

KAKATIYA UNIVERSITY, WARANGAL -506 009
Department of Information Technology

B. Tech. (IT) VI SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PC3201IT	Compiler Design	3	1	0	4	30	70	4
2	PC3202IT	Computer Networks	3	1	0	4	30	70	4
3	PC3203IT	Software Engineering	3	1	0	4	30	70	4
4	PE-II*	Professional Elective –II*	3	1	0	4	30	70	4
5	OE-I#	Open Elective-I*	3	0	0	3	30	70	3
6	PC3208IT	Compiler Design Lab	0	0	3	3	25	50	1.5
7	PC3209IT	Software Engineering Lab	0	0	3	3	25	50	1.5
8	PW3210IT	Mini-project	0	0	3	3	50	00	1.5
Total			15	4	9	28	250	450	23.5

***(PE-II) Professional Elective – II**

PE3204IT: Advanced Database Management System

PE3205IT: Advanced Operating System

PE3206IT: Computer Graphics

Please Refer Annexure

KAKATIYA UNIVERSITY, WARANGAL-506009

Department of Information Technology

B. Tech. (IT) VI SEMESTER**COMPILER DESIGN (PC3201IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT – I

INTRODUCTION TO COMPILER: Definition of Compiler, Interpreter, Analysis of the source program, Phases of a compiler, Cousins of the Compiler, Grouping of Phases, Compiler construction tools.

LEXICAL ANALYSIS: Definition of lexeme, patterns and Tokens, Lexical analyzer, Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Data structures in compilation, LEX- Lexical analyzer generator

UNIT – II

SYNTAX ANALYSIS: Introduction to parser, Role of the parser, Context-Free Grammars; Top-Down parsing-Recursive Descent Parsing, Predictive Parsing; Bottom-Up parsing-Shift Reduce Parsing, Operator Precedent Parsing; LR Parsers–SLR Parser, Canonical LR Parser, LALR Parser; YACC – automatic parser generator.

UNIT – III

SEMANTIC ANALYSIS: Attributed grammars, Syntax Directed Definitions, Evaluation Orders for Syntax directed definitions, Syntax directed translation;

INTERMEDIATE CODE: Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes; Conversion of popular Programming languages into intermediate code forms: Declarations, Assignment Statements, Boolean Expressions and loops.

UNIT – IV

CODE OPTIMIZATION: Introduction, Principal sources of optimization, Optimization of basic blocks, Introduction to global data flow analysis, Basic blocks, Flow graphs, Data flow equation, Global optimization, Data flow analysis for structured programs.

UNIT – V

RUN-TIME ENVIRONMENT AND CODE GENERATION: Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management, Issues in the design of code generator, The target machine, Next-use Information, A simple Code generator, Introduction to DAG, DAG representation of Basic Blocks, Peephole Optimization.

TEXT BOOK:

1. A.V. Aho, M.S. Lam, R. Sethi and J.D. Ullman, "Compilers: Principles, Techniques and Tools", 2nd edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. Allen I. Holub, "Compiler Design in C", 1st edition, Prentice Hall of India, 2003.
2. C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", 1st edition, Benjamin Cummings, 2003.
3. J.P. Bennet, "Introduction to Compiler Techniques", 2nd edition, Tata McGraw-Hill, 2003.
4. Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", 3rd edition, Pearson/Prentice Hall India, 2001.
5. Kenneth C. Loudon, "Compiler Construction: Principles and Practice", 1st edition, Thompson Learning, 2003.
6. K. Muneeswaran "Compiler Design" 1st edition. Oxford University press ,2012

KAKATIYA UNIVERSITY, WARANGAL-506 009
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B. Tech. (IT) VI SEMESTER
COMPUTER NETWORKS (PC3202IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT – I

Introduction to Computer Networks, Network Hardware and Software, Network Standardization, Protocols and Standards, OSI and TC/IP Reference Models, Example Networks. The Physical Layer: Guided Transmission Media, Wireless Transmission, Communication Satellites, Circuit switched networks, Datagram networks, virtual circuit networks, The Mobile Telephone System.

UNIT – II

The Data Link Layer: Data link layer design issues, framing techniques, error control methods, flow control over noiseless and noisy channels, Example data link protocols. The Medium Access Control Sublayer: The Channel Allocation Problem, Carrier Sense Multiple Access Protocols, Collision free protocols, IEEE Ethernet, Wireless LANs, Bluetooth, Data Link Layer Switching.

UNIT – III

The Network Layer: Network Layer Design Issues, Datagram and Virtual circuit subnets, Routing Algorithms, Multicast Routing Algorithms, Routing in Adhoc networks, Congestion Control Algorithms, Quality of Service, Internetworking, and The Network Layer in the Internet: IPv4 IPv6 and IP Addresses.

UNIT – IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, TCP connection establishment, A Simple Transport Protocol, UDP, and TCP Protocols, The Internet Transport Protocols: TCP

UNIT – V

The Application Layer: DNS—The Domain Name System, Electronic Mail, MIME, SMTP protocol, PoP3, IMAP, The World Wide Web, URLs, HTM and Multimedia. Network Security: Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms.

TEXT BOOKS:

- 1.Computer Networks -- Andrew S Tanenbaum, 4th Edition, Pearson Education.
- 2.Data Communications and Networking – Behrouz A. Forouzan, Fourth Edition TMH,2006.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition, Pearson Education
- 2.Understanding communications and Networks,3rd Edition, W.A.Shay, Cengage Learning.
- 3.Computer and Communication Networks ,Nader F. Mir, Pearson Education
- 4.Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3rd Edition, Pearson Education.

B. Tech. (IT) VI SEMESTER**SOFTWARE ENGINEERING (PC3203IT)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT-I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process, Agile development model.

UNIT-II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: Context models, behavioral models, data models, object models, structured methods.

UNIT-III

Design Engineering: Design process and design quality, design concepts, the design model.

Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

User Interface Design: the golden rules, User Interface Analysis and Design

UNIT-IV

Software Testing Techniques: White box and black box testing, testing for specialized environment, architectures and application, user interface testing.

Software Testing Strategies: A strategic approach to software testing, test strategies for conventional software, validation testing, system testing, the art of debugging.

Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT-V

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

Text Books:

1. Roger S.Pressman , “Software Engineering , A Practitioner ‘s Approach”, 6th Edition, McGraw-Hill International Edition.
2. Ian Sommerville, “Software Engineering”, 7th Edition, Pearson Education.
3. Grady Booch, James Rumbaugh, Ivar Jacobson, “The Unified Modeling Language User Guide”, Pearson Education.

Reference Books:

1. James F. Peters, Witold Pedrycz , “Software Engineering :An Engineering Approach”, John Wiley.
2. Waman S Jawadekar, “Software Engineering Principles and Practice”, The Mc Graw-Hill Companies.

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B. Tech. (IT) VI SEMESTER

Professional Elective – II

ADVANCED DATABASE MANAGEMENT SYSTEMS (PE3204IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT –I

Parallel and Distributed Databases: Introduction, Architectures for Parallel Databases, Parallel Query Evaluation, Parallelizing Individual Operations, Parallel Query Optimization, Introduction to Distributed Databases, Distributed DBMS Architectures, Storing Data in Distributed DBMS, Distributed Catalog Management.

UNIT –II

Distributed Databases: Distributed Query Processing, Updating Distributed data, Distributed Transactions, Distributed Concurrency Control, Distributed Recovery.

Object-Database Systems: Motivating Example, Structured Data Types, Operations on Structured Data, Encapsulation and ADTs, Inheritance, Objects, OIDs and Reference types, Database design for an ORDBMS.

UNIT –III

Object-Database Systems: ORDBMS Implementation Challenges, OODBMS, Comparing RDBMS, OODBMS, and ORDBMS.

Deductive Databases: Introduction to Recursive Queries, Theoretical Foundations, Recursive Queries with Negation, From Data log to SQL, Evaluating Recursive Queries.

UNIT –IV

Information Retrieval and XML data: Colliding Worlds: Databases, IR, and XML, Introduction to Information Retrieval, Indexing for Text Search, Web Search Engines, Managing Text in DBMS, A Data Model for XML, XQUERY: Querying XML Data, Efficient Evaluation of XML Queries.

UNIT –V

Spatial Data Management: Types of Spatial Data and queries, Applications involving Spatial Data, Introduction to Spatial Indexes, Indexing Based on Space-Filling Curves, Grid Files, R Trees: Point and Region Data, Issues on High Dimensional Indexing.

TEXTBOOKS :

1. Raghu Ramakrishnan and Johannes Gehrke , “Database Management Systems “, Third Edition, McGraw Hill Education, ISBN No: 978-9339213114, 2014.
2. Ramez Elmasri and Shamkanth B. Navathe, “Fundamentals of Database Systems“, Seventh Edition, Pearson Education, ISBN No: 978-9332582705, 2017.
3. Stefano Ceri, Giuseppe Pelagatti , “Distributed Databases: Principles and Systems” , McGraw Hill Education , ISBN No: 978-0070265110, 2017.
4. M. Tamer Ozsu, “Principles of Distributed Database Systems”, Pearson Education , ISBN No: 978-8177581775.

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B. Tech. (IT) VI SEMESTER

Professional Elective – II

ADVANCED OPERATING SYSTEMS (PE3205IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT – I

Functions of Operating System, Why Advanced Operating Systems, Types of Advanced Operating Systems. Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT – II

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, Non-Token – Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, Token-Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Singhal's Heuristic Algorithm, Raymond's Tree Based Algorithm.

UNIT – III

Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms

UNIT – IV

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures, Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems. Operating System Design Issues, Threads, Process Synchronization, Processor Scheduling. Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues

UNIT – V

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

TEXT BOOKS:

1. 1.Advanced Concepts in Operating Systems, MukeshSinghal, Niranjan G. Shivaratri, Tata McGraw-Hill Edition 2001

REFERENCES:

1. Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall, 2nd Edition, 2007
2. Sinha, Distributed Operating Systems Concepts and Design, IEEE Computer Society Press, 1997.

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B. Tech. (IT) VI SEMESTER

Professional Elective – II

COMPUTER GRAPHICS (PE3206IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT-I

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid-point circle and ellipse algorithms

Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT-II

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT-III

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V

Computer animation: Design of animation sequence, general computer animation functions, rasteranimation, computer animation languages, key frame systems, motion specifications

Visible surface detection methods: Classification, back-face detection, depth-buffer, BSP-treemethods and area sub-division methods

Text Books:

1. Steven Harington , “Computer Graphics”, *TMH*.
2. Foley, Van Dam, Feiner, Hughes, “Computer Graphics: Principles and Practice in C”, *2nd Edition, Pearson Education*.
3. Donald Hearn and M.Pauline Baker, “Computer Graphics C Version”, *Pearson Education*.

Reference Books:

1. David F Rogers, “Procedural Elements For Computer Graphics”, *2nd Edition Tata Mc Graw Hill*.
2. Neuman and Sproul, “Principles of Interactive Computer Graphics”, *The Mc Graw Hill*
3. Shalini Govil, “Principles of Computer Graphics”, *2005, Springer*.

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B. Tech. (IT) VI SEMESTER

COMPILER DESIGN LAB(PC3208IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

1. Programs using Lex Tool.
 - a. Specification to skip comments in a file.
 - b. Specification to print two digit numbers in words.
 - c. Specification to check validity of given date.
 - d. Specification to convert given octal number into decimal equivalent.
2.
 - a. Design a lexical analyzer for a given language and the lexical analyzer should ignore redundant spaces, tabs and new lines
 - b. Implement the lexical analyzer using LEX tool to generate tokens from the given C program
3. Write a lexical analyzer program for the following:
 - a) To count the number of vowels and consonants in the given string .
 - b) To count the number of characters, words and lines in the given text.
 - c) To count the number of '+'ve and '-'ve integers from the given program
4. Write a lexical analyzer program for the following:
 - a) To count the number of keywords and identifiers in the given program.
 - b) To convert an octal number to decimal number.
 - c) To recognize numbers in the given program.
5. Programs using Lex Tool.
 - a) To count the number of comment lines in the given C program
 - b) To count the number of scanf and printf statements in the given C program
6. Write lexical analyzer program for the following:
 - a) To add line numbers to the given file and displays the same onto the standard output
 - b) To extract only comments from C program and display the same onto the standard output
7. Write yet another compiler compiler program for the following:
 - a) To recognize nested if control statements and display the level of nesting.
 - b) To check the validity of given simple sentence.
8. Write yet another compiler compiler program for the following:
 - a) To check the validity of given date.
 - b) To test for balanced parentheses in the given input.
 - c) To check the validity of given arithmetic expression.
9. Write yet another compiler compiler (YACC) program for the following:

- a) To recognize a valid variable which starts with a letter followed by any number of letters or digits.
- b) To check whether given string is Palindrome or not.
- c) Implementation of Calculator using LEX and YACC.

10. Program to find all the meaningful words and generate the tokens for the given input program.
11. Program on implementing symbol table for HLL.
12. Program for designing predicative parser.
13. Program on implementing shift reduce parser.
14. Program on implementing SLR Parser.
15. Program on implementing LALR parser.
16. Program for constructing LL(1) parser.

Text Book:

[1] Alfred V.Aho, Ravi Sethi, JeffreyD.Ullman, *Compilers: Principles, Techniques and Tools*, 2nd ed. Hong Kong: Pearson Education Asia, 2013.

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B. Tech. (IT) VI SEMESTER
SOFTWARE ENGINEERING LAB (PC3209IT)

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	3	1.5	External Marks :50

List of Experiments

Experiment –I

1. Development of problem statement.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Experiment –II

Perform above exercised for any two sample projects. List of sample projects is given below

1. Online Exam Registration
2. E-ticketing
3. Library Management system
4. Credit Card Processing
5. Hospital Management
6. Student Course Registration
7. Trading System
8. Bank ATM System

ANNEXURE

- ✓ Students should not choose same department subject as an Open elective subject.
- ✓ Students can select any one of the following subjects as an Open elective subject.

Open Elective subjects offered from different department

Sl.No	Course Code	Name of the subject	Branch
1	OE3213EC	Microprocessor and Interfacing	ECE
2	OE3207CS	Fundamentals of Data Structures	CSE

B. Tech. (IT) VI SEMESTER**OPEN ELECTIVE-I****MICROPROCESSORS AND INTERFACING(OE3213EC)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

UNIT I

Evolution of microprocessors, 8085 microprocessor architecture, addressing modes and instruction sets. Basic assembly language programming, pin configuration, timing diagram of read and write operation.

UNIT II

8086 architecture-functional block diagram, register organization, memory segmentation, programming model, pins description in maximum mode and minimum mode, timing diagrams.

UNIT III

Instruction formats, addressing modes, classification of instruction set, assembler directives, macros, 8086 microprocessor assembly language programs: simple programs involving data transfer operation, arithmetic operation, logical operation, branch operation, machine control operation, string manipulations, stack and subroutine operations.

UNIT IV

8255 Programmable peripheral interface block diagram and various modes of operation. Interfacing of ADC, DAC, keyboard, seven segment display, stepper motor interfacing and 8254 (8253) programmable interval timers.

UNIT V

Interrupt structure of 8086, interfacing programmable interrupt controller 8259 and DMA Controller 8257 to 8086 microprocessor. Serial communication standards, RS 232, Serial data transfer schemes and block diagram of 8251 USART.

TEXTBOOKS:

1. Ramesh Gaonkar, "Microprocessor architecture, programming and applications with the 8085", Penram International Publication (India) Pvt. Ltd.
2. Douglas V. Hall, "Microprocessors and Interfacing", Tata McGraw Hill Publication.
3. Sivarama P. Dandamudi, "Introduction to Assembly Language Programming From 8086 to Pentium Processors", Springer Publication.
4. Walter A. Triebel and Avtar Singh, "The 8088 and 8086 Microprocessors: Programming, Interfacing Software, Hardware and Applications", Pearson Publication.
5. A. K. Ray and K. M. Bhurchandi, "Advance microprocessors and Peripherals" Tata McGraw Hill Publication.
6. Lyla B. Das, "The X86 Microprocessors, Architecture, Programming and Interfacing (8086 to Pentium)", Pearson Publication.

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B. Tech. (IT) VI SEMESTER**OPEN ELECTIVE-I****FUNDAMENTALS OF DATA STRUCTURES(OE3207CS)**

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

UNIT-I

Introduction: Introduction to data structure, types of data structures, revision of arrays, memory representation of arrays, operations on arrays, static versus dynamic memory allocation, pointers, self-referential Structure Time complexity.

UNIT-II

Stack-Queue (Linear Data structures): Definition of stack, operations on stack, implementation of stack. Applications of Stack.

UNIT-III

Definition of queue, operations on queue, implementation of queue using arrays
Applications of queue, Circular queue and priority queue.

UNIT-IV

Trees-Graphs (Nonlinear Data structures): definition of trees, Terminology on trees, binary tree, binary search tree and its operations, tree traversal techniques. Applications of Trees.

UNIT-V

Graph: definition, terminology on graphs, representation of graphs, graph traversal techniques, spanning tree, minimum cost spanning tree algorithms. Applications of Graphs.

Text Books:

- 1.Sahni Horowitz, "Fundamentals of data structures in C", UniversitiesPress, second edition, 2008, ISBN No-978-8173716058.
- 2.R Venkatesan,SLovelynRose,"Datastructures",Wiley, second edition, 2019, ISBN No-978-8126577149.

References:

- 1.Narasimha Karumanchi, "Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles", Careermonk Publications, 2016, ISBN-No: 978-8193245279.

ABBREVIATIONS

L	:	Lectures	T	:	Tutorials
P	:	Practicals	CIE	:	Continuous Internal Evaluation
SEE	:	Semester End Examination	PC	:	Professional Core
OE	:	Open Elective	PW	:	Project Work