Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL-506 009
Department Computer Science &Engineering

B. Tech. (CSE) VI SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PC3201CS	Compiler Design	3	1	0	4	30	70	4
2	PC3202CS	Computer Networks	3	1	0	4	30	70	4
3	PC3203CS	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	PC3208CS	Compiler Design Lab	0	0	3	3	25	50	1.5
7	PC3209CS	Software Engineering Lab	0	0	3	3	25	50	1.5
8	PW3210CS	Mini-project	0	0	3	3	50	00	1.5
		Total	**15**	**4**	**9**	**28**	**250**	**450**	**23.5**

*(PE-II) Professional Elective – II

PE3204CS : Artificial Intelligence
PE3205CS : Distributed Databases
PE3206CS : Mobile Application Development

 # Please Refer Annexure

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Department of Computer Science &Engineering

B. Tech. (CSE) VI SEMESTER

COMPILER DESIGN (PC3201CS)

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, HeapManagement, 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 Books:

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

References:

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. Louden, "Compiler Construction: Principles and Practice", 1st edition, Thompson Learning, 2003.

6. K. Muneeswaran "Compiler Design" 1st edition. Oxford University press,2012.

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Department of Computer Science &Engineering

B. Tech. (CSE) VI SEMESTER

COMPUTER NETWORKS (PC3202CS)

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.

References:

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.Computerand 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.

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B. Tech. (CSE) VI SEMESTER

SOFTWARE ENGINEERING (PC3203CS)

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 specializedenvironment, 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, metricsforsource 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, riskprojection, 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 Rambaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Pearson Education.

References:

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. (CSE) VI SEMESTER

Professional Elective – II

ARTIFICIAL INTELLIGENCE (PE3204CS)

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

UNIT-I

Introduction to Artificial Intelligence: The AI problems, The underlying assumption, Historical Backdrop, What is Intelligence, The level of the model, Criteria for success.
Problems, Problem Spaces and Search: Defining the problem as a state space search, Production systems, Production system characteristics, Introduction to search strategies, Issues in the design of search programs, additional problems.

UNIT-II

Heuristic Search Techniques: Generate-and-Test, Hill climbing; simple & steepest; simulated Annealing, Best-first-search; A* Algorithm, Constraint satisfaction.
Knowledge Representation: Knowledge representations and mappings, Approaches to knowledge representation, Issues in knowledge representation.

UNIT-III

Predicate Logic: Representing simple facts in logic, Representing Instance and Isa relationships, Computable functions and Predicates, Resolution, Natural Deduction.
Representing Knowledge Using Rules: Procedural versus Declarative knowledge, Logic programming, Forward versus Backward Reasoning.

UNIT-IV

Symbolic Reasoning under Uncertainty: introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation issues.
Game Playing: The MinMax Search procedure, Adding Alpha-Beta Cut-offs, Additional Refinements, Iterative Deepening.

UNIT-V

Planning: overview, An Example Domain: The Blocks World, Components of a Planning System.
Natural Language Processing: Introduction, Syntacting Processing, Semantic Analysis, Discourse and Pragmatic Processing, Statistical Natural Language Processing, Spell Checking.

Text Books:

1. Elaine rich, Kevin knight and Shivashankar B Nair "Artificial Intelligence", Third Edition, McGraw-Hill, ISBN No: 978-0-07-008770-5, 2015.
2. Deepak Khemani, "A First Course in Artificial Intelligence", First Edition, McGraw Hill Education,ISBN No: 978-1259029981, 2013.
3. Patterson, "Introduction to Artificial Intelligence" First Edition, 2000, Pearson Education India,ISBN No: 978-8120307773, 2015.

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B. Tech. (CSE) VI SEMESTER

<u>Professional Elective – II</u>

<u>DISTRIBUTED DATABASES (PE3205CS)</u>

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

UNIT – I

Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture.

Distributed Database Design: AlternativeDesign Strategies,Distribution Design issues, Fragmentation,Allocation.

UNIT – II

Query processing and decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

Distributed query Optimization: Query optimization, centralized query optimization, distributed query optimization algorithms.

UNIT – III

Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT – IV

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

UNIT – V

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS.

Text Books:

1.M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.

2.Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

References:

1.. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The Complete Book", Second Edition, Pearson International Edition

B. Tech. (CSE) VI SEMESTER

Professional Elective – II

MOBILE APPLICATION DEVELOPMENT (PE3206CS)

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

UNIT – I

Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools

Discussion on Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes

What is Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT – II

How to Create Android User Interface: Measurements–Device and pixel density independent measuring units.

Layouts – Linear, Relative, Grid and Table Layouts.

Various components of User Interface (UI)– Editable and non-editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers.

Event Handling – Handling clicks or changes of various UI components.

Fragments& Life cycle– Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT – III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS.

Broadcast Receivers and Notifications– Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity **Notifications** – Creating and Displaying notifications, Displaying Toasts

UNIT – IV

Persistent Storage: Files, Saving state and Preferences– Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared

preferences, saving and retrieving data using Shared Preference

Introducing Android Databases – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

UNIT - V

Advanced Topics: Alarms – Creating and using alarms.
Using Internet Resources – Connecting to internet resource, using download manager
 Location Based Services – Finding Current Location and showing location on the Map, updating location. Publishing Android Applications, Using Eclipse for Android Development ,Using the Android Emulator .

Text Books:

1.Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012
2.Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

References:

1.Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

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B. Tech. (CSE) VI SEMESTER

COMPILER DESIGN LAB (PC3208CS)

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

List of Experiments

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 Books:

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. (CSE) VI SEMESTER
SOFTWARE ENGINEERING LAB (PC3209CS)

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

List of Experiments

Experiment1:
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.

Experiment2:
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.

<u>Open Elective subjects offered from different department</u>

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

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Department of Computer Science &Engineering

B. Tech. (CSE) 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 interfaceblock 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.

References:

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 Programing 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. (CSE) 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