

Description	Subject Teaching Methodology	L	T	P	C
Course Code	17300201 Data Structures	3	1	0	4
Teaching	Total contact hours - 64				
Prerequisite (s)	Knowledge of C programming				

Course Objective(s):

- 1.To understand the concepts of data structure
2. To choose the appropriate data structure for a specified application.

Unit – I

Objective: To Overview of the basic concepts of data structure ,complexities of algorithms and types of data structures. (CO1, CO2)

Basic concepts - Algorithm Specification - Introduction, Recursive algorithms, Data Abstraction Performance analysis - time complexity and space complexity, Asymptotic Notation - Big O, Omega and Theta notations, introduction to Linear and Non Linear data structures.

Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists- Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion. Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

Unit – II

Objective: To Introduce the stack and queue data structure ,operations and applications. (CO1, CO3)

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

Unit – III

Objective:. To Introduce the tree and graph data structure ,operations and applications. (CO1, CO2)

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap. Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

Unit – IV

Objective: To Introduce the various searching and sorting techniques. (CO1, CO2)

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions,Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

Unit – V

Objective: To Introduce the Advanced concepts in trees. (CO2, CO3)

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees- Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees (Elementary treatment-only Definitions and Examples), Comparison of Search Trees.Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

Course Outcomes

After successful completion of the course, a successful student will be able to-

- CO1: Learn how to use data structure concepts for realistic problems.
- CO2: Ability to identify appropriate data structure for solving computing problems in respective language
- CO3: Ability to solve problems independently and think critically.

Text Books:

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

Reference books:

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum, Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung, Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz, Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2nd edition, Pearson..
9. Data Structures using C & C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2nd edition, PHI.
11. Advanced Data structures, Peter Brass, Cambridge.

Web Resources:

1. <http://nptelonlinecourses.iitm.ac.in/>
2. <https://www.quora.com/What-are-some-good-websites-to-learn-data-structures>
3. <https://www.peterindia.net/DataStructureandAlgorithms>
4. https://www.tutorialspoint.com/data_structures_algorithms/

COURSE CODE		17300201 Data Structures									
COURSE DESIGNED BY		DEPARTMENT OF COMPUTER APPLICATIONS									
Program Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Course outcomes	CO1	✓	✓				✓				✓
	CO2			✓	✓	✓				✓	
	CO3			✓				✓	✓		
Category	Programming	Core		Mathematics Based		Non Computer Based		Latest Technology			
	✓										
Mode of Evaluation : Written Examination											

Description	Subject Teaching Methodology	L	T	P	C
Course Code	17300202 Computer Organization	4	0	0	4
Teaching	Total contact hours - 64				
Prerequisite (s)	Basic Knowledge of electronic circuits and Gates , digital computers				

Course Objective(s):

1. To analyze the system performance, how Computer Systems work & its basic principles
2. Examine the operation of the major building blocks of a computer system
3. To study the basic organization of digital computers (CPU, memory, I/O, software).

Unit – I

Objective: To have a thorough understanding of the basic structure and operation of a digital computer. (CO1, CO5)

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean algebra, Map Simplification, Combinational Circuits, Flip-flops, Sequential Circuits. Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.

Unit – II

Objective: To discuss in detail Data types , micro operations and Computer Organization Design(CO1, CO3)

Data Representation: Data types, Complements, Fixed-point Representation, Floating-point representation, other binary codes, Error detection Codes. Register Transfer and Micro operations: Register transfer language, Register transfer, Bus & memory Transfers, Arithmetic micro operations, logic micro operations, Shift micro operations, Arithmetic Logic Shift Unit Basic Computer Organization and Design: Instruction Codes, Computer registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-output Interrupt

Unit – III

Objective: To study the Micro programmed control and CPU (CO2, CO4)

Micro programmed Control: Control memory, Address Sequencing, Micro program Example, Design of control Unit. Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control

Unit – IV

Objective: To discuss in detail the operation of the arithmetic unit including the floating-point addition, subtraction, multiplication & division. (CO1, CO5)

Computer Arithmetic: Introduction, Addition and subtraction, Multiplication algorithm, Floating point arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations.

Unit – V

Objective: To study the hierarchical memory system including cache memories (CO1, CO2)

To study the different ways of communicating with I/O devices and standard I/O interfaces.

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory

Course Outcomes

After successful completion of the course, a successful student will be able to-

CO1: To apply the knowledge of performance metrics to find the performance of systems.

CO2: To create an assembly language program for a microprocessor system.

CO3: To design a hardware component for an embedded system

CO4: To deal with different types of computers

CO5: To identify high performance architecture design

Text Books:

1. M. Morris Mano ,Computer System Architecture,3rdEdition, Pearson Education (2008).

Reference books

- 1 V. Rajaraman, T. Radha Krishnan Computer Organization and Architecture PHI
- 2 Behrooz Parhami Computer Architecture Oxford (2007)
- 3 ISRD group Computer Organization ace series, TMH (2007)
- 4 William Stallings Computer Organization and Architecture – Designing for Performance Pearson Education (2005)

Web Resources:

1. <https://pdfs.semanticscholar.org/30a2/02b45d404e51531267a3e7362892f5036e3e.pdf>
2. <https://www.quora.com/What-are-the-best-websites-and-videos-to-learn-computer-arc>
3. <https://www.quora.com/What-is-the-best-way-to-learn-computer-organization-and-arc>
4. www.nu.edu.sa/c/document_library/get_file?...computer+organisation

COURSE CODE		17300202 Computer organisation									
COURSE DESIGNED BY		DEPARTMENT OF COMPUTER APPLICATIONS									
Program Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Course outcomes	CO1	✓					✓				
	CO2		✓	✓							✓
	CO3				✓				✓		
	CO4					✓					
	CO5			✓				✓			
Category	Programming	Core		Mathematics Based		Non Computer Based		Latest Technology			
		✓									
Mode of Evaluation :Written Examination											

Description	Subject Teaching Methodology	L	T	P	C
Course Code	17300203 OOPS Through Java	3	1	0	4
Teaching	Total Contact Hours 64				
Prerequisite (s)	Knowledge of basic programming concepts				

Course Objective(s):

1. To impart knowledge on basic Object Oriented Programming.
2. Understanding data abstraction using problem representation.
3. To teach the basic concepts and techniques which form the object oriented programming paradigm.

Unit-I

Objective: To describe basic concepts of Object Oriented Programming, java data types, classes and objects. (CO1,CO2)

Basics of Object Oriented Programming (OOP):

Need for OO paradigm , A way of viewing world - Agents, responsibility, messages, methods, classes and instances, class hierarchies(Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity , abstraction mechanisms.

Java Basics:

Data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects - concepts of classes, objects, constructor methods, access control, this keyword, garbage .handling.

Unit-II

Objective: To implement object oriented constructs such as various class hierarchies, interfaces and exception handling.(CO2,CO3)

Inheritance:

Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism, abstract classes.

Packages and Interfaces:

Defining, Creating and Accessing a package, Understanding Class path ,Importing packages, differences between classes and interfaces, defining an interface, Implementing interface, applying interfaces variables in interface and extending interfaces.

Unit , III

Objective: To gain knowledge of throwing on exception and catching it.(CO2,CO3)

Exception handling and multithreading:

Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

Unit , IV

Objective: To be able to build dynamic user interface using event handling and to designing the user interface using the UI components. (CO5,CO6)

Event Handling:

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components-labels, button, canvas, scrollbars, text components, check box, check box groups, choices, list panes- scroll pane, dialogs, menu bar , graphics, layout manager-layout manager types- boarder, grid, flow, card and grid bag.

Unit , V

Objective: To know about the creation of applets & using it and application oriented knowledge on swings. (CO5,CO7)

Applets:

Concepts of Applets, differences between applets and applications, lifecycle of an applet, types of applets, creating applets, passing parameters to applets.

Swings:

Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons-The JButton class, Check boxes, Radio Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees and Tables.

Course Outcomes:

After successful completion of the course, a successful student will be able to -

- CO1: Understand of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs.
- CO2: Develop object oriented constructs such as various class hierarchies, interfaces & exception handling .
- CO3: Able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- CO4: Demonstrate the ability to use simple data structures like arrays in a Java program.
- CO5: Make use of members of classes found in the Java API
- CO6: Develop various types of selection constructs in a Java program.
- CO7: Know about the creation of applets & using it and application oriented knowledge on swings.

Text Book:

1. Java-The complete reference - 7/e, Herbert schildt, TMH.

References:

1. JAVA: How to program, 8/e, Dietal and Dietal, PHI.
2. Introduction of programming with JAVA, S.Dean, TMH.
3. Introduction to Java programming, 6/e, Y.Daniel Liang, Pearson.
4. Core Java 2, Vol 1(Vol 2) Fundamentals (Advanced), 7/e, Cay.S.Horstmann, Gary Cornell, Pearson.
5. Big Java2, 3/e, Cay.S. Horstmann, Wiley.
6. Object Oriented Programming through Java, P.Radha Krishna, University Press.

Web Resources:

1. http://ebook-dl.com/item/java_programming_seventh_edition_joyce_farrell/
2. <http://introcs.cs.princeton.edu/java/10elements/>
3. http://www.ntu.edu.sg/home/ehchua/programming/java/J3a_OOPBasics.html
4. <http://www.horstmann.com/bigjava2.html>
5. <https://www.edx.org/course/introduction-programming-java-part-1-uc3mx-it-1-1x>

Course code		17300203 OOPS Through Java									
Course Designed By		Department of Computer Applications									
Program Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Course outcomes	CO1		✓								
	CO2			✓	✓						
	CO3	✓	✓	✓	✓						
	CO4		✓					✓	✓		✓
	CO5	✓	✓	✓							
	CO6				✓	✓					
	CO7		✓					✓			
Category	Programming	Core		Mathematics Based		Non Computer Based		Latest Technology			
	✓										
Mode of Evaluation :Written Examination											

Description	Subject Teaching Methodology	L	T	P	C
Course Code	17300204 Organizational Structures and Personnel Management	4	0	0	4
Teaching	Total contact hours - 64				
Prerequisite (s)	Basics about organization				

Course Objective(s):

1. To provide the students with an in depth understanding of organizations.
2. To understand various levels of management and to describe the various skills that are necessary for successful managers.
3. To develop the nature and scope of management.
4. To know the difference between management and administration.

Unit – I

Objective: To identify the planning and importance of management (CO1, CO5)

Introduction to Management: Concepts, nature and definitions of management, management and administration, principles of management -functions of management planning, organizing, directing and controlling –importance of management.

Unit – II

Objective: To explore the basic theories of Personnel Management and its functions. (CO1, CO4)

Classical Theories of Organization: Functional approach –division of labor, levels of authority, span of Control, authority& responsibility, efficiency of management. Concept of organization Structure-Formal and Informal organization, difficulties due to informal organization-group Behavior-Committee motivation and theories of motivation.

Unit – III

Objective:. To identify Manpower management effectively describes the processes of planning and directing the application, development, and utilization of human resources in employment (CO2, CO4)

Manpower planning: Uses benefits problems and limitations, manpower inventory, manpower forecasting, job description, recruitment, Job specification and job selection, interviewing techniques, transfers, promotion and its policies. Training and development : Objectives and policies planning, organizing the training department, training manager and his job, on and off the job training, techniques, career planning, objectives of performance appraisal

Unit – IV

Objective: To obtain and practice effective written and oral business communications skills. (CO1, CO3)

Communication : Importance of communication, inter personnel communication barriers of communication, communication in organizations, using communication skills to manage conflicts. Impact of informational technology and fostering effective communication

Unit – V

Objective: To learn business levels and strategic management (**CO1, CO3, CO5**)

Strategic management: Objectives, importance policies, concept of core competence capability of organizational learning, strategic levels and planning, business level strategy and functional level, PHASES OF PLANNING, SWOT, develop strategies and prepare strategic plan

Course Outcomes

After successful completion of the course, a successful student will be able to-

- CO1: Understand the importance of organizational structure and design on internal organizational.
- CO2: Understand the relationships between organization structure and the behavior of those who work in them or otherwise interact with them.
- CO3: Recognize the managerial implications of organization design and change and how these are informed by the relevant theories.
- CO4: Appreciate the impact of advanced technologies on the strategy and structure of organizations and how to address the changes implied by the adoption of these technologies.
- CO5: Understand the Personnel Functions like position of the personnel department in the organization

Text Books:

1. L.M.Prasad, Principles and Practice of Management, Sultan Chand & Sons.
2. A.R.Aryasri, Organizational Structure and Personnel Management, TMH, 2009

Reference books:

1. Organization Structure and Personnel Management, 2/e, Subbarao.P, HPH.
2. Personnel and Human Resource Management, Recenzo, Robins, PHI.
3. Management process and Organizational Behaviour, Karampal, I.k.Int.
4. Human Resource Management Jyothi, Oxford.
5. Organizations and Management, Agarwal, TMH.
6. Fundamentals of HRM, David A. Decenzo and Stephen R. Robins, Wiley India.

Web Resources:

1. <https://www.slideshare.net/WelingkarDLP/hrm-i-personnel-mgmtchap2>
2. <https://www.slideshare.net/Williardq/personnel-managemen>
3. <https://management-chandrasekhar.blogspot.com/2011/.../personnel-management.htm>
4. www.yourarticlelibrary.com/personnel-management/organization-structure
5. www.managementstudyguide.com/personnel-management.htm

COURSE CODE		17300204 Organizational Structures and Personal Management									
COURSE DESIGNED BY		DEPARTMENT OF COMPUTER APPLICATIONS									
Program Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Course outcomes	CO1	✓				✓		✓			
	CO2								✓		
	CO3		✓				✓				✓
	CO4				✓					✓	
	CO5			✓							✓
Category	Programming	Core		Mathematics Based			Non Computer Based		Latest Technology		
							✓				
Mode of Evaluation :Written Examination											

Description	Subject Teaching Methodology	L	T	P	C
Course Code	17300205 Intellectual Property Rights & Professional Ethics	4	0	0	4
Teaching	Total contact hours - 64				
Prerequisite (s)	Basics about law and marketing				

Course Objective(s):

- 1 To appreciate the concept of Intellectual Property and recognize different kinds of Intellectual Property
- 2 To appreciate the rationale behind IP and underlying premises,
- 3 To know the position of IP under the Constitution of India,
- 4 To understand the concepts of Ethics in work environment.
- 5 To understand the threats in computing environment and the in trceries of accessibility

Unit – I

Objective: To introduce the concepts of intellectual property law basics and various types of trademarks. (CO1, CO3, CO4)

Intellectual property law basics:

Types of Intellectual property – agencies responsible for Intellectual property registration.

Introduction to law of trademarks:

Purpose and function, types of trademarks, acquisition of trademark rights, trademark selection and searching, trademark registration process.

Unit – II

Objective: To know the concept of IPR and the relevant Law and its practical application. (CO1, CO4)

Introduction to patent law – patent requirements – ownership-patents application process-patent infringement –patent litigation –International patent law-double patenting-patent searching-invention developers and promoters.

Unit – III

Objective: To know the copyright ownership and their disputes. (CO3, CO4)

Copyright ownership, transfer and duration-right to prepare derivative works- rights of distribution –rights of perform the work publicity copyright formalities and registrations – limitations –copyright disputes and international copyright law.

Unit – IV

Objective: To summarize the laws for prosecuting computer attacks and risk assessment. (CO1, CO2, CO5)

Computer and Internet Crime:

Types of exploits, types of perpetrators, federal laws for prosecuting computer attacks, implementing trustworthy computing, Risk assessment, establishing security policy, educating employees and contract workers, prevention, detection, response.

Unit – V

Objective: To know about the importance of software quality, social networking and ethical issues. (CO5)

SoftwareDevelopment:

Importance of software quality, software product liability, software development process, capability maturity model integration, key issues in software development, development of safety critical system, quality management standards.

Social Networking –Ethical issues:

Cyber bullying- cyber stalking –online virtual world- crime in virtual world

Course Outcomes

After successful completion of the course, a successful student will be able to-

- CO1: Understand intellectual property rights and trademarks
- CO2: Model in different views in patent law and international patent law
- CO3: Identify and analyze intellectual property rights and law of trademarks
- CO4: Identify the infringement of different laws basing on ownership, transfers , duration, registration and searching
- CO5: Know about the importance of software quality, social networking and ethical Issues .

Text Books:

1. Intellectual Property- Deborah E.Bouchoux- Cengage learning, New Delhi.
2. Ethics in Information technology - George W.Reynolds-4/e,Cengage Learning

Reference books:

1. Intellectual Property Rights Unleashing the Knowledge Economy, Prabuddha Ganguli, Tata McGraw Hill, New Delhi, 2001.
2. Ethical, legal and professional issues in computing, Penny Duquenoy, Simon Jonesand Barry G Blundell ,Middlesex University Press, 2008.
3. Intellectual Property Rights: In the WTO and Developing Countries, Jayasree Watal,Oxford University Press.
4. Intellectual Property Rights and Copyright, V.Sarkar , ESS publications.

Web Resources:

1. <http://www.cengagebrain.com.au/content/9781285243863.pdf>
2. <http://www.abebooks.co.uk/book-search/title/intellectual-property-for-paralegals-the-law-of-trademarks-copyrights-patents-and-trade-secrets/author/bouchoux-deborah-e/>
3. <http://capitadiscovery.co.uk/brookes/items/1194118>
4. <http://trove.nla.gov.au/work/34006945?q&versionId=41863400>

COURSE CODE		17300205 Intellectual Property Rights & Professional Ethics									
COURSE DESIGNED BY		DEPARTMENT OF COMPUTER APPLICATIONS									
Program Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Course outcomes	CO1	✓					✓				
	CO2								✓		✓
	CO3		✓			✓				✓	
	CO4									✓	
	CO5			✓							
Category	Programming	Core		Mathematics Based		Non Computer Based		Latest Technology			
						✓					
Mode of Evaluation :Written Examination											

Description	Subject Teaching Methodology	L	T	P	C
Course Code	17300211 DATA STRUCTURES LAB			3	2
Teaching	Total contact hours - 48				
Prerequisite (s)	Knowledge of C programming				

Course Objective(s):

- 1 To write and execute programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables
- 2 To write and execute write programs in C to implement various sorting and searching methods.

Recommended Systems/Software Requirements:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space.
 - C compiler.
1. Write a C program that uses functions to perform the following: (CO1,CO3)
 - a. Create a stack of integers.
 - b. Delete a given integer from the above .
 - c. Display the contents of the above .
 2. Write a C program that uses functions to perform the following: (CO1,CO3)
 - a. Create a queue of integers.
 - b. Delete a given integer from the above .
 - c. Display the contents of the above .
 3. Write a C program that uses functions to perform the following: (CO1,CO3)
 - a. Create a singly linked list of integers.
 - b. Delete a given integer from the above linked list.
 - c. Display the contents of the above list after deletion.
 4. Write a C program that uses functions to perform the following: (CO1,CO3)
 - a. Create a doubly linked list of integers.
 - b. Delete a given integer from the above doubly linked list.
 - c. Display the contents of the above list after deletion.
 5. Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent, Implement the stack using an array (CO1,CO3)
 6. Write a C program that uses stack operations for implementing Tower of Hanoi Problem (CO1,CO3)
 7. Write a C program that uses stack operations for evaluating a postfix expression (CO1,CO3)
 8. Write C programs to implement a double ended queue ADT using array . . (CO1,CO3)
 9. Write C programs to implement a double ended queue ADT using doubly linked list . (CO1,CO3)
 10. Write C programs to implement Linear Search . (CO3)
 11. Write C programs to implement Binary Search . (CO3)
 12. Create a binary search tree of characters. (CO1,CO3)
 13. Traverse the above Binary search tree recursively in Postorder. (CO1,CO3)
 14. Traverse the above Binary search tree recursively in Inorder. (CO1,CO3)

15. Traverse the above Binary search tree recursively in Preorder. (CO1,CO3)
16. Create a binary search tree of integers. (CO1,CO3)
17. Traverse the above Binary search tree non recursively in Inorder. (CO1,CO3)
18. Traverse the above Binary search tree non- recursively in Postorder. (CO1,CO3)
19. Traverse the above Binary search tree non recursively in Preorder. (CO1,CO3)
20. Write C program for implementing Bubble sort to arrange a list Of integers in Ascending order : (CO1,CO2)
21. Write C program for implementing Insertion sort to arrange a list Of integers in Ascending order : (CO1,CO2)
22. Write C program for implementing Merge sort to arrange a list Of integers in Ascending order : (CO1,CO2)
23. Write C program for implementing Quick sort to arrange a list Of integers in Ascending order : (CO1,CO2)
24. Write C program for implementing Heap sort to arrange a list Of integers in Ascending order : (CO1,CO2)
25. Write C program for implementing Radix sort to arrange a list Of integers in Ascending order : (CO1,CO2)
26. Write C program for implementing Selection sort to arrange a list Of integers in Ascending order : (CO1,CO2)
27. Write a C program to Implement a B-tree. (CO1,CO3)
28. Write a C program to Implement an AVL tree. (CO1,CO3)
29. Write a C program to implement all the functions of a dictionary (ADT) using hashing. (CO1,CO3)
30. Write a C program for implementing Knuth-Morris- Pratt pattern matching. Algorithm (CO1,CO3)
31. Write C programs for implementing the following graph traversal algorithms: Depth first traversal (CO1,CO3)
32. Write C programs for implementing the following graph traversal algorithms: Breadth first traversal (CO1,CO3)

Course Outcomes:

After successful completion of the course, a successful student will be able to-

CO1: Identify the appropriate data structure for given problem.

CO2: Design and analyze the time and space complexity of algorithm or program.

CO3: Effectively use different data structures for solving real application problems.

Text books:

1. C and Data Structures, Third Edition, P.Padmanabham, BS Publications.
2. C and Data Structures, Prof. P.S.Deshpande and Prof. O.G. Kakde, Dreamtech Press.
3. Data structures using C, A.K.Sharma, 2nd edition, Pearson.
4. Data Structures using C, R.Thareja, Oxford University Press.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand.
6. C Programming and Data Structures, P.Radha Krishna, Hi-Tech Publishers.

COURSE CODE		17300211 DATA STRUCTURES LAB									
COURSE DESIGNED BY		DEPARTMENT OF COMPUTER APPLICATIONS									
Program Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Course outcomes	CO1		✓			✓		✓			
	CO2			✓			✓		✓		
	CO3	✓			✓					✓	✓
Category	Programming	Core		Mathematics Based			Non Computer Based		Latest Technology		
	✓										
Mode of Evaluation :Written Examination											

Description	Subject Teaching Methodology	L	T	P	C
Course Code	17300212 OOPS Through Java Lab	0	0	3	2
Teaching	Total Contact Hours 48				
Prerequisite (s)	Knowledge of fundamental programming concepts				

Course Objective(s):

1. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc
2. Defining classes, invoking methods, using class libraries.
3. Use applets and swings to create and run simple Java programs .

Recommended Systems/Software Requirements:

Intel based desktop PC, JDK 1.5 or more

List of Programs:

1. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1, 1. Every subsequent value is the sum of the two values preceding it. Write a Java Program (WJJP) that uses both recursive and non-recursive functions to print the *n*th value of the Fibonacci sequence. **(CO1)**
2. WJJP that prints all real solutions to the quadratic equation $aX^2+bX+c=0$. Read in a, b,c and use the quadratic formula. If the discriminate b^2-4ac is negative, display a message stating that there are no real solution. **(CO1)**
3. WJJP to demonstrate wrapper classes, and to fix the precision. **(CO7)**
4. WJJP that prompts the user for an integer and then prints out all the prime numbers up to that Integer. **(CO1)**
5. WJJP that checks whether a given string is a palindrome or not. Ex: MALAYALAM is a palindrome. **(CO2)**
6. WJJP for sorting a given list of names in ascending order. **(CO3)**
7. WJJP to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose. **(CO1)**
8. WJJP that illustrates how runtime polymorphism is achieved. **(CO5)**
9. WJJP to create and demonstrate packages. **(CO5)**
10. WJJP, using String Tokenizer class, which reads a line of integers and then displays each integer and the sum of all integers. **(CO1)**
11. WJJP that reads on file name from the user then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the using File Input Stream class. **(CO7)**
12. WJJP that displays the number of characters, lines and words in a text/text file. **(CO1)**
13. WJJP that reads a file and displays the file on the serene, with a line number before each line **(CO1)**
14. Write an Applet that displays the content of a file. **(CO6)**
15. Write a program using applets for passing parameters. **(CO6)**
16. WJJP that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the + - x / % operations. Add a text field to display the result. **(CO1)**

17. WAJP for handling mouse events.(CO6)
18. WAJP demonstrating the life cycle of a thread.(CO6)
19. WAJP that correctly implements Producer-Consumer problem using the concept of Inter Thread Communication.(CO6)
20. WAJP that lets users create Pie charts. Design your own user interface (with Swings & AWT).(CO7)
21. WAJP that allows user to draw lines, rectangles and ovals.(CO1)
22. WAJP to generate a set of random numbers between two numbers x1 and x2, and x1>0. (CO1)
23. WAJP to create an abstract class named Shape, that contains an empty method named number Of Sides ().Provide three classes named Trapezoid, Triangle and Hexagon, such that each one of the classes contains only the method number Of Sides (), that contains the number of sides in the given geometrical figure.(CO5)
24. WAJP to implement a Queue, using user defined Exception Handling (also make use of throw, throws).(CO6)
25. WAJP that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays “Welcome” every 3 seconds. (Repeat the same by implementing Runnable) (CO6)
26. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods. (CO1)
27. WAJP to create and add 3 scroll bars to the window and handle the event appropriately. (CO7)
28. WAJP on key event handling. (CO7)
29. WAJP which uses flow layout.(CO1)
30. WAJP which uses grid layout .(CO1)

Course outcomes:

After successful completion of the course, a successful student will be able to -

- CO1: Write, compiling and execute basic Java program.
- CO2: Know the use of data types and variables, decision control structures: if, nested if ,etc.
- CO3: Understand the use loop control structures: do, while, for etc.
- CO4: Create classes and objects and use them in their program.
- CO5: Know the use of oop’s concept i.e data abstraction, data hiding, encapsulation, Inheritance and polymorphism.
- CO6: Create and use threads, handle exceptions and write applets.
- CO7: Develop programs to create interfaces ,inner classes and wrapper classes.

Course code		17300212 OOPS Through Java Lab									
Course Designed By		Department of Computer Applications									
Program Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Course outcomes	CO1	✓							✓		
	CO2		✓								
	CO3		✓				✓				
	CO4			✓							
	CO5				✓			✓			
	CO6			✓						✓	
	CO7				✓						✓
Category	Programming		Core		Mathematics Based		Non Computer Based		Latest Technology		
	✓										
Mode of Evaluation :Written Examination											

Description	Subject Teaching Methodology	L	T	P	C
Course Code	17300213 IT Workshop	0	0	3	2
Teaching	Total Contact Hours 48				
Prerequisite (s)	Basic knowledge about computer hardware and software				

Course Objectives:

1. An ability to use current techniques, skills, and tools necessary for computing practice.
2. To impart basic computer usage and maintenance skills.
3. It concentrates more on hands -on experience rather theoretical classes.
4. It enables to make the best use of Microsoft Office Suite in their day-today requirements and make use of it to improve the standards in the educational environment.

Recommended Systems Requirements:

Intel processor, 64-bit processor with SSE2 instruction set, OS: Windows 7

List of programs:

Hardware and Networking:

1. Dismantling of a Personal Computer (PC)(CO1,CO2)
2. Identification of Components of a PC such as power supply, motherboard, processor, hard disk, memory (RAM, ROM), CMOS battery, CD drive, monitor, keyboard, mouse, printer, scanner, pen drives disk drives etc. (CO1,CO2)
3. Assembling of PC. (CO1,CO2)
4. Installation of Operating System (Any one) and Device drivers. (CO1,CO2)
5. Boot-up sequence. (CO1,CO2)
6. Installation of application software (at least one) basic troubleshooting and maintenance. (CO1,CO2)
7. Identification of network components: LAN card, wireless card, switch, hub, router. (CO1,CO2)
8. Different types of network cables (straight cables, crossover cables, rollover cables) (CO1,CO2)
9. Basic networking and crimping. (CO1,CO2)

MS Office:

MS-Word

10. Create a project certificate, Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.
11. Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check and Track Changes.

12. Create a Newsletter. Features to be covered:-Table of content. Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.
13. Create a Feed Back Form:-Features to be covered: Forms, Text Fields, Inserting objects and Mail Merge in Word.
14. Create a Scheduler:-Features to be covered: - Gridlines, Format Cells, Summation, auto fill, Formatting Text.
15. Prepare a your personal resume in word document.
16. Design a farewell (to seniors) invitation in Ms.Word.

MS-Excel

17. Calculate GPA-Features to be covered-Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count Function.
18. Performance Analysis-Features to be covered:-split cells, freeze panes, group and outline, sorting, Boolean and logical operators, Conditional formatting.
19. Update Manager Designation to Sr.Manager in EMP table.Delete employee Smith from EMP table.
20. Make a document containing a table displaying MBA I sem Time Table.
21. Design a work sheet for purchase made by a customer at a shop and calculate the total amount he need to pay.
22. Design a worksheet for calculating total marks and percentage of students.
23. Draw a column chart for showing production of crops in different years.
24. Draw a line chart for showing temperature in different months.
25. Draw a pie chart for showing pass percentage of students.
26. Create a table that containing the details about students and related fields. Also performing the operations insert, update, delete on the table.

MS-Power Point

27. Create a power point presentation consists of slide layouts inserting text, formatting text,bullets and numbering of five slides with following information: Slide 1 – contents, Slide 2 –Name, Slide 3 –Address, Slide 4 –Hobbies, Slide 5 –Friends. (CO5)
28. Create a power point presentation consisting of hyperlinks, inserting images, clip art, audio, video objects of 4 slides with the following information: Slide 1:-Name of your

college in bold letters. Slide 2:-Address of your college in bold letters. Slide 3:-List of all available courses, Slide 4:-Extra co-curricular activities. And apply the transition effects and set the time three seconds for each slide and view it in slide show.

29. Create a power Point presentation on business by using master layouts and see the presentation in different views. (CO5)

Course Outcomes:

After successful completion of the course, a successful student will be able to-

1. To know the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers.
2. Understand the hardware and software level trouble shooting process, tips and tricks.
3. Masters in working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC.
4. Having awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks.
5. Design in crafting professional word documents; excel spread sheets and power point presentations using the Microsoft suite of office tools and Latex.

Reference Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. PC Hardware and A +Handbook –Kate J. Chase PHI(Microsoft)
3. Latex Companion –Leslie Lamport, PHI/Pearson
4. “Introduction to Computers with MS-Office 2000”, Alexis Leon and Mathews Leon, Leon Tech world.

COURSE CODE		17300213 IT Workshop									
COURSE DESIGNED BY		DEPARTMENT OF COMPUTER APPLICATIONS									
Program Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Course outcomes	CO1	✓		✓							
	CO2				✓				✓	✓	
	CO3		✓			✓					✓
	CO4	✓					✓				
	CO5							✓		✓	
Category	Programming	Core		Mathematics Based			Non Computer Based		Latest Technology		
		✓									
Mode of Evaluation :Written Examination											