GALGOTIAS UNIVERSITY

(Under the Uttar Pradesh Private Universities Act No. 12 of 2019)

COURSE BOOK - 2021
Volume-5

Curriculum and syllabus

2021-2022

University Polytechnic

Program :Diploma in Computer Science and Engineering

Vision To be recognized as a centre of excellence for diploma Computer Science & Engineering by imparting the technical and professional skills

Mission : To prepare efficient technical graduates with high levels of knowledge and technological innovation.

- **To provide necessary support to the aspirants in their goal oriented academic pursuits through value aided curricular and co-curricular activities.**
- **To achieve the international standards of quality assurance in accordance with the needs in public and private sectors**
- **To provide the students with an academic environment of excellence, leadership, ethical guidelines and lifelong learning needed for a long productive career.**

Program Educational Objectives: The educational objectives of the Computer Science & Engineering Diploma Program are to produce Diploma holder who, within three years after diploma, are able to:

1. **Prepare students to excel in Computer Science and Engineering program through quality education enabling them to succeed in computing industry profession.**
2. **Expose students to tools and techniques of Computer Science and engineering so that they can comprehend, analyze, design and create innovative computing products and solutions for real life problems.**
3. **Be employed as an expert in solving computer hardware and software problems by their core computing technical skills.**

Program Specific Objectives: Computer Science & Engineering Diploma holders will be able to:

PSO1: Problem-Solving Skills: The ability to apply standard practices and strategies in software & hardware project development using open source tools to deliver a quality product.

PSO2: Successful Career and Entrepreneurship: The ability to create innovative career paths to be an entrepreneur, and a zest for higher studies.

Program Outcomes

1. Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems.

2. Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.

3. Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.

4. Engineering Tools: Apply appropriate technologies and tools with an understanding of the limitations.

5. The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

6. Environment and sustainability: Understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

7. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

8. Individual and team work: Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.

9. Communication: An ability to communicate effectively.

10. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

Curriculum

Semester 1									
Sl. No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	PHYE-1001	APPLIED PHYSICS-I	3	2	0	4	20	50	100
2	MATD-1002	APPLIED MATHEMATICS-I	4	0	0	4	20	50	100
3	SLPC-1003	PROFESSIONAL COMMUNICATION-I	2	0	0	2	20	50	100
4	DPCS-1004	COMPUTER FUNDAMENTALS	3	0	0	3	20	50	100
5	CHEM-1005	BASIC CHEMISTRY	4	0	0	4	20	50	100
6	PHYE-1006	APPLIED PHYSICS-I LAB	0	0	2	1	50	-	50
7	SLPC-1007	PROFESSIONAL COMMUNICATION-I LAB	0	0	2	1	50	-	50
8	DPCS-1008	COMPUTER FUNDAMENTALS LAB	0	0	2	1	50	-	50
9	CHEM-1009	BASIC CHEMISTRY LAB	0	0	2	1	50	-	50
10	SPYO1001	SPORTS AND YOGA	0	0	2	1	50	-	50
		Total	16	2	10	22			
Semester II									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	PHYE-1010	APPLIED PHYSICS-II	3	2	0	4	20	50	100
2	MATD-1011	APPLIED MATHEMATICS-II	3	2	0	4	20	50	100

3	SLPC-1012	PROFESSIONAL COMMUNICATION-II	3	0	0	3	20	50	100
4	DPCO-1013	FUNDAMENTAL OF ELECTRONICS DEVICE	3	0	0	3	20	50	100
5	DPCS-1014	OPERATING SYSTEM	3	0	0	3	20	50	100
6	PHYE-1015	APPLIED PHYSICS-II LAB	0	0	2	1	50	-	100
7	SLPC-1016	PROFESSIONAL COMMUNICATION-II LAB	0	0	2	1	50	-	100
8	DPME-1017	WORKSHOP PRACTICE	0	0	6	3	50	-	100
9	DPCO-1018	FUNDAMENTAL OF ELECTRONICS DEVICE LAB	0	0	2	1	50	-	100
10	DPCS-1019	OPERATING SYSTEM LAB	0	0	2	1	50	-	100
		Total	15	4	14	24			

Semester III

Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPCS-2001	COMPUTER PROGRAMMING & PROBLEM SOLVING	3	0	0	3	20	50	100
2	DPCS-2002	COMPUTER HARDWARE AND MAINTENANCE	3	0	0	3	20	50	100
3	DPCS-2007	DATA COMMUNICATION AND COMPUTER NETWORKS	3	0	0	3	20	50	100
4	MATD-2001	APPLIED MATHEMATICS-III	3	2	0	4	20	50	100
5	DPCS-2003	PRINCIPLES OF DIGITAL ELECTRONICS	3	0	0	3	20	50	100
6	DPCS-2004	COMPUTER PROGRAMMING & PROBLEM SOLVING LAB	0	0	4	2	50	-	100

7	DPCS-2005	COMPUTER HARDWARE AND MAINTENANCE LAB	0	0	2	1	50	-	100
8	DPCS-2011	DATA COMMUNICATION AND COMPUTER NETWORKS LAB	0	0	2	1	50	-	100
9	DPCO-2007	PRINCIPLES OF DIGITAL ELECTRONICS LAB	0	0	2	1	50	-	100
10	DPCS2017	DIGITAL MARKETING & E-COMMERCE	3	0	0	3	20	50	100
		Total	18	2	10	24			

Semester IV

Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPCS-2009	DATA STRUCTURES USING C	3	0	0	3	20	50	100
2	DPCS-2008	RELATIONAL DATABASE MANAGEMENT SYSTEMS	3	0	0	3	20	50	100
3	DPCS-2003	SOFTWARE ENGINEERING	3	0	0	3	20	50	100
4	DPCS-2018	JAVA PROGRAMMING	3	0	0	3	20	50	100
5	DPCO-2010	MICROPROCESSOR & ITS APPLICATION	3	0	0	3	20	50	100
6	DPCS-2014	DATA STRUCTURES USING C LAB	0	0	2	1	50	-	50
7	DPCS-2012	RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB	0	0	2	1	50	-	50
8	DPCS-2006	SOFTWARE ENGINEERING LAB	0	0	2	1	50	-	50

9	DPCO-2013	MICROPROCESSOR & ITS APPLICATION LAB	0	0	2	1	50	-	50
10	DPCS-2019	JAVA PROGRAMMING LAB	0	0	2	1	50	-	50
11	DPCS9001	DISRUPTIVE TECHNOLOGY LAB	0	0	2	1	50	-	50
12	EEDM-3002	ENVIRONMENT EDUCATION & DISASTER MANAGEMENT	3	0	0	2	20	50	100
		Total	18	0	12	23			
Semester V									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPCS-3002	COMPUTER GRAPHICS	3	0	0	3	20	50	100
2	DPCS-3003	INTERNET & WEB TECHNOLOGY	3	0	0	3	20	50	100
3	IMED3001	INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT	3	0	0	3	20	50	100
4	DPCS-3004	1.1) PYTHON & DATA SCIENCE (ELECTIVE-I)	3	0	0	3	20	50	100
5	DPCS-3011	PYTHON & DATA SCIENCE LAB (ELECTIVE-I)	0	0	2	1	50	-	50
6	DPCS-3005	2.1) MOBILE COMPUTING (ELECTIVE-II)	3	0	0	3	20	50	100

7	DPCS-3012	2.1) MOBILE COMPUTING LAB (ELECTIVE-II)	0	0	2	1	50	-	50
8	DPCS-3008	COMPUTER GRAPHICS LAB	0	0	2	1	50	-	50
9	DPCS-3009	INTERNET &WEB TECHNOLOGY LAB	0	0	2	1	50	-	50
10	PDSS3008	PERSONALITY DEVELOPMENT & SOFT SKILLS	0	0	4	2	50	-	50
		Total	18	0	10	21			

Semester VI

Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
	DPPE-9998	FIELD VISIT AND PRESENTATION OR MINOR PROJECT	0	0	0	2	50	0	50
	DPPE-9999	MAJOR PROJECT	0	0	0	12	50	0	50
		Total	0	0	0	14			

List of Electives

Diploma in Computer Science and Engineering

Elective-1

Sl No	Course Code	Name of the Electives					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	**DPCS-3004**	1.1) PYTHON & DATA SCIENCE (ELECTIVE-I)	3	-	-	3	20	50	100
2	**DPCS-3011**	1.2) PYTHON & DATA SCIENCE (ELECTIVE-I) LAB	-	-	2	1	50	-	50
3	**DPCS-3006**	1.3) CLOUD COMPUTING (ELECTIVE-II)	3	-	-	3	20	50	100
4	**DPCS-3013**	1.4) CLOUD COMPUTING LAB(ELECTIVE-II)	-	-	2	1	50	-	50
		TOTAL				8			

Elective-2

Sl No	Course Code	Name of the Elective					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
	DPCS-3005	**2.1) MOBILE COMPUTING (ELECTIVE-III)**	3	-	-	3	20	50	100
	DPCS-3012	**2.1) MOBILE COMPUTING LAB (ELECTIVE-III)**	-	-	2	1	50	-	50
	DPCS-3024	**2.3) AI & ML (ELECTIVE-IV)**	3	-	-	3	20	50	100
	DPCS-3025	**2.4) AI & ML (ELECTIVE-IV)**	-	-	2	1	50	-	50
		TOTAL				**8**			

Detailed Syllabus

Unversity Polytechnic
Diploma in Computer Science and Engineering

Name of The Course	**OPERATING SYSTEM**				
Course Code	DPCS1014				
Prerequisite	DPCS1004				
Co-requisite					
Anti-requisite					
	L	**T**	**P**	**C**	
	3	0	0	3	

Course Objectives

1. This course introduces the basic facilities provided in modern operating systems
2. The course discusses concurrency: how to manage multiple tasks that execute at the same time and share resources. Topics in this section include processes and threads, context switching, synchronization, scheduling, and deadlock.

3. The course addresses the problem of memory management; it will cover topics such as linking, dynamic memory allocation, dynamic address translation, virtual memory, and demand paging.

4. The course concerns file systems, including topics such as storage devices, disk management and scheduling, directories, protection, and crash recovery.

Course Outcomes

CO 1	Understand the function and classification of operating system. **K2**
CO 2	Analyze the structure and organization of the file system, Evaluate the process synchronization and scheduling. **K4**
CO 3	Differentiate the different approaches to memory management and concept of paging and segmentation.**K4**
CO 4	Develop a description for occurrence and avoidance of deadlock. **K6**
CO 5	Analyze deadlock condition and apply algorithm for prevention and detection of deadlock.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test(CAT)	End Term Exam (ETE)	Total Marks
50	30	50	100

Course Content:

Unit I:Introduction 8 hours
Operating system and functions, evolution of operating system, Classification of operating system-Batch ,Time sharing, Real Time system, Multiprocessing system, Multi programming System, Multi tasking system, Network system, Distributed system, Operating system structure- layered structure.
Unit II:File System 9 hours
File concepts, Access methods, Directory system, introduction to file system protection and security.
Unit III: CPU and Disk Scheduling 8 hours
Scheduling concepts, Scheduling algorithm, Multiprocessor scheduling, FCFS scheduling, Shortest seek time first.
Unit IV: Memory Management 8 hours
Swapping, multiple partitions, Paging, Segmentation, Demand paging, Page replacement, Virtual memory concepts.
Unit V:Deadlock 8 hours
Introduction to deadlock, Necessary condition for deadlock, Method for handling deadlock, Brief overview of deadlock prevention, Deadlock avoidance (Banker's algorithm), Deadlock detection and recovery.

University Polytechnic
Diploma in Computer Science and Engineering

Suggested Reading

1.Abraham Silberschatz, "Operating System Concepts"

2. Tannenbaum" Operating System Design and Implementation "

3. Die Annleblanc and Issac Yates, Linux – Install and Configuration Black Book, IDG Books India Private Ltd., Delhi.

4. Richard Peterson, Linux – The Complete Reference, Tata McGraw Hill, New Delhi

University Polytechnic
Diploma in Computer Science Engineering

Name of The Course	**OPERATING SYSTEM LAB**				
Course Code	DPCS1019				
Prerequisite	DPCS1008				
Co-requisite					
Anti-requisite					
	L	**T**	**P**	**C**	
	0	0	2	1	

Course Objectives

1.This course introduces students to basic structure of operating systems, Kernel, user interface, I/O device management, device drivers, process environment, concurrent processes and synchronization, inter-process communication, process scheduling, memory management, deadlock management and resolution, and file system structures.

Course Outcomes

CO1	Creating and manipulating user account and practice on Linux Command and practice on V I(Visual Interface) command and analyze the structure and organization of the file system into operating system. S5
CO2	Create the programs In Linux using Shell and set up Windows operating system and Installing and configuring different driver and software. S5

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test(CAT))	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

Ex.1
Creating and managing user accounts.
Ex.2
Practice on Linux commands, Practice on VI (Visual Interface) commands.
Ex.3
Write and execute at least 10 programmers in Linux using shells such as- i. Factorial of numbers **ii. Prime numbers** **iii. Fibonacci series** **iv. Sum & Reverse of numbers** **v. Largest of three numbers, etc.**
Ex.4
Installing and configuring windows.
Ex.5
Create file and folder.
Ex.6
Searching a file.
Ex.7
Installation of device drivers.

Ex.8
Creating user accounts.
Ex.9
Customizing desktop.
Ex.10
Setting monitor resolution.

University Polytechnic
Diploma in Computer Scienceand Engineering

Suggested Reading

1.Silberschatz, Galvin, Gagne"Operating System Principles,Wiley India Pvt Ltd,ISBN: 9788126509621,

2. Richard Peterson, Linux – The Complete Reference, Tata McGraw Hill, New Delhi

3. Neetu Singh,Operating System,Global Academic Publishers & Distributors,ISBN-13: 978-9381695715

4. Die Annleblanc and Issac Yates, Linux – Install and Configuration Black Book, IDG Books India Private Ltd., Delhi.

Name of The Course	DATA STRUCTURE USING C
Course Code	DPCS2009
Prerequisite	
Co-requisite	
Anti-requisite	

	L	**T**	**P**	**C**
	3	2	0	4

Course Objectives

1. To teach efficient storage mechanisms of data for an easy access.

2. To design and implementation of various basic and advanced data structures.

3. To introduce various techniques for representation of the data in the real world.

4. To develop application using different types of data structures.

Course Outcomes

CO1	Generalize the Big (O) notation and role of algorithm complexity in computing as applied to specified problem definition. (K5)
CO2	Develop different kinds of stacks & queues and their applications and implementations in problem solving. (K4).
CO3	Use different kinds of linked lists and their applications in problem solving. (K4)
CO4	Generalize tree concept and Apply traversing mechanism on various tree structure. (K3).
CO5	Analyze Graph: representation and algorithms, Breadth-first search (BFS), Depth-first search (DFS). (K4).

Continuous Assessment Pattern

Internal Assessment (IA)	**Continuous Assessment Test(CAT)**	**End Term Exam (ETE)**	**Total Marks**
20	30	50	100

Course Content:

Unit I: Introduction to data structure & Basic Concepts 8 hours
Data Representation, Abstract data Types, Data Structure and Structured Types, Difference between Abstract Data Types, Data Types and Data Structures. Data Types, Linear data type, Non- Linear data type, Primitive data type, Non primitive data type. Basic concepts and notation & Mathematical background and representation of array
Unit II:Stacks and Queues **10 Hours**
Representation of stacks & queues using linked , sequential and their applications. Making a program that implement Stack and Queue.
Unit III: Lists **8 Hours**
List representation techniques, Multilinked structures, Dynamic storage allocation techniques.
Unit IV: Tree **10 Hours**
Definitions and basic concepts, Linked tree representations, binary tree traversal algorithms, Type of Trees: General tree, Binary tree, Binary search tree (BST), B-trees and their applications. Making a program that implement Binary Tree & BST.

Unit V: Graphs, Hashing & Sorting Algorithms **8 Hours**
Graphs: introduction , types of Graphs, Breadth-first and Depth-first Search, Symbol Table, Hashing: Hash function, Hash table, Collision resolution techniques, sorting: Insertion sorts, Bubble sort, Quick sort, Merge sort, Heap sort. Making a program that implement different sorting & searching techniques.

University Polytechnic
Computer Science and Engineering

Suggested Reading

1. **Ellis Horowitz, SatrajSahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, W. H.Freeman and Company.**
2. **Seymour Lipschutz, Data Structures, Schaum's Outlines Series, Tata McGraw-Hill.**
3. **Reference Book (s):1Data Structure using 'c' Tanenbaum PHI**
4. **Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.**

University Polytechnic
Computer Science and Engineering

Name of The Course	DATA STRUCTURE USING C LAB				
Course Code	DPCS2013				
Prerequisite	DPCS1014				
Co-requisite	DPCS2009				
Anti-requisite					
	L	**T**	**P**	**C**	
	0	0	4	2	

Course Objectives

1.To teach efficient storage mechanisms of data for an easy access.

2. To design and implementation of various basic and advanced data structures.

3. To develop application using different types of data structures..

Course Outcomes

CO1	Create programs for implementation of various linear data structures like stacks, queues, linked lists and their applications using static and dynamic allocation. (S5)
CO2	Create programs for implementation of nonlinear data structure like Tree, binary search tree and

	their applications using static and dynamic allocation. (S5)

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test(CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

Experient-1
Implement List data structure using array.
Experient-2
Implement List data structure using singly linked list.
Experient-3
Implement basic operations on doubly linked list.
Experient-4
Implement stack using i) array ii) singly linked list
Experient-5
Implement Queue using i) array ii) singly linked list .
Experient-6
Implement basic operations on Circular Queue .
Experient-7
Implement basic operations (insertion, deletion) on Binary trees.
Experient-8
Implement basic operations (insertion, deletion, searching) on Binary Search trees.
Experient-9
Implement various sorting techniques.
Experient-10
Implement Breadh First search Techniques.
Experient-11
Implement Depth First search Techniques.

University Polytechnic
Computer Science and Engineering

Suggested Reading

1.Ellis Horowitz, SatrajSahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, W. H. Freeman and Company.

2. Seymour Lipschutz, Data Structures, Schaum's Outlines Series, Tata McGraw-Hill.

3. Reference Book (s):1. Data Structure using 'c' Tanenbaum PHI

4. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

Name of The Course	Relational database management system				
Course Code	DPCSE2008				
Prerequisite					
Co-requisite					
Anti-requisite					
		L	**T**	**P**	**C**
		3	0	0	3

Course Objectives

1. **List and explain the fundamental concepts of a relational database system**
2. **Analyze database requirements and determine the entities involved in the system and their relationship to one another.**

Course Outcomes

CO1	Understand the basic concepts of database management system. K2
CO2	Apply knowledge of database design methodology which give a good formal foundation in data model. K3
CO3	Understand the Relational algebra and Relational calculus in DBMS. K2
CO4	Demonstrate the normalization concept and functional dependency of database management system . K3
CO5	Apply the SQL command on the table in database management system.K3
CO6	

Continuous Assessment Pattern

Internal Assessment (IA)	**Continuous Assessment Test(CAT)**	**End Term Exam (ETE)**	**Total Marks**
20	30	50	100

Course Content:

Unit-1 OVERVIEW OF DBMS 8 hours
Introduction to DBMS, DBMS Application, Advantage of DBMS over file processing system, DBMS Architecture, Three level DBMS architecture, View of data, data abstraction, Instance and Schema, Database User and DBA.
Unit 2 DATA MODELS 8 hours
Introduction of data model, Types of data model, Entity and Entity set, E-R diagram, Relational Model, Hierarchical Model, Network model, Object-oriented model, Generalization, Specialization, Aggregation, Constrains, Cardinality, Types of keys in DBMS.
Unit-3 RELATIONAL DATABASE 8 hours
RDBMS Concepts, Table, record, Field, Domain, Relational algebra, basic operation select, project, union , set difference, Cartesian product, rename, derived operations: natural join, cross join, left, right join, Intersection, division
Unit-4 NORMALIZATION 8 hours
Introduction of Functional dependency, Type of functional dependency, Trivial Functional dependency, Non-trivial Functional dependency,Multivalued Functional dependency, Transitive Functional dependency, First Normal Form(1 NF),Second Normal

Form(2 NF),Third Normal Form(3 NF), Boyce & Cod normal form (BCNF)
Unit-5 STRUCTURE QUERY LANGUAGE (SQL) & security 9 hours
DBMS language, SQL Database, Syntax, Data Types, Operators, Expression, Create database, Drop database, Create, table, Alter table, Drop Table, Insert query, Select query, Where clause, AND & OR clause, Update query, Delete query, Like clause, order by, group by, Distinct keyword, SQL constraints. Database integrity, Authentication, Access Control and Encryption.
Unit VI

University Polytechnic
Diploma in Computer Science Engineering

Suggested Reading

1.. Database System Concepts - A. Silberschatz& H. F. Korth

2. An Introduction to Database System - C. J. Date

3. Fundamental of Database System - R. Elmashri& S. B. Navathe

4. Database Concepts and Systems - LvanBayroos/SPD

5. "Database Management Systems" by Raghu Ramakrishnan.

6. "An Introduction to Database Systems" by Bipin Desai

7. "Principles of Database Systems" by J D Ullman

8."Database Systems: A Practical Approach to Design, Implementation and Management" by CONNOLY.

Name of The Course	Relational database management system LAB			
Course Code	DPCSE2012			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	**T**	**P**	**C**
	0	0	2	1

Course Objectives

1. List and explain the fundamental concepts of a relational database system

2. Analyze database requirements and determine the entities involved in the system and their relationship to one another.

3. Create a relational database using a relational database package.

Course Outcomes

CO1	Write the DDL/ DML/DCL Command which deal with database and apply the concept of Constraints triggers view and index. S4
CO2	Create the relational algebra, and use the normalization techniques with the database and reconstruct the transaction, integrity, and concurrency. S5

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test(CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

Experiment 1

Write a program to Create the database.
Experiment 2
Write a program to Create the table in database.
Experiment 3
Write a program to ALTER the table in database
Experiment 4
Write a program to use the SELECT and SELECT DISTINCT command.
Experiment 5
Write a program to use the WHERE & HAVING command
Experiment 6
Write a program to use the INSERT command
Experiment 7
Write a program to use the UPDATE & DELETE command
Experiment 8
Write a program to use the ORDER BY command.

Experiment 9
Write a program to use the AND,OR & NOT command.
Experiment 10
Write a program to use the IS NULL VALUES command.
Experiment 11
Write a program to use the IS NOT NULL VALUES command.
Experiment 12
Write a program to use the BETWEEN command.
Experiment 13
Write a program to use the PRIMARY KEY command.
Experiment 14
Write a program to use the INDEX command.

University Polytechnic
Diploma in Computer Science Engineering

Suggested Reading

1.. Database System Concepts - A. Silberschatz& H. F. Korth.

2. An Introduction to Database System - C. J. Date.

3. Fundamental of Database System - R. Elmashri& S. B. Navathe.

4. Database Concepts and Systems - LvanBayroos/SPD.

5. "Database Management Systems" by Raghu Ramakrishnan

6. "An Introduction to Database Systems" by Bipin Desai

7. "Principles of Database Systems" by J D Ullman

8."Database Systems: A Practical Approach to Design, Implementation and Management" by CONNOLY.

Name of The Course	Software Engineering			
Course Code	DPCS2003			
Prerequisite	Fundamentals of Computer Programming			
Co-requisite				
Anti-requisite				
	L	**T**	**P**	**C**
	3	0	0	3

Course Objectives

1. **The objective of software engineering to make students early careers will be capable of team and organizational leadership in computing project settings, and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.**

   2. Be employed in industry, government, or entrepreneurial endeavours to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility.

Course Outcomes

CO1	Know about software engineering process life cycle, including the specification, design, implementation, and testing of software.
CO2	Elicit, and specify Software Requirements Specification(SRS)
CO3	Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.
CO4	Analyze the different Code and Design Standards for Development of Project.
CO5	Explain the working and use of Software Testing and Software Quality Assurance in Software Development.
CO6	

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 Software Engineering and Software Development Models **8 hours**
The evolving role of Software – software engineering, Phases in Software Engineering, Features of Software Engineering, Software Crisis/ challenges. Software Life Cycle Model, Water Fall Model Spiral Model, Prototype Model, View Model, Verification and Validation.

Unit-2 Software Requirement Analysis Software Design 8 hours
Introduction of Software Engineering, Feasibility study, Requirement Analysis, Software Requirement Specification (SRS). Basics of Software Design; Data Design; Architectural Design Evolution of software design; Fundamental Design concepts- Abstraction, Refinement, Information hiding, Structure, Modularity, Software architecture, Data structure, Concurrency, Verification Effective Modular Design, Basic concepts of Data Flow-Oriented Design & Object-Oriented Design.
Unit-3 Software Planning & Scheduling and Cost Estimation 8 hours
Software planning & scheduling: Project planning, scheduling & Staffing, Software Cost Estimation: Basics of Software Cost estimation: Software Cost Estimation Techniques – Expert Judgment; & COCOMO, Gantt Chart and its role in Software Planning.
Unit-4 Software Testing 8 hours
Software Testing Introduction, Testing Objectives; Test plan, Model of software testing, & Testing Strategies, Functional Testing and Structure Testing Types, Test Case Designing and Bug Report Layout.
Unit-5 Software Quality Assurance, & Maintenance 8 hours
Software Quality Concept, Software Quality Assurance (SQA), SQA activities, Software Quality Assurance Framework, Basics of Software maintenance, enhancing maintainability during development,

University Polytechnic
Diploma in Computer Science Engineering

Suggested Reading

1.. . Software Engineering, A Practitioner's Approach / Roger S. Pressman / McGraw-Hill

Reference Book (s):1. Software Engineering Concepts / Richard E. Fairly / Tata McGraw Hill

2. Software Engineering Principles and Practice / Hans Van Vlient / Wiley

Name of The Course	Software Engineering Lab			
Course Code	DPCS2006			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	**T**	**P**	**C**
	0	0	2	1

Course Objectives

1.The objective of software engineering to make students early careers will be capable of team and organizational leadership in computing project settings, and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.

2. Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility.

Course Outcomes

CO1	Write the Software Requirement Specification Document for the Project.

CO2	Perform Software Testing Methodologies for Testing the Project and Test Case Execution.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

Unit-1 Software Engineering Requirement Phase and SRS Document.
Practical 1: Create a level 0 DFD using smart draw. Practical 2: To perform the Requirement analysis of the specified problem and draw a flow chart. Practical 3: Understanding of System modeling: Data model i.e. ER –Diagram and draw the ER Diagram with generalization, specialization and aggregation of specified problem statement. Practical 4: Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents for some problems. Practical 5: Preparation of Software Configuration Management and Risk Management related documents.
Unit-2 Software Testing and Bug Reports
Practical 1: Create Software Testing Test Plan. Practical 2: Preparation of Test Cases for given Project. Practical 3: Execution of Test Cases. Practical 4: Preparation of a Bug Reports. Practical 5: Understanding of Bug Reports Factors.

University Polytechnic
Diploma in Computer Science Engineering

Suggested Reading

1.Software Engineering, A Practitioner's Approach / Roger S. Pressman / McGraw-Hill

2. Software Engineering Concepts / Richard E. Fairly / Tata McGraw Hill

3. Software Engineering Principles and Practice / Hans Van Vlient / Wiley

Name of The Course	JAVA PROGRAMMING			
Course Code	DPCS-2018			
Prerequisite	DPCS2004			
Co-requisite				
Anti-requisite				
	L	**T**	**P**	**C**
	3	0	0	3

Course Objectives

1. Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm.

2. To understand Object oriented concepts like data abstraction, encapsulation, etc.

3. To solve the real world scenarios using top down approach.

Course Outcomes

CO1	Discuss object oriented programming: abstract data types, encapsulation, inheritance and polymorphism
CO2	Apply Java programming constructs. (K3)
CO3	Develop Java programs to solve real world problems using object classes, encapsulation, inheritance, polymorphism and interfaces. (K4)
CO4	Develop Java programs to implement error handling techniques using exception handling and Java applets. (K4)
CO5	Demonstrate programs on multithreading and applets. (K3)
CO6	

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit-1 AN OVERVIEW OF JAVA 8 hours
Introduction to Object Oriented Programming (two paradigms, abstraction, the three oops principles), creation of JAVA,JAVA Applets& applications, security & portability.
Unit-2 DATA TYPES & CONTROL STATEMENT 10 hours
Integer, floating point type, character, Boolean, all Operators, JAVA's selection statements, iteration and jump statement.
Unit-3 CLASSES AND METHODS 8 hours
Class fundamentals, declaring objects, overloading methods &constructs, access control, nested and inner classes, exploring the string class.
Unit-4 INHERITANCE AND MULTITHREADING 8 hours
Inheritance basics, member access and inheritance. Making a program that implement Inheritance etc. The JAVA thread model, thread priority, synchronization, messaging. Making a program that implement thread model, synchronization.
Unit-5 INPUT & OUTPUT AND APPLET 8 hours
I/O Basics, byte streams & character streams, predefined streams, reading and writing console input/output, reading and writing files, applet fundamentals, and applet class. Making a program that implement applets etc.

University Polytechnic
Diploma in Computer Science Engineering

Suggested Reading

Text Book (s)

1. **Core Java II Advanced Feature 8th Edition, Sun Microsystem**
2. **The Complete Reference JAVA Seventh Edition**
3. **Thinking in Java, Third Ediction, Bruce Eckel Pearson Eduction.**
4. **Database Concepts and Systems - LvanBayroos/SPD**

Reference Book (s)

1. **JAVA 6 By Rogers Cadenhead, Laura Lemay, Pearson Education.**
2. **Programming in JAVA by E. Balagursamy by TMH publications.**
3. **Introduction to Java by Sedgewick**
4. **"Java in a Nutshell" by Benjamin J. Evans & David Flanagan**

Name of The Course	JAVA PROGRAMMING LAB			
Course Code	**DPCS-2019**			
Prerequisite	DPCS2004			
Co-requisite				
Anti-requisite				
	L	**T**	**P**	**C**
	0	0	4	2

Course Objectives

1. **Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm.**
2. **To understand Object oriented concepts like data abstraction, encapsulation, etc.**
3. **To solve the real world scenarios using top down approach.**

Course Outcomes

CO1	Write a programs to implement the concept of encapsulation, inheritance, polymorphism, interfaces and exception handling.
CO2	Write a programs to implement the concept of multi-threading and Applet

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Exam (ETE)	Total Marks
50	-	50	100

Course Content:

List of Experiments
Ex.1
Write a Java program to display Hello World on the screen.
Ex.2
Write a Java program to display the asterisk pattern as shown below: ***** *****

Ex.3
Write a Java program to declare two integer variables, one float variable, and one string variable and assign 10, 12.5, and "Java programming" to them respectively. Then display their values on the screen.
Ex.4
Write a Java program by using BufferedReader class to prompt a user to input his/her name and then the output will be shown as an example below: **Hello Dara!**
Ex.5
Write a java program to implement the Control statements (if- else, Switch, Loop etc).
Ex.6
Write a java program to implement the constructor.
Exp.7
Write a java program to implement Inheritance.
Exp.8
Write a java program to implement the method overloading.
Exp.9
Write a java program to implement the method overriding .
Exp.10
Write a java program to implement the Abstraction Class.
Exp.11
Write a java program to implement the Interface.
Exp.12
Write a java program to implement the Package.
Exp.13
Write a java program to implement the Multithreading.
Exp.14
Write a Program to Implement Applet.
Exp.15
Write a Program to connect java application with database.

Suggested Reading

Text Book (s)

1. **Core Java II Advanced Feature 8th Edition, Sun Microsystem**

2. **The Complete Reference JAVA Seventh Edition**

3. **Thinking in Java, Third Ediction, Bruce Eckel Pearson Eduction.**

4. **Database Concepts and Systems - LvanBayroos/SPD**

Reference Book (s)

1. **JAVA 6 By Rogers Cadenhead, Laura Lemay, Pearson Education.**

2. **Programming in JAVA by E. Balagursamy by TMH publications.**

3. **Introduction to Java by Sedgewick**

4. **"Java in a Nutshell" by Benjamin J. Evans & David Flanagan**

University Polytechnic
Diploma in Computer Science Engineering

Name of The Course	**DATA COMMUNICATION AND COMPUTER NETWORKS**				
Course Code	**DPCS2007**				
Prerequisite					
Corequisite					
Antirequisite					
	L	**T**	**P**	**C**	
	3	**0**	**0**	**3**	

Course Objectives:

1. Familiarize the student with basic taxonomy and terminology of the computer networking area.

2. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

3. Apply fundamentals of networking to detect and correct error in transmission.

4. Familiarize the student with routing and addressing also applying suitable protocol in networks.

Course Outcomes

CO1	**Discuss the concept of data communication and networking criteria with reference to OSI model. K2**
CO2	**Generalize the need of Multiplexing, Switching and Modulation, discuss about transmission media. K3**
CO3	**Demonstrate function of Data link layer, identify and correcting error using appropriate algorithm. K3**
CO4	**Illustrate Routing Technique, algorithm, protocols and addressing by Transport layer K3**
CO5	**Discuss function of Transport, session and application layer with protocol and algorithm. K2**

Text Book (s): 1. B. A. Forouzan - Data Communication and Networking (3 Ed.) -TMH.

2. A. S. Tanebaum - Computer Networks (4 Ed.) – Pearson Education/ PHI.

Reference Book (s):1. W. Stallings - Data and Computer Communication (5 Ed.) -Pearson Education/ PHI.

2. James F. Kurose, Keith W. Ross "Computer Networking: A Top-Down Approach, 6th Edition"- Pearson Education, ISBN: 9780132856201

Unit-1 Overview of Data Communication and Networking 10 hours
Introduction; Data Communication; Components, data representation (ASCII, ISO, etc.). Direction of Data Flow(Simples, Half duplex, Full duplex), Parallel and Serial Transmission. Network; Distributed processing, Network criteria, Physical structure (Types of connection, Topology), Categories of network (LAN, MAN, WAN; Reference models; OSI reference model TCP/IP reference model, their architecture and comparative layered study.
Unit-2 Physical Layer 6 hours
Overview of data (Analog and Digital), Signal (Analog and Digital), Modulation (AM,FM) Transmission (Analog and Digital) and Transmission media (Guided and Non-guided); Multiplexing: TDM, FDM, WDM; Switching; Circuit switching, Packet switching and Message switching.
Unit-3 Data Link Layer 8 hours
Types of errors, Framing (Character and bit stuffing), Error detection and Correction methods; Flow control; Protocols Stop and wait ARQ, Go-Back, NARQ, Selective repeat ARQ, HDLC. Medium Access Sub Layer :Point to point protocol, LCP, NCP, FDDI, Token bus, Token ring; Multiple access protocols, CSMA,CSMA/CD, FDMA, TDMA, CDMA; Ethernet.
Unit-4 Network layer 8 hours
Addressing : Internet address, classful address, Sub netting; Routing : Techniques, Static vs. dynamic routing, Routing table for classful address; Routing algorithms: Shortest path algorithm, Flooding, Distance vector routing, Link state routing; Protocols ARP,RARP, IP, ICMP, IPV6; Unicast and multicast routing protocols.
Unit-5 Transport, Session and Application layer 10 hours
Process to process delivery; UDP, TCP; Congestion control algorithm; Leaky bucket algorithm, Token bucket algorithm, Choke packets. Functioning of session and application layers; protocols: DNS;SMTP;SNMP;FTP; HTTP & WWW; Security: Cryptography, authentication, encryption and decryption; Security protocols in internet Firewalls.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Test (ETE)	Total Marks
20	30	50	100

University Polytechnic
Diploma in Computer Science Engineering

Name of The Course	**COMPUTER PROGRAMMING AND PROBLEM SOLVING**				
Course Code	**DPCS2001**				
Prerequisite					
Corequisite					
Antirequisite					
	L	**T**	**P**	**C**	
	3	**2**	**0**	**4**	

Course Objectives: 1. This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code.

2. To learn and acquire art of computer programming.

Course Outcomes

CO1	**Apply the basic concepts of algorithm and different programming techniques. (K3)**
CO2	**Develop, compile and debug programs using different data types involving decision structures and loops in C language. (K4)**
CO3	**Develop programs using array and strings concepts. (K4)**
CO4	**Apply the dynamics of memory by the use of pointers and functions. (K3)**
CO5	**Develop program using functions, structure and Union. (K4)**

Text Book (s): 1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.

Reference Book (s):1. Practical C programming, 3rd Edition (A Nushel Handbook) O' Really

2. Programming and Problem solving through 'C' by (ELSEVIER).

Unit-1 Algorithm & Programming Environment 8 hours
Algorithm for problem solving: An Introduction – Properties of algorithm – Classification –Algorithm logic – Flowchart. Programming environment: High level programming language – low level programming language – middle level programming language – Assembler – Compiler – Interpreter. How to install C compiler and IDE tool to run C programming Code

Unit-2 Programming Basics **8 hours**
Introduction to ‘ C’ programming : fundamentals ,structure of a ‘C’ program, Constants, Variables – Data Types – Expressions using operators in ‘C’ – Managing Input and Output operations – Decision Making and Branching – Looping statements – solving simple scientific and statistical problems. Making a program using loops and conditional statements
Unit-3 Arrays and Strings **8 hours**
Arrays: Initialization – Declaration – One dimensional and two dimensional arrays. String-: String operations – String Arrays. Simple programs: sorting- searching – matrix operations.
Unit-4 Functions and Pointers **10 hours**
Function: definition of function – Declaration of function – Pass by value – Pass by reference – Recursion – Pointers: Definition – Initialization – Pointers arithmetic – Pointers and arrays- Example Problems. Making programs that create a function including some methods (Swap, power, string operations, etc.).
Unit-5 Structures And Unions **8 hours**
Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives. Making programs that create a structure/Union of a students/employee.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Test (ETE)	Total Marks
20	30	50	100

Name of The Course	**COMPUTER PROGRAMMING AND PROBLEM SOLVING LAB**			
Course Code	**DPCS2004**			
Prerequisite				
Corequisite				
Antirequisite				
	L	**T**	**P**	**C**
	2	**0**	**2**	**1**

Course Objectives: This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code.

Course Outcomes

CO1	**Apply array, string, structures, unions and recursion and write simple program. (S4)**
CO2	**Apply concept of call by value and call by reference for writing program in C.**
CO3	**Practice the programming using pointer and recursive function.**

Text Book (s): 1. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.

Reference Book (s):1. Programming and Problem solving through 'C' by (ELSEVIER)

2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

Ex.1
Problem formulation, Problem Solving and Flowcharts.
Ex.2
C Programming using Simple statements and expressions.
Ex.3
Scientific problem solving using decision making and looping.
Ex.4
Simple programming for one dimensional and two dimensional arrays.
Ex.5
Solving problems using String functions.
Ex.6
Programs with user defined functions – Includes Parameter Passing.
Exp.7
Write a Program using Pointer.
Exp.8
Write a Program using Recursive Function.
Exp.9
Write a Program using structures.
Exp.10
Write a Program using Union.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Test (ETE)	Total Marks
50	-	50	100

Name of The Course	Computer Hardware & Maintenance
Course Code	DPCS2002
Prerequisite	Fundamentals of Computer System
Corequisite	
Antirequisite	

	L	T	P	C
	3	0	0	3

Course Objectives: 1. Computer hardware involves all physical components of computer those integrate to each other and make a system and maintenance means care of all parts.

2. Students learn the working and function of all hard devices and apply for troubleshooting and maintenance. Student also learns network device and applying for making LAN.

Course Outcomes:

CO1	Understand the different peripheral and Network devices.
CO2	Understand the basics components on motherboard and peripherals devices.
CO3	Analyze the working, function of Keyboard and Mouse.
CO4	Illustrate the working, function and troubleshooting of external memory devices.
CO5	Analyzing working, function and troubleshooting of printer, scanner and storage devices.

Text Book (s): 1. K.L.James "Computer Hardware and Maintenance" PHI

Reference Book (s):

1 Dan Gookin"Troubleshooting and Maintaining Your PC All-in-one "John Wiley and Sons Ltd, ISBN13 9780470396650

2. William G. Wong"PC Hardware Maintenance, Repair & Upgrading for A+ Certification "engage Learning, Inc, ISBN10 0766832732

Unit-1 Introduction to peripheral and Network devices 8 hours

Component and peripheral devices (connected with computer). Power Supply: Operating characteristics in CPU, Network Devices: Hub, Switch, Router, Bridge, Gateway, Ethernet Card.
Unit-2 Mother Board **8 hours**
Mother Board features and Architecture, Mother board components, BUS Architecture and its types, CMOS- Battery, Connections on the Mother Board, Keeping CPU cool, Motherboard trouble shooting.
Unit-3 Key Board and Mouse **8 hours**
Key Board: Switches, Keyboard organization, Key board type, trouble shooting. **Mouse: Mouse type, Connecting Mouse, Trouble shooting.**
Unit-4 HDD/CD **8 hours**
HDD: Magnetic recording, Data Encoding Method, HDD feature, HDD trouble shooting. Compact Disc Drive: CD-R, CD-W, CD-RW, DVD-R, DVD-RW, Working and Maintenance.
Unit-5 Printers and Scanner **8 hours**
Printers: Image formation method, Printing mechanism, types of printer, working and Trouble shooting of printer. Scanner: Flat Bed, External Devices- Pen Drive, Flash Drive, External Hard Disk.

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Test (ETE)	Total Marks
20	30	50	100

Name of The Course	**COMPUTER HARDWARE AND MAINTENANCE LAB**			
Course Code	**DPCS2005**			
Prerequisite	**DPCS1004**			
Corequisite				
Antirequisite				
	L	**T**	**P**	**C**
	0	**0**	**2**	**1**

Course Objectives: 1. This course is designed to enable the students get a detailed knowledge of all the hardware

components that assembled a computer and to understand the different interfaces required for connecting these hardware devices and also understand and applying the basics of troubleshooting of computer as well as printer ans scanner..

Course Outcomes

CO1	**Understand basics components on motherboard and peripherals devices. S3**
CO2	**Analysis the internal peripheral devices of CPU and assembling PC .S4**
CO3	**Understand the computer related problems. S3**

Text Book (s): 1. K.L.James – Computer Hardware and maintenance - PHI

Reference Book (s):1. Computer Hardware And Maintenance, by S S Velankar Mrs Y C Kulkarni, ISBN-13: 978-9383750528

2. Stephen Root – Computer Hardware and Maintenance –Elsevier..

EXP. 1
1. Study of devices on motherboard. **1.1 Study of Key board & Keyboard decoder** **1.2 Study of Video Adopter & display controllers** **1.3 Study of Floppy Drive, CD Drive and Hard Disk.** **1.4 Study of Multifunction Input/output controllers** **1.5 Assembling of PC and Installation of Operating System**
EXP.2
Troubleshooting & repair of following equipment **2.1 Dot Matrix Printer, Laser, Inkjet Printer.** **2.2 CPU** **2.3 Disk Drive** **2.4 Problems related to monitor**
EXP.3
Study and Trouble Shooting of **3.1 Network** **3.2 Power**

Supplies

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Test (ETE)	Total Marks
50		50	100

Name of The Course	**Data Communication and Computer Networks Lab**
Course Code	**DPCS2011**
Prerequisite	**DPCS2005**
Corequisite	**DPCS2009**
Antirequisite	

	L	T	P	C
	0	0	2	1

Course Objectives: 1. Analyze the communication tools and appropriate architecture, topology for networking structure.

2. To Apply networking concept in Establishment of a LAN.

CO1	**Discuss data communication concept and computer networking tools. S3**
CO2	**Analysis of various network components and designing issues of LANs. S4**
CO3	**Perform proxy server and network drivers installation and also handle troubleshooting of network related problem. S3**

Text Book (s): 1. B. A. Forouzan - Data Communication and Networking (3 Ed.) -TMH.ISBN-13: 978-1259064753

2. A. S. Tanebaum - Computer Networks (4 Ed.) – Pearson Education/ PHI.ISBN-13: 978-9332518742

3. W. Stallings - Data and Computer Communication (5 Ed.) -Pearson Education/ PHI.

Reference Book (s):1. Kurose James F.- Computer Networking: A Top-Down Approach, Pearson Education, ISBN-13: 978-9332585492

2. Peterson - Computer Networks - A System Approach, Elsevier; Fifth edition, ISBN-13: 978-9380501932

3. Todd Lammle - CCNA Routing and Switching Complete Study Guide,Wiley; Second edition, ISBN-13: 978-8126564460

Experient-1
Identification of various networks components, Connection, BNC, RJ-45, I/O box,Cables, Co-axial, twisted pair, UTP, NIC (Network Interface Card),Switch, Hub.
Experient-2
Sketch wiring diagram of network cabling considering a computer lab of 20 systems.
Experient-3
Interfacing with the network card (Ethernet)
Experient-4
Preparing of network cables.
Experient-5
Establishment of a LAN.
Experient-6
Use of protocols in establishing LAN.
Experient-7
Trouble shooting of networks.
Experient-8
Installation of network device drivers.
Experient-9
Installation of networks (Peer Networking client server Interconnection).
Experient-10
Use/installation of proxy server.

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (CAT)	End Term Test (ETE)	Total Marks
50	-	50	100

University Polytechnic
Diploma in Computer Science Engineering

Name of The Course	**DIGITAL MARKETING AND E-COMMERCE**				
Course Code	**DPCS2017**				
Prerequisite					
Corequisite					
Antirequisite					
	L	**T**	**P**	**C**	

	3	0	0	3

Course Objectives: 1. Digital marketing is the promotion of products or brands via one or more forms of electronic media.

2. This course introduces the concepts, vocabulary, and procedures associated with E-Commerce and the Internet.

Course Outcomes

CO1	**Understand basic Concept of digital marketing.**
CO2	**Apply the SEO and prepare report.**
CO3	**Identify the use of all the most popular social media platforms to grow business.**
CO4	**Illustrate the major categories and trends of e-commerce applications.**
CO5	**Examine the essential processes of an e-commerce system.**

Text Book (s): 1 Dynamic Digital Marketing, Dawn McGrue Wiley publication.

Electronic Commerce- Technologies & Application - Bhaskar

Bharat - TMH

Reference Book (s): 1. E-Commerce :Strategy Technologies and Applications - TataMcGraw Hill

Unit-1 Introduction to Digital Marketing: 8 hours
Introduction to digital marketing, How is it different from traditional marketing? Discussion on new trends and current scenario of the world? How can digital marketing be a tool of success for companies? Categorization of digital marketing for the business
Unit-2 Search Engine Optimization (SEO) 8 hours
SEO (Search engine Optimization, what is On page optimization, Off page optimization, how to prepare a reports like- Keywords, titles, meta tag
Unit-3 Social Media Optimization (SMO) 8 hours
SMO (Social Media Optimization) like Facebook, Twitter, LinkedIn, Tumblur, Pinterest and more social media services optimization.
Unit 4 ELECTRONIC COMMERCE 8 hours
Overview, Definitions, Advantages and Disadvantages of Ecommerce, threats of E-commerce, Managerial Prospective, Rules and Regulations For controlling E-commerce, Cyber Laws.
Unit-5 BUSINESS MODELS & STRATEGY OF E-COMMERCE 8 hours

Text Book (s): 1. Introduction to Computer Graphics – Tata Mc Gra Hill

Reference Book (s): 1. Computer Graphics by Neeta Awasthi

Model based on transaction, Type, Model Based on TransactionParty -B2B, B2C,C2b, C2c, E-Governance. Overview, Strategic, Methods for developing E-commerce

Continuous Assessment Pattern

Internal Assessment (IA)	**Mid Term Test (CAT)**	**End Term Test (ETE)**	**Total Marks**
20	**30**	**50**	**100**

University Polytechnic
Diploma in Computer Science Engineering

Name of The Course	Computer Graphics				
Course Code	DPCS3008				
Prerequisite	Fundamentals of computers, C and C++				
Corequisite					
Antirequisite					
	L	**T**	**P**	**C**	
	3	0	0	3	

Course Objectives: 1.The subject aims at imparting knowledge and skill components in the field graphics and multimedia design.

2. It deals with the various real life object creation on computer.

Course Outcomes

CO 1	Understand the working hardware devices used in graphics like CRT/LCD.
CO 2	Apply knowledge of various Line and circle drawing algorithm to generate same.
CO 3	Apply knowledge of scan line and boundary fill algorithm to scan line.
CO 4	Apply knowledge of transformation to translate, rotate and scale any object.
CO 5	Apply knowledge of clipping to clip area and understand shading.

Unit-1 OVERVIEW OF GRAPHICS SYSTEM 8 hours
Refresh Cathode Ray Tubes, Random Scan and Raster Scan Monitors, Color CRT Monitors, DVST, Plasma Panel Displays, LED and LCD Monitors, Laser Devices, Three dimensional Monitors, Hard copy devices - Printer, Plotters, Display processes- Random-Scan systems, DVST system, Raster Scan System. Logical input devices, Locator devices, Stroke devices, String device, Valuator devices.

Unit-2 OUTPUT PRIMTIVES **8 hours**
Points and lines, Line drawing algorithms, DDA algorithm, Presentations Line algorithm, Anti aliasing Lines, circle generating algorithms - Circle equation, Presentations circle algorithm
Unit-3 ATTRIBUTES OF OUTPUT PRIMITIVES **8 hours**
Line styles, Line type, Line width, Line colour, Area filling- Scan line algorithm, Boundary fill algorithm, Flood fill algorithm.
Unit 4- TWO/ THREE DIMENSIONAL TRANSFORMATIONS **10 hours**
Basic transformations Translation, Scaling and Rotation, Matrix representation of homogeneous co-ordinates, Projection parallel and perspective. Composite transformations, Translations, scaling and protection, scaling relative to a fixed point, Rotation about fixed point, Arbitrary scaling directions, Three dimensional transformations: Three dimensional graphics concept, Matrix representation of 3 D Transformations, Composition of 3-D transformation.
Unit-5 WINDOWING AND CLIPPING **12 hours**
Windowing concepts, Clipping algorithms - Line clipping, Area clipping, Text clipping, linking, Window to viewport transformations. Illumination models, shading models for polygons, shadows, transparency.

Continuous Assessment Pattern

Internal Assessment (IA)	**Continuous Assessment Test (CAT)**	**End Term Test (ETE)**	**Total Marks**
20	30	50	100

Name of The Course	Computer Graphics Lab
Course Code	DPCS3008
Prerequisite	C and C++
Corequisite	
Antirequisite	

	L	**T**	**P**	**C**
	0	0	2	1

Course Objectives: 1. To draw point and line on c.

2. To introduce the students with the basics of graphics premitieves like line, circle and complex geometry.

3. Students are able to perform DDA and Breshanham algorithm and clipping as well as transformation

Course Outcomes

CO 1	Performing exercise on computer graphics.
CO 2	Designing real life complex structures.

Text Book (s): 1. Donald D Hearn "Computer Graphics, C Version"ISBN-13: 978-9332535879, Pearson Education.

Reference Book (s):1. Andries van Dam; F. Hughes John "Computer Graphics Principles and Practice in C: Principles & Practice in c,ISBN-13: 978-8131705056,Pearson Education India.

Ex.1
Implementation of Bresenhams Algorithm – Line, Circle, Ellipse.
Ex.2
Implementation of Line, Circle and ellipse Attributes.
Ex.3
Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear.
Ex.4
Composite 2D Transformations.
Ex.5
Cohen Sutherland 2D line clipping and Windowing.
Ex.6
Sutherland – Hodgeman Polygon clipping Algorithm.
Ex.7
Three dimensional transformations - Translation, Rotation, Scaling.
Ex.8
Composite 3D transformations.
Ex.9
Drawing three dimensional objects and Scenes.
Ex.10
Generating Fractal images.

Continuous Assessment Pattern

Internal Assessment (IA)	**Continuous Assessment Test (CAT)**	**End Term Test (ETE)**	**Total Marks**
50	-	50	100

Name of The Course	**Internet & Web Technology**				
Course Code	DPCS3003				
Prerequisite					
Corequisite					
Antirequisite					
		L	**T**	**P**	**C**
		3	0	0	3

CO 1	Understand a web page,identify its elements and attributes. K2
CO 2	Develop web pages using XHTML and Cascading Style Sheets. K4
CO 3	Develop dynamic web pages using JavaScript (Client side programming) and DHTML. K4
CO 4	Understand a Java Servelt Life Cycle and its importance in Web Based designing. K2
CO 5	Develop a server side java application called Servlet /JSP to catch form data sent from client, process it and store it on database. K4

Course Objectives:

This course is intended to teach the basics involved in publishing content on the World Wide Web.

This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.

This will also expose students to the basic tools and applications used in Web publishing.

Course Outcomes

Text Book (s): 1. AchyutGodbole,AtulKahate"WebTechnologies:TCP/IP,Web/Java Programming, and Cloud Computing",ThirdEdition,McGraw Hill Education.

2. Deitel, Goldberg, "Internet & World Wide Web How to Program", Third Edition, Pearson Education, 2006.

3. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill.

4. Web Technologies, Black Book, Dreamtech Press

Reference Book (s):1. Ralph Moseley and M. T. Savaliya, Developing Web Applications, Wiley-India

2. HTML 5, Black Book, Dreamtech Press

3. P.J. Deitel & H.M. Deitel, Internet and World Wide Web How to program,Pearson

4. Joel Sklar, Web Design,Cengage Learning

Unit-1 INTERNET **8 hours**
Introducing Internet, Its Uses : Why Internet(Social Impact of Internet), Basic Internet Tools, E-Mail, Ftp, Telnet, Usenet News, WebBrowsers, Search Engines, Yahoo, Archie, Infoseek, Veronica,World Wide Web.How Internet works, Administration of Internet, Internet : Requirements, Hardware, Software, ISP, Internet Account PPP/Shell. Email Services On Internet Introducing Hotmail/Yahoo/Vsa-Net, How To Operate E-Mail address, Email operations
Unit-2 HTML **8 hours**
Elements of HTML, HTML sources & Rules of nesting, syntaxconventions, HTML Categories, text tags, Formatting WebPagesby using Styles, adding pictures, image attribute ,Introduction to forms, tables and models,advantages &limitations of tables, frames, links. CSS cascading stylesheets, XHTML, XML, Client Side Scripting, Server SideScripting, Managing data with SQL,Dynamic Web Pages:Overview of DHTML,the need of dynamic web pages,Cascading Style Sheet (CSS),
Unit-3 JAVA SCRIPTS **9 hours**
Introduction of Java Scripts, adding, Java scripts to documents,embedding java scripts, linking java scripts, creating apage program with scripts. Java and its applets, make webpages run server scripts, activeX.Data types, variables, operators, conditional statements,array object, date object, string object.
Unit-4 JAVA SERVLET **8 hours**
Servlet environment and role, HTML support, Servlet API, servlet life cycle, Cookies and Sessions.
Unit-5 JSP **9 hours**
JSP architecture, JSP servers, JSP tags, understanding thelayout in JSP, Declaring variables, methods in JSP,inserting java expression in JSP, processing request fromuser and generating dynamic response for the user, insertingapplets and java beans into JSP, using include and forwardaction, comparing JSP and CGI program, comparing JSP and ASPprogram; Creating ODBC data source name, introduction to JDBC, prepared statement and callable statement.

Continuous Assessment Pattern

Internal Assessment (IA)	**Continuous Assessment Test (CAT)**	**End Term Test (ETE)**	**Total Marks**
20	30	50	100

Name of The Course	Web Technology Lab
Course Code	DPCS3009
Prerequisite	
Corequisite	
Antirequisite	

	L	T	P	C
	0	0	4	4

Course Objectives: 1. This course is intended to teach the basics involved in publishing content on the World Wide Web.

2. This includes the 'language of the Web' HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.

3. This will also expose students to the basic tools and applications used in Web publishing.

Course Outcomes

CO 1	Create the dynamic web page using HTML, Java Script. S5
CO 2	Create server side JSP application to catch form data sent from client, process it and store it on database. S5

Text Book (s): 1. AchyutGodbole,AtulKahate"WebTechnologies:TCP/IP,Web/Java Programming, and Cloud Computing",ThirdEdition,McGraw Hill Education.

2. Deitel, Goldberg, "Internet & World Wide Web How to Program", Third Edition, Pearson Education, 2006.

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Reference Book (s):1. Ralph Moseley and M. T. Savaliya, Developing Web Applications, Wiley-India

2. HTML 5, Black Book, Dreamtech Press.

3. P.J. Deitel & H.M. Deitel, Internet and World Wide Web How to program,Pearson.

4. Joel Sklar, Web Design,Cengage Learning.

Experiment-1
Write a program to develop a simple HTML document.
Experiment-2
Write a program to Link between web pages.
Experiment-3
Write a program to implement TABLE & IMAGE.
Experiment-4
Write a program to implement INTERNAL & EXTERNAL CSS.
Experiment-5
Write a program to display date and time.
Experiment-6
Write a program to implement LISTS & FORM .

Experiment-7
Write a program to validate Email Id using java script.
Experiment-8
Write a program to validate Name , Password & Numeric Value.
Experiment-9
Write a program to develop Xml Schema
Experiment-10
Write a program to print the user name using JSP scriptlet.
Experiment-11
Write a program to implement JSP request & response implicit object.
Experiment-12
Write a program to implement JSP implicit object & JSP application implicit object.
Experiment-13
Write a program to implement JSP session implicit object.
Experiment-14
Write a program to implement JSP Cookies handling.
Experiment-15
Write a program to database connection using JSP

Continuous Assessment Pattern

Internal Assessment (IA)	**Continuous Assessment Test (CAT)**	**End Term Test (ETE)**	**Total Marks**
50	-	50	100

Name of The Course	**PYTHON & DATA SCIENCE**			
Course Code	DPCS3011			
Prerequisite	DPCS2001			
Corequisite	DPCS2008			
Antirequisite				
	L	**T**	**P**	**C**
	3	0	0	3

Text Book (s): 1. Charles R. Severance, “Python for Everybody: Exploring Data Using Python 3”, 1st Edition, CreateSpace Independent Publishing Platform, 2016.
Reference Book (s): 1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist”, 2ndEdition, Green Tea Press, 2015.

Course Objectives: 1.The subject aims at imparting knowledge and skill components in the field of python and data science

2. It deals with various tools of python like Anaconda, NumPy, Pandas, Matplotlib.

Course Outcomes

CO 1	**Understand basic tools of Python.**
CO 2	**Apply** the basic concept of python for writing programs to a simple problem.
CO 3	**Identify** the given problem statement to use the concepts like lists, dictionaries and regular expressions in developing applications.
CO 4	**Evaluate** the concepts of Object-Oriented Programming using Python
CO 5	**develop** applications using python.

Unit-1 Introduction to Python **8 hours**
Introduction to Python and Basic Syntax, class, Data types and variables Conditional statements, Local and Global variables. Working with Python & Anaconda installation.
Unit-2 Python List, Dictionary & Function **8 hours**
Discussion on Python List, Dictionary , function and modules.
Unit-3 Python Classes and objects **8 hours**
Classes and objects, Classes and functions, Classes and methods. Inheritance & Data hiding.
Unit 4- Files in python **8 hours**
Files: Kinds of files, Opening a File, Techniques for Reading Files, Files over the Internet, Writing Files,
Unit-5 GUI Programming **8 hours**
Building a Basic GUI, Models, Views, and Controllers, Customizing the Visual Style Introducing few more Widgets, Object Oriented GUIs, Keeping the Concepts from Being a GUI Mess..

Continuous Assessment Pattern

Internal Assessment (IA)	Continuous Assessment Test (CAT)	End Term Test (ETE)	Total Marks
20	30	50	100

Name of The Course	Mobile Computing			
Course Code	DPCS3005			
Prerequisite	Basic Understanding of Computer Networks			
Corequisite				
Antirequisite				
	L	**T**	**P**	**C**
	3	0	0	3

Course Objectives: 1. Mobile computing and wireless communication are the most important technology and standard for data communication for various electronics systems for home and industry application. Students understands the various wireless data communication networks e.g. GSM,CDAM, GPRS, GPS and other accessing technologies of wireless data communications.

2. In this course students also learn about the adhoc and mobile adhoc networks basic working and call drooping algorithm of of mobile adhoc netwoks.In this course students also learn the working of mobile commerce application and aware about the structure of mobile commerce.

Course Outcomes:

CO 1	Understand the working, characteristics and limitations of mobile hardware devices including their user-interface modalities
CO 2	Illustrate the working of OSI and TCP/IP models and Generalize view on different Types of Accessing Techniques and Understand the working of MAC Technologies
CO 3	Analyze the working of GSM and GPRS Mobile Communication Technologies and different core components of Mobile Communication Networks.
CO 4	Analyze the working of Ahdoc Networks, MANET and Identify the root causes of call dropping, and concept of call forwarding in roaming in Adhoc Networks.
CO 5	Understand the Mobile Operating System framework, different development resource kit of Mobile Operating System and structure of Mobile -Payment System

Text Book (s): 1 Mobile computing by Raj Kamal (Oxford)

Reference Book (s):1. Kaveh Pahlavan, Prasanth Krishnamoorthy- “Principles of Wireless Networks”

2. Wireless communication and networking" by William Stallings..

Unit-1 Introduction of Mobile Computing **8 hours**
Mobile Computing Features Mobile Computing Vs wireless Networking, Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.
Unit-2 MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER **8 hours**
Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP-Adaptation of TCP Window – Improvement in TCP Performance.
Unit-3 MOBILE TELECOMMUNICATION SYSTEM 8 hours
Global System for Mobile Communication (GSM), Architecture of GSM, General Packet Radio Service (GPRS) ,Universal Mobile Telecommunication System(UMTS), Code Division Multiple Access (CDMA) Mobile Networks.GSM Vs CDMA.
Unit-4 MOBILE AD-HOC NETWORKS **8 hours**
Ad-Hoc Basic Concepts, Characteristics, Applications, Adhoc Networks Design Issues, Routing Protocol, and Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security.
Unit-5 MOBILE PLATFORMS AND APPLICATIONS **8 hours**
Mobile Device Operating Systems, Special Constrains & Requirements, Commercial Mobile Operating Systems – Software Development Kit: IOS, Android, BlackBerry, Windows Phone – M-Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

Continuous Assessment Pattern

Internal Assessment (IA)	**Continuous Assessment Test (CAT)**	**End Term Test (ETE)**	**Total Marks**
20	30	50	100

Name of The Course	Mobile Computing Lab

Course Code	DPCS3012
Prerequisite	Basic knowledge of Computer Networking
Corequisite	
Antirequisite	

	L	**T**	**P**	**C**
	0	0	2	1

Course Objectives:

1. This course is designed to enable the students get a detailed knowledge Mobile Computing and different Mobile Communication Networks: GSM, GPRS, GPS, and CDMA.

2. Be Familiar with Wireless Access Protocol (WAP) and different Networks Protocol and also understand the Simulation Techniques of Mobile Communication.

Course Outcomes

CO 1	Perform simulation operation for Authentication and Encryption Technique used in GSM.
CO 2	Performs simulation operation to design a game, calculator and browsing the internet.

Text Book (s):

1. Mobile computing by Raj Kamal (Oxford).

Reference Book (s):

1. Fundamentals of Mobile Computing by Pattnaik, Mall (PHI)

Unit-1 Study of Mobile Communication Networks:
Practical 1: Study of Global System for Mobile (GSM). Practical 2: Study of GPRS, GPS and CDMA. Practical 3: Study of Computer Networks Topologies and Wireless Access Protocol. Practical 4: Study of Floppy Drive, CD Drive and Hard Disk. Practical 5: Understand the working of Network Devices Switch and Routers.
Unit-2 Simulation Techniques for Mobile Device:
Practical 1: Study of WML and J2ME simulator. **Practical 2: Design of simple Calculator having + -- * and / using WML/J2ME3.** **Practical 3: Design of Calendar for any given month and year using WML/J2ME4.**

Practical 4: Design a Timer to System Time using WML/J2ME5.

Practical 5: Design of simple game using WML/J2ME6

Practical 6: Simulation of Authentication and encryption technique used in GSM.

Practical 7: Design a personal phone book containing the name, phone no., address, e-mail, etc.

Practical 8: Animate an image using WML/J2ME7.

Practical 9: Browsing the Internet using Mobile phone simulator

Practical 10: Study of Glomo Sim Simulator.