CURRICULUM

FOR

FIFTH SEMESTER

OF

THREE-YEAR DIPLOMA COURSE

IN

COMPUTER ENGINEERING

STUDY SCHEME FOR FIFTH SEMESTER COMPUTER ENGINEERING

Code	Subjects	Study Scheme Periods Per Week			Total Hours L+T+P	CREDITS			Total Credits L+T+P
		L	T	P		L	T	P	
COPC501	Computer Peripherals and Interfacing	4	0	0	4	4	0	0	4
COPC502	Computer Peripherals and Interfacing Lab	0	0	2	2	0	0	1	1
COPC503	Python Programming	4	0	0	4	4	0	0	4
COPC504	Python Programming Lab	0	0	2	2	0	0	1	1
	Elective-I	3	0	0	3	3	0	0	3
	Elective-I Lab	0	0	2	2	0	0	1	1
	Elective-II	3	0	0	3	3	0	0	3
	Elective-II Lab	0	0	2	2	0	0	1	1
MP509	Seminar	0	0	2	2	0	0	1	1
MP510	Minor Project	0	0	4	4	0	0	2	2
MP511	Industrial Training	4 weeks to 6weeks during summer/winter break				0	0	1	1
		14	0	14	28*	14	0	8	22

*Remaining 02 hours shall be utilized for any other sports/extra-curricular activities.

PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING	
Course Code: **COPC501**	Course Title: **Computer Peripherals and Interfacing**
Semester: **5ᵗʰ**	Credit: **4**
Periods Per Week: **4 (L: 4, T: 0, P: 0)**	

COURSE OBJECTIVE:

This course focuses on the study of computer peripherals, their functions, and the techniques involved in interfacing them with computer systems. Students will gain a comprehensive understanding of various peripheral devices commonly used in computer systems and learn how to effectively interface them through different communication interfaces.

COURSE CONTENT

1. **Video Display**
   1.1. The basic principle and working of video monitors (CRT, LCD, LED)
   1.2. Video display EGA/VGA/SVGA/PCI/AGP adapters and their architecture.
   1.3. Overview of raster scan, vector graphic, their main difference and relative advantages.

2. **Hardware Organization of PCs**
   2.1. Types of motherboard and their details (Form Factor, Chipset).
   2.2. Types of processors (INTEL, AMD) and their compatibility with motherboards
   2.3. Serial and parallel ports, PS/2, USB Ports
   2.4. RISC & CISC architecture.

3. **Storage Devices**
   3.1. Hard disk drives (HDDs)
   3.2. Solid-state drives (SSDs)
   3.3. Optical drives (CD/DVD/Blu-ray)
   3.4. Flash memory (USB drives, memory cards)

4. **Input and Output Devices**
   4.1. Keyboards and keypads, Light Pen, Touch Screens, Digitizers.
   4.2. Pointing devices (mouse, trackball, touchpad)
   4.3. Scanners and digital cameras, Biometric input devices
   4.4. Monitors and displays
   4.5. Printers, its types and plotters, Projectors and visual display units
   4.6. Audio devices (speakers, headphones).

5. **Interfacing Techniques, Troubleshooting and Maintenance**
    5.1. Device drivers and software interfaces
    5.2. Addressing and data transfer methods
    5.3. Interrupts and DMA (Direct Memory Access),
    5.4. Diagnosing and resolving peripheral device issues, Firmware and driver updates.
    5.5. Preventive maintenance and cleaning procedures.

6. **Basic Input/output System and Power Supplies**
    6.1. Overview of BIOS and its role in the computer boot process.
    6.2. Understanding the components and structure of BIOS firmware
    6.3. ROM (Read-Only Memory) and flash memory in BIOS.
    6.4. Overview of SMPS and its advantages over linear power supplies
    6.5. Basic working principle and components of SMPS

COURSE OUTCOME:

After completion of this course the students will be able to:
- Understand the basic concepts of computer peripherals and their role in computer systems.
- Identify and describe the functions and characteristics of various computer peripherals.
- Demonstrate knowledge of different types of interfaces and protocols used for peripheral device communication.
- Analyze and select appropriate peripheral devices based on system requirements.
- Develop skills in interfacing peripheral devices with computer systems.
- Troubleshoot common issues related to peripheral devices and their interfaces.

RECOMMENDED BOOKS:
1. Computer Peripherals and Interfaces" by Amit Kamra
2. "Peripheral Interfacing Using PC for Data Acquisition and Process Control" by Dhananjay A. Gadre
3. "Interfacing to the IBM Personal Computer" by Lewis C. Eggebrecht
4. "Interfacing Sensors to the IBM-PC" by Tom Kibalo
5. "Universal Serial Bus System Architecture" by Don Anderson, MindShare Inc.
6. Fundamentals of Computers by Sukhvir Singh; Khanna Publishers, New Delhi
7. Computer Peripherals for Micro Computers, Microprocessor and PC by Levis Hahensteu
8. Inside the PC (Eight Edition) by Peter Norton; Tech Media Publication, Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted (Hrs)	Marks Allotted (%)
1	09	16
2	10	16
3	10	16
4	15	20
5	10	16
6	10	16
Total	**64**	**100**

PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING	
Course Code: **COPC502**	Course Title: **Computer Peripherals and Interfacing Lab**
Semester:**5th**	Credits: **01**
Periods Per Week :**2 (L: 0, T: 0, P:2)**	

COURSE OBJECTIVES:

The objectives for practical on Computer Peripherals and Interfacing are designed to enhance students' practical skills and reinforce the theoretical concepts learned in the classroom.

LIST OF PRACTICAL:

1. To study the working of CRT, LCD, LED (colored and black and white monitor) and it's troubleshooting.

2. To Study the components and internal parts, working of hard disk and CDROM, DVD, Flash Drives.

3. To study the operations and components and internal parts of Key Board, mouse and their troubleshooting.

4. Study of components and internal parts and working of DMP, Inkjet printer and Laser printer and various installations of printers.

5. To study the SMPS circuit and measure its various voltages. Connecting SMPS to motherboard and other devices.

6. Study the operation and maintenance of UPS.

7. Exercise on assembling a PC with peripherals and testing the same.

8. Setup and configuration of ROM BIOS.

9. Visit to nearby industry.

PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING	
Course Code: **COPC503**	Course Title: **Python Programming**
Semester: **5th**	Credit: **4**
Periods Per Week: 0**4 (L: 04, T: 00, P: 00)**	

COURSE OBJECTIVES:

The course aims to provide students with a comprehensive understanding of Python programming, starting from its historical development and installation to utilizing Visual Studio Code as an Integrated Development Environment (IDE). Students will learn the fundamental syntax and data structures of Python, enabling them to write basic programs with loops, conditional statements, and functions. Additionally, they will gain proficiency in handling strings, file input/output operations, and implementing regular expressions. By the end of the course, students will be equipped with the knowledge and skills necessary to develop practical Python applications and solve real-world problems using this versatile programming language.

COURSE CONTENT:

1. Introduction

    1.1   Brief History of Python.
    1.2   Python Versions
    1.3   Installing Python
    1.4   Executing Python from the Command Line
    1.5   Using Visual studio code as IDE
    1.6   Python Reserved Words
    1.7   Naming Conventions

2. Basic Python Syntax

    2.1   Basic Syntax
    2.2   Indenting
    2.3   Comments
    2.4   The 'id' function
    2.5   Basic input and basic output (print) function
    2.6   Numeric Data Types
    2.7   Conversion Functions

3 Language Components

    3.1   The if Statement
    3.2   Relational and Logical Operators
    3.3   Bit Wise Operators

COURSE OUTCOME:

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

- Write and run a python code

- Do string manipulation operations in python code

- Use python data structures efficiently

- Use loops and conditionals in code

- Write functions in Python

- Perform basic file i/o operations in Python code

RECOMMENDED BOOKS:

1. Learning Python by Mark Lutz; Pratham Books, Bangalore
2. Let Us Python – Yashavant Kanetkar
3. Python Crash Course – Eric Matthes
4. Foundations of Python Network Programming by John Goerzen and Brandeu Rhodes
5. Dive Into Python by Mark Pilgrim; Pratham Books, Bangalore
6. Think Python by Allen B. Downey; O'Reily Media
7. Python Programming For Beginners: A Must Read Introduction to Python Programming by Robert Richards; Pratham Books, Bangalore

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted (Hrs)	Marks Allotted (%)
1	4	05
2	12	20
3	10	15
4	12	20
5	10	15
6	10	15
7	6	10
Total	**64**	**100**

PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING	
Course Code: **COPC504**	Course Title: **PYTHON Programming LAB**
Semester: **5th**	Credit: **1**
Periods Per Week: **02 (L: 00, T: 00, P: 02)**	

COURSE OBJECTIVES:

This practical Python course covers fundamental data types, functions, operators, conditional statements, loops, strings, files, collections, searching, sorting, and regular expressions. Students will gain essential skills for programming and data manipulation.

LIST OF PRACTICALS:

1. Demonstrate about fundamental Data types in Python Programming (i.e., int, float, complex, bool and string types)
2. Demonstrate the working of following functions in Python i.e. id( ), type( ) and range( )
3. Write a Python program to demonstrate various base conversion functions.
4. Write a Python program to demonstrate various type conversion functions.
5. Demonstrate the following Operators in Python with suitable examples.
   i) Arithmetic Operators
   ii) Relational Operators
   iii) Assignment Operator
   iv) Logical Operators
   v) Bit wise Operators
   vi) Ternary Operator
   vii) Membership Operators
   viii) Identity Operators
6. Demonstrate the following Conditional statements in Python with suitable examples.
   i) if statement
   ii) if else statement

7. Demonstrate the following loop statements in Python with suitable examples.
   i) While loop
   ii) For loop
   iii) Break, continue and pass

8. Write Python programs to print the following Patterns:

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

```
1
2 1
3 2 1
4 3 2 1
5 4 3 2 1
```

```
1
1 2 1
1 2 3 2 1
1 2 3 4 3 2 1
1 2 3 4 5 4 3 2 1
```

```
      *
     * *
    * * *
   * * * *
  * * * * *
 * * * * * *
* * * * * * *
```

9. Demonstrate the various functions, which operate on Strings in Python.
   - By using Indexing, Slice operator
   - Len(), strip(), lstrip(), rstrip(), find(), index(), count(), replace(), split(), upper(), lower(), title(), startswith(), endswith(), swapcase(), join(), rfind(), rindex()

10. Create list object in python and perform the following operations on it-
    i) list( ) ii) len( ) iii) count( ) iv) index ( ) v) append( ) vi) insert( ) vii) extend() viii) remove( ) ix) pop( ) x) reverse( ) xi) sort( ) xii) copy( ) xiii) clear( )

11. Create tuple object in python and perform the following operations on it-
    i)   len( ) ii) count( ) iii) index( ) iv) sorted( ) v) min ( ) vi)max( ) vii) cmp( ) viii) reversed( )

12. Create set object in python and perform the following operations on it-
    i) add( ) ii) update( ) iii) copy( ) iv) pop( ) v) remove( ) vi)discard( ) vii) clear( ) viii) union() ix) intersection( ) x) difference( )

13. Create dictionary object in python and perform the following operations on it-
    i) dict( ) ii) len( ) iii) clear( ) iv) get( ) v) pop( ) vi)popitem( ) vii) keys( ) viii) values() ix) items( ) x) copy( ) xi) update()
14. Write Python function to demonstrate the following-
    i)   Positional Parameters
    ii)   Default Parameters
    iii)   Keyword Parameters
15. Python program to open/read/write/append/close a file.

PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING AND INFORMATION TECHNOLOGY	
Course Code: **MP509**	**Course Title**: **Seminar**
Semester: **5th**	Credit: **1**
Periods Per Week: **2 (L: 0, T: 0, P: 2)**	

Students will have the opportunity to deliver one or two seminars aimed at enhancing their presentation skills, deepening their understanding of specific topics, and fostering collaboration between academia and industry. These seminars will provide a platform for students to showcase their knowledge, research abilities, and innovative thinking to industry professionals and fellow students. The seminars will be structured as follows:

1. **Seminar Topic Selection:**
   - Students will choose topics relevant to current trends, emerging technologies, or challenges in the field of computer engineering.
   - Topics may include artificial intelligence, cybersecurity, data science, Internet of Things (IoT), cloud computing, or any other area of interest within the domain of computer engineering.

2. **Preparation Phase:**
   - Students will conduct in-depth research on their chosen topic, gathering information from academic journals, industry reports, and reputable online sources.
   - They will create comprehensive presentation materials, including slides, diagrams, and multimedia content to support their seminar.

3. **Practice Sessions:**
   - Prior to the seminar, students will participate in practice sessions to refine their presentation skills, receive feedback from peers and instructors, and ensure clarity and coherence in their delivery.

4. **Seminar Delivery:**
   - On the designated day, students will deliver their seminars in front of an audience comprising industry professionals, faculty members, and fellow students.
   - Each seminar will typically last 20-30 minutes, followed by a question-and-answer session to facilitate discussion and exchange of ideas.

5. **Feedback and Evaluation:**
   - Following each seminar, participants will provide constructive feedback to the presenter, highlighting strengths and areas for improvement.
   - Faculty members and industry experts will evaluate the content, delivery, and overall effectiveness of the seminar, providing valuable insights for student development.

6. **Reflection and Learning:**
   After completing their seminars, students will reflect on their experiences, identifying lessons learned, challenges overcome, and areas for future growth. They will document their reflections in their industrial training reports, integrating insights gained from the seminar experience into their overall learning journey.

By participating in these seminars, students will not only enhance their communication and presentation skills but also deepen their understanding of key concepts and issues in computer engineering. Moreover, the interaction with industry professionals will provide valuable networking opportunities and industry insights, enriching their overall educational experience.

COURSE EVALUATION:

Evaluation of students' performance during the seminar presentations will be conducted by industry experts and faculty members. The assessment criteria will focus on various aspects of the seminar, including content, delivery, engagement, and overall effectiveness. Here's a draft of how students' performance will be evaluated:

1. **Content (40% of total evaluation):**
   - Relevance: The extent to which the seminar topic is pertinent to the field of computer engineering.
   - Depth of Research: The thoroughness and depth of the student's research on the chosen topic.
   - Clarity of Concepts: The ability to explain complex concepts clearly and concisely.
   - Originality and Innovation: The presentation of fresh insights or innovative perspectives on the topic.

2. **Delivery (30% of total evaluation):**
   - Organization: The logical structure and flow of the presentation, including introduction, main points, and conclusion.
   - Visual Aids: The effectiveness of visual aids (e.g., slides, diagrams) in enhancing understanding and engagement.
   - Verbal Communication: The clarity, articulation, and pace of the student's speech.
   - Body Language: The use of appropriate gestures, eye contact, and overall confidence during the presentation.

3. **Engagement (20% of total evaluation):**
   - Audience Interaction: The student's ability to engage the audience through questions, anecdotes, or interactive elements.
   - Interest Generation: The degree to which the presentation captures and maintains the audience's interest throughout.
   - Relevance to Audience: The alignment of the content with the audience's background and interests.

4. **Overall Effectiveness (10% of total evaluation):**
   - Impact: The overall impact of the seminar in terms of stimulating discussion, raising awareness, or inspiring further inquiry.
   - Time Management: The ability to manage time effectively and cover the key points within the allotted time frame.

Each evaluator will assign scores based on these criteria, and the final evaluation will be a weighted average of the scores given by all evaluators and will necessarily give each evaluated student the feedback on his/her performance, highlighting strengths and areas for improvement.

A complete compiled report for the same is to be submitted by the concerned evaluator to the concerned HOD/Principal for record and reference.

PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING AND INFORMATION TECHNOLOGY	
Course Code: **MP510**	**Course Title**: Minor Project
Semester: **5ᵗʰ**	Credit: **2**
Periods Per Week: **4 (L: 0, T: 0, P: 2)**	

COURSE OBJECTIVE:

The Computer Engineering diploma program aims to equip students with practical skills and knowledge essential for their future roles as technologists. To achieve this, the program focuses on providing students with diverse pathways for skill development and practical application:

Students can opt for any one of the following options:

1. **Live Training Experience and Specialized Training:**
   - Providing immersive real-world applications by establishing strong connections with technology companies or organizations.
   - Offering project-oriented and professional training opportunities either after the completion of the 4th semester or after the completion of the 5th semester, with training sessions lasting for 2 to 3 weeks.
   - Offering specialized training opportunities, such as at the Center for Invention, Innovation, Incubation & Training (CIIIT) in Baramulla and Jammu, for a minimum of two weeks in emerging technologies like Internet of Things (IoT).

2. **Minor Project Development:**
   - Allowing students the option to undertake the development of a Minor Project during their 5th semester.
   - Enabling students to apply their knowledge and skills in computer engineering to conceive, plan, and execute projects, thereby demonstrating their understanding of key concepts and technologies.

3. **Major Project Exploration:**
   - Offering students the opportunity to dedicate their efforts towards a Major Project during their 6th semester.

- Allowing students to delve deep into a specific area of interest within the field of computer engineering, enhancing their practical skills and readiness for future professional endeavors.

PROGRAM: THREE YEAR DIPLOMA IN COMPUTER ENGINEERING AND INFORMATION TECHNOLOGY	
Course Code: **MP511**	**Course Title**: Industrial Training
Semester: **5th**	Credit: **1**
Duration: 04 to 06 Weeks during Summer/Winter Break	

COURSE OBJECTIVE:

Industrial training for Diploma in Computer Engineering aims to provide students with practical exposure and hands-on experience in various facets of the field. Throughout the training, students will develop technical skills in computer hardware, software, and networking, aligning with industry standards and trends. The program emphasizes problem-solving abilities by presenting students with real-world engineering challenges and fostering their capacity to work effectively in teams. Additionally, students will gain proficiency in project management methodologies, communication skills, and professional etiquette, preparing them for the demands of the workplace. Practical training opportunities cover areas such as programming, system administration, database management, and cybersecurity, ensuring that students are well-equipped for entry-level positions in the industry. Moreover, the training emphasizes adaptability, flexibility, and a commitment to continuous learning, essential traits for success in dynamic and evolving environments. By the end of the program, students will have acquired not only technical expertise but also the soft skills and industry exposure necessary to excel in their careers as computer engineering professionals.

The students shall have to necessarily attend an industrial training for a period of 04 to 06 weeks during the summer/winter vacations after the completion of 3rd or 4th Semester (2nd Year) in any of the relevant or related domains. The students may also opt to undergo training in Online Mode/Work from Home.

The students have to submit the copy of the certificate to the institute at the time of exam which will be mandatory and a viva is to be conducted both at the time of internal examination and external examination. The student is to be evaluated on the basis of knowledge gained and skill acquired during the said training period.