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**

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DMA 3101 APPLIED MATHEMATICS

OBJECTIVE:

Students 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 Analysis 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.

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-VI:

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.).

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3001 C PROGRAMMING

OBJECTIVE

1. To understand basic programming concepts and write simple programs.
2. To use operators and library functions for writing arithmetic expressions.
3. To apply programming logic and develop problem solving approach.
4. To use arrays for developing more efficient logic.
5. To apply function oriented approach in program design.

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3003 DATABASE MANAGEMENT SYSTEM

OBJECTIVE

1. List and explain the fundamental concepts of a relational database system.
2. Analyze database requirements and determine the entities involved in the system and their relationship to one another.
3. Develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
4. Create a relational database using a relational database package.
5. Manipulate a database using SQL.
6. Assess the quality and ease of use of data modeling and diagramming tools.
7. To be able to design the database using Normalization.

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3005 COMPUTER ORGANIZATION

OBJECTIVE

1. Such knowledge leads to better understanding and utilization of digital computers.
2. Understand the digital logic and simplification of logical expression.
3. Understand the functionality of logic design and circuits.
4. Understand the basic components for design of memory.
5. To study the basic organization and architecture of digital computers. Foundation for more advanced computer-related studies.

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.

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 3007 WEB TECHNOLOGY

OBJECTIVE

1. To get an introduction to the basic idea and concepts of Internet and Web Wide Weband its Security.
2. To provide students with an understanding of how network protocols work, particularly those used in internet.
3. The ability to present and manipulate information on the World Wide Web with an emphasis on HTML, DHTML and PHP.
4. To be able to design a website.

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

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.

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

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.

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

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DHU3002 PROFESSIONAL PRACTICES-II

OBJECTIVE:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture

Fault detection and adopting proper troubleshooting procedure for repair and maintenance.

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**

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DSC4001 OBJECT ORIENTED PROGRAMMING IN C++

Objective:

1. To understand how C++ differs from C, and some new features of C++.
2. To have an understanding of the object-oriented programming paradigm.
3. To understand the use of constructors and destructors.
4. To understand what class hierarchy means and design program accordingly.
5. To be able to use built-in stream objects for I/O and file operations.

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

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 4007 .NET

OBJECTIVE

1. To understand basics of .Net Framework.
2. To understand common IDE and language specifications.
3. Develop understanding of database concepts.
4. Students will be able to establish connection between Application and database.
5. Develop acquaintance with standard controls.

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

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS4009 OPERATING SYSTEMS

OBJECTIVE

1. To get acquainted with various types of systems.
2. To understand basics of operation of computer system.
3. To understand the concept of processes and process scheduling algorithms.
4. To understand various memory management techniques.
5. To understand file system, and scheduling of disk.

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DAC 4001 ENVIRONMENTAL SCIENCE

OBJECTIVE

The main aim of Environmental Science is to make the students acquainted with various types of pollution hazards, which are becoming more critical every day and also acquire the knowledge to participate in solving environmental problems for green earth.

Students will be able to understand:

1. Importance of Environmental Science as well as biogeochemical cycles 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

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"

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 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

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

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

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

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DHU 4002 PROFESSIONAL PRACTICES-III

OBJECTIVE : Student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture

Fault detection and adopting proper troubleshooting procedure for repair and maintenance.

Module-I:

Field Visits:

Structuredfieldvisits(minimumthree)bearrangedandreportofthesameshouldbesubmittedbytheindividualstudent,toforma 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

SYLLABUS

SEMESTER-V

Diploma in Computer Engineering

(wef 2018 batch)

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**

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5001 INTRODUCTION TO JAVA PROGRAMMING

OBJECTIVE

1. Understand basic concepts of object oriented programming.
2. Improve their programming skills.
3. Apply the knowledge gained for their project work as well as to develop GUI applications.
4. Students are expected to go through the websites for latest know-how related to the subject.

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5003 DATA COMMUNICATION AND NETWORKING

OBJECTIVE

1. Understand basics elements of Computer Network.
2. Develop understanding of communication over various transmission media.
3. Understand various encoding techniques.
4. Understanding working of various protocols at data link layer.
5. Develop understanding of OSI and TCP/IP model, key protocols used at various layers.

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

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5005 COMPUTER SYSTEM ARCHITECTURE

OBJECTIVE

1. To understand working of various forms of Register and counter.
2. To understand organization of a digital computer.
3. Develop understanding of Input and Output organization.
4. Develop understanding of various types of memory and their need.
5. Understand basics of 8085 and 8086 microprocessors.

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

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DSC 5007 MULTIMEDIA & ANIMATION

OBJECTIVE

1. Multimedia is the combined use of text, graphics, sound, animation, and video.
2. A primary objective to teach students how to develop multimedia programs.
3. Another objective is to demonstrate how still images, sound, and video can be digitized on the computer.

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

.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5009 SOFTWARE ENGINEERING

OBJECTIVE

1. Discuss Factor like cost schedule, quality that drive a software project to learn the role of S/W process and process model in a project.
2. Understand the role of SRS in a project and to know how requirements are validated.
3. Understand S/W architectural views and learn planning and estimation of S/W project.
4. Describe the key design concept of S/W Engineering and articulate in project.
5. Illustrate principles of structured programming, testing modules using unit test framework and code inspection to improve quality of code.

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.

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.

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

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 5010 VISUAL BASIC LAB

LIST OF EXPERIMENTS

OBJECTIVE

1. Develop acquaintance with standard VB controls.
2. Developing understanding of various controls and mathematical functions.
3. Understanding various inbuilt functions.
4. Using control statements in VB.
5. Database connectivity and report generation.

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

OBJECTIVE

1. To understand the principles of Total Quality Management (TQM).
2. To identify various components of TQM.
3. To be acquainted with various quality standards.
4. To understand the need for benchmarking and its process, and various quality improvement techniques.
5. To understand the importance of quality circle and identify various issues related with it.

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS6001 ADVANCE JAVA PROGRAMMING

OBJECTIVE

1. To revise basic concepts of OOP and Java.
2. To be able to develop simple networking applications.
3. To be able to use AWT components in the applications.
4. To be able to write simple java applets.
5. To be able to use database in the applications.

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

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6003 COMPUTER HARDWARE

OBJECTIVE

1. To know various components used inside motherboard.
2. Students will be acquainted with the technologies used in modern microprocessor.
3. Develop understanding of construction & working of various types of memory used inside digital computer.
4. Develop understanding of working of SMPS and UPS.
5. Understand basics of various types of printer, preventive and corrective maintenance.

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

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6005 CYBER SECURITY

OBJECTIVE

This course provides students basic knowledge and skills in the fundamental theories and practices of Cyber Security. Upon completion of the course a student is expected to have met the following six (6) 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 to maintain security protection
6. Understand the legal and social issues at play in developing solutions.

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.

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

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.

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6008 SOFTWARE TESTING LAB

LIST OF EXPERIMENTS

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)

OBJECTIVE

Understand the structure of modern computer graphics systems.

1. Under Understand the basic principle of implementing computer graphics primitives.
2. Familiarity with key algorithms for modeling of graphical data.
3. Develop design and problem solving skills with application to computer graphics.
5. Free form shape design using graphical data.

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)

OBJECTIVE

Students will be able to

1. Develop the essential background in Image Processing.
2. Realize the applications of Spatial Filtering methods in different fields of computer vision.
3. Learn and apply Frequency Domain Filtering techniques in computer vision.
4. Learn and use basic Image Segmentation algorithms for practical applications.
5. Use Image Processing techniques necessary for daily and practical problems.

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.

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)

OBJECTIVE

1. To understand features of Network Operating system.
2. To understand structure and services of Active directory.
3. Student will be able to manage user accounts and groups.
4. Student will be able to manage file and printer access permissions.
5. Student will be able to configure DHCP and DNS.

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

UNIVERSITY POLYTECHNIC
BIT, MESRA

Diploma in Computer Engineering

DCS 6017 INTERNET OF THINGS(ELECTIVE)

OBJECTIVE

1. To understand basics of Internet of Things.
2. To understand various wireless communication techniques
3. Understanding use of various protocols.
4. Understanding of various embedded components & physical design.
5. Students will be able to create and implement APIs.

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)

OBJECTIVE

1. To get introduced to the Android development environment.
2. To get acquainted with the various components of user interface.
3. To understand the concept of Intents.
4. To be able to use SQLite in Android applications.
5. To be able to use hardware elements and location based services in applications.

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)

OBJECTIVE

1. To understand the basics of Mobile Computing, GSM Services and Channel Allocation mechanism.
2. To understand various wireless communication standards.
3. To understand the data management in mobile environment.
4. To understand transaction processing in mobile environment and get an idea of Ad hoc Networks and Mobile Operating Systems.
5. To understand the basics of mobile telecommunication system.

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.