Institute Vision

To emerge as a leading technical training institution in the country and serve the nation and engineering profession with distinction by developing the most skilled human resources with comprehensive and modern training and skillsets in selected engineering disciplines and trades.

Institute Mission

1. To administer a technical training institute of highest standard of education and training commensurate with modern engineering practices.
2. To offer technical diploma and certificate courses to cater to contemporary demand and relevance to the engineering industry.
3. To adopt and implement modern curriculum of technical education and training.
4. To continuously upgrade the infrastructure necessary for practical training with new and contemporary machines and methods.
5. To arrange on job training and internships for the students and staff members with proper supervision.
6. To liaise with industry for internship and collaboration, and also, for arranging periodic review of infrastructure and training methods and modernizing teaching and training curriculum.
7. To create special program for the youth of the State of Jharkhand to help them acquire entrepreneurial and managerial skills, manufacturing capability, career advancement training and professional confidence.

COMPUTER ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

DEPARTMENT VISION

To produce competent, committed and confident professionals and entrepreneurs with a zeal to excel in the field of Computer Engineering and also, lead the society in its path of technological, economical and social development, by imparting quality technical education and extensive exposure to the latest trends in the field.

DEPARTMENT MISSION

1. To impart technical knowledge and practical skills in Computer Engineering - including hardware, software, and networking concepts, to the students through effective teaching and learning methodologies.

2. To equip students with problem solving skills and knowledge in the domain of Computer Engineering as per the requirements of the computer industry and also the needs of the modern society.

3. To enhance educational experience of our students and foster innovation and entrepreneurship in the field of Computer Engineering.

4. To cultivate a strong work ethics and professionalism among students, along with good communication skills and the ability to work effectively in teams.

5. To maintain pace with the developments in the software industry through industry collaboration and regular faculty training.

DEPARTMENT OF COMPUTER ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1. To prepare students with sound technical knowledge and practical skills in various domains of computer engineering, who are confident in accepting challenges and apply their knowledge to solve them.

2. To prepare students who possess enough creativity and entrepreneurial skills who can venture into developing new products or services in the field of computer engineering.

3. To foster in them a culture of lifelong learning, by equipping them with strong concepts in Computer Engineering, enabling them to pursue advanced degrees and professional development opportunities.

DEPARTMENT OF COMPUTER ENGINEERING

PROGRAM SPECIFIC OBJECTIVES (PSOs)

Students are expected to:

Acquire sound subject knowledge in computer engineering fundamentals as well as advanced subjects like Data Structures, Databases, Data Communication and Networks, Web Technology and Internet of things etc., that could also be supportive in pursuing higher studies.

Develop good programming and problem solving skills on most of the modern programming languages and paradigms, along with Software Engineering practices, preparing them to work productively as a software developer.

Gain Provide adequate hands-on in specific areas like web development, multimedia and animation, computer hardware diagnostics and setting up computer networks, mainly preparing them for entrepreneurial ventures.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

SYLLABUS

SEMESTER-III

Diploma in Computer Engineering

(wef 2018 batch)

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

Course Structure
Diploma in Computer Engineering
Third Semester

Subject Code	Subject	Theory	Tutorial	Lab.	Credit
DMA 3101	Applied Mathematics	3	0	0	3
DCS 3001	C Programing	3	1	0	4
DCS 3003	DBMS	3	0	0	3
DCS 3005	Computer Organization	3	0	0	3
DCS 3007	Web Technology	3	0	0	3
DCS 3002	C Programing Lab.	0	1	2	2
DCS 3004	DBMS Lab.	0	0	2	1
DCS 3006	Computer Organization Lab.	0	0	2	1
DCS 3008	Web Design Lab.	0	0	2	1
DHU 3002	Professional Practices-II	0	0	2	1
DGA 3002/04/06/08	PT and Games/NSS/NCC/CA	0	0	2	1
	Periods per week	15	2	12	-
	Total credits	-	-	-	23
	Total Periods per week	-	-	-	35

COURSE INFORMATION SHEET

Course code: DMA 3101

Course title: APPLIED MATHEMATICS

Pre-requisite(s): Knowledge of Engineering Mathematics taught in 2nd semester.

Credits:

L	T	P	C
3	0	0	3

Class schedule per week: 3 lectures

Course Objectives: This course enables the students to learn how to extend the principles of single variable differential and integral calculus to multivariable and vector framework and how to solve ordinary differential equations of first or higher order, and basics of statistics and probability. These different mathematical methods are prerequisite for studying other subjects in engineering fields. Students are going to learn the following topics:

1.	Partial Differentiation and Multiple Integrals
2.	Vector Calculus
3.	Ordinary Differential Equations (ODE) of First Order
4.	Linear Differential Equations of Second and Higher Order
5.	Statistics and Probability

Course Outcomes: After completion of the course, the learners will be able to:

1.	Develop the essential skills of using Partial Differentiation and Multiple Integrals for applications in engineering.
2.	Learn and apply Vector Calculus to solve technical problems.
3.	Learn to use First order ODEs necessary for modelling engineering problems.
4.	Acquire necessary ability to use Second order ODEs to design engineering models.
5.	Learn and appreciate basic probability and statistical methods.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DMA 3101 APPLIED MATHEMATICS

Module-I:
Partial Differentiation and Multiple Integrals

   1.1 Functions of two or more variables. Partial derivatives of first and higher order.

   1.2 Differentiation of composite functions. Jacobians and its properties.

   1.3 Evaluation of double integral. Change of order of integration.

   1.4 Finding area and volume using double integration. Change of variables from Cartesian to polar.

Module-II:
Vector Calculus

   2.1 Definition Vector functions and its derivative. Velocity and acceleration.

   2.2 Concepts of Scalar and Vector Fields. Gradient of scalar field. Directional Derivative and its geometrical interpretation. Properties of Gradient.

   2.3 Divergence and Curl of a vector function and their properties. Physical interpretation of divergence and curl.

   2.4 Integration of vector functions. Concept of line integral. Work done by a force. Surface and volume integral.

Module-III:
Ordinary Differential Equations (ODE) of First Order

   3.1 Definitions of ODE and meaning of solution of ODE. Formation of ODE.

   3.2 Solution of ODE of first order and first degree: Variable separable method, Homogenous equations, Equations reducible to homogenous form, Exact equations, Linear equations, Bernoulli equations.

Module-IV:
Linear Differential Equations of Second and Higher Order

   4.1. Definition of linear ODE. The operator 'D'. Auxiliary Equations (A.E.) and rules of finding Complementary Function (C.F.).

   4.2. The inverse Operator $\frac{1}{f(D)}$. Rules for finding the Particular Integral (P.E.).

Diploma in Computer Engineering

Module-V:
Statistics and Probability

    5.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution.

    5.2 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation.

    5.3 Definition of random experiment, sample space, event, Occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). Definition of Probability, addition and multiplication theorems of Probability.

Text Books

1. N.P. Bali and Manish Goyal. "A Textbook of Engineering Mathematics". Laxmi Publications Pvt. Ltd.

Reference Books

1. B. S. Grewal. Higher Engineering Mathematics. Khanna Publication, New Dehli.
2. Erwin Kreyszig. Advanced Engineering Mathematics. John Wiley & Sons, Inc.
3. Murray R Spiegel. Vector Analysis and an Introduction to Tensor Analysis. Schaum's Outline series. McGraw-Hill.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Third

Course code: DCS3001

Course title: C Programming

Credits:

Lectures	Tutorials	Practicals	Credits
3	1	0	4

Class schedule per week: 4 lectures

Course Objectives:

1. To enable students to prepare algorithms for solving simple problems.
2. To enable them to use various operators and library functions for writing mathematical expressions.
3. To enable them to use control statements for implementing the required logic.
4. To enable them to use 1- and 2- dimensional arrays for solving problems related to lists manipulation and matrices.
5. To enable them to understand the importance of modular design and write simple functions of their own.

Course Outcomes:

After completion of the course, the learners will be able to:

1. Develop algorithms and write C programs for solving simple problems.
2. Use C operators and expressions for mathematical computation and data manipulation.
3. Apply programming constructs effectively for solving relatively complex problems.
4. Use arrays effectively for solving problems involving collection of data, matrices or strings.
5. Implement modular design in their programs by writing functions of their own.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3001 C PROGRAMMING

Module-I:
Programming techniques and overview of c language
Algorithm and programming development, steps in development of a program, flowcharts, algorithm development, program debugging, program structure. formatted input, formatted output, assignment statements, constant, variables and data types.

Module-II:
Operators and Expressions
Arithmetic, relational, increment, decrement, assignment, logical and conditional operators, operator precedence and associativity, type casting, sizeof() operator, Math functions sqrt(), pow(), sin(), cos() and tan().

Module-III
Decision Making and Branching:
if statement (if, if-else, else-if ladder, nested if-else), switch case statement, break statement, goto.
Decision Making and Looping: while-do, do-while statements, for loop, continue statement

Module-IV:
Arrays and Strings
Declaration and initialization of one dimensional, two dimensional and character arrays, accessing array elements. Declaration and initialization of string variables, string handling functions from standard library (strlen (), strcpy (), strcat (),strcmp ()).

Module-V:
Functions and Pointers
Need of functions, scope and lifetime of variables, defining functions, function call (call by value, call by reference), return values, storage classes. Category of function (No argument No return value, No argument with return value, argument with return value), recursion.
Pointers:Understanding pointers, declaring and accessing pointers, Pointers arithmetic, pointers and arrays.

Text Books
  1. E Balagurusamy, "Programming in ANSI C" Tata McGraw-Hill, New Delhi.

Reference Books
  1. Ashok N. Kamthane, "Programming in C" Pearson Education India, New Delhi.

Program: Diploma in Computer Engineering

Semester: Third

Course code: DCS3003

Course title: Database Management System (DBMS)

Credits:

Lectures	Tutorials	Practicals	Credits
3	0	0	3

Class schedule per week: 3 lectures

Course Objectives:

1. To explain to the students advantages of using a database system and make them identify its key components.

2. To make them understand the different between various data models and design ER diagram for specific scenarios.

3. To make them understand the essential concepts and terminologies in RDBMS, and enable them to execute SQL queries for data retrieval and manipulation.

4. To give them knowledge of practical database-related issues and ways to deal with them.

5. To make them understand the importance of database normalization and enable them to normalize their database design.

Course Outcomes:

After completion of the course, the learners will be able to:

1. Explain the key concepts and principles of database management systems, including the advantages and disadvantages of using a DBMS command.

2. Design a relational database schema that meets a set of requirements, using appropriate modeling techniques such as ER diagrams.

3. Use SQL to create tables, insert data, retrieve data using SELECT statements with various filtering and sorting options, update data, and delete

4. Understand various aspects of protection and security in databases.

5. Design database conforming to the rules of database normalization.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3003 DATABASE MANAGEMENT SYSTEM

Module-I:
Introduction
Traditional File Management System (TFMS), Problems with TFMS, Advantages of Using a database, Introduction to Database System, Goals of DBMS, Components of Database System, Database System Architecture, Physical and logical Data independence.

Module-II:
Introduction to Data Models
Introduction to Data Models, Entity Relationship model, Entity Relationship model Hierarchical, Network and Relational Model , Comparison of Network , Hierarchical and Relational Model.

Module-III:
Relational Data model
Relational Data Model,RDBMS Terminologies, SQL, Keys, Relational Database, Relation Algebra and Calculus.

Module-IV:
Database Protection
Database Protection, Recovery, Concurrency, Security, Integrity and control.

Module-V:
Data Normalization
Need for Data Normalization, First, Second, Third, Fourth and Fifth Normal Form, Functional and Multi-valued Dependency.

Text Books

1. ISRD Group, "Introduction to Database Management System", Tata McGraw-Hill.

Reference Books

1. Database System, by A. Silberschatz & Henry F. Korth.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Third

Course code: DCS3005

Course title: Computer Organization

Credits:

Lectures	Tutorials	Practical	Credits
3	0	0	3

Class schedule per week: 03 lectures

Course Objectives:

1. To provide students understanding of various number systems and inter-conversion among them along with arithmetic operations.

2. To familiarize students with logic gates, Boolean expressions, and Boolean algebra, enabling them to analyze and design digital circuits.

3. To enable them to simplify Boolean expressions using Boolean algebra and K-map technique and construct logical circuits based on those expressions.

4. To introduce them to flip-flops and sequential logic design, enabling them to understand the working of standard sequential circuits

5. To provide insight into fundamentals of computer architecture, components, instruction set, microprogramming, and instruction execution cycles.

Course Outcomes:

After completion of the course, the learners will be able to:

1. Understanding number systems and inter-conversion among them, and perform arithmetic operations.
2. Understand the use of logic gates, Boolean expressions, and Boolean algebra, enabling them to analyze and design digital circuits.
3. Simplify Boolean expressions using Boolean algebra and K-map technique and construct logical circuits based on those expressions.
4. Understand the working of flip-flops and design simple sequential circuits.
5. Understand the fundamentals of computer architecture, components, instruction set, microprogramming, and instruction execution cycles.

BIT, MESRA

Diploma in Computer Engineering

DCS 3005 COMPUTER ORGANIZATION

Module-I:
Overview of Number System

Introduction to Binary, Octal, Decimal, Hexadecimal number system, Conversion of number systems, 1's complement and 2's complement, Binary arithmetic (addition, subtraction).

Module-II:
Logic Gates and Boolean Algebra

Logical symbol, logical expression and truth table of AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR gates. Universal gates – NAND and NOR gates. Basic laws of Boolean algebra, Duality theorem, De Morgan's theorems.

Module-III:
Combinational Logic Design/Circuits

Simplification of Boolean expression using Boolean algebra, Construction of logical circuits forms Boolean expressions, Boolean expressions using Sum of products and product of sums forms, K-map representation of logical functions, Minimization of logical expressions using K-map (2, 3, 4 variables). Standardization of SOP & POS equations, Truth table, K-map, Simplified logical expression and logical circuit using basic gates and universal gates.

Combinational Logic: Concept of Adders, half/Full adder Block diagram, Truth table, Logical expression and logic diagram of Decoder, Encoder, Multiplexers (4:1 and 8:1) and De-Multiplexer.

Module-IV:
Flip Flops and Sequential Logic Design

One-bit memory cell, clock signal, Symbol and Logic diagram using NAND gates, working, truth table and timing diagram of Clocked R S flip flop. Symbol and Logic diagram using NAND gates, working, truth table and timing diagram of J-K flip flop. Block diagram and truth table of Master slave J-K flip flop. Symbol, working and truth table of D-flip flop and T-flip flop. Applications of flip flops.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

Module-V:

Computer architecture and Instruction set

Computer architecture, Program counter, Input and memory address Register, RAM, Instruction Register, Controller sequencer, Accumulator, Adder-Subtractor, Buffer Register, Output Register, Binary Display. Instruction Set, Programming with Instruction, Fetch Cycle and Execution cycle, Micro programming, Schematic diagrams

Text Books

1. M.Morris Mano and charles R. Kime "Logic and computer Design Fundamentals", Pearson Education Asia Limited, Delhi.
2. Malvino & Brown"Digital Computer Electronics", Tata McGraw Hill, Delhi.

Reference Books

1.B.R.Gupta and Vandana Singhal " Digital Electronics" S.K. Kataria & Sons, Nai sarak ,Delhi.
2. Nagrath IJ. "Electronics Analog and Digital", Prentice Hall of India Ltd Delhi.
3. Jain R.P. "Modern Digital Electronics", Tata McGraw Hill Delhi.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Third

Course code: DCS3007

Course title: Web Technology

Credits:

Lectures	Tutorials	Practical	Credits
3	0	0	3

Class schedule per week: 03 lectures

Course Objectives:

1. To introduce students to the basics of the Internet, web servers, browsers, and hypermedia.
2. To teach students HTML document structure, tags, hyperlinks, graphics, and forms.
3. To teach students about programming in PHP.
4. To introduce students to advanced PHP concepts, like POST & GET requests, cookies, and sessions.
5. To teach them about http, Java applets, Java Script and data security.

Course Outcomes:

After completion of the course, the learners will be able to:

1. Comprehend how the Internet functions and identify various Internet applications.
2. Create and design web pages using HTML and implement various web elements effectively.
3. Write dynamic and interactive web pages using PHP to handle user input and perform server-side processing.
4. Develop more complex web applications with enhanced functionality.
5. Write Java applets and understand the security aspects of web applications.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3007 WEB TECHNOLOGY

Module-I:
Introduction to Internet

Basics of Internet, Address and Names for the Internet, Web Objects and Sites, E-mail, World Wide Web, Web Page, Web Servers, Browsers, Hypertext, hyperlinks and hypermedia, search engines, Internet Protocols (TCP/IP), Uniform Resource Locator (URL), Internet Applications: E-mail, Telnet, FTP, Video conferencing, e-commerce.

Module-II:
Introduction to HTML

HTML and its applications, HTML basics, document tags, tag attributes, container and empty tags, logical and physical tags, block level and text level element, emphasizing text implicitly and explicitly. Using lists and nested lists in web documents: ordered, unordered lists, menu lists, directory lists, definition lists, graphics for web pages, hotspots, absolute and relative URLs, working with links, tables, frames and forms.

Module-III:
PHP Basics

Introduction, Environment, syntax, variables, echo, comments, constants, operators, strings, require vs. include, if statement, if- else, else if, while loop, for loop, for each, do while, switch, forms, functions, array.

Module-IV:
PHP Advanced

PHP POST & GET, *File Handling*: create, open, close, write, read, delete, append, truncate, and upload. Strings (strops, str_replace, substr_replace, capitalization), Cookies, Sessions.

Module-V: Web Security

Introduction to Web security, HTTP, Active-X, Java Applets, Java Script, Virus Menus in the internet. Firewalls & Transaction Security, Client Server Network, Secure Socket Layer(SSL), Emerging Client Server Security Threats, Data Security.

Text Books
1. W. Jason Gilmore, "Beginning PHP and My SQL", Amazon
2. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill

Reference Books
1. Using the World Wide Web, (IInd edition) by Wall, PHI Pvt. Ltd.,New Delhi

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Third

Course code: DCS3002

Course title: C Programming Lab

Credits:

Lectures	Tutorials	Practical	Credits
0	1	2	2

Class schedule per week: 03 lectures

Course Objectives:

1. To teach students about use of variables, programs interaction with the user and how to perform I/O operations.

2. To enable students to understand the basic concepts of programming in C and write simple programs using variables and arithmetic operators.

3. To familiarize students with control structures and enabling them to implement more complex logic in their programs.

4. To teach students how to program one-dimensional and two-dimensional arrays, work with collection of data, perform matrix operations and handle strings.

5. To teach students how to program structures and unions, and create user-defined functions.

Course Outcomes:

After completion of the course, the learners will be able to:

1. Understand data-types, use variables, perform I/O operations and make their programs interactive.

2. Understand the basic concepts of programming in C and write simple programs using variables and arithmetic operators.

3. Use control structures and implement more complex logic in their programs.

4. Write programs using one-dimensional and two-dimensional arrays, work with collection of data, perform matrix operations and handle strings.

5. Write programs using structures and unions, and create user-defined functions.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3002 C PROGRAMMING LAB.

LIST OF EXPERIMENTS

1. Write Programs in C to implement.

2. Programming Exercise on Executing and Editing a C Program.

3. Programming Exercise on defining Variable and assigning values to variables.

4. Programming Exercise on arithmetic's and relational operators.

5. Programming Exercise on arithmetic expression and their evaluation.

6. Programming Exercise on formatting input/output using printf and scanf

7. Programming Exercise using if-statement.

8. Programming Exercise using if-else statement.

9. Programming Exercise on switch statement

10. Programming Exercise on do-while statement.

11. Programming Exercise on for statement.

12. Programming exercise on one-dimensional array and two-dimensional array.

13. (i) Programs for putting two strings together (ii) Programs for comparing two strings.

14. Simple programs using structures and Union.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Third

Course code: DCS3004

Course title: DBMS Lab.

Credits:

Lectures	Tutorials	Practical	Credits
0	1	2	2

Class schedule per week: 03 lectures

Module-1: Basic DDL & DML commands, Simple SQL Queries.
Module-2: Using Arithmetic operators, and Math, Text and Date functions.
Module-3: Special Clauses and Operators used with Select Statement- Sorting, Grouping and Aggregate Functions.
Module-4: Creating Tables and Views from Existing Tables. Keys & Constraints.
Module-5: SQL Joins. User Privileges.

COURSE OBJECTIVE:
1. To introduce students to Data Definition Language (DDL) and Data Manipulation Language (DML) commands of SQL and to enable them to perform simple SQL queries.
2. To enable them to execute SQL queries using arithmetic operators and various functions (math, text, and date functions).
3. To familiarize students with special clauses and operators used with the SELECT statement, such as sorting, grouping, and aggregate functions.
4. To enable students to create tables and views from existing tables, define keys and impose constraints.
5. To enable students to retrieve data from multiple tables using SQL joins, and define privileges to users on database objects.

COURSE OUTCOME
After completing this course students should be able to:
1. Execute Data Definition Language (DDL) and Data Manipulation Language (DML) commands of SQL and perform simple SQL queries.
2. To enable them to execute SQL queries using arithmetic operators and various functions (math, text, and date functions).
3. To familiarize students with special clauses and operators used with the SELECT statement, such as sorting, grouping, and aggregate functions.
4. To enable students to create tables and views from existing tables, define keys and impose constraints.
5. To enable students to retrieve data from multiple tables using SQL joins, and define privileges to users on database objects.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3004 DBMS LAB

LIST OF EXPERIMENTS

1. DDL, DML – Their Scope and usage. SQL as DDL and DML.

2. Write SQL queries using logical operations (=,<,>,etc)

3. Write SQL queries using SQL operators

4. Write SQL query using character, number, date and group functions

5. Write SQL queries for relational algebra

6. Write SQL queries for extracting data from more than one table

7. Write SQL queries for sub queries, nested queries

8. Database Maintenance Activities

9. Concepts for ROLL BACK & COMMIT

10. Working with Ms-Access

    i)   Create database
    ii)   Create table
    iii)   Create relationship between tables.
    iv)   Queries on single table.
    v)   Queries on multiple tables

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Third

Course code: DCS3006

Course title: COMPUTER ORGANIZATION LAB.

Credits:

Lectures	Tutorials	Practical	Credits
0	1	2	2

Class schedule per week: 03 lectures

Experiments are divided as:
Module-1: Function of basic logic gates and their realization using universal gates
Module-2: Implementation of encoders and decoders
Module-3: Verification of DeMorgan's Theorems
Module-4: Realization of Flip-flops
Module-5: Realization of standard digital devices like: adder, subtractor, complementor, comparator, encoder, decoder, multiplexer and demultiplexer.

COURSE OBJECTIVES
1. To develop in students an understanding of operations of fundamental logic gates and their implementation using universal gates.
2. To provide students the knowledge for designing and implementation of encoders and decoders.
3. To enable students design circuits for verification of DeMorgan's Theorems.
4. To enable students to realize flip-flops using basic logic gates.
5. To enable students to realize standard digital devices such as adders, subtractors, complementors, comparators, multiplexers, and demultiplexers.

COURSE OUTCOMES
After completion of this course students should be able to:

1. To develop in students an understanding of operations of fundamental logic gates and their implementation using universal gates.
2. To provide students the knowledge for designing and implementation of encoders and decoders.
3. To enable students design circuits for verification of DeMorgan's Theorems.
4. To enable students to realize flip-flops using basic logic gates.
5. To enable students to realize standard digital devices such as adders, subtractors, complementors, comparators, multiplexers, and demultiplexers.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3006 COMPUTERORGANIZATION LAB.

LIST OF EXPERIMENTS

1. Verification of basic Logic gates
2. Verification of Universal logic gates and realization of basic gates
3. Design and implementation of code converters using logic gates
   (i) BCD to excess-3 code and vice versa (ii) Binary to gray and vice-versa
4. Prove DE – Morgan's 1st theorem.
5. Prove DE – Morgan's 2nd theorem.
6. Design and realization of S.R. flip-flop using IC 7400.
7. Design and realization of J.K. flip-flop using IC 7400.
8. Design and realization of a 4-bit magnitude comparator using IC 7485.
9. Design and realization of a parity bit checker using IC 7486.
10. Design and realization of parity bit generator using IC 7486.
11. Design and implementation of 4 bit binary Adder/ Subtractor and BCD adder using IC 7483.
12. Design and implementation of Multiplexer and De-multiplexer using logic gates
13. Design and implementation of encoder and decoder using logic gates
14. Construction of Half Adder and Full Adder.
15. Verification of De Morgan's First and Second laws.
16. Simplification and Realization of Boolean Functions, using NAND gates only.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Third

Course code: DCS3008

Course title: WEB DESIGN LAB.

Credits:

Lectures	Tutorials	Practical	Credits
0	1	2	2

Class schedule per week: 03 lectures

COURSE OBJECTIVES:

1. To develop in students an understanding of HTML elements incuding hyperlinks and anchors, and how to use them in designing a web page.

2. To enable students to create dynamic and interactive web content using JavaScript.

3. To develop in students programming skills in JavaScript, enabling them to create interactive web applications.

4. To develop in students the ability to program in PHP and perform data file processing tasks and also to create applications interacting with web servers.

5. To enable them to explore advanced concepts in PHP such as sessions and cookies and to develop applications for managing user data and preferences.

COURSE OUTCOMES:

After completion of this course students should be able to:

1. Develop in students an understanding of HTML elements incuding hyperlinks and anchors, and use them in designing a web page.

2. Create dynamic and interactive web content using JavaScript.

3. Write programs in JavaScript, and create interactive web applications.

4. Write program in PHP and perform data file processing tasks, and also, create applications interacting with web servers.

5. Use advanced concepts in PHP such as sessions and cookies and develop applications for managing user data and preferences.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3008 WEB DESIGN LAB.

LIST OF EXPERIMENTS

1. Design a 5-page website of your choice using following HTML elements.

   ☐ List
   ☐ Table
   ☐ Hyperlinks
   ☐ Images
   ☐ Hotspots
   ☐ Frames

2. Add a feedback form to the above website.

3. Embed JavaScript into html pages and display (alert, confirm, prompt) boxes.

4. Programming exercises based on if, if-else, switch-case, while loop, for loop in JavaScript.

5. Write JavaScript related to Onclick, onsubmit, onmouseover, onmouseout evnts.

6. Apply form validations using JavaScript.

7. Programming exercises based on PHP basics.

   ☐ Include file
   ☐ Require
   ☐ Echo
   ☐ Working with functions
   ☐ Comments

8. Programming exercise based on if statement, if-else, else if, while loop, for loop, for each, do while, switch in PHP

9. String handling in PHP: strops, str_replace, substr_replace, capitalization, explode, implode

10. File handling in PHP: creating, deletion, open, write, append, close, read, write

11. Write a program in PHP to create sessions

12. Write a program in PHP to create cookies

Diploma in Computer Engineering

DHU3002 PROFESSIONAL PRACTICES-II

Module-I:
Field Visits:
Structuredfieldvisits(minimumthree)bearrangedandreportofthesameshouldbesubmittedbytheindividualstudent,toforma part of the term work.

Module-II:

Lectures by Professional/Industrial Expert:(any four fields)
Cyber laws, Fiber optics communication system, Disaster management, Use of signals for Telephone, internet, Industrial Safety, Computer security systems, any other suitable topic.

Module-III:

InformationSearch: Informationsearchcanbedonethroughmanufacturers,catalogue,internet, magazines; book set and submit a report.

Module-IV:

Seminar: Seminar topic should be related to the subjects of fourth semester. Each student shall submit are port of at least10 pages and deliver a seminar (Presentation time–10 minutes)

Module-V:

Troubleshooting: Reliability Factors of equipment, Maintenance Management, Troubleshooting Procedures, Troubleshooting Aids.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

SYLLABUS

SEMESTER-IV

Diploma in Computer Engineering

(wef 2018 batch)

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

Course Structure
Diploma in Computer Engineering

Fourth Semester

Subject Code	Subject	Theory	Tutorial	Lab.	Credit
DCS 4001	OOP in C++	3	0	0	3
DCS 4005	Data Structures	3	1	0	4
DCS 4007	.NET	3	0	0	3
DCS 4009	Operating System	3	0	0	3
DAC 4001	Environmental Science	2	0	0	2
DCS 4002	C++ Lab.	0	1	2	2
DCS 4004	Oracle Lab.	0	1	2	2
DCS 4006	Data Structures Lab.	0	1	2	2
DCS 4008	.NET Lab.	0	0	2	1
DCS 4010	Linux Lab.	0	0	2	1
DHU 4002	Professional Practices-III	0	0	2	1
	Periods per week	14	4	12	-
	Total credits	-	-	-	24
	Total Periods per week	-	-	-	30

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS 4001
Course Title: OOP in C++

Credits:	L	T	P	C
	3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVE:
1. To enable students to use language features of C++ such as function overloading, reference variables, and manipulators.
2. To enable students to create programs using classes and objects and understand the significance of private and public sections.
3. To make them understand the significance of constructors, its types and destructor, and enable them to write meaningful constructors and destructors for their classes.
4. To develop an understanding of inheritance and polymorphism in C++ and use them in their programmes.
5. To give the students an idea of the C++ stream classes enabling them to write programmes to process data files.

COURSE OUTCOME:
After completing this course students will be able to:
1. Use C++ language features like function overloading, reference variables, and manipulators.
2. Create programs using classes and objects with an understanding of private and public members.
3. Understand different types of constructors and write constructors and destructors for their classes.
4. Understand the concepts of inheritance and polymorphism in C++ and use them in their programmes.
5. Use C++ stream classes to write programmes for processing data files.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DSC4001 OBJECT ORIENTED PROGRAMMING IN C++

Module- I:
Language Features of C++:
Variable declaration, Function overloading, Optional parameters in function, Reference variables, Basics of console I/O, Dynamic memory allocation, Manipulators.

Module- II:
Classes and Objects:
Object-oriented programming paradigm, Significance of classes and objects, Creating a class, Inline functions, Private and public members of class, static members, Array of objects, Objects as arguments, Friend functions, Returning objects.

Module- III:
Constructors and Destructors:
Significance of constructor and destructor, Defining constructor, Parameterized constructor, Constructors with default arguments, Dynamic initialization of objects, Copy constructor, Overloading constructors and data members, Operator overloading, Overloading using friend function. Significance of destructor.

Module- IV:
Inheritance:
Significance of inheritance, Access specifier, Base class and derived class constructors, Types of inheritance, Function overriding, Virtual Function, Pure virtual function, Abstract class, Pointers to objects, Pointers to Derived class objects, Polymorphism.

Module-V:
Console I/O and File Handling:
Stream and Stream classes, Unformatted I/O Operations, Formatted I/O operations, File stream classes, File operations, Sequential I/O operations, Updating files, Random access, Error Handling,

Text Book:
E. Balagurusamy, "Object Oriented Programming with C++", McGraw Hill

Reference Book:
Herbert Schildt, "Teach Yourself C++", Osborne McGraw Hill

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS4005
Course Title: Data Structures

Credits:	L	T	P	C
	3	1	0	4

Class schedule per week: 3 lectures

COURSE OBJECTIVES
1. To make students understand the importance of data structures in problem solving and enable them to implement simple algorithms involving use of arrays.
2. To enable students to implement a stack in an array along with various operations for manipulating it.
3. To enable students to implement a queue in an array along with various operations for manipulating it.
4. To develop an understanding of dynamic data structures and enable them to implement a linked-list (singly- and doubly-linked) along with various operations for manipulating it.
5. To grasp the concept of non-linear data structures (trees and graphs) and understand their representation in memory and enable them to implement binary search tree along with various operations to manipulate it.

COURSE OUTCOMES
After completing this course students will be able to:
1. Understand the importance of data structures in problem solving and implement simple algorithms involving use of arrays.
2. Implement a stack in an array along with various operations for manipulating it.
3. Implement a queue in an array along with various operations for manipulating it.
4. Understand dynamic data structures and implement a linked-list (singly- and doubly-linked) along with various operations for manipulating it.
5.
6. Understand non-linear data structures (trees and graphs) and their representation in memory and implementation of binary search trees along with vaious operations to manipulate it.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 4005 DATA STRUCTURES

OBJECTIVE
1. To get an introduction to the basic idea and concepts of Data Structures.
2. To be able to implement Stacks and its operations.
3. To be able to implement Queues and its operations.
4. To be able to implement Linked-lists and its operations.
5. To be able to implement Binary Search Trees and its operations.

Module-I:
Introduction to Data Structures
Classification of Data Structures- linear & non-linear, Static & dynamic implementation of data structures, Dynamic memory allocation and deallocation, Arrays and contiguous lists, Sorting algorithms- Insertion sort, selection sort & bubble sort, Searching- sequential and random (binary search).

Module-II:
Stacks
Array implementation of stack, Concept of Overflow and Underflow in Stacks, Stack Full and Stack Empty conditions, Stack operations- Push(), Pop() and View(), Applications of stack- Conversion of an Arithmetic Expression to Postfix, Evaluation of Postfix Expression.

Module-III:
Queues
Queue and its types, Queue Full and Queue Empty Conditions in Queues, Implementation of Simple Queue, Queue Operations- Insert(), Delete() and View(), Implementation of Circular Queue, Idea of Priority Queue and Dequeue.

Module-IV:
Linked- Lists
Concept of Linked-List, Advantages and Disadvantages of Linked-list, Implementation of Linked-list, Linked-list operations- Insert at beginning, Insert in between, Insert at end, Insertion maintaining sorted order of the list, Deletion of First Node, Deletion of Intermediate Node, Deletion of Last Node, Idea of Circular Linked-list and Doubly-linked list.

Module-V:
Trees & Graphs
Concept of Trees, Tree Traversal Methods- Preorder, Inorder and Postorder, Expression Trees, Binary Search Trees (BST), Operations on BST- Insertion of a Node, Traversal of Nodes in Preorder, Inorder and Postorder pattern, and Deletion of a Node.
Graph, Types of graphs, Array representation of graph.

Text Books
1. E. Balagurusamy, "Data Structures using C", McGraw Hill.

Reference Books
1. Reema Thareja, "Data Structures using C", Oxford University Press.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS 4007
Course Title: .NET

Credits:	**L**	**T**	**P**	**C**
	3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVE

1. To enable students to work with the .NET Framework and use base classes in applications.
2. To acquaint them with the Visual Studio .NET IDE (Integrated Development Environment) for various .NET languages, and develop uderstanding of the Common Language Specification (CLS).
3. To give them the knowledge to implement relational database design, queries, stored procedures, functions and triggers using SQL Server.
4. To introduce them to ADO.NET and integration with CSS, JavaScript, and HTML.
5. Enable them to use ASP.NET components like web forms, server and client controls for web application development, and understand advanced concepts of ASP.NET like caching, AJAX, Web Services, WPF, and Silver light.

COURSE OUTCOME

After completing this course students should be able to:

1. Work with the .NET Framework and be able to use of base classes in applications.
2. Use Visual Studio .NET IDE (Integrated Development Environment) for various .NET languages, and demonstrate uderstanding of the Common Language Specification (CLS).
3. Implement relational database design, queries, stored procedures, functions and triggers using SQL Server.
4. Gain programming knowledge with ADO.NET while integrating CSS, JavaScript, and HTML.
5. Use ASP.NET components like web forms, server and client controls for web application development, and understand advanced concepts like caching, AJAX, Web Services, WPF, and Silver light.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 4007 .NET

Module-I:
Introduction to .NET
.NET Framework:Evolution Need and perspective in current scenario, .net framework overview, structural diagram.
.NET Framework Base Classes: User and program interfaces, windows forms, web forms, console applications.CLR.

Module-II:
Visual Studio .NET
Common IDE for all languages, the common language specification, all .net languages, management of multiple languages, projects.

Module-III:
MSSQL Server
Intro to databases, Relational database concepts, Structured Query Language, Stored Procedures ¬ Functions, Triggers.

Module-IV:
Database Connectivity
Ado.NET, Basics of Ado.net, Connected and Disconnected modes, Programming with Ado.NET, CSS and JavaScript, HTML

Module-V:
Controls
Asp.Net, Intro to Web forms, Web Controls, Server Controls, Client Controls, Navigation Controls, Validations, Master Page, State Management Techniques, Caching, AJAX, Web Services, WPF, Silverlight.

Text Books and Reference books
1. Harold Davis, "Visual Basic .NET Programming", SYBEX
2. Shirish Chavan, "Visual Basic.Net", Pearson

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS 4009
Course Title: Operating System

Credits:

	L	T	P	C
	3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVES

1. To explain to the students, the fundamentals of operating system, its roles and features with regard to different types of systems and computing environments.
2. To make them understand the operation of computer system, and the role of along with the knowledge of various OS components, APIs, and system calls.
3. To enable them to understand the concept of process in operating systems and understand different process scheduling schemes and evaluate them on various parameters.
4. To enable them to understand different memory management schemes and address relocation mechanism.
5. To enable them to understand the working of disk storage and various logical structures associated with it, and also, compare different disk scheduling algorithms.

COURSE OUTCOME

After completing this course students will be able to:

1. Understand the fundamentals of operating system, its roles and features with regard to different types of systems and computing environments.
2. Understand the operation of computer system, and the role of the various OS components along with the knowledge of APIs, and system calls.
3. Develop the concept of process in operating systems and understand different CPU scheduling schemes and evaluate them on various parameters.
4. Understand different memory management schemes and address relocation mechanism.
5. Understand the working of disk storage and various logical structures associated with it, and also, compare different disk scheduling algorithms.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS4009 OPERATING SYSTEMS

Module-I:
Introduction to OS
Types of Systems- Batch, Multi-programmed, Time-sharing, Real-time, Desktop PCs, Multiprocessor Systems, Computer Networks- Client-Server, Peer-to-peer, Computing environments- Traditional, Web-based and Embedded, OS design goals, OS Architectures- Monolithic, Layered, Microkernel

Module-II:
Computer System Operation
I/O structure, Storage Structure, Protection Mechanism- I/O protection, Memory Protection, CPU protection, Operating System Components, APIs and System Calls.

Module-III:
Processes
Process Concepts, Process Control Block, Context switching, Process Scheduling- FCFS, SJF, RR, Priority Scheduling.

Module-IV:
Memory Management
Address binding- compile-time, Load-time, Execution-time, Dynamic Loading and Linking, Shared Libraries, Overlays, Swapping, Contiguous Memory Allocation (MFT, MVT), Paging, Translation Look-aside Buffer, Segmentation.

Module-V:
Secondary Storage & File System
File concepts, Access methods, Privileges and access control, Directory structure. File System Implementation- structure, implementation, partitioning and mounting. Disk Scheduling- FCFS, SSTF, SCAN, CSCAN, LOOK, CLOOK.

Text Book
1. A. Silberschatz, "Operating System Concepts", Wiley-India

Reference Book
1. H. M. Deitel, "Operating System", Pearson.

COURSE INFORMATION SHEET

Course code: DAC 4001

Course title: Environmental Science

Pre-requisite(s): Knowledge of Environmental Science

Credits:

L	T	P	C
2	0	0	2

Class schedule per week: 2 lectures

Course Objectives : T

1.	To make student acquainted with multidisciplinary nature of Environmental Science.
2.	To aware about Segment of Environment.
3.	To acquire the knowledge about Water Pollution and waste water treatment.
4.	To understand the Air Pollution with various types of pollution hazards.
5.	To acquire the knowledge to participate in solving environmental problems for green earth related to Noise Pollution and Soil Pollution.

Course Outcomes : After completion of the course, the learners will be able to:

1.	Importance of environmental science and concept of ecology, biogeochemical cycle, and food chain
2.	Composition and function of various segments of environment
3.	Water pollution, various pollutants, their toxic effects and water treatment process
4.	Classification, toxic effects and sources of air pollutants and their control measures
5.	Brief introduction to Noise Pollution, Soil Pollution and radiation pollution

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DAC 4001 ENVIRONMENTAL SCIENCE

Module-I:
Multidisciplinary nature of Environmental Science & Ecology
Definition & importance of Environmental Science.Ecosystem, basic structure of an ecosystem (abiotic and biotic components), nutrient and biogeochemical cycles (carbon cycle, nitrogen cycle, and hydrological cycle), food chain, food web.

Module-II:
Segments of environment
Atmosphere, hydrosphere, lithosphere, soil profile and composition of soil, biosphere.

Module-III:
Water Pollution & Waste water treatment
Water resources, sources of water pollution, various pollutants, their toxic effect, potability of water, rain water harvesting, primary and secondary waste water treatment (Trickling filter & Activated sludge process.

Module-IV:
Air Pollution
Classification of air pollutants, toxic effects, sources and their control measures like ESP, catalytic converter and bag house filter.

Module-V:
Noise and Soil Pollution
A brief introduction to Noise Pollution, Soil Pollution and radiation pollution.

Text books:
1. A. K. Dey,"Environmental Chemistry"
2. Deswal & Deswal,"A basic course in Environmental studies"

Reference books:
1. B. K. Sharma,"Environmental pollution"
2. C. S. Rao, "Environmental pollution and control"

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS 4002
Course Title: C++ Lab.

Credits:	L	T	P	C
	0	1	2	2

Class schedule per week: lectures

COURSE OBJECTIVE
1. To enable students to write C++ programs using function overloading, reference variables, and basic console I/O.
2. To help students visualize a problem in object-oriented style and write programs in C++ following the object oriented paradigm i.e. using classes and objects.
3. To enable them to identify the need for constructors in their classes and write C++ programs with classes including constructors and destructors, and overloading of constructors.
4. To enable students to identify the need to implement features likeinheritance and its types, abstract class, virtual functions and polymorphism through real-life examples.
5. To demonstrate the features of the stream classes in C++and enable them to write programs for processing data file involving both sequential as well as random access.

COURSE OUTCOME
After completing this course students should be able to:
1. Write C++ programs using function overloading, reference variables, and basic console I/O.
2. Write programs in C++ following the object oriented paradigm i.e. using classes and objects.
3. Write C++ programs with classes including constructors and destructors, and overloading of constructors.
4. Write C++ programs demonstrating the feature of inheritance and its types, abstract class, virtual functions and polymorphism.
5. Write programs using the C++ stream classes for processing data file involving both sequential as well as random access.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 4002 C++ LAB

LIST OF EXPERIMENTS

1. Examples on Function Overloading, Reference Variables, Basic Console I/O
2. Examples on Dynamic Memory Allocation
3. Examples on Classes and Objects
4. Examples on Constructors and Destructors
5. Programs with more than one object
6. Programs with array of objects
7. Examples on Operator Overloading
8. Programs with more than one class
9. Examples on Single Inheritance
10. Examples on Hierarchical and Multi-level Inheritance
11. Examples on Multiple-level Inheritance
12. Examples on Polymorphism
13. Examples on Data File Processing

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 4010 LINUX LAB.

LIST OF EXPERIMENTS

1. General Linux Commands

2. Files and Directory Management Commands

3. Text Search and Regular Expressions

4. Filters and Redirection

5. User-to-User Communication

6. System Administration Commands

7. Shell Scripts:

      i)   Variables and values

      ii)   Conditional statements

      iii)   Iterative statements

      iv)   Command-line arguments

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DHU 4002
Course Title: PROFESSIONAL PRACTICES-III

Credits:	L	T	P	C
	0	0	2	1

Class schedule per week: lectures

COURSE OBJECTIVES

1. Enable students to acquire information from various sources, including manufacturers, catalogs, internet, magazines, and books, to gather relevant data for their professional practices.
2. Develop students' skills in preparing comprehensive notes on given topics, enhancing their ability to organize and synthesize information effectively.
3. Enhance students' presentation and communication skills by requiring them to deliver a seminar on a topic related to the subjects of the fourth semester, fostering their ability to present technical information confidently.
4. Promote interaction among peers to facilitate the sharing of thoughts, experiences, and knowledge, creating a collaborative and conducive learning environment.
5. Familiarize students with the principles of reliability factors of equipment, maintenance management, and troubleshooting procedures, enabling them to adopt appropriate troubleshooting techniques for repair and maintenance tasks.

COURSE OUTCOMES

1. Demonstrate the ability to gather relevant information from diverse sources, ensuring the acquisition of accurate and up-to-date data for professional practices.
2. Prepare well-structured and organized notes on given topics, showcasing their proficiency in summarizing and presenting information effectively.
3. Successfully deliver a seminar on a subject related to the fourth semester, displaying confident presentation skills and effective communication to convey technical concepts.
4. Actively engage in peer interactions and knowledge-sharing, fostering teamwork, and collaborative learning experiences.
5. Apply the principles of reliability factors, maintenance management, and troubleshooting procedures to detect faults and adopt appropriate troubleshooting methods for repair and maintenance tasks in real-world scenarios.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS 4004
Course Title: ORACLE LAB

Credits:	L	T	P	C
	0	1	2	2

Class schedule per week: lectures

COURSE OBJECTIVES
1. To familiarize students with the essential concepts of Oracle Database Management, including creating and managing tables, manipulating data, and writing basic SQL SELECT statements to retrieve and modify data.
2. To develop students' understanding of advanced SQL concepts, such as single-row functions, displaying data from multiple tables using joins, aggregating data using group functions, and controlling user access through database transactions.
3. To introduce students to the concept of subqueries, constraints, creating views, working with sequences, and implementing indexes for efficient data retrieval and manipulation in Oracle.
4. To equip students with the skills to analyze given systems, prepare Entity-Relationship (ER) models, and convert them into relational schemas to design efficient database structures.
5. To introduce students to the fundamentals of PL/SQL programming, including cursors, exception handling, triggers, and the implementation of procedures, functions, and packages for efficient database operations.

COURSE OUTCOMES
1. Demonstrate proficiency in creating and managing Oracle tables, writing basic SQL SELECT statements, and using data manipulation techniques to retrieve and modify data effectively.
2. Apply advanced SQL concepts such as single-row functions, joins, and group functions to display and aggregate data from multiple tables, while also gaining expertise in controlling user access through transactions.
3. Implement subqueries, constraints, views, sequences, and indexes to optimize data storage and retrieval in Oracle databases and efficiently analyze and design relational schemas from given systems.
4. Develop practical skills in PL/SQL programming, including working with cursors, handling exceptions, implementing triggers, procedures, functions, and packages to enhance database performance and functionality.
5. Gain hands-on experience in interfacing Oracle databases with VB.NET applications and successfully implement real-world projects that utilize the acquired Oracle database management skills.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 4004 ORACLE LAB.

LIST OF EXPERIMENTS

1. Creating and Managing Tables, Manipulating Data, Writing Basic SQL SELECT Statements, Restricting and Sorting Data

2. Single-Row Functions, Displaying Data from Multiple Tables, Aggregating Data Using Group Functions. Database Transaction, Controlling User Access.

3. Sub queries, Including Constraints, Creating Views, Joins, Sequences, Indexes.

4. Analyzing given system and preparing E R model and converting it to relational schema.

5. PL/SQL BASICS

6. Cursors

7. Exception handling

8. Triggers

9. Procedures, Functions, Packages

10. Interfacing DB with VB.NET

11. Implementation

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS 4006
Course Title: DATA STRUCTURES LAB

Credits:

L	T	P	C
0	1	2	2

Class schedule per week: lectures

COURSE OBJECTIVES

1. To reinforce the understanding of array data structures and their operations through revision exercises, enabling students to efficiently handle and manipulate data in array-based structures.
2. To strengthen students' knowledge of functions and recursion, allowing them to implement recursive algorithms effectively and apply them to various data structure operations.
3. To enhance students' proficiency in working with pointers, enabling them to effectively manage memory, implement pointer-based data structures, and perform pointer arithmetic.
4. To introduce students to contiguous lists and develop their skills in implementing operations on contiguous lists, including insertion, deletion, and traversal, for effective data management.
5. To familiarize students with essential data structures like stacks, queues, and linked-lists, and provide them with hands-on experience in implementing these structures and their applications.

COURSE OUTCOMES

1. Demonstrate a comprehensive understanding of array data structures and their operations, successfully applying revision exercises to handle data effectively in array-based implementations.
2. Develop proficiency in writing functions and recursive algorithms, effectively applying them to various data structure operations, and analyzing their performance.
3. Gain practical expertise in working with pointers, efficiently managing memory, and implementing pointer-based data structures and algorithms for optimized data handling.
4. Successfully implement contiguous lists and perform operations such as insertion, deletion, and traversal, demonstrating a clear understanding of their functionalities and applications.
5. Acquire hands-on experience in working with essential data structures like stacks, queues, and linked-lists, demonstrating proficiency in implementing these structures and their applications, including Binary Search Tree (BST) creation and traversal.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 4006 DATA STRUCTURES LAB

LIST OF EXPERIMENTS

Lab1: Revision exercises on arrays

Lab2: Revision exercises on functions and recursion

Lab3: Revision exercises on pointers

Lab4: Exercises on contiguous list

Lab5: Exercises on sorting and searching

Lab6: Exercises on stacks

Lab7: Exercises on applications of stacks

Lab8: Exercises on Queue

Lab9: Exercises on circular queue

Lab10: Exercises on linked-list

Lab11: Exercises on linked-list

Lab12: Demo on BST creation and traversal

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS4008
Course Title: .NET LAB

Credits:

L	T	P	C
0	0	2	1

Class schedule per week: lectures

COURSE OBJECTIVES

1. To develop students' proficiency in creating simple web applications using various web controls, enabling them to perform basic operations such as finding factorial values, money conversion, solving quadratic equations, and implementing login controls.
2. To familiarize students with the states of ASP.NET pages, allowing them to understand and manage the page states effectively in web applications.
3. To provide hands-on experience with essential ASP.NET controls such as Adrotator, Calendar, and Tree view, enabling students to use these controls to display messages, manage vacation schedules, and perform various operations on tree view controls.
4. To introduce students to validation controls and query textbox, allowing them to validate user inputs and display records efficiently in web applications.
5. To familiarize students with data binding techniques using various ASP.NET controls like Drop Down List, Data List, and Data Grid, enabling them to interact with databases, insert, delete, and display records, and implement paging and customized table formats using Data Grid.

COURSE OUTCOMES

1. Demonstrate the ability to create web applications using different web controls and effectively perform operations like finding factorial values, money conversion, solving quadratic equations, and implementing login controls.
2. Understand the concept of ASP.NET page states and effectively manage the states in web applications, ensuring smooth functionality and user experience.
3. Acquire proficiency in using essential ASP.NET controls like Adrotator, Calendar, and Tree view to display messages, manage vacation schedules, and perform various tree view operations in web applications.
4. Successfully implement validation controls and query textbox to validate user inputs and display records efficiently in web applications, ensuring data accuracy and integrity.
5. Gain hands-on experience in data binding techniques using Drop Down List, Data List, and Data Grid controls, allowing students to interact with databases, perform data manipulation operations, and implement paging and customized table formats in web applications.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 4008 .NET LAB.

LIST OF EXPERIMENTS

1. Create simple application using web controls
   a) Finding factorial Value
   b) Money Conversion
   c) Quadratic Equation
   d) Temperature Conversion
   e) Login control
2. States of ASP.NET Pages
3. Adrotator Control
4. Calendar control
   a) Display messages in a calendar control
   b) Display vacation in a calendar control
   c) Selected day in a calendar control using style
   d) Difference between two calendar dates
5. Treeview control
a) Treeview control and datalist
b) Treeview operations
6. Validation controls
7. Query textbox and Displaying records
8. Display records by using database
9. Datalist link control
10. Databinding using dropdownlist control
11. Inserting record into a database
12. Deleting record into a database
13. Databinding using datalist control
14. Datalist control templates
15. Databinding using datagrid
16. Datagrid control template
17. Datagrid hyperlink
18. Datagrid button column
19. Datalist event
20. Datagrid paging
21. Creating own table format using datagrid

Program: Diploma in Computer Engineering

Semester: Fourth

Course Code: DCS 4010
Course Title: LINUX LAB

Credits:	L	T	P	C
	0	0	2	1

Class schedule per week: lectures

COURSE OBJECTIVES
1. To familiarize students with the essential general Linux commands, enabling them to navigate the Linux environment, manage files and directories, and perform basic system tasks efficiently.
2. To develop students' proficiency in using text search and regular expressions in Linux, allowing them to search for specific patterns and manipulate text effectively.
3. To introduce students to filters and redirection in Linux, enabling them to process and manipulate data streams, redirect input and output, and effectively manage command outputs.
4. To equip students with the skills to perform user-to-user communication in Linux, facilitating effective collaboration and sharing of information in a Linux-based environment.
5. To introduce students to system administration commands in Linux, allowing them to perform essential administrative tasks and manage Linux-based systems effectively.

COURSE OUTCOMES
1. Demonstrate proficiency in using general Linux commands to navigate the Linux environment, manage files and directories, and execute basic system tasks efficiently.
2. Apply text search and regular expressions in Linux to search for specific patterns, manipulate text data, and extract relevant information from files effectively.
3. Implement filters and redirection in Linux to process data streams, redirect input and output, and efficiently manage command outputs for various data manipulation tasks.
4. Successfully perform user-to-user communication in Linux, enabling effective collaboration and information sharing among users in a Linux-based environment.
5. Gain practical experience in using system administration commands in Linux to perform essential administrative tasks, manage Linux-based systems, and ensure the smooth functioning of Linux environments.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DHU 4002 PROFESSIONAL PRACTICES-III

Module-I:
Field Visits: Structured field visits(minimum three) be arranged and report of the same should be submitted by the individual student, to form a part of the term work.

Module-II:

Lectures by Professional/Industrial Expert:(any four fields)
Disaster management, Industrial Safety, any other suitable topic.

Module-III:

Information Search: Information search can be done through manufacturers, catalogue, internet, magazines; books etc. and submit a report.

Module-IV:

Seminar: Seminar topic should be related to the subjects of fourth semester. Each student shall submit a report of at least 10 pages and deliver a seminar (Presentation time–10 minutes)

Module-V:

Troubleshooting : Reliability Factors of equipment, Maintenance Management, Troubleshooting Procedures, Troubleshooting Aids.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

Course Structure
Diploma in Computer Engineering
Fifth Semester

Subject Code	Subject	Theory	Tutorial	Lab.	Credit
DCS 5001	Introduction to Java Programming	3	1	0	4
DCS 5003	Data Communication and Networking	3	1	0	4
DCS 5005	Computer System Architecture	3	1	0	4
DCS 5007	Multimedia and Animation	3	0	0	3
DCS 5009	Software Engineering	3	0	0	3
DCS 5002	Java Programming Lab. – I	0	0	2	1
DCS 5004	Computer Networking Lab.	0	0	2	1
DCS 5008	Multimedia Lab.	0	0	2	1
DCS 5010	Visual Basic Lab.	0	0	4	2
DCS 5012	Project-I	0	0	6	3
	Periods per week	15	3	16	-
	Total credits	-	-	-	26
	Total Periods per week	-	-	-	34

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5001

Course title: INTRODUCTION TO JAVA PROGRAMMING

Credits:

Lectures	Tutorials	Practicals	Credits
3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVES:

1. To review the concepts of OOP with Java programming language and other features of Java making studentes understand the suitability of Java for Internet programming.

2. To introduce students to the Java programming language features like program structure, data-types, constructs, mathematical and array operations.

3. To enable students to work with classes and objects, and explore the Java class hierarchy and inbuilt Java classes for type conversion, user I/O, and to use the feature of inheritance.

4. To provide students with the knowledge to design and implement interfaces, and to organize code through packages.

5. Enabling students to understand Java applets and write applet programs, identify and handle exceptions and also create exceptions of their own.

COURSE OBJECTIVES:

After completing this program students should be able to:

1. Learn to implement OOP concepts using Java programming language, and learn about other features of Java and understand the suitability of Java for Internet programming.

2. Write programs in Java with an understanding of the program structure, data-types, constructs, mathematical and array operations.

3. Work with classes and objects, and use the Java class hierarchy and inbuilt Java classes in their programs for performing type conversion, user I/O, and also use the feature of inheritance.

4. Design and implement interfaces, and organize code through packages.

5. Develop an understanding of Java applets and write applet programs, and learn to identify and handle exceptions and also create exceptions of their own.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5001 INTRODUCTION TO JAVA PROGRAMMING

Module-I:
Introduction

Review of object oriented programming; Features of JAVA; JAVA for Internet programming, Difference between JAVA and C++; Introduction to JAVA Development Kit and JAVA API (inbuilt packages).

Module-II:
Programming in JAVA

Structure of a JAVA program; Writing, compiling and executing a JAVA program; Byte-code; JAVA Virtual Machine; Data types, variables and constants; Operators and expressions; Typecasting; Mathematical operations using the Math class; Programming constructs; Array processing; Command-line arguments.

Module-III:
Classes and Objects

The Math class; static members; The String class; Wrapper classes; The System class; Keyboard input and output; Defining a class; Method overloading Inheritance; Method overriding; final methods; final class. abstract methods and classes; Visibility control.

Module-IV:
Interfaces and Packages

Defining and implementing interface; Extending interface; Multiple inheritance using interface; Using system packages; Creating and accessing packages; Adding a class to a package.

Module-V:
Multi-threading and Exception Handling

Creating a thread; Thread priority; Managing threads; Life cycle of a thread. Inbuilt exceptions; Handling an exception; Handling multiple exceptions within a block; User-defined exceptions.

Text Book

1. Programming in JAVA by E. Balagursamy by TMH publications.

Reference Book

1. JAVA 2 Complete BPB publications.
2. Programming in JAVA 2 by QUE (Prentice Hall) publications.
3. MCSE networking guide by BPB publications.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5003

Course title: Data Communication and Networking

Credits:

Lectures	Tutorials	Practicals	Credits
3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVES:

1. To provide students with a strong foundation in network topologies, devices and addressing.

2. To develop an understanding of data transmission modes, transmission media and transmission impairments.

3. To develop an understanding of digital and analog data transmission, decoding digital signals, and configuring transmission line setups along with interfacing techniques.

4. To familiarize students with data link control protocols and the concept of multiplexing with applications in network communication.

5. To introduce students to the OSI and TCP/IP protocol suites and provide an overview of protocols working at various layers.

COURSE OUTCOMES:

After completing this course students should be able to:

1. Develop a strong foundation in network topologies, devices and addressing.

2. Develop an understanding of data transmission modes, transmission media and transmission impairments.

3. Develop an understanding of digital and analog data transmission, decoding digital signals, and transmission line setup and configuration along with interfacing techniques.

4. Develop an understanding of data link control protocols and the concept of multiplexing along with its applications in network communication.

5. Gain idea about the OSI and TCP/IP protocol suites and the protocols working at various layers.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5003 DATA COMMUNICATION AND NETWORKING

Module-I:
Network Fundamentals

Network Topology; Network devices: Ethernet card, Hub, Switch, Bridge, Router, Gateway; Addressing: Physical address, Logical address, Classes of IP address, Subnet Mask; Terminology: unicasting, multicasting, broadcasting, broadband, point-to-point, multipoint.

Module II:
Data transmission and Transmission Media

Transmission modes: Simplex, Half duplex, full duplex. Analog and Digital data transmission, transmission impairments, guided transmission media- Coaxial cable, UTP, STP, OFC; wireless transmission- Infrared, Radio waves, Microwaves.

Module III:
Data Encoding and Communication Interface

Digital data-digital signals, Digital data-analog signals, analog data-digital signals, analog data-analog signals, asynchronous and synchronous transmission line configurations, interfacing.

Module IV:
Data Link Control and Multiplexing

Simple, Stop and wait, Stop and Wait ARQ, GO-Back-N ARQ, Selective repeat, high level data link control; Multiplexing: FDM, TDM, TDM; Switching: Circuit-switched networks, Virtual-circuit networks, Datagram networks, Structure of a switch.

Module V:
Protocols and Architecture

Protocols, OSI, TCP/IP protocol suite. Overview of protocols used at various layers- TELNET, HTTP, SMTP, FTP, POP, DNS, ICMP, IGMP, IPv4, IPv6, ARP, RARP, OSPF, RIP, TCP, UDP, SCTP, DHCP.

Text Book
1. B.A. Forouzan, "Data Communication and Networking". 4e, TMH

Reference Books
1. Stallings. W., "Data and ComputerCommunication", 6e, PHI.
2. Andrew S. Tanenbaum, "Computer Networks", 4e, PHI

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5005

Course title: Computer System Architecture

Credits:

Lectures	Tutorials	Practicals	Credits
3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVES:

1. To develop an understanding of digital components like registers, shift-register and counters along with their operations.

2. To develop an understanding of stored program organization of computer, types of computer registers and their purpose, the common bus systems, and instruction execution cycle, and also how the central processing unit (CPU) works under different types of organizations of its registers and instruction formats.

3. To develop an understanding of input-output (I/O) organization, program interrupts and I/O interfaces, and different methods of data transfer.

4. To explore various types of memory technologies in the hierarchy of computer memory and their use in a computer system.

5. To understand schemetic diagrams of 8085 and 8086 microprocessors along with addressing modes and interrupt handling mechanisms used in them.

COURSE OUTCOMES:

After completing this course students should be able to:

1. Understand the design, operation and use of the digital components used in a computer like registers, shift-register and counters.

2. Understand the essence of the stored program organization of computer, and the types of computer registers and their purpose, the common bus systems, and instruction execution cycle, and also how the central processing unit (CPU) works under different types of organizations of its registers and instruction formats.

3. Understand the organization of input-output (I/O), the mechanism of handling interrupts and working of I/O interfaces along with different methods of data transfer.

4. Understand various types of memory technologies in the hierarchy of computer memory and their use in a computer system.

5. Understand the schematic diagrams of 8085 and 8086 microprocessors along with addressing modes and interrupt handling mechanisms used in them.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5005 COMPUTER SYSTEM ARCHITECTURE

Module-I:
Digital components: Registers; Register with Parallel load; Shift Registers; Bidirectional shift register with Parallel load. Counter: Asynchronous counter and Synchronous, Ring Counter, Up-Down counter.

Module-II:
Basic Computer Organization: Stored program organization; Computer registers; common Bus System; Computer Instruction; Instruction Cycle.
Central Processing Unit: General Register Organization; Stack Organization; Instruction Formats.

Module III:
Input Output Organization: Input output configuration; Program Interrupt, Input output interface; Handshaking; Asynchronous serial transfer. I/O Processor, DMA data transfer.

Module IV:
Memory Technology: Static and dynamic memory, Random Access and Serial Access Memories, Memory Hierarchy, Cache memory, Cache memory Mapping: Associative, Set Associative, Direct Mapping, Cache updation schemes, Virtual memory and memory management unit.

Module V:
Microprocessor: Introduction, Address bus, control bus, data bus, pin details of 8085.
8086 Microprocessor - Minimum mode and Maximum mode, Flag registers, Types of interrupts.

Text Books

1. M.Morris Mano,"Computer System Architecture",3e, Pearson Education

2. Douglas V Hall, "Microprocessor and Interfacing", 2nd edition, TMH

Reference Books

1. Thomas L. Floyd, "Digital Fundamentals", 8th edition, Pearson Education

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5007

Course title: Multimedia and Animation

Credits:

Lectures	Tutorials	Practicals	Credits
3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVES

1. To develop in students an understanding of the concept of multimedia, its various classifications, and the necessity of using multimedia in different domains and explore the architecture of multimedia systems and evolving technologies in this field.
2. To familiarize students with the usage of text (in different fonts faces and styles) in multimedia projects and understand bitmap fonts, as well as international character sets and their integration with hypertext.
3. To understand digitization of sound, audio file formats, sound synthesis and audio compression techniques and learn to add sound to multimedia projects.
4. To understand the fundamentals of color generation, image compression, and popular image file formats and gain hands-on experience in basic image processing using Photoshop.
5. To explore the basics of video technology, understand video compression standards and techniquesand and gain hands-on experience in video editing and creating animations.

COURSE OUTCOMES

After completing this course students should be able to:

1. Understand of the concept of multimedia, its various classifications, the architecture of multimedia systems and evolving technologies in this field.
2. Use text (in different fonts faces and styles) in multimedia projects and develop an understanding of bitmap fonts, as well as international character sets and their integration with hypertext.
3. Develop an understanding about digitization of sound, audio file formats, sound synthesis and audio compression techniques and be able to add sound to multimedia projects.
4. Develop an understanding of the fundamentals of color generation, image compression, and popular image file formats and gain hands-on experience in basic image processing using Photoshop.
5. Understand the basics of video technology, understand video compression standards and techniques and gain hands-on experience in video editing and creating animations.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DSC 5007 MULTIMEDIA & ANIMATION

Module-I: Introduction to Multimedia
What is multimedia, Classification of multimedia, Need of Multimedia, Multimedia System Architecture, Evolving Technologies for Multimedia System, Applications of Multimedia.

Module-II: Computer Fonts and Hypertext
Usage of text in Multimedia, Families and faces of fonts, outline fonts, bitmap fonts International character sets and hypertext, Digital fonts techniques.

Module-III: Audio fundamentals and representations
Digitization of sound, frequency and bandwidth, decibel system, data rate, audio file format, Sound synthesis, MIDI, wavetable, Compression and transmission of audio on Internet, Adding sound to your multimedia project, Audio software and hardware.

Module-IV: Image fundamentals and representations
Colour Science , Colour Models, Colour palettes, Dithering, 2D Graphics, Image Compression and File Formats :GIF, JPEG, JPEG 2000, PNG, TIFF, EXIF, PS, PDF, Basic Image Processing using Photoshop , Use of image editing software, White balance correction, Dynamic range correction, Gamma correction, Photo Retouching.

Module-V: Video and Animation
Video Basics , How Video Works, Broadcast Video Standards, Analog video, Digital video, Video Recording and Tape formats, Shooting and Editing Video (Use Adobe Premier for editing), Video Compression and File Formats. Video compression based on motion compensation, MPEG-1, MPEG-2, MPEG-4, MPEG-7, MPEG-21.
Animation: Cell Animation, Computer Animation, Morphing.

Text Book
1. Parekh Ranjan, "Principles of Multimedia", Tata McGraw-Hill, 2007
2. Anirban Mukhopadhyay and Arup Chattopadhyay, "Introduction to Computer Graphics and Multimedia", Second Edition, Vikas Publishing House.

Reference Books
1. Tay Vaughan, "Multimedia making it work", Tata McGraw-Hill, 2008.
2. R. Aggarwal & B. B Tiwari, " Multimedia Systems", Excel Pub., New Delhi,2007.
3. Li & Drew, " Fundamentals of Multimedia" , Pearson Education, 2009

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5009

Course title: Software Engineering

Credits:

Lectures	Tutorials	Practicals	Credits
3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVES

1. To enable students to understand the necessicity for studying software engineering and phases in various software process models and to provide them an overview of software project management.

2. To enable students to understand the process of software project planning and cost estimation and also the principles of structured analysis and use of various structured analysis tools.

3. To provide them an insight into various software design methodologies and an idea of various considerations in creating effective user interfaces.

4. To provide them an insight into Software Testing strategies and Quality Assurance.

5. To provide them an insight into software reliability matrices and quality parameters and provide them the knowledge of different types of software maintenance.

COURSE OUTCOMES

After completing this course students should be able to:

1. Understand the necessicity for studying software engineering and phases in various software process models and get an idea of software project management.

2. Understand the process of software project planning and cost estimation and also understand the principles of structured analysis and use various structured analysis tools.

3. Understand various software design methodologies and an idea of various considerations in creating effective user interfaces.

4. Understand and use various software testing strategies and develop an understanding of Quality Assurance.

5. Understand various software reliability metrics and quality parameters and understand the purpose of different types of software maintenance.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5009 SOFTWARE ENGINEERING

Module-I:
Software
Characteristics, Components, Applications, Software process model: Waterfall, Spiral, Protyping, Fourth generation techniques, Concepts of project management, Role of metrics and measurement.

Module-II:
S/W Project Planning
Decomposition techniques: S/W sizing, Problem based estimation, Process based estimation, Cost estimation models:COCOMO Model, The S/W Equation, System Analysis:
Principles of structured analysis requirement analysis, DFD, Entity Relationship Diagram, Data Dictionary.

Module-III:
S/W Design
Principles, Concepts, Design Mythologies: Data Design, Architecture Design, Procedural Design, Object Oriented Concept, User Interface Design: Characteristic of good eser interface, GUI, CUI.

Module-IV:
S/W Testing
Principles, Testability, Test Cases: White Box And Black Box Testing, Testing Strategies: Verification & Validation, Unit Test, Integration Testing, Validation Testing, System Testing.

Module-V:
Quality Management And Maintenance
S/W Reliability matrices, S/W Quality Parameter, Basic Idea of CASE, Maintenance and its type, S/W Evaluation.

Text Book

Rajiv Mall, " Software Engineering", Tata McGraw Hill

Reference Books

Bharat Bhushan Agarwal, Sumit Prakash Tayal, "Software Engineering", Firewall Media.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5002

Course title: Java Programming Lab- I

Credits:

Lectures	Tutorials	Practical	Credits
0	1	2	2

Class schedule per week: 03 lectures

COURSE OBJECTIVES:

1. To enable students to write programs in Java using the basics data types, variables, operators, and expressions and, compile and execute them thus identifying the role of the JVM.

2. To provide students hands-on with the Java control statements enabling them to implement the desired logic for processing numbers, strings and arrays.

3. To provide students hands-on with the object-oriented programming in Java- classes and objects, constructors, overloading, and static members.

4. To provide students hands-on with inheritance and interfaces and enable them to develop an understanding of the Java class hierarchy, and use concepts like abstract classes and method overriding.

5. To provide students hands-on with Input and Output handling in Java and other advance features like Threads, Exceptions and Applets.

COURSE OUTCOMES:

After completing this course students should be able to:

1. Write programs in Java using the basics data types, variables, operators, and expressions and, compile and execute them, and understand the role of the JVM.

2. Use control statements and be able to implement the desired logic for processing numbers, strings and arrays.

3. Write programs in object-oriented style using classes and objects, constructors, overlading, and static members.

4. Write programs to involving use of inheritance and implementation of interfaces, develop an understanding of the Java class hierarchy, and also use concepts like abstract classes and method overriding.

5. Write programs involving Input and Output handling in Java and other advance features like Threads, Exceptions and Applets.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5002 JAVA PROGRAMMING LAB.-I

LIST OF EXPERIMENTS

1. To write a Java application program which clarify the following points:

- How to compile and run
- How to set path and class path,Single and Multi-line comments, and,Command line arguments.

Data Types, Variables Operators & Arrays:

1. To write a Java program which defines and initialized different data types: byte, short, int, long, float & double.

2. Problems related to Character and Boolean data type.

3. Problems related to one and two dimensional array.

4. Problems related to Arithmetic, bit wise and relational operators.

Control Statements & Looping Structure:

1. Problems related to: IF-ELSE, IF-ELSE-IF, SWITCH statements.

2. Problems related to the following looping statements — WHILE, DO-WHILE &FOR.

3. Problems related to nested looping and jump statements (BREAK, CONTINUE & RETURN)
Classes, Objects & Methods:

1. To write a Java program to clarify the following points: (a) how to declare a class, (b) how to create an object, (c) how methods are defining in a class, (d) access variables and methods.

2.To construct a Java program which defines: (a) how arguments values are passed to a method, (b) use of new operator, constructor and finalize method, (c) passing objects to a method, (d) declaration of static keyword.

3. To practice problems related to: (a) Method overloading, (b) Multiple constructor, (c)Calling constructor from a constructor.

Exception Handling:

1. To write a Java program which is constructed using TRY, CATCH and FINALLY blocks .

Inheritance & Extending Classes (Interface):

1.To write Java programs which clarify the following: (a) super class, (b) sub- class/derive class, (c) understanding abstract and final class, (d) polymorphism.

2. To practice problems related to:

 (a) Multiple Inheritance, (b) Interface, (c) Extending Interfaces, (d) Thread & Multi-Thread.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5004

Course title: COMPUTER NETWORKING LAB

Credits:

Lectures	Tutorials	Practical	Credits
0	1	2	2

Class schedule per week: 03 lectures

COURSE OBJECTIVES

1. Course Objectives for DCS 5004 Computer Networking Lab:

2. To enable them to understand the functionality of various network devices and configure IP address for a small network.

3. To enable them to make the required settings for file and device sharing within a network and access shared resources.

4. To teach them how to configure and manage network security settings and how to implement security policies.

5. To teach them how to install server operating system and to enable them to set up a client-server network.

6. To teach them how to configure and manage terminal client services, and manage user accounts.

COURSE OUTCOMES

After completing this course students should be able to:

1. Understand the functionality of various network devices and configure IP address for a small network.

2. Make the required settings for file and device sharing within a network and enable accessing of shared resources.

3. Configure and manage network security settings and implement security policies.

4. Install server operating system and set up a client-server network.

5. configure and manage terminal client services, and create as well as manage user accounts.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5004 COMPUTER NETWORKING LAB.

LIST OF EXPERIMENTS

1. Identification of various network components/devices e.g. Connectors, Hub, Switch, Modem
2. Preparation of cross and parallel cable.
3. Setting IP address.
4. Using command line diagnostics: ipconfig and ping.
5. Setting-up of small home/office network:
    a. Connecting PCs in a network.
    b. Configuring PCs in a network.
    c. Creating workgroup.
6. File and print sharing
    a. Setting-up file sharing options (read/write/full control).
    b. Setting-up print sharing options.
    c. Installation of network printer.
7. Configuring and managing computer security
    a. Account lockout
    b. Password policy
    c. Audit policy
    d. User Rights Assignment
    e. Security Options
8. Setting-up of Remote desktop services
9. Net meeting:
    a. Installation of Net meeting
    b. Sharing of files on Net meeting
    c. Desktop sharing
    d. Shared white board
10. Setting-up remote assistance.
11. Installation of server Operating system.
12. Installation of Active directory.
13. Configuring access permissions.
14. Installation & configuration of TCS(Terminal Client Services)
15. Managing user accounts
    a. Creating user accounts
    b. Making a user account member of Administrative group.
    c. Assigning permissions

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5008

Course title: MULTIMEDIA AND ANIMATION LAB

Credits:

Lectures	Tutorials	Practical	Credits
0	1	2	2

Class schedule per week: 03 lectures

COURSE OBJECTIVES:

1. To introduce students to multimedia tools and software in Adobe Photoshop and Adobe Image Ready and to enable them to understand the basics of multimedia content creation and manipulation.

2. To teach students basic tools, color theory, and image size and resolution manipulation using Adobe Photoshop.

3. To familiarize students with selection and masking techniques in Adobe Photoshop, enabling them to edit specific parts of the images effectively.

4. To teach students working with layers and understanding blend modes for creative image composition.

5. To provide students an introduction to creating simple animations using Adobe Image Ready.

COURSE OUTCOMES:

After completing this course, students should be able to:

1. Understand the multimedia tools in Adobe Photoshop and Adobe Image Ready, and also, create and manipulate simple multimedia content.

2. Understand basic tools and color theory, and image size and resolution manipulation using Adobe Photoshop.

3. Familiarize themselves with selection and masking techniques in Adobe Photoshop, and edit specific parts of the images effectively.

4. Work with layers and use blend modes for creative image composition.

5. Create simple animations using Adobe Image Ready.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5008 MULTIMEDIA AND ANIMATION LAB.

LIST OF EXPERIMENTS

Basics
Overview of the Adobe Photoshop. Image modes. Image size and resolution. Image color concepts.

Basic tools and color
Overview of the Photoshop toolset. Brushes and brush types. Choosing colors by eye. Numerical color. Pantone color. Canvas color. Review and assignment.

Selections and masks
Marquee selection tools. Lasso & Wand selection tools. Selection tool. Select menu commands. Transforming selections. Quick mask mode. Alpha channels and channel palette. Mask/selection practice exercise.

Layers and blend modes
Intro to layers. Move, copy and transform layers. Advanced layer features. Applying layer effects. Layers review. Review and assignment.

Painting tools
Intro, paint bucket and fill command. Gradient, pattern and line tools. Brushes and fade command. Pencil, Paintbrush and Airbrush tools. Eraser tools.

Retouching tools
Retouching tools intro and tips. Blur, sharpen, and smudge. Dodge, burn, sponge. Clone stamp, history brush, art history brush. Practice exercises. Review and assignment.

Adobe image ready
Introduction to Image Ready. Opening and importing files. Image Reader workspace. Toolbox. Animation.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Fifth

Course code: DCS5010

Course title: Visual Basic Lab

Credits:

Lectures	Tutorials	Practical	Credits
0	1	2	2

Class schedule per week: 03 lectures

COURSE OBJECTIVE:

1. To introduce students to the concept of event-driven programming and the elements of Visual Basic programming environment.

2. To introduce them to user interface designing using Visual Basic controls.

3. To enable them use the built-in functions for processing numeric data and strings.

4. To enable them to use control statements to implement the desired programming logic.

5. To give them the knowledge about connecting their application to a database and storing data, and access the same for retrieving information and/or processing it.

COURSE OUTCOME:

After completing this course students should be able to:

1. Understand the concept of event-driven programming and use the elements of Visual Basic programming environment to develop simple applications.

2. Design user interface using various Visual Basic controls and program them to develop a complete application.

3. Use the built-in functions to process numeric data or strings for a given purpose.

4. Use control statements to implement the desired programming logic.

5. Connect their applications to a database for storing data, and access the same for retrieving information and/or processing it.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5010 VISUAL BASIC LAB

LIST OF EXPERIMENTS

1. **Visual basic building blocks:**
   - Object, properties, events, forms, controls, modules, methods, input box and message box.
   - Form: Creating adding and removing forms in project: Add, remove, hide, show, load statement, unload statement, me keyword, Referring to objects on a different forms.
   - Data types, Variable, constant
2. **Working with Controls:**
   - Text box, label, command button, frame, list box, check box, radio button, file list box, drive list box, directory list box, timer, scroll bar control, picture box, image box, Menu editor.
3. **Inbuilt functions:**
   Mathematical function: Rnd, Sqr, Int, Abs, Exp, Log, Sin, Cos, Tan , Atn, Fix and Round.
   Format function and String: Tab, Space, and Format, String comparison: equals, compareto.
4. **Control statements:**
   if ....then, if..........then......else, if..........then......elseif...end if
   Looping: for....next, while...wend, do....while, do....until.
   Compound conditions: and, or, not; select case
5. **Database connecting tools:**
   ADODC, ADODB, Creating the database files for use by visual basic(using MS-Access), Data control and their properties, Adding a New Record, searching record, Updating a record, Deleting a record, Data grid.
   Report generation: Data environment, creating query, preparing a report.
6. Mini Project

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

SYLLABUS

SEMESTER-VI

Diploma in Computer Engineering

(wef 2018 batch)

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

Course Structure
Diploma in Computer Engineering

Sixth Semester

Subject Code	Subject	Theory	Tutorial	Lab.	Credit
DMT 6001	Total Quality Management	3	0	0	3
DCS 6001	Advance Java Programming	3	1	0	4
DCS 6003	Computer Hardware	3	1	0	4
DCS 6005	Cyber Security	3	0	0	3
	Elective	3	0	0	3
DCS 6002	Java Programming Lab. – II	0	0	2	1
DCS 6004	Computer Hardware Lab.	0	0	2	1
DCS 6008	Software Testing Lab.	0	1	3	2
DCS 6010	Project-II	0	0	6	3
List of Elective(Any one)					
DCS 6011	Computer Graphics	3	0	0	3
DCS 6013	Image Processing	3	0	0	3
DCS 6015	Network Administration and Management	3	0	0	3
DCS 6017	Internet of Things	3	0	0	3
DCS 6019	Android Based Application Development	3	0	0	3
DCS 6023	Mobile Computing	3	0	0	3
	Periods per week	15	3	13	-
	Total credits	-	-	-	24
	Total Periods per week	-	-	-	31

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DMT 6001 TOTAL QUALITY MANAGEMENT

Module-I: Introduction
Management Concept, Function or Process, Characteristics of Management,
Total Quality Management Concept, Objective, Scope, Principles of TQM, Evolution of TQM,
Difference of Quality Vs Total Quality Management.

Module-II: Components of Total quality Management
Customer Supplier Relationship in TQM System, Managerial Role in TQM, Value, vision,
mission and goals in TQM.
Practices for TQM: TQM and Human Resource Development, Need and Significance of
TQM, Process of TQM.

Module-III: Quality Management Systems: Need for ISO 9000 and Other Quality Systems,
ISO 9000:2000 Quality System – Elements, Implementation of Quality system Documentation,
ISO 14000 – Concept, Requirements and Benefits.

Module-IV: Benchmarking
Introduction, Reasons to Benchmark, Benchmarking Process, Quality Function Deployment
(QFD), Cost of Quality, QFD Process. Six- Sigma.

Module-V: Quality Circle
Purpose, Benefits, Problem in implementation of quality circles, Requirements of effective
quality Circle.

Text &Reference Books

1. Feigenbaum.A.V. "Total Quality Management, McGraw-Hill, 1991.
2. S.K.Mandal,"Total Quality Management,Pricnciples & Practice", Vikas Pub. House Pvt. Ltd.
3. Oakland.J.S. "Total Quality Management Butterworth", Hcinemann Ltd., Oxford. 1989.
4. Narayana V. and Sreenivasan, N.S.,"Quality Management – Concepts and Tasks", New
     Age International 1996.
5. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.
6. Dr. S. Kumar,"Total Quality Management", Laxmi Publications Pvt. Ltd.,2011.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Sixth
Course Code: DCS 6001
Course Title: ADVANCE JAVA PROGRAMMING

Credits:	L	T	P	C
	3	1	0	4

Class schedule per week: 3 lectures

COURSE OBJECTIVES
1. To develop in students, a comprehensive understanding of advanced concepts in Java with regard to object-oriented programming.
2. To give students an insight into network programming and communication.
3. To help students understand event handling mechanisms in Java, enabling the development of interactive graphical user interfaces (GUIs).
4. To acquaint students with the techniques of creating dynamic and interactive applets.
5. To acquaint students with the mechanism of database connectivity using JDBC and perform database operations.

COURSE OUTCOMES
After completing this course students should be able to:
1. Understanding the concepts of Object-oriented programming and Java.
2. Write programmes involving concepts of Java network programming and communication.
3. Develop interactive GUI applications in Java.
4. Create dynamic applets in Java.
5. Build Java applications with database connectivity and execute SQL queries through it.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS6001 ADVANCE JAVA PROGRAMMING

Module-I:
Review of Basic Concepts
Inheritance, Aggregation and Composition, Method Overriding, Static and Dynamic Binding, Abstract Class and Interface, Call by Value and Call by Reference.

Module-II:
Networking
Basic concepts, Socket Programming, URL Class, Displaying data of a Web Page, InetAddress class, Datagram Socket and Datagram Packet classes, Two-way Communication.

Module-III:
Event Handling
AWT Controls, Event Classes and Listener Interfaces, Adapter Classes.

Module-IV:
Applets
Applet Life-Cycle, Graphics in Applets, Displaying Image in Applets, Event-handling in Applets.

Module-V:
Database Connectivity (JDBC)
JDBC Driver, Connecting to database, Driver manager, Connection Interface, Statement Interface, Result Set Interface, Prepared Statement, Transaction Management.

Text Book
1. Kanika Lakhani, "Advance Java", S. K. Kataria & Sons

Reference Book
1. Herbert Schildt, "Java The Complete Reference", Oracle Press

Program: Diploma in Computer Engineering

Semester: Sixth
Course Code: DCS 6003
Course Title: COMPUTER HARDWARE

Credits: L   T   P   C
                3   1   0   4

Class schedule per week: 3 lectures

COURSE OBJECTIVES
1. To acquaint students with the layout and architectures of different motherboards.
2. To acquaint students with the features of different microprocessors used in these motherboards.
3. To enable students to identify the physical packaging and characteristics of various memory modules, and understand various hard disk interfaces.
4. To enable students to recognize power problems, understand EMI and ESD issues, and the working of SMPS and UPS.
5. To enable students to understand the working of the computer peripherals, and troubleshoot common PC problems and also perform preventive maintenance activities for PCs.

COURSE OUTCOMES
After completing this course students should be able to:

1. Understand the various components of a motherboard, their functionality and how to identify different form factors.

2. Identify the features of different processors and their specifications, including multi-core, hyper-threading and turbo boost technologies.

3. Identify and understand the compatibility aspects of different types of memory packaging and memory modules and understand the technical im

4. Understand the functionality of SMPS, its form factors. Understanding the working and application of various types of UPS.

5. Describe the working of dot matrix, inkjet and laser printers, and identify the steps for preventive maintenance and logical troubleshooting of computer

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6003 COMPUTER HARDWARE

Module-I:
Motherboard

Motherboard form factors; Layout of motherboard; Components of motherboard — chipset, processor socket, expansion slots, power supply connectors, ROM BIOS, CMOS, ports etc.

Module-II:
Microprocessor

Processor Specification, FSB; Evolution of Processor; Modern Microprocessor technology- 64 bit architecture, Hyper-Threading, Multi-core processor, Turbo boost, Smart cache.

Module-III:
Memory

Logical memory Configuration— Conventional memory, UMA, Extended Memory & Expanded Memory; Memory Physical Packaging; SIMM, DIMM & RIMM memory modules; Memory Banks; Types of Dynamic RAM— FPM, EDO, BEDO, SDRAM, RD RAM, DDR RAM.Magnetic Storage: Hard Drives— Hard Drive Construction and Interfaces. File System.

Module-IV:
Power Supply

Power Problems— Spike, Surge, Brownout and Blackout; EMI (Electromagnetic Interference); ESD; SMPS— SMPS form factors, connectors and voltages; UPS— Purpose of UPS, SPS and Double conversion UPS.

Module-V:
Printer, Preventive Maintenance & Troubleshooting

Printer: Working of Dot matrix printer, Inkjet printer and Laser printer; Maintenance and Troubleshooting: Preventive Maintenance — HDD, CDROM, Viruses detection and Protection; Steps of Logical Troubleshooting, common PC problems.

Text Book
1. Ron Gilster, "PC Hardware: A Beginner's Guide", TMH

Reference Books
1. C.A.Schmidt, "The Complete Computer Repair Textbook", 3e, Dreamtech
2. David Groth, "A+ Complete Study Guide", 3e

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Sixth
Course Code: DCS 6005
Course Title: CYBER SECURITY

Credits:	**L**	**T**	**P**	**C**
	3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVES
1. Understand the broad set of technical, social & political aspects of Cyber Security
2. Appreciate the vulnerabilities and threats posed by criminals, terrorist and nation states to national infrastructure
3. Understand the nature of secure software development, operating systems and database design
4. Recognized the role security management plays in cyber security defense
5. Understand the security management methods and the legal and social issues.

COURSE OUTCOMES
After completing this course students should be able to:
1. Demonstrate an understanding of the fundamentals of the various aspects of computer security.
2. Analyze and apply various security tools and techniques to protect against malicious code.
3. Assess the security aspects of web technologies and operating systems and security requirements for databases.
4. Evaluate the security issues related to network communications and security measures.
5. Demonstrate knowledge of legal and ethical issues in cyber security and understanding of the laws.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6005 CYBER SECURITY

Module-I:
Introduction
Computer Security, Threats, Harm, Vulnerabilities and Control.

Module-II:
Toolbox: Authentication, Access Control, and Cryptography
Authentication, Access Control, and Cryptography, Unintentional(Non-malicious) Programming Malicious Code—Malware.

Module-III:
The Web—User Side and Operating Systems
Browser Attacks, Web Attacks Targeting Users Obtaining User or Website Data, Email Attacks. Security in Operating Systems, Security in the Design of Operating Systems, Security requirements of Databases.

Module-IV:
Networks and defenses
Network Concepts, Threats to Network Communications, Wireless Network Security, Denial of Service.
Strategic Defenses: Security Countermeasures, Cryptography in Network Security, Firewalls Intrusion Detection and Prevention Systems.

Module-V:
Legal Issues and Ethics
Protecting Programs and Data, Information and the Law, Rights of Employees and Employers, Redress for Software Failures, Computer Crime, Ethical Issues in Computer Security, Incident Analysis with Ethics.

Text Book

1. William Stallings,"Cryptography and N/W security Principle and Practices", Prentice Hall.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Sixth
Course Code: DCS 6002
Course Title: JAVA PROGRAMMING LAB.-II

Credits: L   T   P   C
           0   0   2   1

Class schedule per week: lectures

COURSE OBJECTIVES
1. To review programming concepts in Java programming.
2. To review the concept of inheritance in Java programming.
3. To give insight into socket programming.
4. To give insight into designing GUI using AWT programming and creating applets.
5. To enable students to implement database connectivity in their applications and manipulate the database.

COURSE OUTCOMES
After completing this course students should be able to:
1. Write programs using Java classes and objects.
2. Write programs using inheritance.
3. Implement client-server interactions using socket programming.
4. Create interactive graphical user interfaces using AWT components and create applets that incorporate event handling.
5. Connect their application to database and perform database operations.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6002 JAVA PROGRAMMING LAB.- II

LIST OF EXPERIMENTS

1. Review examples on Java Classes and Objects
2. Review examples on Inheritance
3. Examples on Socket Programming
4. Examples on AWT components
5. Examples on Applets
6. Examples on Event Handling in Applets
7. Examples on Programming using Database
8. Examples on Database in Applets

Program: Diploma in Computer Engineering

Semester: Sixth
Course Code: DCS 6004
Course Title: COMPUTER HARDWARE LAB.

Credits: L T P C
             0 0 2 1

Class schedule per week: lectures

COURSE OBJECTIVES

1. To enable students to understand the layouts and components on different motherboard form factors (XT, AT, LPX, ATX).
2. To train students on disassembling and assembling PCs of various form factors (XT, AT, ATX) taking care of the compatibility of various components.
3. To familiarize students with BIOS setup and operating system installation procedures.
4. To familiarize students with disk management techniques, such as partitioning, formatting, and creating volumes.
5. To train students to perform maintenance procedures, like system restore, disk defragmentation, and scanning with anti-virus.

COURSE OUTCOMES

After completing this course students should be able to:

1. Identifying and different various motherboard form factors (XT, AT, LPX, ATX) and their key components.
2. Disassemble and assemble PCs of different form factors (XT, AT, ATX), with an understanding of their hardware configurations.
3. Configure BIOS settings and install the Windows operating system, and manage system configurations.
4. Use disk management techniques to create and manipulate partitions, volumes, and dynamic disks, ensuring efficient data storage and organization.
5. Perform maintenance tasks like system restore, disk defragmentation, and virus scanning.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6004COMPUTER HARDWARE LAB.

LIST OF EXPERIMENTS

1. Study of motherboard:
   a. XT form factor.
   b. AT form factor.
   c. LPX form factor.
   d. ATX form factor.
2. Disassembling of PC:
   a. PC- XT
   b. PC- AT
   c. PC- ATX
3. Assembling of PC:
   a. PC-XT
   b. PC-AT
   c. PC-ATX
4. Study of BIOS Setup.
5. Installation of Windows-XP operating system.
6. Repairing corrupted operating system.
7. Installation of display diver, sound driver, network driver.
8. Managing disk and file system:
   a. Installing two hard disk
   b. Creating primary, extended, logical partition
   c. Formatting a partition
   d. Converting a Basic Disk to a Dynamic Disk
   e.
   f. Understanding simple, spanned, striped, Mirrored volume
      i. Creating Simple volume
      ii. Creating spanned volume
      iii. Creating striped volume
      iv. Extending volume size
      v. Deleting simple, striped, spanned volume
9. Preventive maintenance tools:
   a. System restore
      i. Creating restore point
      ii. Restore system to earlier date and time.
   b. Disk defragmentation
   c. Scandisk
   d. Installation and configuration of Anti-virus
10. Installation and configuration of VM Ware.

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Sixth
Course Code: DCS 6008
Course Title: SOFTWARE TESTING LAB.

Credits:

L	T	P	C
0	1	3	2

Class schedule per week: lectures

COURSE OBJECTIVE
1. To enable students identify different sources of errors due to choice of data-type, improper type conversion and range overflow.
2. To enable students trace the program flow through different constructs by creating flowcharts and test the program for errors.
3. To enable students to test programs involving arrays and string processing.
4. To enable students to perform module-level test for a programs having function-oriented design.
5. To enable students to test programs involving static and dynamic implementation of simple data structures (like stacks and queues).

COURSE OUTCOME
After completing this course, students should be able to:
1. Identify different sources of errors resulting from improper choice of data-type, improper type conversion and range overflow.
2. Trace the flow of program through different constructs using flowcharts and test the program.
3. Test programs involving arrays and string processing.
4. Perform module-level test for a programs having function-oriented design.
5. Test programs involving static and dynamic implementation of simple data structures (like stacks and queues).

1. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on boundary value analysis, execute the test cases and discuss the results.

2. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of boundary value testing, derive different test cases, execute these test cases and discuss the test results.

3. Design, develop, code and run the program in any suitable language to implement the NextDate function. Analyze it from the perspective of boundary value testing, derive different test cases, execute these test cases and discuss the test results.

4. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on equivalence class partitioning, execute the test cases and discuss the results.

5. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of equivalence class testing, derive different test cases, execute these test cases and discuss the test results.

6. Design, develop, code and run the program in any suitable language to implement the NextDate function. Analyze it from the perspective of equivalence class value testing, derive different test cases, execute these test cases and discuss the test results.

7. Design and develop a program in a language of your choice to solve the Triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Derive test cases for your program based on decision-table approach, execute the test cases and discuss the results.

8. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of decision table-based testing, derive different test cases, execute these test cases and discuss the test results.

9. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of dataflow testing, derive different test cases, execute these test cases and discuss the test results.

10. Design, develop, code and run the program in any suitable language to implement the binary search algorithm. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results.

11. Design, develop, code and run the program in any suitable language to implement the quicksort algorithm. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results. discuss the test results.

12. Design, develop, code and run the program in any suitable language to implement an absolute letter grading procedure, making suitable assumptions. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6011 COMPUTER GRAPHICS(ELECTIVE)

Module-I:
Overview of Graphics System
Random Scan Display, Raster Scan Displays, Vector scan display, color CRT monitors, & flat panel display, input output devices.

Module-II:
Output primitives
Line drawing algorithms– DDA Algorithms and Bresenham's algorithm, Circle generating algorithm- Circle algorithm & mid-point circle algorithm.

Module-III:
Two-Dimensional Transformation
Basic Transformations -Translation, Rotation, and Scaling.Matrix representation & Homogeneous Co-ordinates, Composite Transformation- Translation, Rotation and Scaling, Pivot Point Rotation.

Module-IV:
Viewing and clipping
Window to viewport co-ordinate transformation, Point clipping, Line Clipping, Cohen Sutherland line clipping algorithm, Sutherland Hodgeman polygon clipping.

Module-V:
Three dimension graphics
Three dimension transformation, Polygon Surfaces, Curved lines and Surfaces, Spline Representations, Bezier curve.

Text Book
1. Computer Graphics by Donald Hearn and M.Pauline Baker; Pearson Prentice Hall Publication

Reference Books
1.John F. Hughes, Andries Van Dam, Morgan Mcguire, David F.Sklar, James D.Foley, Steven K. Feiner, Kurt Akeley,"Computer Graphics: Principle and practice", Addison Wesley Publishing Co. Ltd.
2. Zhigang Xiang and Roy Plastock,"Computer Graphics", Tata McGraw-Hill Publishing Co. Ltd.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6013 IMAGE PROCESSING (ELECTIVE)

Module-I:
Digital Image Processing Fundamentals
Light and Electromagnetic Spectrum, Image sensing and acquisition, Image sampling and Quantization.Fundamental steps in Digital Image Processing.Digital Image Representation, Basic relationship between pixels. Mathematical Tools used in Image Processing: Array versus Matrix Operations. Linear versus Nonlinear Operations. Arithmetic Operations. Set and Logical Operations, Spatial Operations, Vector and Matrix Operations, Image Transforms, Probabilistic Methods.

Module-II:
Intensity Transformations and Spatial Filtering
Image Negatives Log Transformations, Power-Law (Gamma) Transformation, Piecewise-Linear Transformation Functions.**Histogram Processing:** Histogram Equalization, Histogram Matching (Specification).
Fundamentals of Spatial Filtering: The Mechanics of Spatial Filtering, Spatial Correlation and Convolution, Vector Representation of Linear Filtering, Generating Spatial Filter Masks.
Smoothing Spatial Filters: Smoothing Linear Filters, Order-Statistic (Nonlinear) Filters
Sharpening Spatial Filters: Using the Second Derivative for Image Sharpening—The Laplacian. Unsharp Masking and Highboost Filtering using First-Order Derivatives for (Nonlinear) Image Sharpening—The Gradient.

Module-III:
Filtering in the Frequency Domain
Preliminary Concepts: Fourier series, Impulses and their Sifting Property, The Fourier Transform of Functions, Convolution, Properties of the 2-D Discrete Fourier Transform.Sampling and the Fourier Transform of Sampled Functions, the Sampling Theorem, Aliasing, Function Reconstruction (Recovery) from Sampled Data. Smoothing Frequency Domain filters, Sharpening Frequency Domain filters.

Module-IV:
Image Restoration
Noise Models, Restoration in the presence of Noise-Only Spatial filtering, Mean filters, Adaptive filters. Periodic Noise Reduction by Frequency Domain filtering.

Diploma in Computer Engineering

Module-V:
Image Segmentation
Detection of Discontinuities, Point Detection, Line detection, Edge Detection.
Thresholding, Optimal Global and Adaptive thresholding. Region-based Segmentation.

Text Book
1.Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3rd Ed., Pearson Edu.
Reference Books
2. B. Chanda and D. Dutta Majumder, "Digital Image Processing and Analysis", PHI

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6015 NETWORK MANAGEMENT AND ADMINISTRATION(ELECTIVE)

Module-I:
Network operating System
Introduction to Network operating system. Features of Windows NT, Windows 2000 Server, Windows 2008 server.

Module-II:
Concept of Active Directory Services
Define directory services, (NDS), Windows NT Domains, Microsoft Active Directory Service (ADS), X.500 Directory, Access Protocol (DAP), and LDAP, Understanding ADS. Structure, Objects, Domains, Organizational Units (OU), Trees, Forests.

Module III:
Managing User Accounts & Resource Services
User account: Managing user accounts, shared folders and network printers.
Understanding user accounts, Types of user account- Guest, Limited, Administrator.
Groups: Working with groups:- Group types, Group Scope, Understanding Group Policies.

Module IV:
Managing Resource Services
Managing File Server: Understanding permissions, sharing files & folders, configuring, File Server.
Managing Print server: Network Printing Process, Managing Shared Printer, Adjustment Print Server settings.

Module V:
Configuring DHCP and DNS
DHCP (Dynamic Host Configuration Protocol), understanding DHCP- IP Address Assignment, DHCP Architecture, Installing, configuring and managing DHCP Server.
DNS (Domain Name System) –Understanding DNS Names- Domain, domain-naming, top level domains, sub-domains, Name Resolution, Managing DNS server and DNS Clients

Text and Reference books
1. Mark Minasi, "Mastering Windows Server 2008", Wiley India
2. Richard Burke, "Network Management Concepts and practice", Pearson
3. Microsoft Press, "MCSE Training Kit", Tata Mc graw Hill

COURSE INFORMATION SHEET

Program: Diploma in Computer Engineering

Semester: Sixth
Course Code: DCS 6017
Course Title: INTERNET OF THINGS

Credits:

L	T	P	C
3	0	0	3

Class schedule per week: 3 lectures

COURSE OBJECTIVES
1. To acaquaint students with the fundamental concepts and principles of the Internet of Things (IoT).
2. To give a compaitive study of various wireless communication standards used in IoT.
3. To make students understand the principles of internet and communication protocols relevant to IoT.
4. To make students understand the components and technologies involved in embedded devices (sensors, actuators, microcontrollers, etc.) used in IoT systems.
5. To make students understand the role of online components used in of IoT systems, and the process of implementation and testing of APIs for IoT applications.

COURSE OUTCOMES
After completing this course students should be able to:
1. Understand the fundamental concepts and principles of the Internet of Things (IoT).
2. Compare various wireless communication standards used in IoT.
3. Understand the principles of internet and communication protocols relevant to IoT.
4. Understand the components and technologies involved in embedded devices (sensors, actuators, microcontrollers, etc.) used in IoT systems.
5. Understand the role of online components are used in of IoT systems, process of implementation and testing of APIs for IoT applications.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6017 INTERNET OF THINGS(ELECTIVE)

Module-I:
The Internet of Things: An Overview
M2M and Internet of Things Technology Fundamentals, IoT Architectural, design principles and needed capabilities, standards considerations.

Module-II:
Wireless Communication standards
Bluetooth, wifi, PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART,Z-Wave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7.

Module-III:
Internet Principles
Internet Communications: IP , TCP, Protocol Suite (TCP/IP), UDP, IP Addresses, DNS, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and UDP Ports, HTTP Ports, Other Common Ports, HTTP, HTTPS: Encrypted HTTP, Other Application Layer Protocols.

Module-IV:
Embedded Devices
Electronics: Sensors, Actuators, Scaling up the Electronics, Embedded Computing Basics, Microcontrollers.

Module-V:
Online Components
Getting started with an API, Legalities, Writing a new API, security, implementing the API & testing.

Text book and Reference books

1. McEwen, Adrian, and Hakim Cassimally,"Designing the Internet of Things", John Wiley & Sons, Incorporated, 2013.
2. Arsheep Bahga &Vijay Madisetti, "Internet of Things: A Hands-On Approach", Universities Press – 2015.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DSC6019 ANDROID BASED APPLICATION DEVELOPMENT(ELECTIVE)

Module-I:
Introduction to Android
Introduction, Java Concepts, Android Architecture & UI Architecture, Android Development Environment, Building blocks of Android Application.

Module-II:
Creating User Interfaces
Application development tools, application manifest, resources, types of applications, Introduction to User Interface components- Layouts, Fragments, Adapters, Action Bars, Dialogs and Notifications, Guidelines for designing user interfaces.

Module-III:
Intents and Adapters

Introduction to Intents, Using Intents to start, stop and transition between Activities, Implicit Intents and Late Run-time Binding, Intent Filters.

Module-IV:
Working with Storage
Saving and loading files, file management tools, Introduction to SQLite, Introduction to content providers.

Module-V:
Android Hardware and Location-based Services
Media APIs, Using Camera, Phone, Blue Tooth, Internet Connectivity.
Using Location-based Services, Selecting a Location Provider, Finding your Location, Map-based Activities.

Text Book
1. Mike McGrath, "Building Android Application in easy steps", McGraw Higher Ed

Reference Book
1. Reto Meier, "Professional Android 4 Application Development", Wrox Press

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS6023 MOBILE COMPUTING(ELECTIVE)

Module-I:
Introduction

Introduction to Mobile Computing, Applications of Mobile Computing. GSM Services, Channel Allocation in Cellular Systems, Channel Access Methods.

Module-II:
Wireless Communication Standards

Types of Wireless Networks, IEEE 802.11 Protocols, Bluetooth, Wireless Multiple Access Protocols.

Module-III:
Mobile Database

Architecture of Mobile Transaction Environment, Data Replication Strategies, Air Indexing, Adaptive Clustering, Data Caching, Context-aware Computing.

Module-IV:
Mobile Agents and Ad Hoc Networks

Transaction Processing in Mobile Computing Environment, Transaction Models, Issues Related to Mobile Transaction Processing Systems, Ad hoc Networks, Security Issues, Quality of Services (QoS). Overview of Mobile Operating Systems.

Module-V:
Mobile Telecommunication

Personal Communication Services, 3G Systems, International Mobile Telecommunication (IMT), CDMA and W-CDMA. Global Mobile Satellite Systems and Classification of Orbits.

Text Book

1. Rishabh Sharm, Sanjay Kumar, "Mobile Computing", S. K. Kataria & Sons

Reference Book

1. Sipra DasBit, Biplab K. Sikdar, "Mobile Computing", PHI Learning (P) Ltd.