

**CURRICULUM  
FOR  
FOURTH SEMESTER  
OF  
THREE-YEAR DIPLOMA COURSE  
IN  
COMPUTER ENGINEERING**

4TH SEM NEP2020 CURRICULUM FOR POLYTECHNICS OF J&K

**STUDY SCHEME 4<sup>TH</sup> SEMESTER**

Code	Subjects	Periods Per Week			Total Hours L+T+ P	CREDITS			Total Credits L+T+P
		L	T	P		L	T	P	
COPC401	Computer Organization and Architecture	3	0	0	3	3	0	0	3
COPC402	Object Oriented Programming using Java	3	0	0	3	3	0	0	3
COPC403	Object Oriented Programming using Java Lab	0	0	4	4	0	0	2	2
COPC404	Internet of Things	3	0	0	3	3	0	0	3
COPC405	Internet of Things Lab	0	0	2	2	0	0	1	1
COPC406	Full Stack Web Development	2	0	0	2	2	0	0	2
COPC407	Full Stack Web Development Lab	0	0	4	4	0	0	2	2
COPC408	Database Management Systems	3	0	0	3	3	0	0	3
COPC409	Database Management Systems Lab	0	0	2	2	0	0	1	1
HS410	Basics of Entrepreneurship Development	2	0	0	2	2	0	0	2
		<b>16</b>	<b>0</b>	<b>12</b>	<b>28</b>	<b>16</b>	<b>0</b>	<b>6</b>	<b>22</b>

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: <b>COPC401</b>	Course Title: <b>Computer Organization and Architecture</b>
Semester: <b>4<sup>th</sup></b>	Credit: <b>3</b>
Periods Per Week: <b>3 (L: 3, T: 0, P: 0)</b>	

**COURSE OBJECTIVE:**

This course provides detail of computer system's functional components, their characteristics, performance and interactions including system bus, different types of memory and input/output organization and CPU. This course also covers the architectural issues such as instruction set program and data types. On top that, the students are also introduced to the increasingly important area of parallel organization. This course also serves as a basic to develop hardware related projects. And hence it is an important course for all students of computer engineering branch.

**COURSE CONTENT:****1. Introduction:**

- 1.1. Functional units of digital system.
- 1.2. Buses, bus architecture, types of buses.
- 1.3. Introduction to computer languages machine language, assembly language, higher level languages
- 1.4. Translators (Assembler, Compiler, Interpreter)
- 1.5. BIOS, Functions of BIOS

**2. Processor Organization**

- 2.1. Processor Registers Accumulator, Data Register, Address Register, program counter (PC), Memory Data Register (MDR), Index register, Memory Buffer Register.
- 2.2. Instruction format (three address, two address, one address, zero address)
- 2.3. Addressing modes: Immediate, register, direct, indirect, relative, indexed.
- 2.4. CISC RISC characteristics, and their comparison.
- 2.5. CPU Design: Microprogrammed v/s hard wired control (Basic idea only).

**3. Basic Computer Organization**

- 3.1. Computer Instructions, Timing and Control.
- 3.2. Instruction Cycle, Memory Reference Instructions.
- 3.3. Input-Output and Interrupt.

**4. Memory Organization**

- 4.1. Memory Hierarchy
- 4.2. RAM and ROM chips.
- 4.3. Magnetic disks and magnetic tapes.
- 4.4. Cache memory
- 4.5. Virtual memory

## 5. I/O Organization

- 5.1. Peripheral devices, I/O interface, I/O ports,
- 5.2. Interrupts and types of interrupts. Modes of Data Transfer: Programmed I/O,
- 5.3. interrupt initiated I/O and Direct Memory Access,
- 5.4. Serial Communication: Synchronous & asynchronous communication,

### COURSE OUTCOME:

#### After the completion of the course the student will be able to:

- Have a complete idea computer organization fundamental, including component functions and programming languages.
- Analyze processor organization, instruction formats, and addressing modes, distinguishing between CISC and RISC architectures.
- Understand computer instruction execution, memory organization, and I/O principles.
- Develop proficiency in using assemblers, compilers, and interpreters for software development.
- Design and manage input/output operations, including serial and parallel communication methods, in computer systems.

### RECOMMENDED BOOKS:

1. Computer system Architecture Mano, M. Morris Pearson publication, Latest Edition ISBN: 978-81-317-0070-9.
2. Computer Architecture and Organization Ghoshal, Subrata Pearson publication, Latest Edition.
3. Computer Architecture Parhami, Behrooz Oxford publication, Latest Edition ISBN: 978-0-19-808407-5.
4. "Computer Organization and Design" by P.V. Shanbhag - Publisher: PHI Learning Pvt. Ltd.
5. "Computer Architecture and Organization" by John P. Hayes - Publisher: Tata McGraw-Hill Education
6. "Computer Organization and Architecture: Designing for Performance" by William Stallings - Publisher: Pearson Education India
7. Advanced Computer Architecture: Parallelism, Scalability, Programmability" by Kai Hwang and Naresh Jotwani - Publisher: McGraw-Hill Education

### UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	25
2	12	30
3	10	25
4	08	10
5	08	10
<b>Total</b>	<b>48</b>	<b>100</b>

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: <b>COPC402</b>	Course Title: <b>OBJECT ORIENTED PROGRAMMING USING JAVA</b>
Semester: <b>4<sup>th</sup></b>	Credit: <b>3</b>
Periods Per Week: <b>03 (L: 03, T: 00, P: 00)</b>	

**COURSE OBJECTIVES:**

Object orientation is a new approach to understand the complexities of the real world. In contrast to the earlier approaches like procedural etc, object orientation helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. This course offers the modern programming language JAVA that will help the students to implement the various concept of object orientation practically.

**COURSE CONTENT:****1. Introduction to Java and Object-Oriented Programming Concept**

- 1.1. Concept of Procedure Oriented Language and Object-Oriented Language and the difference between the two.
- 1.2. Background of Java and Java Features
- 1.3. Java Virtual Machine, Byte code, JIT Compiler, Java IDE Tools, Introduction of NetBeans (IDE) for developing programs in Java.
- 1.4. Basics of OOP: Abstraction, Inheritance, Encapsulation and Polymorphism (Basic concept only)

**2. Classes and Objects**

- 2.1. Class fundamentals, declaring objects, creating and accessing variables and methods, static variables and methods.
- 2.2. Constructor (Default and Parameterized)

**3. Language Constructs in Java**

- 3.1. Primitive Data Types: Integers, Floating Point type, Characters, Booleans
- 3.2. User Defined Data Type, Declarations, Constants, Identifiers & Literals,
- 3.3. Type Casting,
- 3.4. Variables: Variable Definition and Assignment, Default Variable Initializations,
- 3.5. Operators: Arithmetic, Rational, Logical, Assignment, Conditional, Ternary, Auto Increment and Decrement

3.6. Control Statements: Selection Statement (If, Switch), Loops (While, Do-while, for), Jump statements (Break, Continue, Return)

#### **4. Inheritance, Interfaces and Packages**

##### 4.1 Inheritance

4.1.1. Concepts of Inheritance, subclass, superclass.

4.1.2. Types of inheritance, single inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance.

4.1.3. Using 'extends' keyword to demonstrate single and multilevel inheritances.

4.1.4. Abstract Classes and final Classes

##### 4.2. Interfaces

4.2.1. Defining an interface, difference between classes and interface.

4.2.2. Implementation of multiple inheritances through interface.

##### 4.3. Packages

4.3.1. Packages: Defining a package, Importing and using a package in-built.

4.3.2. packages, user defined packages.

##### 4.4. Access modifiers

4.4.1 Public, protected, default, and private (visibility and scope)

#### **5 Polymorphism**

5.1 Constructor overloading

5.2 Method Overloading

5.3 Method Overriding

5.4 Use of Keyword "super"

#### **6 Exception Handling**

6.1 Basics of Exception and types: Checked and Unchecked

6.2 Handling Exceptions: try, catch, finally

6.3 Use of throw and throws for built-in exceptions

#### **7 Multithreading**

7.1 Threads, Difference between multi-threading and multi-tasking

7.2 Thread life cycle

7.3 Implementing Threads: extension of Thread Class and Implementation of Runnable Interface.

#### **COURSE OUTCOME:**

**After the completion of the course the student will be able to:**

- Perform Java programming, understanding its background and key features, including the role of Java Virtual Machine and Byte code.
- Utilize the NetBeans IDE proficiently for Java development.
- do manipulation of data by working with primitive and user-defined data types, variables, type casting, and operators.
- apply Object-Oriented Programming (OOP) principles, including abstraction, inheritance, encapsulation, and polymorphism, to design efficient Java programs.
- Create Java applications by applying class fundamentals, object creation, and constructors.
- Utilize inheritance, interfaces, and packages to organize and structure Java code effectively.
- Implement access modifiers to control the visibility and accessibility of Java classes and members.
- Demonstrate polymorphism through constructor overloading and method overriding.
- Implement effective exception handling mechanisms for error management in Java programs.
- Apply multithreading concepts, understanding the thread life cycle to develop concurrent and responsive Java applications.

#### RECOMMENDED BOOKS:

1. Java: A Beginner's Guide by Herbert Schildt
2. Head First Java, O'REILLY, Kathy Sierra & Bert Bates.
3. Programming with Java: A Primer; E. Balagurusamy
4. Programmer's Guide to Java, Pearson, Khalid E Mughal
5. Java in a Nutshell" by Benjamin J. Evans and David Flanagan - Publisher: O'Reilly Media
6. "Java Programming 24-Hour Trainer" by Yakov Fain - Publisher: Wrox
7. "Java for Dummies" by Barry A. Burd - Publisher: For Dummies

#### UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted (Hrs)	Marks Allotted (%)
1	03	10
2	10	20
3	07	15
4	10	25
5	02	5
6	05	10
7	09	15
<b>Total</b>	<b>48</b>	<b>100</b>

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: COPC403	Course Title: <b>OBJECT ORIENTED PROGRAMMING USING JAVA LAB</b>
Semester: 4 <sup>th</sup>	Credit: 2
Periods Per Week: 04 (L: 00, T: 00, P: 04)	

**COURSE OBJECTIVES:**

The objectives of the course is to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their application in different engineering problems

**LIST OF PRACTICALS:**

1. Install JDK and NetBeans, write a simple "Hello World" or similar java program, compilation, debugging, executing using java compiler and interpreter.
2. Develop minimum five (05) programs to explore java data types, operators, control structures and decision statements.
3. Develop minimum two (02) programs to explore labelled loop.
4. Develop minimum two (02) programs to explore arrays.
5. WAP to create a simple class to find out the area and perimeter of rectangle and box using super and this keyword.
6. WAP to design a class account using the inheritance and static that show all function of bank (withdrawal, deposit).
7. WAP to design a class using abstract methods and classes.
8. WAP to design a string class that perform string method (equal, reverse the string, change case).
9. Develop minimum four (04) programs based on overloading methods.
10. Modify created classes in during the previous practical sessions to provide constructor and retest all classes.
11. Develop minimum five (05) programs based on inheritance.
12. Develop minimum two (02) programs based on package and also test all the visibility modifiers.
13. Develop minimum two (02) programs to explore the multiple inheritance concept using interfaces.
14. Consider we have a Class of Cars under which Hyundai-i20, Alto-800, and Ignis represents individual Objects. In this context each Car Object will have its own, Model, Year of Manufacture, Colour, Top Speed, etc. which form



Properties of the Car class and the associated actions i.e., object functions like Create (), Sold (), display () form the Methods of Car Class.

- 15.** In a software company Software Engineers, Sr. Software Engineers, Module Lead, Technical Lead, Project Lead, Project Manager, Program Manager, Directors all are the employees of the company but their work, perks, roles, responsibilities differ. Create the Employee base class would provide the common behaviors of all types of employees and also some behavior's properties that all employee must have for that company.
- 16.** Using the concept of multiple inheritance create classes: Shape, Circle, Square, Cube, Sphere, Cylinder. Your classes may only have the class variable specified in the table below and the methods Area and/or Volume to output their area and/or volume.

Class	Class Variable	Constructor	Base class
Shape	String name	Shape ()	
Circle	double radius	Circle (double r, String n)	Shape
Square	double side	Square (doubles, String n)	Shape
Cylinder	double height	Cylinder (double h, double r, String n)	Circle
Sphere	None	Sphere (double r, String n)	Circle
Cube	None	Cube (doubles, String n)	Square

- 17.** WAP that show the partial implementation of interface.
- 18.** WAP to handle the exception using try and multiple catch block.
- 19.** WAP that implement the Nested try statements besides usage of throw and throws.
- 20.** Develop minimum two (02) programs using multiple thread concepts.

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: <b>COPC404</b>	Course Title: <b>Internet of Things (IoT)</b>
Semester: <b>4<sup>th</sup></b>	Credit: <b>3</b>
Periods Per Week: <b>03 (L: 3, T: 0, P: 0)</b>	

**COURSE OBJECTIVE:**

The objective of the course is to develop skill set and domain knowledge in students of the field of Internet of Things, which is considered as one among the advancements in Computer Engineering and to further provide them with the knowledge for classification of Real World IoT applications in various Domains. The course focuses on hands-on IoT Concepts such as Sensing, Actuation and Communication

**COURSE CONTENT:****1. Introduction to Internet of Things (IoT)**

- 1.1. Definition and characteristics of IoT
- 1.2. Physical design of IoT
- 1.3. IoT Protocols (M2M vs IOT)
- 1.4. Logical Design of IoT
- 1.5. IoT functional blocks
- 1.6. IoT communication Models

**2. Introduction to Arduino**

- 2.1. Arduino Uno Architecture and its setup
- 2.2. Basics of Embedded C-Programming-Revision of Variables (Global/Local), data types ,loops and functions and setup() and loop() function
- 2.3. Interfacing LED , push button and buzzer with Arduino

**3. Sensors and Actuators working**

- 3.1. Overview of Sensors Working
- 3.2. Analog and Digital Sensors
- 3.3. Interfacing of
  - 3.3.1. Temperature Sensor
  - 3.3.2. Humidity Sensor
  - 3.3.3. Motion Sensor
  - 3.3.4. Light Sensor
- 3.4. Interfacing of Actuators
- 3.5. Interfacing of Servo Switch and Servo Motor with Arduino

**4. Wifi Module and Raspberry Pi**

- 4.1. Basics of Wireless Networking

- 4.2. Introduction to ESP8266 WiFi Module
- 4.3. General Overview of Raspberry Pi (Without Coding)

## 5. Applications of IOT

- 5.1. Applications of IoT
- 5.2. IoT Wearables
- 5.3. Smart Home Applications
- 5.4. Health Care
- 5.5. Smart Cities
- 5.6. Agriculture
- 5.7. Industrial Automation

### COURSE OUTCOME:

#### After the completion of the course the student will be able to:

- Interpret the vision of IoT from a global context.
- Understand the differences and Similarities between IoT and M2M.
- Develop real time applications using Sensors/Actuators/Arduino Uno
- Explain the concept of Wi fi module functionalities and its applications.
- Enumerate and illustrate the applications of IOT in various domains

### RECOMMENDED BOOKS:

1. Internet of Things – A Hands on Approach, By Arshdeep Bahga and Vijay Madiseti Universities Press
2. Internt of Things by Michael Miller ,Pearson
3. Arduino Programming: The Ultimate Intermediate Guide to Learn Arduino Programming Step by Step, Ryan Turner
4. IOT for Begineers ,Vibha Soni
5. Getting Started with Arduino" by Massimo Banzi, Michael Shiloh
6. The ESP8266 Wi-Fi Module for Dummies" by Cefn Hoile
7. Building the Internet of Things" by Maciej Kranz

### UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	20
2	08	20
3	18	30
4	07	15
5	07	15
<b>Total</b>	<b>48</b>	<b>100</b>

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: <b>COPC405</b>	Course Title: <b>Internet of Things(IoT) Lab</b>
Semester: <b>4<sup>th</sup></b>	Credit: <b>1</b>
Periods Per Week: <b>02(L: 0, T: 0, P: 2)</b>	

**COURSE OBJECTIVE:**

The objective of the course is to develop practical knowledge and hands on practice to the candidate pertaining to various IOT Applications

**LIST OF PRACTICALS:**

1. Working With Arduino Uno/Nano and IDE
2. Revision of C-Language Basics
3. Revision of C-Language Loops and functions
4. Use of Embedded C for Arduino Uno and Switching On/Off of LED-Working with Digital output Pins
5. Interfacing Digital Output Based Sensors with Arduino
6. Interfacing Analog Output
7. Interfacing Analog Input
8. Interfacing of
  - a. Temperature Sensor
  - b. Humidity Sensor
  - c. Motion Sensor
  - d. Light Sensor
9. Controlling LED and Buzzer using WIFI server
10. Controlling Relays using ultrasonic sensor.
11. Controlling brightness of LED using PWM.
12. Built an intrusion detection system or a similar/different case study
13. Visit to Industry/Other Institute dealing with IOT

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: <b>COPC406</b>	Course Title: <b>Full Stack Web Development</b>
Semester: <b>4<sup>th</sup></b>	Credit: <b>2</b>
Periods Per Week: <b>02 (L: 02, T: 00, P: 00)</b>	

**COURSE OBJECTIVES:**

To impart the basic knowledge of web development concepts this course makes the students to learn how to create responsive and visually appealing user interfaces. Also how to build dynamic and interactive web applications using component-based architecture and state management. Learn server-side programming languages like Node.js, Php, etc. It also gives students the skill to perform database operations.

**COURSE CONTENT:****1. Introduction to Web Development**

- 1.1 Overview of web technologies(Web Browsers, HTML, CSS and JavaScript)
- 1.2 Client-server architecture of web applications
- 1.3 Application development
  - 1.3.1 Frontend Development
  - 1.3.2 Backend Development
  - 1.3.3 Database
- 1.4 Basic concept of Responsive design

**2. Front-end Design**

- 2.1 HTML5
  - 2.1.1 Basic Structure of an HTML Document
  - 2.1.2 HTML Elements and Tags
  - 2.1.3 Headings and Paragraphs, Text Formatting
  - 2.1.4 Lists
  - 2.1.5 Links and Images
  - 2.1.6 HTML Forms and Tables
- 2.2 CSS Basics
  - 2.2.1 Introduction to CSS,
  - 2.2.2 Inline, Internal and External CSS
  - 2.2.3 CSS Selectors
  - 2.2.4 CSS Properties(color, font-size, background-color, and margin)
  - 2.2.5 Box Model(content, padding, border, margin).
  - 2.2.6 Borders and Backgrounds
  - 2.2.7 CSS Display and Positioning (display property :block, inline, inline-block)
- 2.3 JavaScript
  - 2.3.1 Introduction to JavaScript
  - 2.3.2 Variable , Operators , Conditions, loops
  - 2.3.3 Functions
  - 2.3.4 DOM manipulation

- 2.3.5 Popup Boxes (Alert ,Confirm)
- 2.3.6 Client side form validation
- 2.4 Bootstrap (Responsive design)
  - 2.4.1 Introduction to bootstrap
  - 2.4.2 Grid layout in Bootstrap (containers, rows, columns)
  - 2.4.3 Bootstrap Buttons, Forms, Navbars

### 3. Back-end Development

- 3.1 PHP and MYSQL
  - 3.1.1 Introduction to PHP, PHP variables, Data types, Operators, Control Statements, Embedding PHP in HTML, Embedding HTML in PHP,
  - 3.1.2 PHP Session Management(Starting, Using, Unset and Destroy only)
  - 3.1.3 Handling HTML form data using GET and POST
  - 3.1.4 Introduction to MySQL Database. Connecting PHP with MySQL, Performing basic database operation(Select, Insert, Delete and Update)
- 3.2 Node js and MongoDB
  - 3.3.1 Introduction to Node JS Platform
  - 3.3.2 Environment Setup for Node js
  - 3.3.3 Node Package Manager
  - 3.3.4 Callbacks
  - 3.3.5 Events And Event Loop
  - 3.3.6 Introduction To MongoDB
  - 3.3.7 Connecting Node.Js To Database

#### COURSE OUTCOME:

##### After the completion of the course the student will be able to:

- understand the foundational elements of web development, including web technologies, client-server architecture, and the distinction between frontend and backend development.
- Demonstrate proficiency in frontend design using HTML5, CSS, and JavaScript, covering essential concepts such as HTML structure, CSS styling, and basic JavaScript functionalities.
- Develop responsive web design skills using Bootstrap, encompassing grid layout, buttons, forms, and navigation components.
- Gain practical knowledge in backend development using PHP and MySQL, focusing on PHP fundamentals, session management, and basic database operations.
- Explore alternative backend development using Node.js and MongoDB, including environment setup, Node Package Manager, callbacks, events, and connecting Node.js to a MongoDB database.

#### RECOMMENDED BOOKS:

1. Learning Web Development with React and Bootstrap by Harmeet Singh, Mehul Bhatt, and Ravi Kant Son

2. Modern Full-Stack Development: Using Type Script, React, Node.js by Frank Zammetti, Apress, 1<sup>st</sup> Edition.
3. Full Stack Web Development For Beginners by Riaz Ahmad, Atlantic Publishers and Distributors
4. Web Design with HTML, CSS, JavaScript and jQuery Set by Duckett Jon, John Wiley & Sons Inc
5. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics" by Jennifer Robbins (Publisher: O'Reilly Media)
6. JavaScript: The Good Parts" by Douglas Crockford (Publisher: O'Reilly Media)
7. Eloquent JavaScript" by Marijn Haverbeke (Publisher: No Starch Press)

#### UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted (Hrs)	Marks Allotted (%)
1	04	10
2	14	45
3	14	45
<b>Total</b>	<b>32</b>	<b>100</b>

4TH SEM NEP2020 CURRICULUM FOR POLYTECHNICS OF J&K

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: <b>COPC407</b>	Course Title: <b>Full Stack Web Development Lab</b>
Semester: <b>4<sup>th</sup></b>	Credit: <b>02</b>
Periods Per Week: <b>04 (L: 00, T: 00, P: 04)</b>	

**COURSE OBJECTIVES:**

The course objectives for full-stack development practical aim to provide students with hands-on experience and practical skills in various aspects of full-stack web development.

**LIST OF PRACTICALS:**

- 1.** Create a HTML page and demonstrate use of all the tags which you have read in theory part.
- 2.** Demonstrate the use of the CSS techniques read in theory part.
- 3.** Build a static webpage using HTML and CSS, use different layout techniques, styling.
- 4.** Create a HTML form with more than five different fields and validate them using Java script.
- 5.** Develop a responsive web application using a Bootstrap front-end framework.
- 6.** Test all data types and operators in PHP.
- 7.** Build a server-side application using Node.js. Create routes, handle requests and responses, and integrate with a database.
- 8.** Build a server-side application using php. Create routes, handle requests and responses, and integrate with a database.
- 9.** Make a HTML form which accepts required inputs from a user. Perform all arithmetic operation using php then display the result on same page also connect to MySQL database and save all the inputs and results in table.
- 10.** Implement user registration, login, and authentication using session management.
- 11.** Work on a comprehensive full-stack project using PHP as Backend Scripting Language, applying the concepts and skills learned throughout the course. This project should include front-end and back-end development, database integration, and user authentication



**PRACTICAL MARKS DISTRIBUTION**

<b>Topic</b>	<b>Time Allotted (Hrs)</b>	<b>Marks Allotted (%)</b>
Front End Design	16 Hrs	50
Back End Design	16 Hrs	50
<b>Total</b>	<b>32Hrs</b>	<b>100</b>

4TH SEM NEP2020 CURRICULUM FOR POLYTECHNICS OF J&K

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: COPC408	Course Title: <b>Database Management Systems</b>
Semester: <b>3<sup>rd</sup></b>	Credit: <b>4</b>
Periods Per Week: <b>4 (L: 04, T: 0, P: 0)</b>	

**COURSE OBJECTIVE:**

The objective of the course is to develop backend programming skills for data storage and data retrieval and to enable him to work on/develop applications based on client server architecture.

**COURSE CONTENT:****1. Introduction to Database**

- 1.1. Basic Concepts of Database Management System and its advantages over File System
- 1.2. Basic Mathematical Concept of a Set, Cross Product of Sets, Relation and Function.
- 1.3. Concept of Data Models, Schemas and Database Architecture.
- 1.4. Role of a Database Administrator

**2. Relational Database Management System**

- 2.1. Concept of Relational Database Management System
- 2.2. Concept of ER-Diagram- Entities, Attributes, Domain of Entities, Types of Entities, Relationship between Entities - 1:1, 1: N, N: 1 and M : N
- 2.3. Mapping of ER Diagram into Relational Model.
- 2.4. Concept of Primary Key, Unique Key, Candidate Key and Foreign Key.

**3. Normalization**

- 3.1. Definition and Need of Normalization: Insertion Anomaly, Deletion Anomaly and Update Anomaly.
- 3.2. Concept of Functional Dependency A->B, Full Functional Dependency and Partial Functional Dependency.
- 3.3. 1N, 2N, 3N and BCNF and Conversion from one normal form to higher Normal form.

**4. Database Language (SQL)- I (DDL)**

- 4.1. Various Types of Database Languages: MSSQL, MySQL, Oracle- brief idea about each.
- 4.2. Details Concept of SQL and types of queries: DDL, DML and DCL
- 4.3. Create /Drop/Alter Commands

**5. Database Language (SQL)-II (DML)**

- 5.1. Select Command with Argument List/all arguments

- 5.2. Select Command with one table and Where Condition with
  - 5.2.1. Only One Condition
  - 5.2.2. Multiple Conditions joined by Boolean Operators (AND/OR/NOT)
- 5.3. Select Command with Multiple Tables: Concept of Join, Cross-Join, Full Join, Natural Join, Inner Join, Outer Join-Full Outer Join, Left Outer Join, Right Outer Join etc.
- 5.4. Select Command with Exists, ANY & ALL.

## **6. Database Language (SQL)-III(Aggregate Commands & DCL )**

- 6.1. Select Command with Group by and Having, Aggregate Commands like Sum, Count, and Maximum etc.
- 6.2. Authorization Privileges- Grant/Revoke Commands

## **7. Indices, Views and Transactions**

- 7.1. Basic Concept of Transaction-ACID properties.
- 7.2. Basic Concept of Views as Virtual Tables-Need
- 7.3. Basic Concept of an Index and its Need

## **COURSE OUTCOME:**

### **After the completion of the course the student will be able to:**

- Define the basic concepts of databases in general and relational databases in particular
- Design and draw the ER diagram for any database system
- Illustrate the concept of normalization
- Write various DDL commands/Queries in SQL.
- Write various DML commands with various conditions including "Group By"
- Write various DCL commands
- Illustrate the concepts of Indices, Views and Transactions

## **RECOMMENDED BOOKS:**

1. Fundamentals of Database Systems by Elamasari & Navathe, A. Wesley
2. Introduction to Database Systems by C.J. Date, Narosa
3. Introduction to Databases Systems by Korth, Silberschatz , Tata McGraw Hill
4. Database Management Systems" by Raghu Ramakrishnan and Johannes Gehrke.
5. Database Systems: Concepts, Design and Applications" by S. K. Singh and A. K. Singh.
6. SQL Programming and Database Design Using Microsoft SQL Server" by Kalman Toth.

**UNIT WISE TIME AND MARKS DISTRIBUTION**

<b>Unit No.</b>	<b>Time Allotted (Hrs)</b>	<b>Marks Allotted (%)</b>
1	06	10
2	08	12
3	14	20
4	06	10
5	18	30
6	06	09
7	06	09
<b>Total</b>	<b>64</b>	<b>100</b>

4TH SEM NEP2020 CURRICULUM FOR POLYTECHNICS OF J&K

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: <b>COPC306</b>	Course Title: <b>Database Management Systems Lab</b>
Semester: <b>3<sup>rd</sup></b>	Credit: <b>1</b>
Periods Per Week: <b>02 (L: 00, T: 00, P: 02)</b>	

**COURSE OBJECTIVE:**

The objective of the "Database Management Systems Lab" is to provide hands-on experience in implementing and managing databases, covering schema creation, query design, and data manipulation. Students will gain practical skills in administration, optimization, and data integrity, preparing them for real-world database scenarios.

**LIST OF PRACTICALS:**

1. Installation of MySQL using XAMPP and successful execution of the same using PHPMYADMIN
2. Installation of Workbench for MySQL.
3. Installation of SQL Server for MSSQL.
4. Use of Create Command in MySQL-for creating Databases and Tables
5. Use of Alter Command in MySQL for Altering the Structure of a table
6. Use of Drop Command in MySQL for Deleting the database/table
7. Use of Insert Command in MySQL for Inserting Data in a table
8. Use of Select Command in MySQL with No or Single Condition
9. Use of Select Command in MySQL with 02 or more Conditions
10. Use of Select Command in MySQL with Two or more tables: Cross Join
11. Use of Select Command in MySQL with Two or More tables: Natural Join.
12. Use of Select Command in MySQL with Two or More Tables: Inner Join and Outer Join.
13. Use of Select Command in MySQL with EXISTS, ANY & ALL
14. Use of Select Command in MySQL with Group By and Having and use of Aggregate functions.
15. Use of Grant/Revoke Commands in MySQL.

**Note: All practical from S.No. 04 to 15 to be performed using MySQL Workbench, SQL Server Management Studio & Direct Command Prompt as well.**

<b>PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING</b>	
Course Code: <b>HS410</b>	Course Title: <b>BASICS OF ENTREPRENEURSHIP DEVELOPMENT</b>
Semester: <b>4<sup>th</sup></b>	Credit: <b>2</b>
Periods Per Week: <b>2 (L: 02, T: 0, P: 0)</b>	

**COURSE OBJECTIVE:**

The course provides a comprehensive understanding of the concept of an entrepreneur and intricacies involved in managing entrepreneurial projects. The prime aim is to imbibe the necessary entrepreneurial competencies among students and motivate them to choose entrepreneurship as a feasible and desirable career option.

**COURSE CONTENT:****1. Introduction to Entrepreneurship**

- 1.1 Meaning and concept of entrepreneurship.
- 1.2 History of entrepreneurship development,
- 1.3 Entrepreneurs, Managers and Intrapreneurs
- 1.4 Barriers to entrepreneurship
- 1.5 Role of Entrepreneurship in economic development.
- 1.6 Types of Entrepreneurships.

**2. Entrepreneurial process and Entrepreneurship Development**

- 2.1 Entrepreneurial competencies.
- 2.2 Traits and characteristics, motives, attitude, achievement orientation, self-assessment required to be an entrepreneur.
- 2.3 Entrepreneurial decision process, Skill gap analysis,

**3. Entrepreneurship as career**

- 3.1 Identification and selection of business opportunities.
- 3.2 Market assessment, technology search, production capacity.
- 3.3 Assessment of infrastructure requirements and other resources.
- 3.4 Business plan and its importance

**4. Institutional infrastructure to promote entrepreneurship**

- 4.1 Overview, roles, promotional schemes.
- 4.2 Financial, regulatory and other support system institutions.

## 5. Emerging trends in Entrepreneurship

- 5.1 Technopreneurship
- 5.2 Webpreneurs, Agripreneurs
- 5.3 Women Entrepreneurship
- 5.4 Franchising

## 6. Legal and financial aids

- 6.1 Definition and purpose of legal aid
- 6.2 Legal Aid Providers
- 6.3 Challenges in Legal Aid
- 6.4 Financial Aid Programs
- 6.5 Student Financial Aid
- 6.6 Financial Aid for Small Businesses
- 6.7 Social Welfare Programs

### COURSE OUTCOME:

#### After completion of the course the student will be able to

- Understand the meaning and concept of entrepreneurship, its historical development, and its role in economic development.
- Differentiate between entrepreneurs, managers, and entrepreneurs and identify the barriers to entrepreneurship.
- Identify the traits, characteristics, and attitudes required to be a successful entrepreneur and perform a self-assessment to evaluate one's potential in entrepreneurship.
- Analyze business opportunities, conduct market assessments, and assess resource requirements for entrepreneurial ventures.
- Recognize and explore emerging trends in entrepreneurship, such as technopreneurship, webpreneurs, Agripreneurs, women entrepreneurship, and franchising.

### RECOMMENDED BOOKS:

1. Desai Vasant, Fundamentals of entrepreneurship and small business management, Himalya publishing house.
2. Gupta C.B. Srinivasan N.P. Entrepreneurship development in India, Text and cases, Sultan Chand and Sons, New Delhi.
3. Charantimath, P.M. Entrepreneurship development and small business management, Pearson Education.
4. Generic skills and entrepreneurship development by Ishan Publishers, Ambala.
5. A handbook of entrepreneurship edited by B.S. Rathore and Dr. J.S. Saini.

**UNIT WISE TIME AND MARKS DISTRIBUTION**

<b>Unit No</b>	<b>Topic</b>	<b>Time (hrs)</b>	<b>Marks (%age)</b>
1.	Introduction to Entrepreneurship	05	20
2.	Entrepreneurial process and Entrepreneurship Development	04	15
3	Entrepreneurship as career	05	20
4	Institutional infrastructure to promote entrepreneurship	05	18
5	Emerging trends in Entrepreneurship	04	15
6	Legal and financial aids	04	12
	<b>Total</b>	<b>32</b>	<b>100</b>

4TH SEM NEP2020 CURRICULUM FOR POLYTECHNICS OF I&K