – Extended model – Application of Cost model.

#### **UNIT V : STANDARDS, CERTIFICATIONS & ASSESSMENTS**

Quality management standards – ISO 9001 and ISO 9000-3 – capability Maturity Models – CMM and CMMI assessment methodologies – Bootstrap methodology – SPICE Project – SQA project process standards – IEEE st 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities – SQA units and other actors in SQA systems.

#### **Learning Resources:**

1. Daniel Galin, "Software Quality Assurance", Pearson Publication, 2009.
2. Alan C. Gillies, "Software Quality: Theory and Management", International Thomson Computer Press, 1997.
3. Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software", International Thompson Computer Press, 1997.

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2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

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

**GRAPH THEORY**  
**(Professional Elective-I)**  
**SYLLABUS FOR B.E. VII SEMESTER**

L:T:P (Hrs./week):3:0:0	SEE Marks :60	Course Code : <b>U18PE730IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE :3 Hrs

<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>
be familiar with the fundamental concepts related to graph theory.	<ol style="list-style-type: none"><li>1. Write precise and accurate mathematical definitions of objects using graph theory.</li><li>2. Identify and construct examples using the mathematical definitions studied</li><li>3. Validate and critically assess a mathematical proof.</li><li>4. Use the theoretical knowledge in the investigation of questions from graph theory</li><li>5. Use the definitions of graph theory in order to construct mathematical proofs.</li></ol>

**UNIT-I:INTRODUCTION**

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler graphs – Hamiltonian paths and circuits – Trees – Properties of trees – Distance and centers in tree – Rooted and binary trees.

**UNIT-II: TREES, CONNECTIVITY & PLANARITY**

Spanning trees – Fundamental circuits – Spanning trees in a weighted graph – cut sets – Properties of cut set – All cut sets – Fundamental circuits and cut sets – Connectivity and separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and geometric graphs – Planer graphs – Different representation of a planer graph.

**UNIT-III: MATRICES, COLOURING AND DIRECTED GRAPH**

Chromatic number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four color problem – Directed graphs – Types of directed graphs – Digraphs and binary relations – Directed paths and connectedness – Euler graphs.

#### **UNIT-IV: PERMUTATIONS & COMBINATIONS**

Fundamental principles of counting – Permutations and combinations – Binomial theorem – combinations with repetition – Combinatorial numbers – Principle of inclusion and exclusion – Derangement – Arrangements with forbidden positions.

#### **UNIT-V: GENERATING FUNCTIONS**

Generating functions – Partitions of integers – Exponential generating function – Summation operator – Recurrence relations – First order and second order – Non-homogeneous recurrence relations – Method of generating functions.

#### **Learning Resources:**

1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.
2. Grimaldi R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", Addison Wesley, 1994.
3. Clark J. and Holton D.A, "A First Look at Graph Theory", Allied Publishers, 1995.
4. Mott J.L., Kandel A. and Baker T.P. "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India, 1996.
5. Liu C.L., "Elements of Discrete Mathematics", Mc Graw Hill, 1985.
6. Rosen K.H., "Discrete Mathematics and Its Applications", Mc Graw Hill, 2007.

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

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**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E. VII SEMESTER**

**CRYPTOGRAPHY AND NETWORK SECURITY**

(Professional Elective-I)

SYLLABUS FOR B.E VII-SEMESTER

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U18PE740IT</b>
Credits : 3	CIE Marks :40	Duration of SEE : 3Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b> <i>On completion of the course, students will be able to</i>
Acquire fundamental knowledge on the concepts of number theory, cryptographic techniques, hash functions, digital signature and cryptanalysis.	<ol style="list-style-type: none"><li>1. Describe basics of number theory.</li><li>2. Explain various Cryptographic Techniques and ciphers.</li><li>3. Describe the different types of asymmetric ciphers.</li><li>4. Understand the cryptographic hash functions.</li><li>5. Describe about cryptanalysis.</li></ol>

**UNIT – I:**

**Introduction to cryptography, Number Theory:** Divisibility and the Division Algorithm, The Euclidean Algorithm , Modular Arithmetic , Prime Numbers Fermat's and Euler's Theorems , Testing for Primality.

**Security Concepts:** Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

**UNIT – II:**

**Symmetric Ciphers:** Symmetric Cipher Model, Classical Encryption Techniques-,Substitution Techniques ,Transposition Techniques.

**Block Ciphers:** Traditional Block Cipher Structure, Block Cipher Design Principles. Block Cipher Modes of Operation. DES, The Strength of DES, Triple DES.

**Advanced Encryption Standard:** AES Structure ,AES Transformation Functions , Stream Ciphers.

**UNIT – III:**

**Asymmetric Ciphers:** Public-Key Cryptography and RSA - Principles of Public-Key Cryptosystems, The RSA Algorithm .

**Other Public-Key Cryptosystems** : Diffie-Hellman Key Exchange, ElGamal Cryptographic System, Elliptic Curve Arithmetic, Elliptic Curve Cryptography .

**UNIT – IV:**

**Cryptographic Hash Functions** : Applications of Cryptographic Hash Functions, MD5, Secure Hash Algorithm (SHA),SHA-3.

**Message Authentication Codes** : Message Authentication Requirements. Message Authentication Functions, MACs Based on Hash Functions: HMAC MACs Based on Block Ciphers: CMAC, Digital Signatures.

**UNIT –V:**

**Cryptanalysis:** Introduction, Time-Memory Trade-off Attack, Differential and Linear Cryptanalysis. Cryptanalysis on Stream Cipher, Modern Stream Ciphers, Shamir's secret sharing, Identity-based Encryption (IBE), Attribute-based Encryption (ABE).

**Learning Resources :**

1. William Stallings, Cryptography and Network Security, 7th Edition, Pearson Education,2017.
2. [https://onlinecourses-archive.nptel.ac.in/noc19\\_cs28/course](https://onlinecourses-archive.nptel.ac.in/noc19_cs28/course).
3. Behrouz A. Ferouzan, “Cryptography & Network Security”, Tata Mc Graw Hill, 2007.
4. Man Young Rhee, “Internet Security: Cryptographic Principles”, “Algorithms and Protocols”, Wiley Publications,2003.

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

Duration of Internal Test: **90 Minutes**

**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
**IBRAHIMBAGH, HYDERBAD-500031**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E VII-SEMESTER**

**DATA ANALYTICS**  
**(Professional Elective-II)**

L:T:P (Hrs./week):3:0:0	SEE Marks :60	Course Code : <b>U18PE750IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE :3 Hrs

Course Objectives	Course Outcomes
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Understand the basic algorithms and techniques used in Data Analytics	1. Find a meaningful pattern in data 2. Graphically interpret data 3. Implement the analytic algorithms 4. Handle large scale analytics projects from various domains 5. Develop intelligent decision support systems

**UNIT-I**

**Data Definitions and Analysis Techniques:** Elements, Variables, and Data categorization, Levels of Measurement, Data management and indexing, Introduction to statistical learning and R-Programming

**UNIT-II**

**Descriptive Statistics :** Measures of central tendency, Measures of location of dispersions, Practice and analysis with R

**UNIT-III**

**Basic analysis techniques:** Statistical hypothesis generation and testing, Chi-Square test, t-Test, Analysis of variance, Correlation analysis, Maximum likelihood test, Practice and analysis with R,

**UNIT-IV**

**Data analysis techniques:** Regression analysis, Classification techniques, Clustering, Association rules analysis, Practice and analysis with R

**UNIT-V**

**Case studies and projects:** Understanding business scenarios, Feature engineering and visualization, Scalable and parallel computing with Hadoop and Map-Reduce, Sensitivity Analysis

**Learning Resources :**

1. Probability & Statistics for Engineers & Scientists (9<sup>th</sup> Edn.), Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Prentice Hall Inc.
2. The Elements of Statistical Learning, Data Mining, Inference, and Prediction (2<sup>nd</sup> Edn.), Trevor Hastie Robert Tibshirani Jerome Friedman, Springer, 2014
3. An Introduction to Statistical Learning: with Applications in R, G James, D. Witten, T Hastie, and R. Tibshirani, Springer, 2013
4. Software for Data Analysis: Programming with R (Statistics and Computing), John M. Chambers, Springer
5. Mining Massive Data Sets, A. Rajaraman and J. Ullman, Cambridge University Press, 2012
6. Advances in Complex Data Modeling and Computational Methods in Statistics, Anna Maria Paganoni and Piercesare Secchi, Springer, 2013
7. Data Mining and Analysis, Mohammed J. Zaki, Wagner Meira, Cambridge, 2012
8. Hadoop: The Definitive Guide (2<sup>nd</sup> Edn.) by Tom White, O'Reilly, 2014
9. MapReduce Design Patterns: Building Effective Algorithms and Analytics for Hadoop and Other Systems, Donald Miner, Adam Shook, O'Reilly, 2014
10. Beginning R: The Statistical Programming Language, Mark Gardener, Wiley, 2013
11. <http://cse.iitkgp.ac.in/~dsamanta/courses/da/>
12. [https://nptel.ac.in/noc/individual\\_course.php?id=noc17-mg24](https://nptel.ac.in/noc/individual_course.php?id=noc17-mg24)

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

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

Duration of Internal Test: **90 Minutes**

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

**SOFTWARE TESTING**  
**(Professional Elective-II)**  
**SYLLABUS FOR B.E VII-SEMESTER**

L:T:P (Hrs./week):3:0:0	SEE Marks :60	Course Code : <b>U18PE760IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE :3 Hrs

Course Objectives	Course Outcomes
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Develop various strategies of software testing in their project.	<ol style="list-style-type: none"><li>1. Identify various methodologies of software testing.</li><li>2. Design test cases by using various testing techniques</li><li>3. Estimate metrics used for testing</li><li>4. Identify the process of testing on various applications.</li><li>5. Apply the testing strategies and methodologies in their projects</li></ol>

**UNIT-I**

**Introduction:** Software-Testing, Terminology and Methodology: Software testing terminology, Software Testing Life Cycle (STLC), Software Testing Methodology

**Verification and Validation:** V & V activities, verification of requirements, verification of HLD and LLD, validation

**UNIT-II**

**Dynamic Testing:** Black Box Testing Techniques, White Box Testing Techniques, Static Testing, Validation Activities, Regression Testing.

**UNIT-III**

**Test Management:** Test Organization, Structure, Planning, Detailed test design and test specification, Software Metrics, Size Metrics, Testing Metrics for Monitoring and Controlling the Testing Process, Efficient Test Suite Management.

**UNIT-IV**

**Testing Process:** Testing Objected Oriented Software, Testing Web Based Systems, Debugging

## UNIT-V

**Software Testing Tools-case study:** Overview of Testing Tools, Testing an Application using WinRunner, Load Runner, JMeter, QTP

### Learning Resources :

1. Naresh Chauhan, Software Testing Principles and Practices, Oxford University Press, 2010.
2. Dr.K.V.K.K.Prasad, Software Testing Tools, Dreamtech press, 2008.
3. William E. Perry, Effective Methods for Software Testing, Third Edition, Wiley & Sons, 2006.
4. Srinivasan Desikan, Gopalaswamy Ramesh, Software Testing: Principles and Practices, Pearson Education, 2006.
5. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers
6. Software Testing Techniques, by Borries Beizer, Second Edition, Dreamtech Press
7. Managing the Testing Process, by Rex Black, Wiley
8. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I. McManus, Second Edition, International Thomson Computer Press
9. <http://www.nptelvideos.in/2012/11/software-engineering.html>
10. [https://onlinecourses.nptel.ac.in/noc16\\_cs16/preview](https://onlinecourses.nptel.ac.in/noc16_cs16/preview)

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

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3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
Duration of Internal Test: <b>90 Minutes</b>				

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E VII-SEMESTER**

**ADVANCED ALGORITHMS**  
**(Professional Elective-II)**

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U18PE770IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Understand the differences among several advanced algorithms and recognize which one is better for the given problem under different conditions.	<ol style="list-style-type: none"><li>1. Use the comparisons and limitations of various algorithms and choose the right one for the given problem.</li><li>2. Analyze various Network and String matching algorithms.</li><li>3. Develop basic advanced algorithm analysis skills for analyzing the approximation ratio of approximation algorithms</li><li>4. Apply different methods and performance measures to analyze algorithms with respect to cost and scalability.</li><li>5. Analyze various Probabilistic Algorithms &amp; Randomized Algorithms for their performance.</li></ol>

**UNIT 1:**

**Fundamental Techniques:** The Greedy Method and Dynamic Programming.

**Graphs:** Elementary Graph Algorithms, Single Source Shortest Paths, All Pair Shortest Paths.

**UNIT 2:**

**String Matching:** Introduction to string-matching problem, Naïve algorithm, Rabin Karp, Knuth Morris Pratt algorithm.

**NP Completeness:** Polynomial time, Polynomial time verification, NP Completeness and reducibility.

### UNIT 3:

**Approximation Algorithms:** Introduction, Approximation algorithms for vertex cover problem, The Travelling Salesman Problem, Set covering problem, The Subset-sum problem.

### UNIT 4:

**Parallel Algorithms:** Introduction, Models, speedup and efficiency, some basic techniques, Two Examples from graph theory, Parallel sorting, Parallel sorting networks.

### UNIT 5:

**Probabilistic Algorithms:** Numerical probabilistic algorithms: Numerical integration, Probabilistic counting, Monte Carlo algorithms: Verifying Matrix Multiplication, Las Vegas Algorithms: The Eight queens problem revisited, Probabilistic selection and sorting.

### Suggested books:

1. Thomas H. Cormen, Leiserson C.E, Rivest R.L , SteinC, Introduction to Algorithm, 4nd edition, MIT press, USA.
2. Fundamentals of Algorithmics : G.Brassard and P.Bratley
3. Approximation Algorithms: Vijay V.Vazirani
4. Randomized Algorithms: R. Motwani and P.Raghavan

### Reference books

1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
3. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.
4. Algorithmics : The spirit of computing: D.Harel

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

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Duration of Internal Test: <b>90 Minutes</b>				



**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**INFORMATION SECURITY**  
**(Professional Elective-II)**  
**SYLLABUS FOR B.E VII-SEMESTER**

L : T : P (Hrs./week): 3:0:0    SEE Marks :60

Course Code :

**U18PE780IT**

Credits : 3

CIE Marks: 40

Duration of SEE : 3 Hours

<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>
Develop an understanding of information security, gain familiarity with prevalent attacks, defenses against systems, and forensics to investigate the aftermath, develop a basic understanding of cryptography, how it has evolved, have a knowledge of information security planning and maintenance.	<ol style="list-style-type: none"><li>1. Enumerate the key terms and basics of Information Security along with Sec SDLC.</li><li>2. Understand how risk is identified and managed.</li><li>3. Identify management's role in development, maintenance and enforcement of Information Security policies</li><li>4. Plan for and respond to intruders in an information system, understand the basic principles of cryptography</li><li>5. Analyze the organizations information security blue print, discuss the need of maintaining information security program.</li></ol>

**UNIT- I**

**Introduction:** History, critical characteristics of information, NSTISSC security model, Components of an information system, Securing the components, balancing security and access, The SDLC, The security SDLC

**Need for Security:** Business needs, Threats, Attacks-secure software development

**UNIT-II**

**Legal, Ethical and Professional Issues:** Law and ethics in information security, relevant U.S laws-international laws and legal bodies, Ethics and information security

**Risk Management:** Overview, Risk Identification, risk assessment, Risk Control strategies, selecting a risk control strategy, Quantitative versus

qualitative risk control practices, Risk management discussion points, recommended risk control practices

### **UNIT-III**

**Planning for Security:** Security policy, Standards and practices, Security blue print, Security education, Continuity strategies.

**Security Technology:** Firewalls and VPNs: Physical design, firewalls, protecting remote connections.

### **UNIT-IV**

**Security Technology:** Intrusion detection, Access control and other security tools: Intrusion detection and prevention systems, Scanning and analysis tools, Access control devices.

**Cryptography:** Foundations of cryptology, cipher methods, cryptographic Algorithms, Cryptographic tools, Protocols for secure communications, Attacks on cryptosystems

### **UNIT-V**

**Implementing Information Security:** information security project management, technical topics of implementation, Non- technical aspects of implementation, Security certification and accreditation

**Security and Personnel:** Positioning and staffing security function, Employment policies and practices, internal control strategies.

**Information security Maintenance:** Security management models. The maintenance model, Digital forensics.

### **Learning Resources:**

1. Michael E. Whitman and Hebert J Mattord, Principles of Information Security, 4th edition, Ed. Cengage Learning 2011
2. Thomas R Peltier, Justing Peltier, John Blackley, Information Security. Fundamentals, Auerbacj Publications 2010
3. Detmar W Straub, Seymor Goodman, Richard L Baskerville, Information Security. Policy proceses and practices PHI 2008
4. Marks Merkow and Jim Breithaupt, Information Security. Principle and Practices, Pearson Education, 2007.
5. [https://onlinecourses.nptel.ac.in/noc17\\_cs08/preview](https://onlinecourses.nptel.ac.in/noc17_cs08/preview)
6. <http://nptel.ac.in/courses/106106129/>

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

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

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

**NEURAL NETWORKS AND DEEP LEARNING**  
**(Professional Elective-III)**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U18PE790IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

<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>
Introducethe fundamental concepts to Neural networks and deep learning and its various architectures to solve real-world problems	<ol style="list-style-type: none"><li>1. Demonstrate knowledge of neural networks and deep learning literature.</li><li>2. Apply an appropriate regularization and optimization techniques for DL models training.</li><li>3. Understand and apply DL architectures like CNN &amp; RNN to the given problem.</li><li>4. Understand various programming models to write, train and inference DL models.</li><li>5. Explain the relative strengths and weaknesses of different DL architectures and its applications.</li></ol>

**UNIT-I:**

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

**UNIT-II:**

**Regularization and Optimization techniques:**L1 and L2 regularization, Early stopping, Dataset augmentation, Parameter sharing, Bagging and Ensemble, Dropout and Adversarial training.

Challenges in optimization, Basic algorithms: SGD, Momentum, NesterovMomentum; Parameter initialization strategies, Adaptative learning algorithms: RMSProp, Adam.

**UNIT-III:**

**Convolutional Neural networks (or CNN):** Convolution operation, Motivation, Pooling, Convolution and pooling as an infinitely strong prior, Convolution variants, AlexNet, GoogleNet models, Applications.

**UNIT-IV:**

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

**UNIT-V:**

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

**Learning Resources:**

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

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

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Duration of Internal Test: <b>90 Minutes</b>				

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
**IBRAHIMBAGH, HYDERABAD – 500 031**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E VII-SEMESTER**

**SOFTWARE REUSE TECHNIQUES**  
**(Professional Elective-III)**

L : T : P (Hrs./week):

SEE Marks :60

Course Code :

3:0:0

**U18PE712IT**

Credits : 3

CIE Marks: 40

Duration of SEE : 3 Hours

<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>
develop reusable components and apply in business applications	1. Understand the basics of software reuse. 2. Identify various design patterns 3. Apply architectural patterns using case studies.

#### **UNIT-I**

Software reuse success factors, Reuse driven software engineering business, Object oriented software engineering, applications and component sub systems, use case components, object components.

#### **UNIT-II**

Design Patterns – Introduction, Creational patterns, factory, factory method, abstract factory, singleton, builder prototype.

#### **UNIT-III**

Structural Patterns- Adapters, bridge, composite, decorator, façade, flyweight, proxy.

Behavioral Patterns – Chain of responsibility, command, interpreter.

#### **UNIT-IV**

Behavioral Patterns – Iterator, mediator, memento, observer, state, strategy, template, visitor, other, design patterns- Whole part, master-slave, view handler, forwarder- receiver, client – dispatcher- server, publisher – subscriber.

#### **UNIT-V**

Architectural patterns – Layers, pipes and filters, black board, broker, model-view controller, presentation- abstraction – control, micro kernel, reflection.

### Learning Resources :

1. Ivar jacobson, Martin Griss, Patrick Hohson – Software Reuse. Architecture, Process and Organization for Bussiness Success, ACM Press, 1997.
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides – Design Patterns- Addison, 1995, Pearson Education.
3. Frank Buschmann etc. – Pattern Oriented Software Architecture – Volume 1, Wiley 1996.
4. James W Cooper – Java Design Patterns, a tutorial, Addison 2000, Pearson Education.
5. <http://nptel.ac.in/courses/106101061/27>
6. <http://www.nptelvideos.com/video.php?id=910>

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

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Duration of Internal Test: <b>90 Minutes</b>				

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**IBRAHIMBAGH, HYDERABAD – 500 031**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E VII-SEMESTER**

**PARALLEL AND DISTRIBUTED ALGORITHMS**  
**(Professional Elective-III)**

L : T : P (Hrs./week):

3:0:0

Credits : 3

SEE Marks :60

CIE Marks: 40

Course Code :

**U18PE722IT**

Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Understand the basic algorithms used in parallel and distributed systems.	<ol style="list-style-type: none"><li>1. To learn parallel and distributed algorithms development techniques for shared memory and message passing models.</li><li>2. To study the main classes of parallel algorithms.</li><li>3. To study the complexity and correctness models for parallel algorithms.</li></ol>

**UNIT-I** :Basic Techniques, Parallel Computers for increase Computation speed, Parallel & Cluster Computing, Dichotomy of Parallel Computing Platforms, Cost of Communication.

**UNIT-II** :Message Passing Technique- Evaluating Parallel programs and debugging, PRAM algorithms:Prefix Sums, List Ranking, Preorder Tree Traversal, Merging Two Sorted Lists, Portioning and Divide and Conquer strategies examples.

**UNIT-III** :Pipelining- Techniques computing platform, pipeline programs examples, Pipelining- Techniques computing platform, pipeline programs examples

**UNIT-IV**:Synchronous Computations, load balancing, distributed termination examples, programming with shared memory, shared memory multiprocessor constructs, parallel programming languages and constructs, Shared Memory Parallel Programming using OpenMP.

**UNIT-V** :Distributed shared memory systems and programming achieving constant memory distributed shared memory programming primitives, algorithms – sorting and numerical algorithms, Global state and snapshot algorithms, Mutual exclusion and Clock Synchronization.

**Learning Resources:**

1. Parallel Programming, Barry Wilkinson, Michael Allen, Pearson Education, 2nd Edition.
2. Introduction to Parallel algorithms by Jaja from Pearson, 1992
3. Michael J Quinn, Parallel Computing, TMH
4. Mukesh Singhal and Niranjana G. Shivaratri, Advanced Concepts in Operating Systems, TMH
5. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Introduction to Parallel Computing, Pearson

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

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Duration of Internal Test: <b>90 Minutes</b>				



**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E VII-SEMESTER**

**INFORMATION STORAGE AND MANAGEMENT**  
(Professional Elective-III)

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U18PE732IT</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>
The knowledge of different Storage techniques to practice scalable data universe generated by heterogeneous devices and understand the role of a storage system for a highly available self sustainable business solutions that are robust and secure.	<ol style="list-style-type: none"><li>1. Explain the need for storage management and differentiate between the types of storage architectures and demonstrate the key data center elements in a classic, virtualized environments</li><li>2. Describe the components of a storage device, evaluate the need for data protection using RAID and illustrate the role of an Intelligent Storage Systems.</li><li>3. Describe storage networking technologies such as FC-SAN, IP-SAN, NAS, and Object-based storage solutions</li><li>4. Determine the role of business continuity solutions that include backup, recovery, archival, local and remote replication.</li><li>5. Elaborate the importance of information, storage security domains by Identifying parameters for managing, monitoring and providing solutions to the storage infrastructure.</li></ol>

**UNIT-I**

**Introduction to Storage Technology:** Data creation and The value of data to a business, Information Lifecycle, Challenges in data storage and data management, Solutions available for data storage, Core elements of a Data Center infrastructure, role of each element in supporting business activities.

**UNIT-II**

**Storage Systems Architecture:** Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical

components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Integrated and Modular storage systems ,high-level architecture and working of an intelligent storage system

### **UNIT-III**

**Introduction to Networked Storage:** Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfil the need, Understand the appropriateness of the different networked storage options for different application environments.

### **UNIT-IV**

**Information Availability, Monitoring & Managing Data Center:** Reasons for planned/unplanned outages and the impact of downtime, Impact of downtime. Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identification of single points of failure in a storage infrastructure and solutions to mitigate these failures, Architecture of backup/recovery and the different backup/ recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities. Key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor storage infrastructure.

### **UNIT-V**

**Securing Storage and Storage Virtualization:** Information Security, Critical security attributes for information systems, Storage security domains, Analyze the common threats in each domain. Storage Virtualization: Forms, Configurations and Challenges. Types of Storage Virtualization: Block-level and File-Level.

### **Learning Resources:**

1. G.Somasundaram, Alok Shrivastava, EMC Education Series, "Information Storage and Management", 2<sup>nd</sup> Edition, Wiley, Publishing Inc., 2012.
2. Robert Spalding, "Storage Networks: The Complete Reference", TataMcGraw Hill,Osborne, 2003.
3. Marc Farley, "Building Storage Networks", TataMcGraw Hill, Osborne. 2001.
4. MeetaGupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.
5. <http://nptel.ac.in/courses/106108058/>

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

With effect from Academic Year 2021-22 (R-18)

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

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E VII-SEMESTER**

**DIGITAL IMAGE PROCESSING**  
**(Professional Elective-IV)**

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U18PE742IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hours

Course Objectives	Course Outcomes
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Understand the basic digital image processing techniques.	<ol style="list-style-type: none"><li>1. Identify the basic concepts of Image processing and compute the different transforms used in image processing.</li><li>2. Apply the different spatial and frequency domain methods for Image enhancement.</li><li>3. Use different techniques for Image segmentation.</li><li>4. Identify the different methods for Image compression.</li><li>5. Apply different morphological algorithms for image processing.</li></ol>

**UNIT – I**

Fundamentals of Image Processing and Image Transforms: Basic steps of Image Processing System, Sampling and Quantization of an image, relationship between pixels. Image Transforms: 2 D- Discrete Fourier Transform, Discrete Cosine Transform (DCT)

**UNIT – II**

Image Processing Techniques: Image Enhancement: Spatial domain methods: Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Frequency domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, Selective filtering.

**UNIT – III**

Image Segmentation: Segmentation concepts, Point, Line and Edge Detection. Thresholding, Region Based segmentation.

## UNIT – IV

Image Compression: Image compression fundamentals - Coding Redundancy, Spatial and Temporal redundancy, Compression models: Lossy & Lossless, Huffman coding, Arithmetic coding, LZW coding, Run length coding, Bit plane coding, Transform coding, Predictive coding, Wavelet coding, JPEG Standards.

## UNIT-V

Preliminaries of morphological Image processing, Erosion and Dilation, Basic Morphological algorithms like boundary extraction, hole filling, extraction of connected components.

### Learning Resources:

1. Gonzalez and Woods ,Digital Image Processing , 3rd ed., Pearson Education.
2. <http://www.nptelvideos.in/2012/12/digital-image-processing.html>

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

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

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

**OBJECT ORIENTED ANALYSIS AND DESIGN**  
**(Professional Elective-IV)**  
**SYLLABUS FOR B.E.- VII SEMESTER**

L:T:P (Hrs./week):3:0:0	SEE Marks : 60	Course Code : <b>U18PE752IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
<ul style="list-style-type: none"><li>Learn the basics of OO analysis and design skills.</li><li>Learn the UML design diagrams.</li><li>Learn to map design to code.</li><li>Be exposed to the various testing techniques.</li></ul>	<ol style="list-style-type: none"><li>Use the UML analysis and design diagrams.</li><li>Design and implement projects using OO concepts.</li><li>Apply appropriate design patterns.</li><li>Create code from design.</li><li>Compare and contrast various testing techniques.</li></ol>

**UNIT I UML DIAGRAMS**

Introduction to OOAD – Unified Process – UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.

**UNIT II DESIGN PATTERNS**

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller – Design Patterns – creational – factory method – structural – Bridge – Adapter – behavioral – Strategy – observer.

**UNIT III CASE STUDY**

Case study – the Next Gen POS system, Inception -Use case Modeling – Relating Use cases – include, extend and generalization – Elaboration – Domain Models – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies –

Aggregation and Composition.

## UNIT IV APPLYING DESIGN PATTERNS

System sequence diagrams – Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement – UML class diagrams – UML interaction diagrams – Applying GoF design patterns.

## UNIT V CODING AND TESTING

Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing.

### TEXT BOOK:

Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.

### REFERENCES:

1. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2010.
2. Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.
3. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.
4. Paul C. Jorgensen, "Software Testing:- A Craftsman"s Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.

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

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

Duration of Internal Test: **90 Minutes**

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**QUEUEING THEORY AND MODELING**  
**(Professional Elective-IV)**  
**SYLLABUS FOR B.E VII-SEMESTER**

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U18PE762IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hours

<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>
Learn the basics of queueing theory and its applications.	<ol style="list-style-type: none"><li>1. Distinguish different types of random variables and their distributions.</li><li>2. Explain Markovian and non-Markovian queueing systems.</li><li>3. Apply Markovian Chain techniques to M/G/1, G/M/1 models</li><li>4. Compare different types of networks of queues.</li><li>5. Explain matrix-geometric methods and their applications to computer and communication networks</li></ol>

**UNIT-I**

Review of probability, random variables, distributions, generating functions

**UNIT-II**

Poisson, Markov, renewal and semi-Markov processes

**UNIT-III**

Characteristics of queueing systems, Little's law, Markovian and non-Markovian queueing systems, embedded Markov chain applications to M/G/1, G/M/1 and related queueing systems

**UNIT-IV**



Networks of queues, open and closed queueing networks; Queues with vacations, priority queues, queues with modulated arrival process, discrete time queues

## UNIT-V

Introduction to matrix-geometric methods, applications in manufacturing, computer and communication networks.

### Learning Resources:

1. D. Gross and C. Harris, *Fundamentals of Queueing Theory, 3rd Edition*, Wiley, 1998. (WSE Edition, 2004).
2. L. Kleinrock, *Queueing Systems, Vol. 1: Theory*, Wiley, 1975.
3. J. Medhi, *Stochastic Models in Queueing Theory, 2nd Edition*, Academic Press, 2003. (Elsevier India Edition, 2006).
4. J.A. Buzacott and J.G. Shanthikumar, *Stochastic Models of Manufacturing Systems*, Prentice Hall, 1992.
5. R.B. Cooper, *Introduction to Queueing Theory, 2nd Edition*, North-Holland, 1981.
6. L. Kleinrock, *Queueing Systems, Vol. 2: Computer Applications*, Wiley, 1976.
7. R. Nelson, *Probability, Stochastic Processes, and Queueing Theory: The Mathematics of Computer Performance Modelling*, Springer, 1995.
8. E. Gelenbe and G. Pujolle, *Introduction to Queueing Networks, 2nd Edition*, Wiley, 1998.

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

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
IBRAHIMBAGH, HYDERBAD-500031  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SYLLABUS FOR B.E VII-SEMESTER**

**INFORMATION RETRIEVAL SYSTEMS**  
**(Professional Elective-IV)**

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : <b>U18PE772IT</b>
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hours

<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>
Gain knowledge on important concepts, algorithms, and data/file structures that are necessary to design, and implement Information Retrieval (IR) systems.	<ol style="list-style-type: none"><li>1. Identify the differences between past, present and future retrieval systems along with different Information Retrieval Models.</li><li>2. Analyze Structured Text Retrieval Models and retrieval evaluation.</li><li>3. Design and implementation of retrieval systems for text and other media.</li><li>4. Generate classification among the web pages using clustering and compression techniques.</li><li>5. Determine relevant data using sequential search and pattern matching, and analyze Parallel and distributed Information Retrieval.</li></ol>

### **UNIT-I**

Introduction: Basic concepts, Past present and Future of IRS, Retrieval Process. Modeling: Introduction, A Taxonomy of IR Models, Retrieval: Adhoc and Filterig, A formal characterization of IR Models, Classic IR, Set Theoretic Models, Algebraic Models, Probabilistic Models

### **UNIT-II**

Structured Text Retrieval Models, Models for Browsing, Retrieval Evaluation: Introduction, Reference Collections. Query languages: Introduction, Keyword-based querying, pattern Matching, Structural Queries, Query Protocols.

### UNIT-III

Query operations: Introduction, User Relevance Feedback, Automatic Local Analysis, Automatic Global Analysis. Text and Multimedia Languages and Properties: Introduction, Meta Data, Text, Markup Languages, Multimedia.

### UNIT-IV

Text operations: Introduction, Document Preprocessing, Document Clustering, Text Compression, Comparing Text Compression Techniques. Indexing: Introduction, Inverted Files, Other Indices for Text, Boolean Queries.

### UNIT-V

Searching: Sequential Searching, Pattern Matching, Structural Queries, Compression. Parallel and Distributed IR: Introduction, Parallel IR, Distributed IR.

#### Learning Resources:

1. Ricardo, Baeza-yates, Berthier Ribeiro-Neto, "Modern Information Retrieval" Pearson Education, 2008
2. David A. Grossman, Ophir Frieder, "Information Retrieval - Algorithms and Heuristics", Springer, 2<sup>nd</sup> Edition (Distributed by Universities Press), 2004.
3. Gerald Kowalski, "Information Retrieval Systems: Theory and Implementation", Kluwer Academic Publishers, 1997.
4. William B. Frakes, Ricardo Baeza- Yates, "Information Retrieval – Data Structures & Algorithms", Pearson Education, 2008.
5. [http://videlectures.net/Top/Computer\\_Science/Information\\_Retrieval/](http://videlectures.net/Top/Computer_Science/Information_Retrieval/)

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

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3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
Duration of Internal Test: <b>90 Minutes</b>				

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**COMPILER CONSTRUCTION LAB**  
**SYLLABUS FOR B.E. VII SEMESTER**

L : T : P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : U18PC711IT
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Learn and implement the different Phases of a compiler and usage of tools LEX,YACC	1. Implement simple lexical analyzer. 2. Generate predictive parsing table for a CFG. 3. Apply LEX and YACC tools to develop a scanner & parser. 4. Implement LR parser. 5. Implement code generation for simple expressions.

**LIST OF EXPERIMENTS**

1. Implementation of Lexical Analyzer to recognize a few patterns in C. (Ex. identifiers, constants, comments, operators etc.)
2. Implementation of Lexical Analyzer using LEX tool.
3. Implementation of Recursive Descent Parser.
4. Implementation of FIRST() of a given Context-Free Grammar.
5. Implementation of FOLLOW() of a given Context-Free Grammar.
6. Construction of a Predictive parsing Table for a given CFG.
7. Write a program for generating derivation sequence for a given terminal string using SLR parsing table.
8. Implementation of Desktop Calculator using LEX and YACC tools.
9. Implementation of simple code optimization techniques.
10. Implementation of Code Generation for simple expressions.

**Suggested Reading:**

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman – Compilers: Principles, Techniques & Tools – Pearson Education, Second Edition, 2007
2. John R Levine, Tony Mason, Dougn Broun, Lex and Yacc, Orielly, 2<sup>nd</sup> Edition, 2009

**Online Resources:**

1. <http://cse.iitkgp.ac.in/~bivasm/notes/LexAndYaccTutorial.pdf>

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

**VASAVI COLLEGE OF ENGINEERING(Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

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

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : <b>U18PC721IT</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>
Create a distributed application as well as utilize virtualization technologies for creating and managing virtual machines.	<ol style="list-style-type: none"><li>1. design and develop distributed applications using socket programming.</li><li>2. design and develop distributed applications using RMI.</li><li>3. create and manage virtual machines.</li><li>4. Write a distributed application using Map Reduce.</li><li>5. Write a distributed application using MPI.</li></ol>

**List of Experiments**

1. Write a JAVA program to implement socket based client server chat application.
2. Write a JAVA program to implement a client-server application using RMI.
3. Study of Virtualization (Type-1 and Type-2)
4. Write a Map Reduce application and execute it on Hadoop environment.
5. Write a distributed application using MPI (Message Passing Interface).

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

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**PROJECT SEMINAR**  
**SYLLABUS FOR B.E VII- SEMESTER**

L : T : P (Hrs./week): 0:0:2	SEE Marks : --	Course Code: <b>U18PW719IT</b>
Credits : 1	CIE Marks : 30	Duration of SEE : -

The objective of the project seminar is to actively involve the student in the initial work required to undertake the final year project. It may comprise of:

1. Problem definition and specifications.
2. A broad understanding of the available technologies/ tools to solve a problem of interest.
3. Presentation (Oral and Written) of the project.

Seminar topics may be chosen by the students with advice from the faculty members.

First 4 weeks of VII-Semester will be spent on special lectures by faculty members, research scholar speakers from industries and R&D institutions. The objective of these talks is to be expose students to real life /practical problems and methodologies to solve them.

A seminar schedule will be prepared by the coordinator for all the students. It should be from the 5th week to the last week of the semester and should be strictly adhered to.

Each student will be required to

1. Submit a one page synopsis of the seminar to be delivered for display on notice board.
2. Give a 20 minutes presentation followed by 10 minutes discussion.
3. Submit a technical write up on the talk delivered.

At least two teachers will be associated with the evaluation of the project seminar for the award of the CIE marks which should be on the basis of performance on all the three items stated above.

In the first Semester the student is expected to complete problem definition, requirements specification and analysis, design.

No. of Internal Reviews:	03	Max. Marks for Internal Reviews:	30
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**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**SCHEME OF INSTRUCTION AND EXAMINATION (R-18)**  
**B.E. – INFORMATION TECHNOLOGY : EIGHTH SEMESTER (2021 - 2022)**

B.E (IT) VIII-SEMESTER									
S No.	Course Code	Course Name	Scheme of Instruction			Scheme of Examination			
			Hours per week			Duration in Hrs	Maximum Marks		Credits
			L	T	P/D			SEE	
1	U18PE8XXIT	Professional Elective - V	3	-	-	3	60	40	3
2	U18PE8XXIT	Professional Elective - VI	3	-	-	3	60	40	3
3	U18PE0XXIT	MOOCs Certification	-	-	-	-	-	-	2
PRACTICALS									
4	U18PW819IT	Project / Internship	-	-	12	Viva-Voce	50	50	6
Total			6	-	12		170	130	14
Grand Total			18			-	300		

<b>Professional Elective – V</b>	<b>Professional Elective - VI</b>
U18PE810IT: Natural Language Processing	U18PE850IT: Computer Vision
U18PE820IT: Software Project Management	U18PE860IT: Agile Software Development
U18PE830IT: Computational Number Theory	U18PE870IT: Information Theory and Coding
U18PE840IT: Cloud Security	U18PE880IT: Block Chain



**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**NATURAL LANGUAGE PROCESSING**  
(Professional Elective-V)  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code :
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>
The main objective of this course is to introduce the fundamental techniques of natural language processing and state-of-the-art deep learning techniques needed to build cutting-edge NLP systems.	<ol style="list-style-type: none"><li>1. Apply hidden Markov models, and word embeddings to implement autocorrect, autocomplete and identify part-of-speech tags for words.</li><li>2. Apply logistic regression and naïve Bayes to implement NLP applications that perform sentiment analysis.</li><li>3. Apply word vectors to complete analogies and translate words.</li><li>4. Apply the concepts of neural networks, LSTM, GRUs for sentiment analysis, text generation and named entity recognition.</li><li>5. Design NLP applications that perform question-answering and create tools to translate languages and even build chatbots.</li></ol>

**UNIT- I**

**NLP with Probabilistic Models:**

**Regular Expressions, Text Normalization, Edit Distance:** Introduction to NLP, Applications of NLP, Regular Expressions, Words, Corpora, Text Normalization, Minimum Edit Distance.

**N-gram Language Models:** N-Grams, Evaluating Language Models, Generalization and Zeros, Smoothing, Kneser-Ney Smoothing, Huge Language Models and Stupid Backoff.

**Sequence Labeling for Parts of Speech and Named Entities:** English Word Classes, Part-of-Speech Tagging, Named Entities and Named Entity Tagging, HMM for Part-of-Speech Tagging, Conditional Random Fields (CRFs).

## **UNIT- II**

### **NLP with Classification:**

**Naive Bayes and Sentiment Classification:** Naive Bayes Classifiers, Training the Naive Bayes Classifier, Worked example, Optimizing for Sentiment Analysis, Naive Bayes for other text classification tasks, Naive Bayes as a Language Model, Evaluation, Test sets and Cross-validation, Statistical Significance Testing.

**Logistic Regression:** The sigmoid, Learning in Logistic Regression, The cross-entropy loss function, Gradient Descent, Regularization, Multinomial logistic regression, Interpreting models, Deriving the Gradient Equation.

## **UNIT- III**

### **NLP with Vector Spaces:**

**Vector Semantics and Embeddings:** Lexical Semantics, Vector Semantics, Words and Vectors, Cosine for measuring similarity, TF-IDF: Weighing terms in the vector, Pointwise Mutual Information (PMI), Applications of the TF-IDF or PPMI vector models, Word2vec, Visualizing Embeddings, Semantic properties of embeddings, Bias and Embeddings, Evaluating Vector Models.

## **UNIT- IV**

### **NLP with Sequence Models:**

**Neural Networks and Neural Language Models:** Units, The XOR problem, Feed-Forward Neural Networks, Training Neural Nets, Neural Language Models.

**Deep Learning Architectures for Sequence Processing:** Language Models Revisited, Recurrent Neural Networks, Managing Context in RNNs: LSTMs and GRUs.

## **UNIT- V**

### **NLP with Attention Models:**

**Machine Translation and Encoder-Decoder Models:** Self-Attention Networks-Transformers, Language Divergences and Typology, The Encoder-Decoder Model, Encoder-Decoder with RNNs, Attention, Beam Search, Encoder-Decoder with Transformers.

**Question Answering:** Information Retrieval, IR-based Factoid Question Answering, Entity Linking, Knowledge-based Question Answering, Using Language Models to do QA, Classic QA Models, Evaluation of Factoid Answers.

**Chatbots & Dialogue Systems:** Chatbots, GUS: Simple Frame-based Dialogue Systems, The Dialogue-State Architecture, Evaluating Dialogue Systems, Dialogue System Design.

**Learning Resources :**

1. Jurafsky Dan and Martin James H. "Speech and Language Processing", Third Edition, 2018.
2. Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Python, First Edition, OReilly Media, 2009.
3. James Allen, "Natural Language Understanding", Pearson Education
4. Christopher D Manning and HinrichSchutze, "Foundations of Statistical Natural Language Processing" MIT Press, 1999.
5. Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, "NLP: A Paninian Perspective", Prentice Hall, New Delhi
6. <https://nptel.ac.in/courses/106/105/106105158/>
7. <http://www.nptelvideos.in/2012/11/natural-language-processing.html>

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

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3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
Duration of Internal Test: <b>90 Minutes</b>				

**VASAVI COLLEGE OF ENGINEERING (Autonomous)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**SOFTWARE PROJECT MANAGEMENT**  
**(Professional Elective-V)**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U18PE820IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	Course Outcomes
<b>The course will enable the students to:</b>	<b>At the end of the course student will be able to:</b>
Understand the fundamental principles of Software Project management & will also have a good knowledge of responsibilities of project manager and how to handle these	<ol style="list-style-type: none"><li>1. Describe the fundamentals of Project Management</li><li>2. Recognize and use Project Scheduling Techniques</li><li>3. Familiarize with Project Control Mechanisms</li><li>4. Understand Team Management</li><li>5. Recognize the importance of Project Documentation and Evaluation</li></ol>

### **UNIT-I**

**Conventional Software Management:** The waterfall model, conventional software Management performance, Evolution of Software Economics, Improving Software Economics: Reducing Software product size. The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

### **UNIT-II**

**Life cycle phases:** Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, pragmatic artifacts, Work Flows of the process, Checkpoints of the process.

### **UNIT-III**

**Iterative Process Planning:** work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic

planning, Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

#### **UNIT-IV**

**Project Control and Process instrumentation:** The seven core Metrics, Management indicators, quality indicators, Tailoring the Process: Process discriminants. Managing people and organizing teams.

#### **UNIT-V**

**Future Software Project Management:** modern Project Profiles, Next generation Software economics, modern process transitions. Process improvement and mapping to the CMM.

#### **Learning Resources:**

- 1) Walker Royce, Software Project Management: A Unified Framework, Pearson Education 1998
- 2) Bob Hughes and Mike Cotterell – Software Project Management, 4th Edition – Tata McGraw Hill – 2006
- 3) Pankaj Jalote, Software Project Management, Pearson Education – 2002
- 4) <http://nptel.ac.in/courses/106101061/29>

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

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3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
Duration of Internal Test: <b>90 Minutes</b>				

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

**COMPUTATIONAL NUMBER THEORY**  
**(Professional Elective-V)**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U18PE830IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

<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>
Introduce computational aspects of number theory and various algorithms related to prime numbers, integer factorization and discrete logarithms.	<ol style="list-style-type: none"><li>1. Demonstrate knowledge of the computational aspects of number theory concepts.</li><li>2. Understand various algorithms available in number theory.</li><li>3. Apply the algorithms and study its practical computational aspects for integer factorization, primality testing.</li><li>4. Understand the complexity of various algorithms</li><li>5. Explain the relative strengths and weaknesses of different algorithms.</li></ol>

**UNIT-I**

- **Algorithms for integer arithmetic:** Divisibility, gcd, modular arithmetic, modular exponentiation, Montgomery arithmetic, congruence, Chinese remainder theorem, Hensel lifting, orders and primitive roots, quadratic residues, integer and modular square roots, prime number theorem, continued fractions and rational approximations.

**UNIT-II**

- **Representation of finite fields:** Prime and extension fields, representation of extension fields, polynomial basis, primitive elements, normal basis, optimal normal basis, irreducible polynomials.
- **Algorithms for polynomials:** Root-finding and factorization, Lenstra-Lenstra-Lovasz algorithm, polynomials over finite fields.

**UNIT-III**

- **Elliptic curves:** The elliptic curve group, elliptic curves over finite fields, Schoof's point counting algorithm

- **Primality testing algorithms:** Fermat test, Miller-Rabin test, Solovay-Strassen test, AKS test.

#### UNIT-IV

- **Integer factoring algorithms:** Trial division, Pollard rho method,  $p-1$  method, CFRAC method, quadratic sieve method, elliptic curve method.
- **Computing discrete logarithms over finite fields:** Baby-step-giant-step method, Pollard rho method, Pohlig-Hellman method, index calculus methods, linear sieve method, Coppersmith's algorithm.

#### UNIT-V

- **Applications:** Algebraic coding theory, cryptography.

#### Learning Resources:

1. V. Shoup, [\*A computational introduction to number theory and algebra\*](#), Cambridge University Press.
2. M. Mignotte, [\*Mathematics for computer algebra\*](#), Springer-Verlag.
3. Niven, H. S. Zuckerman and H. L. Montgomery, *An introduction to the theory of numbers*, John Wiley.
4. J. von zurGathen and J. Gerhard, [\*Modern computer algebra\*](#), Cambridge University Press.
5. R. Lidl and H. Niederreiter, [\*Introduction to finite fields and their applications\*](#), Cambridge University Press.
6. J. Menezes, editor, [\*Applications of finite fields\*](#), Kluwer Academic Publishers.
7. J. H. Silverman and J. Tate, [\*Rational points on elliptic curves\*](#), Springer International Edition.
8. D. R. Hankerson, A. J. Menezes and S. A. Vanstone, [\*Guide to elliptic curve cryptography\*](#), Springer-Verlag.
9. Das and C. E. VeniMadhavan, [\*Public-key cryptography: Theory and practice\*](#), Pearson Education Asia.
10. H. Cohen, [\*A course in computational algebraic number theory\*](#), Springer-Verlag

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

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Duration of Internal Test: <b>90 Minutes</b>				

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

**CLOUD SECURITY**  
**(Professional Elective-V)**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U18PE840IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

<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>
Understand the concepts related to security mechanisms in cloud computing	<ol style="list-style-type: none"><li>1. Understand the basic principles of cloud security.</li><li>2. Explain the various security concerns in cloud computing.</li><li>3. Assess the risk tolerance in cloud computing</li><li>4. Identify the architectural features for providing cloud security</li><li>5. Explain about the mechanisms related to security data in the cloud.</li></ol>

**UNIT-I**

Introduction to Cloud Security: Terminology and principles, Risk Management, Security as a business enabler, Systems engineering, IT Architecture, Control over security in cloud model.

**UNIT-II**

Cloud Computing Security concerns: Virtualization, Provisioning, Cloud Storage, Cloud Operation, Security and networking.

**UNIT-III**

Risk Tolerance in Cloud Computing: Assessing the Risk, Information assets and Risk, Privacy and confidentiality concerns, Data ownership and Locale concerns, Auditing and Forensics, Emerging threats.

**UNIT-IV**

Securing the Cloud - Architectural aspects: Security requirements for architecture-Physical security, Cloud security standards and policies, Cloud security requirements, Security patterns and architecture elements-Defense-in-depth, Honey-pots, Sandboxes, Network pattern, Importance of CMDB, Cabling patterns, Resilience and grace, planning for change



## UNIT-V

Securing the Cloud-Data Security: Overview of Data security in Cloud Computing-Control over data and public cloud economics, organizational responsibility: ownership and custodianship, Data in rest, data in motion, common risk with cloud data security, Cloud data security: Sensitive data categorization- authentication and identity, access control techniques, data categorization and the use of data labels, application of encryption at data at rest and data in motion

### Learning Resources:

1. Vic Winkler 'Securing the cloud' Syngress/Elsevier , April 2011
2. Thomas Erl 'Cloud Computing Design Patterns', Prentice Hall, 1<sup>st</sup> edition, June, 2015
3. <https://www.oreilly.com/library/view/securing-the-cloud/9781597495929/>
4. [https://www.academia.edu/19589929/Securing\\_the\\_Cloud](https://www.academia.edu/19589929/Securing_the_Cloud)
5. [file:///F:/IT%20Department/VCE%20AUTONOMOUS%20-%20BOS/2019-20/BOS%20CBCS%202019-20/Scheme/cscie\\_49.pdf](file:///F:/IT%20Department/VCE%20AUTONOMOUS%20-%20BOS/2019-20/BOS%20CBCS%202019-20/Scheme/cscie_49.pdf)
6. <https://canvas.harvard.edu/courses/8146/assignments/syllabus>

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

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

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

**COMPUTER VISION**  
**(Professional Elective-VI)**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U18PE850IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

<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>
The applications of pattern recognition techniques and Deep Neural Networks to problems of machine vision is the main focus for this course. Topics covered include, an overview of problems of machine vision and pattern classification, image formation and processing, feature extraction from images, object recognition, tracking and Gesture recognition.	

**Unit -1**

**Introduction:** Background, requirements and issues, human vision

**Image formation:** Geometric primitives and transformations, Photometric image formation, The digital camera.

**Unit-2**

Feature detection and matching: Points and patches, Edges, Lines  
Statistical approaches for Feature Extraction: Mathematical Notation & Background, Fourier Transform, Windowed Fourier Transform, Wavelets, Bayesian Decision Theory, Principal and Independent Component Analysis

**Unit-3**

Classification and Clustering: Bayes classifiers, SVM classifiers

Segmentation, Split and merge, Mean shift and mode finding – Medical Image segmentation

#### **Unit 4:**

Artificial neural networks: CNNs, Deep Learning Methods for Image classification, object detection and Instance recognition. Category recognition, Context and scene understanding

#### **Unit -5**

Deep learning for Face recognition, Visual question answering, Tracking, Gesture recognition

#### **Learning Resources:**

1. "Computer Vision: Algorithms and Applications", Richard Szeliski, 2010 (online version available at no cost for personal use).
2. "Computer Vision: A Modern Approach", D. Forsyth and J. Ponce, 2010.
3. "Deep Learning: Algorithms and Applications", I. Goodfellow, Y. Bengio and A. Courville, 2017 (online version available at no cost for personal use).
4. "A Guide to Convolutional Neural Networks for Computer Vision", S. Khan, H. Rahmani, S. Shah and M. Bennamoun, 2018 (online version available from a USC account).

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

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

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

**AGILE SOFTWARE DEVELOPMENT**  
**(Professional Elective-VI)**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U18PE860IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

<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>
Introduce Agile development methodologies and understanding of its practical application to today's software development to deliver the products or services quickly with high quality.	<ol style="list-style-type: none"><li>1. Apply Agile Software Development practices and work small teams to create high-quality software.</li><li>2. Understand the concepts of software design and a set of software technologies and APIs.</li><li>3. Demonstrate Agile development and testing techniques.</li><li>4. Understand the benefits and pitfalls of working in an Agile team.</li></ol>

**UNIT I AGILE METHODOLOGY**

Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model – Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams – Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values

**UNIT II AGILE PROCESSES**

Lean Production – SCRUM, Crystal, Feature Driven Development- Adaptive Software Development – Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.

**UNIT III AGILITY AND KNOWLEDGE MANAGEMENT**

Agile Information Systems – Agile Decision Making – Earl\_S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile

Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).

## **UNIT IV AGILITY AND REQUIREMENTS ENGINEERING**

Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.

## **UNIT V AGILITY AND QUALITY ASSURANCE**

Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance – Test Driven Development – Agile Approach in Global Software Development.

### **Learning Resources:**

1. David J. Anderson and Eli Schragenheim, —Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003.
2. Hazza and Dubinsky, —Agile Software Engineering, Series: Undergraduate Topics in Computer Science, Springer, 2009.
3. Craig Larman, —Agile and Iterative Development: A Managers Guide, Addison-Wesley, 2004.
4. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Management, Butterworth-Heinemann, 2007.

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

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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: <b>90 Minutes</b>				

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

**INFORMATION THEORY AND CODING**  
**(Professional Elective-VI)**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U18PE870IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

<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>
Understand the basic principles of Information Theory and coding.	<ol style="list-style-type: none"><li>1. Define the fundamental concepts related to Information Theory</li><li>2. Apply the concept of Huffman coding in block to variable length coding</li><li>3. Apply the concepts of Arithmetic, Lempel-Ziv and Tunstall codes in variable to variable length coding.</li><li>4. define and compute the channel capacity of discrete memoryless channels.</li><li>5. Define the concepts related to differential entropy, Gaussian channel, parallel gaussian channels.</li></ol>

**Unit-I:**

Introduction: Entropy, Relative Entropy, Mutual Information, Information Inequalities,

Block to Variable length coding-I: Kraft's Inequality.

**Unit-II:**

Block to variable length coding -II: Huffman coding, Variable to Block length coding: Tunstall coding.

### **Unit-III:**

Block to Block length coding: Typical sequences; Variable to variable length coding-I: Arithmetic codes, Variable to variable length coding-II: Lempel-Ziv codes.

### **Unit-IV:**

Asymptotic Equipartition property, coding for sources with memory, Noisy channel coding theorem, converse of noisy channel coding theorem, Channel capacity of discrete memoryless channels

### **Unit -V:**

Differential Entropy, Gaussian channel, Parallel Gaussian channel, Rate Distortion Theory.

### **Learning Resources:**

1. **Thomas M. Cover, Joy A. Thomas, ``Elements of Information Theory'', 2nd Edition, John Wiley & Sons, 2006.**
2. <https://nptel.ac.in/courses/117108097/>

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

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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: <b>90 Minutes</b>				

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

**BLOCK CHAIN**  
**(Professional Elective-VI)**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : <b>U18PE880IT</b>
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

<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>
Understand the fundamental concepts in blockchain, its architecture and platforms and build blockchain related applications for various use cases.	<ol style="list-style-type: none"><li>1. Demonstrate knowledge of the blockchain technologies.</li><li>2. Understanding various architectures used in blockchain.</li><li>3. Understand various platforms available to build blockchain apps</li><li>4. Apply block chain technologies to various use cases.</li><li>5. Explain the relative strengths and weaknesses of different approaches in blockchain algorithms.</li></ol>

**UNIT-I: Introduction**

History: Digital Money to Distributed Ledgers, Crypto currencies, Design Primitives: Protocols, Security, Consensus, Permissions, Privacy

**UNIT-II: Cryptography primitives, Blockchain Architecture and Design:** Basic crypto primitives: Hashing, Signature, Privacy and Security, Hash chain to Blockchain, Basic consensus mechanisms, Requirements for the consensus protocols, Proof of Work (PoW), Scalability aspects of Blockchain consensus protocols

**UNIT-III: Private and public Blockchains:** private, public, Permissioned Blockchains, Design goals, Consensus protocols for Permissioned Blockchains.

**UNIT-IV: Ethereum and Hyperledger Fabric Platforms:**Decomposing the consensus process, Hyperledger fabric components,Chain code Design and



Implementation, fabric SDK and Front End, Hyperledger composer tool, Ethereum platform and programming.

**UNIT-V: Use cases:**Blockchain in Financial Software and Systems (FSS): Settlements, KYC, Capital markets, Insurance.

Blockchain in trade supply chain: Provenance of goods, visibility, trade supply chain finance, invoice management discounting, etc.

Blockchain for Government: Digital identity, land records and other kinds of record keeping between government entities, public distribution system social welfare systems

### Learning Resources:

1. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos
2. Blockchain by Melanie Swa, O'Reilly
3. Hyperledger Fabric - <https://www.hyperledger.org/projects/fabric>
4. Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits  
<https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html>

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

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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: <b>90 Minutes</b>				

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

**PROJECT / INTERNSHIP**  
**SYLLABUS FOR B.E VIII-SEMESTER**

L:T:P (Hrs./week): 0:0:12	SEE Marks : 50	Course Code : <b>U18PW819IT</b>
Credits : 6	CIE Marks : 50	Duration of SEE: VIVA-VOCE

Focus of U.G. Project should be on *Solving a Real Life Problem*.

Faculty members should prepare project briefs well in advance. They should be made available to the students at the departmental library.

A project may be classified as hardware/software/modeling/simulation. It should involve elements of such as analysis, design, coding, testing, etc.,

The department will appoint a project coordinator who will be incharge of the following:

- Grouping of students ( a maximum of three in a group)
- Allotment of projects and project guides
- Project monitoring at regular intervals

Project allotments is to be completed by the 4th week of 1st Semester of IV years to that students

get sufficient time for completion of their projects.

All projects are to be based on the grade/marks, awarded by a monitoring committee comprising of faculty members as well as by the supervisor.

Efforts are to be made so that some of the projects are carried out in industries.

Projects may also be invited from industries.

Norms for final documentation of the project report are to be provided by the department.

\* Excellent / Very Good / Good / Satisfactory / Unsatisfactory.

Note: Three periods of contact load will be assigned to each project guide.

No. of Internal Reviews:	2	Max. Marks for Internal Reviews:	50
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**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)**  
**HYDERABAD-500031**

**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**ACTIVITY CALENDAR FOR THE ACADEMIC YEAR**  
**2021-2022**

S. No.	Date	Day	Details of Activity / Public Holiday
<b>July 2021</b>			
1	01-7-2021	Thursday	Semester End lab Exams for IV, VI & VIII Sem students
2	02-7-2021	Friday	Semester End lab Exams for IV, VI & VIII Sem students
3	03-7-2021	Saturday	Semester End lab Exams for IV, VI & VIII Sem students
4	04-7-2021	Sunday	Public Holiday
5	05-7-2021	Monday	Semester End lab Exams for IV, VI & VIII Sem students
6	06-7-2021	Tuesday	Semester End lab Exams for IV, VI & VIII Sem students
7	07-7-2021	Wednesday	Semester End lab Exams for IV, VI & VIII Sem students
8	08-7-2021	Thursday	Semester End lab Exams for IV, VI & VIII Sem students
9	09-7-2021	Friday	Semester End lab Exams for IV, VI & VIII Sem students
10	10-7-2021	Saturday	Mock Interview by Alumni –Vishal for VIII Sem (2022 Batch) students Semester End lab Exams for IV, VI & VIII Sem students
11	11-7-2021	Sunday	<b>Public Holiday</b>
12	12-7-2021	Monday	Semester End Theory Exams for IV, VI & VIII Sem students
13	13-7-2021	Tuesday	Semester End Theory Exams for IV, VI & VIII Sem students
14	14-7-2021	Wednesday	Semester End Theory Exams for IV, VI & VIII Sem students
15	15-7-2021	Thursday	Semester End Theory Exams for IV, VI & VIII Sem students
16	16-7-2021	Friday	Semester End Theory Exams for IV, VI & VIII Sem students
17	17-7-2021	Saturday	Mock Interview by Alumni –Santosh, Kiranmayi , Sarika, Akhil & Srikar for VIII Sem (2022 Passed out) students Semester End Theory Exams for IV, VI & VIII Sem students
18	18-7-2021	Sunday	Mock Interview by Alumni –Santosh, Kiranmayi , Sarika, Akhil & Srikar for VIII Sem (2022 Passed out) students
19	19-7-2021	Monday	Mock Interview by Alumni –Abhijeeth for VIII Sem (2022 Batch) students Semester End Theory Exams for IV, VI & VIII Sem students
20	20-7-2021	Tuesday	Mock Interview by Alumni –Abhijeeth for VIII Sem (2022 Batch) students Semester End Theory Exams for IV, VI & VIII Sem students
21	21-7-2021	Wednesday	Semester End Theory Exams for IV, VI & VIII Sem students
22	22-7-2021	Thursday	Semester End Theory Exams for IV, VI & VIII Sem students
23	23-7-2021	Friday	Semester End Theory Exams for IV, VI & VIII Sem students
24	24-7-2021	Saturday	Semester End Theory Exams for IV, VI & VIII Sem students
25	25-7-2021	Sunday	PUBLIC HOLIDAY
26	26-7-2021	Monday	Semester End Theory Exams for IV, VI & VIII Sem students

With effect from Academic Year 2021-22 (R-18)

S. No.	Date	Day	Details of Activity / Public Holiday
27	27-7-2021	Tuesday	Semester End Theory Exams for IV, VI & VIII Sem students
28	28-7-2021	Wednesday	Semester End Theory Exams for IV, VI & VIII Sem students Recommencement of Classwork for II sem students
29	29-7-2021	Thursday	Semester End Theory Exams for IV, VI & VIII Sem students
30	30-7-2021	Friday	Semester End Theory Exams for IV, VI & VIII Sem students
31	31-7-2021	Saturday	Semester End Theory Exams for IV, VI & VIII Sem students
<b>August 2021</b>			
32	1-8-2021	Sunday	PUBLIC HOLIDAY
33	2-8-2021	Monday	<b>Bonalu</b>
34	3-8-2021	Tuesday	
35	4-8-2021	Wednesday	
36	5-8-2021	Thursday	
37	6-8-2021	Friday	
38	7-8-2021	Saturday	
39	8-8-2021	Sunday	PUBLIC HOLIDAY
40	9-8-2021	Monday	
41	10-8-2021	Tuesday	
42	11-8-2021	Wednesday	
43	12-8-2021	Thursday	
44	13-8-2021	Friday	
45	14-8-2021	Saturday	
46	15-8-2021	Sunday	<b>Independence Day</b>
47	16-8-2021	Monday	Advance Supplementary Exams for IV, VI & VIII Sem students Second Internal for II sem Students
48	17-8-2021	Tuesday	Advance Supplementary Exams for IV, VI & VIII Sem students Second Internal for II Sem Students
49	18-8-2021	Wednesday	Advance Supplementary Exams for IV, VI & VIII Sem students Second Internal for II sem Students
50	19-8-2021	Thursday	Muharram
51	20-8-2021	Friday	Advance Supplementary Exams for IV, VI & VIII Sem students
52	21-8-2021	Saturday	Advance Supplementary Exams for IV, VI & VIII Sem students
53	22-8-2021	Sunday	PUBLIC HOLIDAY
54	23-8-2021	Monday	Advance Supplementary Exams for IV, VI & VIII Sem students
55	24-8-2021	Tuesday	Advance Supplementary Exams for IV, VI & VIII Sem students
56	25-8-2021	Wednesday	Seminar on Demonstration of accessing journals remotely for V-Semester IT A&B, Mr. Ravi Kumar, Librarian, VCE Advance Supplementary Exams for IV, VI & VIII Sem

With effect from Academic Year 2021-22 (R-18)

S. No.	Date	Day	Details of Activity / Public Holiday
			students
57	26-8-2021	Thursday	Certification exam on "Introduction to Network switching and Routing Lab" under CC Activity. Advance Supplementary Exams for IV, VI & VIII Sem students Semester End Theory Exams for II Sem students
58	27-8-2021	Friday	Workshop on Introduction to Data Analytics for V-Semester IT A&B by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli (27-29 August 2021) under Professional Body Activity Advance Supplementary Exams for IV, VI & VIII Sem students Semester End Theory Exams for II Sem students
59	28-8-2021	Saturday	Workshop on Introduction to Data Analytics for V-Semester IT A&B by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli (27-29 August 2021) under Professional Body Activity Advance Supplementary Exams for IV, VI & VIII Sem students Semester End Theory Exams for II Sem students
60	29-8-2021	Sunday	Workshop on Introduction to Data Analytics for V-Semester IT A&B by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli (27-29 August 2021) under Professional Body Activity
61	30-8-2021	Monday	<b>Janmashtami</b> Course Registration by V and VII Sem students
62	31-8-2021	Tuesday	Advance Supplementary Exams for IV, VI & VIII Sem students Semester End Theory Exams for II Sem students Course Registration by V and VII Sem students
<b>September 2021</b>			
63	1-9-2021	Wednesday	Workshop on Android Development for V-Sem IT A&B by Mr. R. Dharma Reddy, Asst. Professor, Department of Information Technology, VCE (1-3 September 2021) Under CCA Activity Advance Supplementary Exams for IV, VI & VIII Sem students Semester End Theory Exams for II Sem students Course Registration by V and VII Sem students
64	2-9-2021	Thursday	Workshop on Android Development for V-Sem IT A&B by Mr. R. Dharma Reddy, Asst. Professor, Department of Information Technology, VCE (1-3 September 2021) Under CCA Activity Advance Supplementary Exams for IV, VI & VIII Sem students

With effect from Academic Year 2021-22 (R-18)

S. No.	Date	Day	Details of Activity / Public Holiday
			Semester End Theory Exams for II Sem students Course Registration by V and VII Sem students
65	3-9-2021	Friday	Workshop on Android Development for V-Sem IT A&B by Mr. R. Dharma Reddy, Asst. Professor, Department of Information Technology, VCE (1-3 September 2021) Under CCA Activity Advance Supplementary Exams for IV, VI & VIII Sem students Semester End Theory Exams for II Sem students Course Registration by V and VII Sem students
66	4-9-2021	Saturday	Advance Supplementary Exams for IV, VI & VIII Sem students Semester End Theory Exams for II Sem students Course Registration by V and VII Sem students
67	5-9-2021	Sunday	Public Holiday
68	6-9-2021	Monday	Commencement of classwork for V and VII Sem Semester End Theory Exams for II Sem students
69	7-9-2021	Tuesday	Semester End Theory Exams for II Sem students
70	8-9-2021	Wednesday	Semester End Theory Exams for II Sem students
71	9-9-2021	Thursday	Semester End lab Exams for II Sem students
72	10-9-2021	Friday	<b>Ganesh Chaturthi</b>
73	11-9-2021	Saturday	Workshop on Introduction to Data Analytics(contd) for V-Semester IT A&B by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli under professional Body Activity. Semester End lab Exams for II Sem students
74	12-9-2021	Sunday	"VASAVI CODATHON – 2021"-Round-1on Online Programming Quiz in collaboration with M/s. Campus Corporate Connect (CCC) for V and VII Semester students of CSE and IT, for the academic year 2021-22.
75	13-9-2021	Monday	Semester End lab Exams for II Sem students
76	14-9-2021	Tuesday	Semester End lab Exams for II Sem students
77	15-9-2021	Wednesday	Guest Lecture on Software Testing with ML for VII Sem A&B by professor from Manipal University, Jaipur Under CSI activity Course Registration by III Sem Students
78	16-9-2021	Thursday	Course Registration by III Sem Students
79	17-9-2021	Friday	Course Registration by III Sem Students
80	18-9-2021	Saturday	Guest Lecture on Introduction to Data visualization and Descriptive Statistics for V-Semester IT A&B by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli Under Professional Body Activity  Guest Lecture on Introduction to CCA Paper Presentation for



With effect from Academic Year 2021-22 (R-18)

S. No.	Date	Day	Details of Activity / Public Holiday
			V-Sem to IT A&B Students by Dr. Raghavendra Kune, Adjunct Faculty & Scientist/Engineer 'SG', Head High performance computing Drones(HPCD), Advanced Data Processing Research Institute (ADRIN), Dept. of Space, ISRO.  Course Registration by III Sem Students
81	19-9-2021	Sunday	PUBLIC HOLIDAY
82	20-9-2021	Monday	Commencement of III Sem Classwork
83	21-9-2021	Tuesday	Awareness on Virtual Labs by IIIT Hyderabad for III Sem by Mr. Ravi Shankar under CC Activity.
84	22-9-2021	Wednesday	
85	23-9-2021	Thursday	
86	24-9-2021	Friday	
87	25-9-2021	Saturday	Alumni Interaction for III Sem students Workshop on Advanced Python by Mr. Amar Sharma for III Sem. under professional Body activity
88	26-9-2021	Sunday	PUBLIC HOLIDAY
89	27-9-2021	Monday	
90	28-9-2021	Tuesday	Microsoft Learn Student Event for III sem by Microsoft Learn Student Ambassadors Taruni & Sonal. K on " Hands-on GitHub" Under CC Activity
91	29-9-2021	Wednesday	Guest Lecture on Theory of Automata by U.S.N.Raju for V-Sem A,B&C students under Professional Body Activity.
92	30-9-2021	Thursday	
<b>October 2021</b>			
93	1-10-2021	Friday	
94	2-10-2021	Saturday	Gandhi Jayanti
95	3-10-2021	Sunday	PUBLIC HOLIDAY
96	4-10-2021	Monday	
97	5-10-2021	Tuesday	Code Chef Event by Student Ambassadors of V-Sem for III-A,B&C students. Under CC Activity
98	6-10-2021	Wednesday	<b>First Day of Bathukamma</b>
99	7-10-2021	Thursday	
100	8-10-2021	Friday	
101	9-10-2021	Saturday	Alumni Interaction for V Sem Students
102	10-10-2021	Sunday	PUBLIC HOLIDAY
103	11-10-2021	Monday	
104	12-10-2021	Tuesday	"VASAVI CODATHON – 2021"-Round-II on Online Coding Challenge in collaboration with M/s. Campus Corporate Connect (CCC) for V and VII Semester students of CSE and IT, for the academic year 2021-22.
105	13-10-2021	Wednesday	
106	14-10-2021	Thursday	

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S. No.	Date	Day	Details of Activity / Public Holiday
107	15-10-2021	Friday	<b>Vijaya Dashami</b>
108	16-10-2021	Saturday	Workshop on Advanced Python by Mr. Amar Sharma for III Sem. under professional Body activity.
109	17-10-2021	Sunday	PUBLIC HOLIDAY
110	18-10-2021	Monday	First spell of offline lab session for V sem students I internal for VII Sem students
111	19-10-2021	Tuesday	<b>Eid e Milad</b>
112	20-10-2021	Wednesday	First spell of offline lab session for V sem students I internal for VII Sem students
113	21-10-2021	Thursday	First spell of offline lab session for V sem students I internal for VII Sem students
114	22-10-2021	Friday	Guest Lecture on Compiler Construction by Dr. U. S. N. Raju for VII-Sem A,B students. Under Professional Body Activity First spell of offline lab session for V sem students I internal for VII Sem students
115	23-10-2021	Saturday	Guest Lecture on DCCN by Dr. Radha Krishna, NIT Warangal, for V-Sem A, B & C students. Under CC Activity Guest Lecture on Digital Image Processing by U. S. N. Raju for VII-Sem A, B Students. Under Professional Body Activity First spell of offline lab session for V sem students I internal for VII Sem students
116	24-10-2021	Sunday	PUBLIC HOLIDAY
117	25-10-2021	Monday	Researcher's Forum on "Computational Intelligence" organized by Dept of IT on 25-26 October 2021. Under Professional Body Activity First spell of offline lab session for VII sem students I Internal for V sem Students
118	26-10-2021	Tuesday	Researcher's Forum on "Computational Intelligence" organized by Dept of IT on 25-26 October 2021. Under Professional Body Activity
119	27-10-2021	Wednesday	
120	28-10-2021	Thursday	
121	29-10-2021	Friday	
122	30-10-2021	Saturday	
123	31-10-2021	Sunday	PUBLIC HOLIDAY
<b>November 2021</b>			
124	1-11-2021	Monday	First spell of offline lab session for III sem students
125	2-11-2021	Tuesday	First spell of offline lab session for III sem students
126	3-11-2021	Wednesday	First spell of offline lab session for III sem students
127	4-11-2021	Thursday	<b>Diwali</b>
128	5-11-2021	Friday	First spell of offline lab session for III sem students
129	6-11-2021	Saturday	First spell of offline lab session for III sem students
130	7-11-2021	Sunday	PUBLIC HOLIDAY



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S. No.	Date	Day	Details of Activity / Public Holiday
131	8-11-2021	Monday	I internal for III Sem students
132	9-11-2021	Tuesday	I internal for III Sem students
133	10-11-2021	Wednesday	I internal for III Sem students
134	11-11-2021	Thursday	I internal for III Sem students
135	12-11-2021	Friday	"VASAVI CODATHON – 2021"-Round-III Build and Present Application in collaboration with M/s. Campus Corporate Connect (CCC) for V and VII Semester students of CSE and IT, for the academic year 2021-22.
136	13-11-2021	Saturday	Guest Lecture on Operating System by Dr. Emmanuel, Manipal University, Manipal for V-Sem A&B Students. Under CC Activity
137	14-11-2021	Sunday	PUBLIC HOLIDAY
138	15-11-2021	Monday	
139	16-11-2021	Tuesday	
140	17-11-2021	Wednesday	
141	18-11-2021	Thursday	
142	19-11-2021	Friday	<b>Karthika Purnima / Guru Nanak Jayanti</b>
143	20-11-2021	Saturday	Parent Teacher Meeting for III Sem students
144	21-11-2021	Sunday	PUBLIC HOLIDAY
145	22-11-2021	Monday	I SEM Induction Program (22- 27 November 2021)
146	23-11-2021	Tuesday	I SEM Induction Program (22- 27 November 2021)
147	24-11-2021	Wednesday	I SEM Induction Program (22- 27 November 2021)
148	25-11-2021	Thursday	I SEM Induction Program (22- 27 November 2021)
149	26-11-2021	Friday	I SEM Induction Program (22- 27 November 2021)
150	27-11-2021	Saturday	I SEM Induction Program (22- 27 November 2021) Guest Lecture on DELD for III Sem students.
151	28-11-2021	Sunday	PUBLIC HOLIDAY
152	29-11-2021	Monday	
153	30-11-2021	Tuesday	
<b>December -2021</b>			
154	1-12-2021	Wednesday	
155	2-12-2021	Thursday	
156	3-12-2021	Friday	
157	4-12-2021	Saturday	Alumni Interaction for V-Sem Students of A&B
158	5-12-2021	Sunday	PUBLIC HOLIDAY
159	6-12-2021	Monday	
160	7-12-2021	Tuesday	
161	8-12-2021	Wednesday	
162	9-12-2021	Thursday	
163	10-12-2021	Friday	Android Hackathon for V sem students under CC Activity

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S. No.	Date	Day	Details of Activity / Public Holiday
164	11-12-2021	Saturday	
165	12-12-2021	Sunday	PUBLIC HOLIDAY
166	13-12-2021	Monday	Second spell of Lab classes for V Sem students
167	14-12-2021	Tuesday	Second spell of Lab classes for V Sem students
168	15-12-2021	Wednesday	Second spell of Lab classes for V Sem students Second Internal for VII sem Students
169	16-12-2021	Thursday	Second spell of Lab classes for V Sem students Second Internal for VII sem Students
170	17-12-2021	Friday	Second spell of Lab classes for V Sem students Second Internal for VII sem Students
171	18-12-2021	Saturday	Second spell of Lab classes for V Sem students Second Internal for VII sem Students
172	19-12-2021	Sunday	PUBLIC HOLIDAY
173	20-12-2021	Monday	Second Internal for V sem Students Second spell of Lab classes for VII Sem students
174	21-12-2021	Tuesday	Second Internal for V sem Students Second spell of Lab classes for VII Sem students
175	22-12-2021	Wednesday	Second Internal for V sem Students Second spell of Lab classes for VII Sem students
176	23-12-2021	Thursday	Second Internal for V sem Students Second spell of Lab classes for VII Sem students
177	24-12-2021	Friday	Second Internal for V sem Students Second spell of Lab classes for VII Sem students
178	25-12-2021	Saturday	<b>Christmas Day</b>
179	26-12-2021	Sunday	<b>Boxing Day</b>
180	27-12-2021	Monday	Semester End lab Exams for V and VII Sem students Second spell of Lab classes for III Sem students
181	28-12-2021	Tuesday	
182	29-12-2021	Wednesday	
183	30-12-2021	Thursday	
184	31-12-2021	Friday	
<b>January 2022</b>			
185	1-1-2022	Saturday	
186	2-1-2022	Sunday	PUBLIC HOLIDAY
187	3-1-2022	Monday	Semester End lab Exams for V and VII Sem students
188	4-1-2022	Tuesday	Second Internal for III sem Students Semester End lab Exams for V and VII Sem students
189	5-1-2022	Wednesday	Second Internal for III sem Students Semester End lab Exams for V and VII Sem students
190	6-1-2022	Thursday	Second Internal for III sem Students Semester End lab Exams for V and VII Sem students
191	7-1-2022	Friday	Second Internal for III sem Students Semester End lab Exams for V and VII Sem students
192	8-1-2022	Saturday	Second Internal for III sem Students

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S. No.	Date	Day	Details of Activity / Public Holiday
			Semester End lab Exams for V and VII Sem students International Conference on Computational Intelligence and Data Analytics (ICCIDA) (8-9, Jan-2022)
193	9-1-2022	Sunday	International Conference on Computational Intelligence and Data Analytics (ICCIDA) (8-9, Jan-2022)
194	10-1-2022	Monday	Semester End lab Exams for III Sem students
195	11-1-2022	Tuesday	Semester End lab Exams for III Sem students
196	12-1-2022	Wednesday	Semester End lab Exams for III Sem students
197	13-1-2022	Thursday	Semester End lab Exams for III Sem students
198	14-1-2022	Friday	Semester End lab Exams for III Sem students
199	15-1-2022	Saturday	Semester End lab Exams for III Sem students
200	16-1-2022	Sunday	PUBLIC HOLIDAY
201	17-1-2022	Monday	Semester End lab Exams for III Sem students
202	18-1-2022	Tuesday	Semester End lab Exams for III Sem students
203	19-1-2022	Wednesday	Semester End lab Exams for III Sem students
204	20-1-2022	Thursday	Semester End lab Exams for III Sem students
205	21-1-2022	Friday	Semester End lab Exams for III Sem students
206	22-1-2022	Saturday	Semester End lab Exams for III Sem students
207	23-1-2022	Sunday	PUBLIC HOLIDAY
208	24-1-2022	Monday	Semester End Theory exams for III Sem students
209	25-1-2022	Tuesday	Semester End Theory exams for III Sem students
210	26-1-2022	Wednesday	<b>Republic Day</b>
211	27-1-2022	Thursday	Semester End Theory exams for III Sem students
212	28-1-2022	Friday	Semester End Theory exams for III Sem students
213	29-1-2022	Saturday	Semester End Theory exams for III Sem students
214	30-1-2022	Sunday	PUBLIC HOLIDAY
215	31-1-2022	Monday	Semester End Theory exams for III Sem students
<b>February 2022</b>			
216	1-2-2022	Tuesday	Semester End Theory exams for III Sem students
217	2-2-2022	Wednesday	Semester End Theory exams for III Sem students
218	3-2-2022	Thursday	Semester End Theory exams for III Sem students
219	4-2-2022	Friday	Semester End Theory exams for III Sem students
220	5-2-2022	Saturday	Semester End Theory exams for III Sem students
221	6-2-2022	Sunday	
222	7-2-2022	Monday	Semester End Theory exams for III Sem students Course Registration by IV Sem Students <a href="#">Outreach Program for Local Youth (7-12, Feb 2022)</a>
223	8-2-2022	Tuesday	Semester End Theory exams for III Sem students Course Registration by IV Sem Students <a href="#">Outreach Program for Local Youth (7-12, Feb 2022)</a>
224	9-2-2022	Wednesday	Semester End Theory exams for III Sem students Course Registration by IV Sem Students

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S. No.	Date	Day	Details of Activity / Public Holiday
			Outreach Program for Local Youth (7-12, Feb 2022)
225	10-2-2022	Thursday	Semester End Theory exams for III Sem students Course Registration by IV Sem Students Outreach Program for Local Youth (7-12, Feb 2022)
226	11-2-2022	Friday	Semester End Theory exams for III Sem students Course Registration by IV, VI and VIII Sem Students Outreach Program for Local Youth (7-12, Feb 2022)
227	12-2-2022	Saturday	Semester End Theory exams for III Sem students Outreach Program for Local Youth (7-12, Feb 2022)
228	13-2-2022	Sunday	PUBLIC HOLIDAY
229	14-2-2022	Monday	Commencement of IV, VI and VIII Sem classwork
230	15-2-2022	Tuesday	
231	16-2-2022	Wednesday	
232	17-2-2022	Thursday	
233	18-2-2022	Friday	
234	19-2-2022	Saturday	Alumni Interaction for IV Sem Students Introduction of Theme Based Projects by Dr. Raghavendra Kune, Adjunct Faculty & Scientist/Engineer 'SG', Head High performance computing Drones(HPCD), Advanced Data Processing Research Institute (ADRIN), Dept. of Space, ISRO. Under CC Activity
235	20-2-2022	Sunday	PUBLIC HOLIDAY
236	21-2-2022	Monday	
237	22-2-2022	Tuesday	
238	23-2-2022	Wednesday	
239	24-2-2022	Thursday	
240	25-2-2022	Friday	
241	26-2-2022	Saturday	Declaration of Results for BE III Sem Students Guest Lecture on "Algo Dynamics " by Dr. Venkatesh Choppalla , IIT Hyderabad. Under Professional Body Activity for IV Sem students.
242	27-2-2022	Sunday	PUBLIC HOLIDAY
243	28-2-2022	Monday	
<b>March 2022</b>			
244	1-3-2022	Tuesday	
245	2-3-2022	Wednesday	
246	3-3-2022	Thursday	Workshop on UML by Dr. Salman Abdul Moiz Professor SCIS, University of Hyderabad, Central University, Hyderabad for IV Sem students between 3-5 march 2022 under Professional Body Activity
247	4-3-2022	Friday	Workshop on UML by Dr. Salman Abdul Moiz Professor SCIS, University of Hyderabad, Central University, Hyderabad for IV Sem students between 3-5 march 2022 under Professional Body Activity

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S. No.	Date	Day	Details of Activity / Public Holiday
248	5-3-2022	Saturday	Workshop on UML by Dr. Salman Abdul Moiz Professor SCIS, University of Hyderabad, Central University, Hyderabad for IV Sem students between 3-5 march 2022 under Professional Body Activity Alumni Interaction for VI sem students
249	6-3-2022	Sunday	PUBLIC HOLIDAY
250	7-3-2022	Monday	
251	8-3-2022	Tuesday	
252	9-3-2022	Wednesday	
253	10-3-2022	Thursday	
254	11-3-2022	Friday	
255	12-3-2022	Saturday	Guest Lecture on AI & ML by Dr. Raghavendra Kune, Adjunct Faculty & Scientist/Engineer 'SG', Head High performance computing Drones(HPCD), Advanced Data Processing Research Institute (ADRIN), Dept. of Space, ISRO. Under CC Activity.
256	13-3-2022	Sunday	PUBLIC HOLIDAY
257	14-3-2022	Monday	
258	15-3-2022	Tuesday	
259	16-3-2022	Wednesday	
260	17-3-2022	Thursday	
261	18-3-2022	Friday	Guest Lecture on SQL Querying Hands-on for IV-Sem Students under Professional Bodies Activity by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli (18-19 March 2022)
262	19-3-2022	Saturday	Guest Lecture on SQL Querying Hands-on for IV-Sem Students under Professional Bodies Activity by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli (18-19 March 2022)
263	20-3-2022	Sunday	PUBLIC HOLIDAY
264	21-3-2022	Monday	
265	22-3-2022	Tuesday	
266	23-3-2022	Wednesday	
267	24-3-2022	Thursday	
268	25-3-2022	Friday	
269	26-3-2022	Saturday	Guest Lecture on AIML to VI-Sem Students under CCA by Dr. Atul Negi, Professor, School of Computer & Information Sciences, University of Hyderabad
270	27-3-2022	Sunday	PUBLIC HOLIDAY
271	28-3-2022	Monday	
272	29-3-2022	Tuesday	
273	30-3-2022	Wednesday	
274	31-3-2022	Thursday	

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S. No.	Date	Day	Details of Activity / Public Holiday
<b>April 2022</b>			
275	1-4-2022	Friday	
276	2-4-2022	Saturday	Alumni Interaction for IV sem students
277	3-4-2022	Sunday	PUBLIC HOLIDAY
278	4-4-2022	Monday	I Internal exams for IV , VI & VII sem Students
279	5-4-2022	Tuesday	<b>Babu Jagjivan Ram Jayanti</b>
280	6-4-2022	Wednesday	I Internal exams for IV , VI & VII sem Students
281	7-4-2022	Thursday	I Internal exams for IV , VI & VII sem Students
282	8-4-2022	Friday	I Internal exams for IV , VI & VII sem Students
283	9-4-2022	Saturday	
284	10-4-2022	Sunday	PUBLIC HOLIDAY
285	11-4-2022	Monday	
286	12-4-2022	Tuesday	
287	13-4-2022	Wednesday	
288	14-4-2022	Thursday	<b>Dr Ambedkar Jayanti</b>
289	15-4-2022	Friday	
290	16-4-2022	Saturday	Parent teacher Meeting for IV, VI, VIII sem students
291	17-4-2022	Sunday	PUBLIC HOLIDAY
292	18-4-2022	Monday	
293	19-4-2022	Tuesday	
294	20-4-2022	Wednesday	
295	21-4-2022	Thursday	
296	22-4-2022	Friday	
297	23-4-2022	Saturday	
298	24-4-2022	Sunday	PUBLIC HOLIDAY
299	25-4-2022	Monday	
300	26-4-2022	Tuesday	
301	27-4-2022	Wednesday	
302	28-4-2022	Thursday	
303	29-4-2022	Friday	
304	30-4-2022	Saturday	Guest Lecture on Introduction to Web Apps and Hosting a website for VI-Sem Students under Professional Bodies Activity by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli
<b>May 2022</b>			
305	1-5-2022	Sunday	PUBLIC HOLIDAY
306	2-5-2022	Monday	
307	3-5-2022	Tuesday	
308	4-5-2022	Wednesday	
309	5-5-2022	Thursday	
310	6-5-2022	Friday	
311	7-5-2022	Saturday	Alumni Interaction for VI sem students
312	8-5-2022	Sunday	PUBLIC HOLIDAY



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S. No.	Date	Day	Details of Activity / Public Holiday
313	9-5-2022	Monday	
314	10-5-2022	Tuesday	
315	11-5-2022	Wednesday	
316	12-5-2022	Thursday	
317	13-5-2022	Friday	
318	14-5-2022	Saturday	Guest Lecture on Career Counseling and How to prepare for Product Company for VI-Sem Students under CCA by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli
319	15-5-2022	Sunday	PUBLIC HOLIDAY
320	16-5-2022	Monday	
321	17-5-2022	Tuesday	
322	18-5-2022	Wednesday	
323	19-5-2022	Thursday	
324	20-5-2022	Friday	
325	21-5-2022	Saturday	
326	22-5-2022	Sunday	PUBLIC HOLIDAY
327	23-5-2022	Monday	
328	24-5-2022	Tuesday	
329	25-5-2022	Wednesday	
330	26-5-2022	Thursday	
331	27-5-2022	Friday	
332	28-5-2022	Saturday	Workshop on Big Data Analytics using HADOOP for VI-Sem Students under Professional Bodies Activity by Mr. Amar Sharma, Adjunct Faculty, Founder & CEO-M/s. Woir Software India Pvt. Ltd.
333	29-5-2022	Sunday	PUBLIC HOLIDAY
334	30-5-2022	Monday	
335	31-5-2022	Tuesday	II Internal exams for IV , VI & VII sem Students
<b>June 2022</b>			
336	1-6-2022	Wednesday	II Internal exams for IV , VI & VII sem Students
337	2-6-2022	Thursday	II Internal exams for IV , VI & VII sem Students
338	3-6-2022	Friday	II Internal exams for IV , VI & VII sem Students
339	4-6-2022	Saturday	II Internal exams for IV , VI & VII sem Students
340	5-6-2022	Sunday	PUBLIC HOLIDAY
341	6-6-2022	Monday	LAB SEE EXAMS for IV , VI and VIII Sem Studnets
342	7-6-2022	Tuesday	LAB SEE EXAMS for IV , VI and VIII Sem Studnets
343	8-6-2022	Wednesday	LAB SEE EXAMS for IV , VI and VIII Sem Studnets
344	9-6-2022	Thursday	LAB SEE EXAMS for IV , VI and VIII Sem Studnets
345	10-6-2022	Friday	LAB SEE EXAMS for IV , VI and VIII Sem Studnets
346	11-6-2022	Saturday	LAB SEE EXAMS for IV , VI and VIII Sem Studnets
347	12-6-2022	Sunday	PUBLIC HOLIDAY
348	13-6-2022	Monday	LAB SEE EXAMS for IV , VI and VIII Sem Students

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S. No.	Date	Day	Details of Activity / Public Holiday
349	14-6-2022	Tuesday	LAB SEE EXAMS for IV , VI and VIII Sem Students
350	15-6-2022	Wednesday	LAB SEE EXAMS for IV , VI and VIII Sem Students
351	16-6-2022	Thursday	LAB SEE EXAMS for IV , VI and VIII Sem Students
352	17-6-2022	Friday	LAB SEE EXAMS for IV , VI and VIII Sem Students
353	18-6-2022	Saturday	LAB SEE EXAMS for IV , VI and VIII Sem Students
354	19-6-2022	Sunday	PUBLIC HOLIDAY
355	20-6-2022	Monday	Semester End Exams for IV, VI & VIII Sem students FDP on Block Chain / Computer Vision (20-25 June 2022)
356	21-6-2022	Tuesday	Semester End Exams for IV, VI & VIII Sem students FDP on Block Chain / Computer Vision (20-25 June 2022)
357	22-6-2022	Wednesday	Semester End Exams for IV, VI & VIII Sem students FDP on Block Chain / Computer Vision (20-25 June 2022)
358	23-6-2022	Thursday	Semester End Exams for IV, VI & VIII Sem students FDP on Block Chain / Computer Vision (20-25 June 2022)
359	24-6-2022	Friday	Semester End Exams for IV, VI & VIII Sem students FDP on Block Chain / Computer Vision (20-25 June 2022)
360	25-6-2022	Saturday	Semester End Exams for IV, VI & VIII Sem students FDP on Block Chain / Computer Vision (20-25 June 2022)
361	26-6-2022	Sunday	PUBLIC HOLIDAY
362	27-6-2022	Monday	Semester End Exams for IV, VI & VIII Sem students
363	28-6-2022	Tuesday	Semester End Exams for IV, VI & VIII Sem students
364	29-6-2022	Wednesday	Semester End Exams for IV, VI & VIII Sem students
365	30-6-2022	Thursday	Semester End Exams for IV, VI & VIII Sem students
<b>July 2022</b>			
366	1-7-2022	Friday	Semester End Exams for IV, VI & VIII Sem students
367	2-7-2022	Saturday	Semester End Exams for IV, VI & VIII Sem students
368	3-7-2022	Sunday	PUBLIC HOLIDAY
369	4-7-2022	Monday	Semester End Exams for IV, VI & VIII Sem students
370	5-7-2022	Tuesday	Semester End Exams for IV, VI & VIII Sem students
371	6-7-2022	Wednesday	Semester End Exams for IV, VI & VIII Sem students
372	7-7-2022	Thursday	Semester End Exams for IV, VI & VIII Sem students
373	8-7-2022	Friday	Semester End Exams for IV, VI & VIII Sem students
374	9-7-2022	Saturday	Semester End Exams for IV, VI & VIII Sem students
375	10-7-2022	Sunday	PUBLIC HOLIDAY
376	11-7-2022	Monday	Workshop on Introduction to Data Analytics for V-Semester IT A&B by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli (11-13 July 2022)
377	12-7-2022	Tuesday	Workshop on Introduction to Data Analytics for V-Semester IT A&B by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli (11-13 July 2022)
378	13-7-2022	Wednesday	Workshop on Introduction to Data Analytics for V-Semester



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S. No.	Date	Day	Details of Activity / Public Holiday
			IT A&B by Mr. Amit Gupta ,Adjunct Faculty, Sr. Data Scientist, CSEO, Microsoft India, Gachibowli (11-13 July 2022
379	14-7-2022	Thursday	
380	15-7-2022	Friday	
381	16-7-2022	Saturday	Mock Interviews by Alumni for (2023 passing out) students
382	17-7-2022	Sunday	Mock Interviews by Alumni for (2023 passing out) students
383	18-7-2022	Monday	
384	19-7-2022	Tuesday	
385	20-7-2022	Wednesday	
386	21-7-2022	Thursday	
387	22-7-2022	Friday	
388	23-7-2022	Saturday	Mock Interviews by Alumni for (2023 passing out) students
389	24-7-2022	Sunday	Mock Interviews by Alumni for (2023 passing out) students