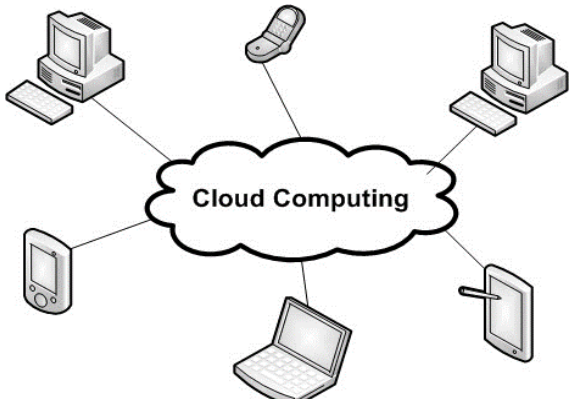
VASAVI COLLEGE OF ENGINEERING
(Autonomous)

IBRAHIMBAGH, HYDERABAD-500 031

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

Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR
B.E. (IT) VII and VIII Semesters with effect from 2020-21
(For the batch admitted in 2017-18)
(R-17)



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.

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(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-17)
B.E. – INFORMATION TECHNOLOGY : SEVENTH SEMESTER (2020 - 2021)

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	
PC710IT	Compiler Construction	3	-	-	3	60	40	3
PC720IT	Distributed Systems and Cloud Computing	3	-	-	3	60	40	3
PE7XXIT	Professional Elective – I	3	-	-	3	60	40	3
PE7XXIT	Professional Elective – II	3	-	-	3	60	40	3
PE7XXIT	Professional Elective – III	3	-	-	3	60	40	3
PE7XXIT	Professional Elective – IV	3	-	-	3	60	40	3
PRACTICALS								
PC711IT	Compiler Construction Lab	-	-	2	3	50	30	1
PC721IT	Distributed Systems and Cloud Computing Lab	-	-	2	3	50	30	1
PW719IT	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**		

Professional Elective – I	Professional Elective – II
PE710IT : Data Mining	PE750IT : Data Analytics
PE720IT : Object Oriented Analysis and Design	PE760IT : Software Testing
PE730IT : Graph Theory	PE770IT : Advanced Algorithms
PE740IT : Cryptography and Network Security	PE780IT : Information Security

Professional Elective – III	Professional Elective – IV
PE790IT : Soft Computing	PE742IT : Digital Image Processing
PE712IT : Software Reuse Techniques	PE752IT : Software Quality and Assurance
PE722IT : Parallel and Distributed Algorithms	PE762IT : Queueing Theory and Modeling
PE732IT : Information Storage and Management	PE772IT : Information Retrieval Systems

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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: PC710IT
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hrs

Course Objective:	Course Outcomes:
The Objectives of the course:	**At the end of the course student will be able to:**
1. Explain the major concepts of language translation and various phases of compiler and its use. 2. Demonstrate various tools for building compilers.	1. Understand different phases of the compiler and develop a lexical analyzer using LEX tool. 2. Design top-down and bottom-up parsers. 3. Implement semantic rules for specifying the syntax and semantics of programming languages, and also transform an AST into intermediate representation. 4. Apply various optimization techniques on the Intermediate Representation. 5. Generate target code from the Intermediate Representation.

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
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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 : **PC720IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hours

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

UNIT I
Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the web, Challenges; Hardware concepts; Software Concepts
System Models: Introduction, Architectural models, Fundamental models.
Time and Global States: Introduction, Clocks events and process states, synchronizing physical clocks, Logical Clocks, Global states, Distributed debugging.

UNIT-II
Coordination and Agreement: Introduction, distributed mutual exclusion, Election, Multicast communication, Consensus and related problems.
Replication: Introduction, System model and group communication, Fault-tolerant services.
Distributed File Systems: Introduction; File service architecture; Case study: Sun Network File System;

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

UNIT-IV
Virtual Machines and Virtualization of Clusters and Data Centers: Implementation levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Virtualization of CPU Memory and I/O devises, Virtual Clusters and Resource Management, Virtualization for Data Center Automation
Case Studies: Xen Virtual machine monitors - Xen API. VMware - VMware products- VMware Features, 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, Shivratari N.G, "Advanced Concepts Introduction, Operating Systems" McGraw Hill, 2001
6. Pradeep K Sinha, " Distributed Opearating Systems: Concepts and Design", Pearson Education Asia India, 2007.
7. https://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

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)
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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 : **PE710IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hours

Course Objectives	Course Outcomes
The objective of this course is:	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.	1. Preform data cleaning, summarization, integration, transformation on the data using various data preprocessing techniques. 2. Apply various kinds of frequent mining methods to generate strong association rules. 3. Compare and classify the data and evaluate the accuracy of classifier and predictor. 4. Do the cluster analysis using various clustering techniques and identify and eliminate the outliers from large data bases. 5. 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, Elsiver, 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

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

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

Duration of Internal Tests: 90 Minutes

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IBRAHIMBAGH, HYDERBAD-500031
DEPARTMENT OF INFORMATION TECHNOLOGY

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

L:T:P (Hrs./week):3:0:0	SEE Marks : 60	Course Code : **PE720IT**
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:
• Learn the basics of OO analysis and design skills. • Learn the UML design diagrams. • Learn to map design to code. • Be exposed to the various testing techniques.	1. Use the UML analysis and design diagrams. 2. Design and implement projects using OO concepts. 3. Apply appropriate design patterns. 4. Create code from design. 5. Compare and contrast various testing techniques.

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 9
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 9
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 9
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 9
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.

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Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)
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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 :PE730IT
Credits : 3	CIE Marks: 40	Duration of SEE :3 Hrs

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
be familiar with the fundamental concepts related to graph theory.	1. Write precise and accurate mathematical definitions of objects using graph theory. 2. Identify and construct examples using the mathematical definitions studied 3. Validate and critically assess a mathematical proof. 4. Use the theoretical knowledge in the investigation of questions from graph theory 5. Use the definitions of graph theory in order to construct mathematical proofs.

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.

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Duration of Internal Tests: 90 Minutes

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IBRAHIMBAGH, HYDERBAD-500031
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 : **PE740IT**
Credits : 3	CIE Marks :40	Duration of SEE : 3Hours

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
1.Provide fundamental knowledge on the concepts of number theory. 2. Demonstrate cryptographic techniques, hash functions, digital signature and cryptanalysis.	1. Understand the fundamentals of number theory and security concepts. 2. Illustrate classical ciphers, block ciphers and stream ciphers. 3. Compare different types of Asymmetric key ciphers. 4. Distinguish different message authentication algorithms. 5. Analyze different types of attacks, and, sharing of id securely.

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.
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.

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF 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 :PE750IT
Credits : 3	CIE Marks: 40	Duration of SEE :3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	**At the end of the course student will be able to:**
Understand the basic algorithms and techniques used in Data Analytics	1.Understand basic data analytic principles. 2.Apply descriptive statistics and visualizations for graphical data interpretation. 3.Select suitable statistical methods for hypothesis testing. 4.Develop large scale analytic projects for diverse data sets. 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 &a Statistics for Engineers & Scientists (9th 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 (2ndEdn.), 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 (2nd 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

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, 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 :PE760IT
Credits : 3	CIE Marks: 40	Duration of SEE :3 Hrs

Course Objectives	**Course Outcomes**
The Objectives of the course:	**At the end of the course student will be able to:**
1. Explore software testing methods and tools. 2. Discuss various testing techniques to develop test cases.	1. Understand the fundamentals of software testing, verification and validation. 2. Design test cases for static and dynamic testing with validation. 3. Understand testing process and apply testing metrics for monitoring and controlling. 4. Develop test cases for object oriented and web-based applications. 5. Identify and apply appropriate tool to test a given software application.

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 Bories 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

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

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

Duration of Internal Tests: 90 Minutes

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

ADVANCED ALGORITHMS
(Professional Elective-II)

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **PE770IT**
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:**
Understand the differences among several advanced algorithms and recognize which one is better for the given problem under different conditions.	1. Use the comparisons and limitations of various algorithms and choose the right one for the given problem. 2. Analyze various Network and String matching algorithms. 3. Develop basic advanced algorithm analysis skills for analyzing the approximation ratio of approximation algorithms 4. Apply different methods and performance measures to analyze algorithms with respect to cost and scalability. 5. Analyze various Probabilistic Algorithms & Randomized Algorithms for their performance.

UNIT 1:
Fundamental Techniques: The Greedy Methodand 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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2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

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

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **PE780IT**
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:**
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.	1. Enumerate the key terms and basics of Information Security along with Sec SDLC. 2. Understand how risk is identified and managed. 3. Identify management's role in development, maintenance and enforcement of Information Security policies 4. Plan for and respond to intruders in an information system, understand the basic principles of cryptography 5. Analyze the organizations information security blue print, discuss the need of maintaining information security program.

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
6. http://nptel.ac.in/courses/106106129/

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

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Duration of Internal Tests: 90 Minutes

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IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E VII-SEMESTER

SOFT COMPUTING
(Professional Elective-III)

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **PE790IT**
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:**
Solve a real world problem using Soft Computing related algorithms.	1. Explain the basic concepts of Fuzzy Logic. 2. Define the relations, propositions and implications related to fuzzy logic. 3. Apply defuzzyfication techniques in the design of fuzzy logic controller. 4. Solve optimization problems using genetic algorithms. 5. Understand different types of GA operators.

UNIT I
Introduction to Soft Computing,Introduction to Fuzzy logic,Fuzzy membership functions,Operations on Fuzzy sets

UNIT II
Fuzzy relations,Fuzzy proposition,Fuzzy implications,Fuzzy inferences

UNIT III
Defuzzyfication Techniques-I,Defuzzyfication Techniques-II,Fuzzy logic controller-I,Fuzzy logic controller-II

UNIT IV
Solving optimization problems,Concept of Genetic Algorithm (GA), GA Operators: Encoding,GA Operators: Selection-I

UNIT V
GA Operators: Selection-II,GA Operators: Crossover-I,GA Operators: Crossover-II,GA Operators: Mutation

Learning Resources:

1. S. N. Sivanandam & S.N.Deepa, "Principles of Soft Computing", Wiley India, 2008.
2. Timoty J. Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill, 1997.
3. An Introduction to Genetic Algorithm Melanic Mitchell (MIT Press)2. Evolutionary Algorithm for Solving Multi-objective, Optimization Problems (2nd Edition), Collelo, Lament, Veldhnizer (Springer)
4. https://nptel.ac.in/courses/106105173/

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

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

Duration of Internal Tests: 90 Minutes

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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): 3:0:0	SEE Marks :60	Course Code : **PE712IT**
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
	At the end of the course student will be able to:
1. Provide overview of software reuse techniques. 2. Discuss creational, structural, behavioural and architectural design patterns.	1. Apply object-oriented techniques for designing reusable, maintainable and modifiable software. 2. Compare different design patterns for a given problem. 3. Demonstrate structural design patterns for better class and object composition. 4. Apply behavioural patterns for better organization and communication between the objects. 5. Analyze different architectural patterns for a software design.

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 jacabson, 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

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

Duration of Internal Tests: 90 Minutes

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

PARALLEL AND DISTRIBUTED ALGORITHMS
(Professional Elective-III)

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **PE722IT**
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:**
Understand the basic algorithms used in parallel and distributed systems.	1. To learn parallel and distributed algorithms development techniques for shared memory and message passing models. 2. To study the main classes of parallel algorithms. 3. To study the complexity and correctness models for parallel algorithms.

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 Niranjan 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

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

Duration of Internal Tests:90 Minutes

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

INFORMATION STORAGE AND MANAGEMENT

(Professional Elective-IV)

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **PE732IT**
Credits : 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	*On completion of the course, students will be able to:*
1. Introduce various networked storage architectures. 2. Discuss business continuity solutions and security.	1. Understand challenges in data storage and management. 2. Illustrate disk functioning and Compare different RAID levels. 3. Compare different networked storage technologies. 4. Apply backup, replication and recovery mechanisms for business continuity. 5. Identify challenges in storage security and Virtualization.

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", 2nd 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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031
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 : **PE742IT**
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:**
Understand the basic digital image processing techniques.	1. Identify the basic concepts of Image processing and compute the different transforms used in image processing. 2. Apply the different spatial and frequency domain methods for Image enhancement. 3. Use different techniques for Image segmentation. 4. Identify the different methods for Image compression. 5. Apply different morphological algorithms for image processing.

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

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Duration of Internal Tests: 90 Minutes

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

SOFTWARE QUALITY AND ASSURANCE
(PROFESSIONAL ELECTIVE-IV)

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **PE752IT**
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:**
Understand the basic concepts related to Software Quality and the relationship with project lifecycle.	1. Understand the basic tenets of software quality and quality factors. 2. Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components. 3. Understand of how the SQA components can be integrated into the project life cycle. 4. Be familiar with the software quality infrastructure. 5. Be exposed to the management components of software quality.

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 developmenting – 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 manangement 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.

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

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Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031
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 : **PE762IT**
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:**
Learn the basics of queueing theory and its applications.	1. Distinguish different types of random variables and their distributions. 2. Explain Markovian and non-Markovian queueing systems. 3. Apply Markovian Chain techniques to M/G/1, G/M/1 models 4. Compare different types of networks of queues. 5. Explain matrix-geometric methods and their applications to computer and communication networks

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.

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, 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 : **PE772IT**
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:**
1. Provide an overview of information retrieval systems. 2. Introduce various retrieval models like classic IR, Structured Text Retrieval Models.	1. Identify appropriate IR Model to retrieve relevant information. 2. Evaluate structured text retrieval models. 3. Understand query operations and multimedia properties. 4. Analyze the different text compression and indexing techniques. 5. Analyze sequential searching, pattern matching, parallel and distributed IR.

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, 2nd 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://videolectures.net/Top/Computer_Science/Information_Retrieval/

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERBAD-500031
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 : PC711IT
Credits : 1	CIE Marks: 30	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:**
Learn to implement the different Phases of 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 Intermediate code generation for subset C language

LIST OF EXPERIMENTS

1. Implement lexical analyzer to recognize a few patterns in C. (Ex. identifiers, constants, comments, operators etc.)
2. Implementation of Lexical Analyzer using LEX tool
3. Implement "first" of a given context free grammar
4. Implement "follow" of a given context free grammar
5. Implementation of Recursive Descent Parser
6. Construction of a Predictive parsing Table
7. Write a program for generating derivation sequence for a given terminal string using SLR parsing table.
8. Use LEX and YACC tool to implement Desktop Calculator.
9. Implementation of code generation
10. Implementation of code optimization techniques
11. Major assignment: Intermediate code generation for subset C language.

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, 2nd 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)
IBRAHIMBAGH, HYDERBAD-500031
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 : **PC721IT**
Credits : 1	CIE Marks : 30	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
Create a distributed application as well as utilize virtualization technologies for creating and managing virtual machines.	1. design and develop distributed applications using socket programming. 2. design and develop distributed applications using RMI. 3. create and manage virtual machines. 4. Write a distributed application using Map Reduce. 5. Write a distributed application using MPI.

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)
IBRAHIMBAGH, HYDERBAD-500031
DEPARTMENT OF INFORMATION TECHNOLOGY

PROJECT SEMINAR
SYLLABUS FOR B.E VII- SEMESTER

L : T : P (Hrs./week): 0:0:2	SEE Marks : --	Course Code : **PW719IT**
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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-17)
B.E. – INFORMATION TECHNOLOGY : EIGHTH SEMESTER (2020 - 2021)

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	CIE	
1	PE8XXIT	Professional Elective - V	3	-	-	3	60	40	3
2	PE8XXIT	Professional Elective -VI	3	-	-	3	60	40	3
PRACTICALS									
3	PW819IT	Project / Internship	-	-	18	Viva-Voce	50	50	9
		Total	**6**	**-**	**18**		**170**	**130**	**15**
		Grand Total	**24**			**-**	**300**		

Professional Elective – V	Professional Elective - VI
PE810IT : Natural Language Processing	PE850IT : Neural Networks and Deep Learning
PE820IT : Software Project Management	PE860IT : Agile Software Development
PE830IT : Computational Number Theory	PE870IT : Information Theory and Coding
PE840IT : Cloud Security	PE880IT : Block Chain

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031
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 : **PE810IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES *On completion of the course, students will be able to*
The main objective of this course is to introduce the fundamental techniques of natural language processing and to design and build computer systems that are able to analyze natural languages, and that generate their outputs in a natural language.	1. Apply fundamental algorithms and techniques in the area of natural language processing 2. Assess / Evaluate NLP based systems. 3. Choose appropriate solutions for solving typical NLP sub-problems 4. Describe the typical problems and processing layers in NLP 5. Analyze NLP problems to decompose them in adequate independent components

UNIT- I

Introduction to Natural Language Processing: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background:An outline of English syntax,

UNIT- II

Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top- Down Chart Parsing.

Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

UNIT- III

Ambiguity Resolution - Statistical Methods: Basic Probability Theory, Estimating Probabilities, Part-of-Speech Tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing.

UNIT- IV

Semantics and Logical Form: Word senses and Ambiguity, Encoding Ambiguity in theLogical Form, Thematic Roles, Speech Acts and Embedded Sentences, Defining Semantic Structure: Model Theory

UNIT-V

Linking Syntax and Semantics: Semantic Interpretation and Compositionality, A Simple Grammar and Lexicon with Semantic Interpretation, Prepositional Phrases and Verb Phrases, Lexicalized Semantic Interpretation and Semantic Roles, Handling Simple Questions, Semantic Interpretation Using Feature Unification, Generating Sentences from Logical Form.

Learning Resources :

1. James Allen, "Natural Language Understanding", Pearson Education
2. Christopher D Manning and HinrichSchutze, "Foundations of Statistical Natural Language Processing" MIT Press, 1999.
3. Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, "NLP: A Paninian Perspective", Prentice Hall, New Delhi
4. D. Jurafsky, J. H. Martin, "Speech and Language Processing", Pearson
5. http://www.nptelvideos.in/2012/11/natural-language-processing.html

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERBAD-500031
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 : **PE820IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	**Course Outcomes**
The Objectives of the course:	**At the end of the course student will be able to:**
1. Introduce the fundamental principles of Software Project management. 2. Describe of artifacts, metrics for effective project management.	1. Compare traditional and modern software project management. 2. Understand workflows and artifacts for engineering and production stages. 3. Analyze iterative process planning for effective project management. 4. Apply seven core metrics to manage project and process. 5. Understand modern process improvement and map to CMM.

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, 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 : **PE830IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Introduce computational aspects of number theory and various algorithms related to prime numbers, integer factorization and discrete logarithms.	1. Demonstrate knowledge of the computational aspects of number theory concepts. 2. Understand various algorithms available in number theory. 3. Apply the algorithms and study its practical computational aspects for integer factorization, primality testing. 4. Understand the complexity of various algorithms 5. Explain the relative strengths and weaknesses of different algorithms.

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERBAD-500031
DEPARTMENT OF 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 : **PE840IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Understand the concepts related to security mechanisms in cloud computing	6. Understand the basic principles of cloud security. 7. Explain the various security concerns in cloud computing. 8. Assess the risk tolerance in cloud computing 9. Identify the architectural features for providing cloud security 10. Explain about the mechanisms related to security data in the cloud.

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, 1st edition, June, 2015
3. https://www.oreilly.com/library/view/securing-the-cloud/9781597495929/
4. 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
6. https://canvas.harvard.edu/courses/8146/assignments/syllabus

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

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

Duration of Internal Tests: 90 Minutes

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

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

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **PE850IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Introduce the fundamental concepts to Neural networks and deep learning and its various architectures to solve real-world problems	1. Demonstrate knowledge of neural networks and deep learning literature. 2. Apply an appropriate regularization and optimization techniques for DL models training. 3. Understand and apply DL architectures like CNN & RNN to the given problem. 4. Understand various programming models to write, train and inference DL models. 5. Explain the relative strengths and weaknesses of different DL architectures and its applications.

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 YoshuaBengio and Aaron Courville.
2. https://www.cse.iitm.ac.in/~miteshk/CS7015.html
3. https://www.deeplearningbook.org/
4. https://keras.io/
5. https://www.tensorflow.org/
6. https://pytorch.org/

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, 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 : **PE860IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
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.	1. Apply Agile Software Development practices and work small teams to create high-quality software. 2. Understand the concepts of software design and a set of software technologies and APIs. 3. Demonstrate Agile development and testing techniques. 4. Understand the benefits and pitfalls of working in an Agile team.

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, 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 : **PE870IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Understand the basic principles of Information Theory and coding.	1. Define the fundamental concepts related to Information Theory 2. Apply the concept of Huffman coding in block to variable length coding 3. Apply the concepts of Arithmetic, Lempel-Ziv and Tunstall codes in variable to variable length coding. 4. define and compute the channel capacity of discrete memoryless channels. 5. Define the concepts related to differential entropy, Gaussian channel, parallel gaussian channels.

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

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

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, 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 : **PE880IT**
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

Course Objectives	**Course Outcomes**
The Objectives of the course:	**At the end of the course student will be able to:**
1. Introduce the fundamental concepts of block chain and cryptography. 2. Describe block chain architectures and platforms. 3. Demonstrate applications of block chain with case studies.	1. Understand fundamental concepts of cryptocurrency, consensus and privacy. 2. Distinguish various architectures of block chain. 3. Analyse the use of public and private block chains. 4. Build block chain applications using ethereum and hyperledger platforms. 5. Understand applications of block chain for financial, supply chain and government systems.

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 FabricPlatforms: 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, OReilly
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

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

Duration of Internal Tests: 90 Minutes

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PROJECT / INTERNSHIP
SYLLABUS FOR B.E VIII-SEMESTER

L:T:P (Hrs./week): 0:0:18	SEE Marks : 50	Course Code : **PW819IT**
Credits : 9	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 I Very Good I Good I Satisfactory I 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