

**Revised Curriculum Structure of FYUGP & FYIMP
OfGAUHATI UNIVERSITY UNDER NEP 2020
(As per the combined PGCCS & UG CCS held on 7th May, 2026)**

January 2025

(Approved by Academic Council, GU, vide Resolution No.....)

**COMPUTER APPLICATION
(MINOR)**



**Gauhati University
Guwahati-781014
Assam:: INDIA**

FYUGP and FYIMP Review& Proposed new structure: Jan-2025

As discussed and recommended in the Review Committee Meetings held on 31st December, 2024 and 10th January, 2025:

Section 4, 5 and 6: Minor only Stream:

Section 4: To be implemented from 2025, Newly Admitted FYUGP and FYIMP (Minor Only):

- For 2025 admitted batch: Total Core Papers: 2 Subjects to be selected from the available subjects of the College.

Semester-1			Semester-2		
Type	Course	Credit	Type	Course	Credit
Minor	Minor-1: Code: COA0100104 (Course-1: Fundamentals of Computer and Programming)	4 (3+1)	Minor	Minor-1: Code: COA0200104 (Course-2: Database Management System)	4 (3+1)
	Minor-2 (Course-1)	4		Minor-2 (Course-2)	4
SEC	SEC-1*	3	SEC	SEC-2 *	3
AEC	AEC-1 (Languages/Alt. English)	4	AEC	AEC-2 (English Communication)	4
MDC	MDC-1	3	MDC	MDC-2	3
VAC	VAC-1	2	VAC	VAC-2	2
		20			20

MINOR to MAJOR CHANGE to be allowed after the 2nd Semester. Major to start from Day 1 of the Third Semester.

Semester-3			Semester-4		
Type	Course	Credit	Type	Course	Credit
Minor	Minor-1 : Code: COA0300104 (Course-3: Basics of Operating System and Networking)	4 (3+1)	Minor	Minor-1 Code: COA0400104 (Course-5: Internet and Web Programming)	4 (2+2)
	Minor-1 Code: COA0300204 (Course-4: Introduction to Desktop Publishing)	4 (1+3)		Minor-1 Code: COA0400204 (Course-6: Computer Hardware and Installation)	4 (1+3)
	Minor-2(Course-3)	4		Minor-2(Course-4) Code: COA0400304 (Course-4: Introduction to Desktop Publishing)(in case students select CA as Minor 2)	4
SEC	SEC-3 *	3		Minor-2(Course-5)	4
MDC	MDC-3	3		Minor-2(Course-6)	4
VAC	VAC-3	2			
		20			20

- Summer Break in Between 4th and 5th Semester: Internship-4 (Credit added to 5th Semester)
- Those who miss the Internship in the 4th-5th Summer Break shall do the Internship after the 6th Semester (during the 6th Semester Summer Break). In such cases, the 5th Semester result shall not be COMPLETE.

Semester-5			Semester-6		
Type	Course	Credit	Type	Course	Credit
Minor	Minor-1: Code: COA0500104 (Course-7: Multimedia Applications)	4 (2+2)	Minor	Minor-1 : Code: COA0600104 (Course-9: Office Operation and Management)	4 (1+3)
	Minor-1 Code: COA0500204 (Course-8: Cyber Law and Computer Security)	4 (2+2)		Minor-1 : Code: COA0600204 (Course-10: E-commerce Technologies)	4 (2+2)
	Minor-2(Course-7)	4		Minor-2(Course-9)	4
	Minor-2(Course-8)	4		Minor-2(Course-10)	4
Internship	Internship 1 Code: COA0500304	4		Minor-1 (Course-11: Code: COA0600304 Project and Presentation)	4
		20			20

*SEC-1, 2, and 3 are Open SECs. Any Skill that the Students require to be Skillful in their professional/established life. Students may choose one of the available Skill Courses in the College for that Semester.

Serial	Type	Credit
1	Minor-1: 10/11 CoursesX4	40/44
2	Minor-1: 11/10 CoursesX4	44/40
3	AEC 4+4	08
4	SEC 3+3+3	09
5	MDC 3+3+3	09
6	VAC 2+2+2	06
7	Internship	04
		120

Semester-7			Semester-8		
Type	Course	Credit	Type	Course	Credit
Minor	System Analysis and Design (Research Scholar)	4	Minor	Basic Python Programming (DrHasin Ahmed)	4 (3+1)
	AI tools for Smart Office (Dr Rintu Das)	4 (2+2)		Digital Marketing: Tools and Techniques (Gautam)	4 (3+1)
	Introduction to AI (Dr C J Kumar)			MIS	4
					4
Internship	Internship 1			Minor-1 Project and Presentation	4
		20			20

Section 5: To be implemented from 2025 EXISTING FYUGP and FYIMP-2024 Batch:

- They have to now select ONLY 2 Core Subjects as Minor-1 and Minor-2.
- One Core out of the already taken 3 Cores shall be dropped.
- AEC-2 (Communicative English) has become 4 Credits now. The existing syllabus (of 2 Credits) will start in Colleges, and by February, the expanded syllabus for 4 credits will be provided.
- A special AEC of 2 credits shall be added in the 4th Semester to make the total AEC Credits 8

Semester-1			Semester-2		
Type	Course	Credit	Type	Course	Credit
Minor	Core-1 (Minor -1-Course-1: : Code: COA0100104 Computer Fundamentals and Programming)	4 (3+1)	Minor	Minor-1 (Course-2:) Code: COA0200104 Database Management System)	4 (3+1)
	Core-2 (Minor-2-Course-1)	4		Minor-2 (Course-2)	4
	Core-3 (Remains as additional))	4	SEC	SEC-2*	3
SEC	SEC-1	3	AEC	AEC-2 (English Communication)	4
AEC	AEC-1	2	MDC	MDC-2	3
MDC	MDC-1	3	VAC	VAC-2	2
VAC	VAC-1	2			
		22			20

Semester-3			Semester-4		
Type	Course	Credit	Type	Course	Credit
Minor	Minor-1: Code: COA0300104 (Course-3: Basics of Operating System and Networking)	4 (3+1)	Minor	Minor-1 : Code: COA0400104 (Course-5: Internet and Web Programming)	4 (2+2)
	Minor-1: Code: COA0100204 (Course-4: Introduction to Desktop Publishing)	4 (1+3)		Minor-1: Code: COA0400204 (Course-6: Computer Hardware and Installation)	4 (1+3)
	Minor-2 (Course-3)	4		Minor-2 (Course-4)	4
SEC	SEC-3 *	3		Minor-2 (Course-5)	4
MDC	MDC-3	3		Minor-2 (Course-6)	4
VAC	VAC-3	2	AEC	AEC-3 (Special)	2
		20			22

- Summer Break in Between 4th and 5th Semester: Internship-4 (Credit added to 5th Semester)
- Those who miss the Internship in the 4th-5th Summer Break shall do the Internship after the 6th Semester (during the 6th Semester Summer Break). In such cases, the 5th Semester result shall not be COMPLETE.

Semester-5			Semester-6		
Type	Course	Credit	Type	Course	Credit
Minor	Minor-1: Code: COA0500104 (Course-7: Multimedia Applications)	4 (2+2)	Minor	Minor-1 Code: COA0600104 (Course-9: Office Operation and Management)	4 (1+3)
	Minor-1 Code: COA0500204 (Course-8: Cyber Law and Computer Security)	4 (2+2)		Minor-1 Code: COA0600204 (Course-10: E-commerce Technologies)	4 (2+2)

Internship	Minor-2(Course-7)	4		Minor-2(Course-9)	4
	Minor-2(Course-8)	4		Minor-2(Course-10)	4
	Internship Code: COA0500304	4		Minor-1 (Course-11: Code: COA0600304 Project and Presentation)	4
		20			20

*SEC-1, 2, and 3 are Open SECs. Any Skill that the Students require to be Skillful in their professional/established life. Students may choose one of the available Skill Courses in the College for that Semester.

Semester-7			Semester-8		
Type	Course	Credit	Type	Course	Credit
Minor	System Analysis and Design (Research Scholar)	4	Minor	Basic Python Programming (DrHasin Ahmed)	4 (3+1)
	AI tools for Smart Office (Dr Rintu Das)	4 (2+2)		Digital Marketing: Tools and Techniques (Gautam)	4 (3+1)
	Introduction to AI (Dr C J Kumar)			MIS	4
					4
Internship	Internship 1			Minor-1 Project and Presentation	4
		20			20

Serial	Type	Credit
X	Core-3 (1 st Semester) remains as additional credit for the 2024 admitted batch	4
1	Minor-1: 10/11 CoursesX4	40/44
2	Minor-1: 11/10 CoursesX4	44/40
3	AEC 2+4+2	08
4	SEC 3+3+3	09
5	MDC 3+3+3	09
6	VAC 2+2+2	06
7	Internship	04
		124

Section 6: To be implemented from 2025EXISTING FYUGP and FYIMP 2023 Batch:

- They have now to select ONLY 2 Core Subjects as their Minors.
- One Core out of the already taken 3 Cores shall be dropped.

Semester-1			Semester-2		
	Completed			Completed	
		22			22
Semester-3			Semester-4		
			Type	Course	Credit
Completed			Minor	Minor-1 Code: COA0400104 (Course-5: Internet and Web Programming)	4 (2+2)
				Minor-1 Code: COA0400204 (Course-6: Computer	4 (1+3)

				Hardware and Installation)	
				Minor-2 (Course-4)	4
				Minor-2 (Course-5)	4
			AEC	AEC-3	4
		18			20

- Summer Break in Between 4th and 5th Semester: Internship-4 (Credit added to 5th Semester)
- Those who miss the Internship in the 4th-5th Summer Break shall do the Internship after the 6th Semester (during the 6th Semester Summer Break). In such cases, the 5th Semester result shall not be COMPLETE.

Semester-5			Semester-6		
Type	Course	Credit	Type	Course	Credit
Minor	Minor-1 Code: COA0500104 (Course-7: Multimedia Applications)	4 (2+2)	Minor	Minor-1 Code: COA0600104 (Course-9: Office Operation and Management)	4 (1+3)
	Minor-1 Code: COA0500204 (Course-8: Cyber Law and Computer Security)	4 (2+2)		Minor-1 Code: COA0600204 (Course-10: E-commerce Technologies)	4 (2+2)
	Minor-2 (Course-6)	4		Minor-2 (Course-8)	4
	Minor-2 (Course-7)	4		Minor-2 (Course-9)	4
Internship	Internship Code: COA0500304 (To be added from last Summer Break)	4	VAC	VAC-3	2
		20			18

Semester-7			Semester-8		
Type	Course	Credit	Type	Course	Credit
Minor	System Analysis and Design (Research Scholar)	4	Minor	Basic Python Programming (DrHasin Ahmed)	4 (3+1)
	AI tools for Smart Office (Dr Rintu Das)	4 (2+2)		Digital Marketing: Tools and Techniques (Gautam)	4 (3+1)
	Introduction to AI (Dr C J Kumar)	4		Management Information System	4
					4
Internship	Internship 1	4		Minor-1 Project and Presentation	4
		20			20

Serial	Type	Credit
1	Core-1&2 (1 st +2 nd +3 rd Semesters) total 6 Courses remain as Minor-1 and Minor-2 subjects, 3 in each Minor	24
2	Core-3 (1 st +2 nd +3 rd Semesters) total 3 Courses remain as Minor-3 subject totalling 3X4=12 Minor credits for the 2023 admitted batch: Already Completed-Considered as Minor-3 Completed	12
3	From 4-6 Semesters: Minor-1X6 CoursesX4 Minor-2X6 CoursesX4	24 24

4	AEC 2+2+4 (Already completed 2+2)	08
5	SEC 3+3+3 (Completed)	09
6	MDC 3+3+3 (Completed)	09
7	VAC 2+2+2 (Already completed 2+2)	06
8	Internship	04
		120

AUDIT Course: (Additional, if students desire/need):

- Students may take Additional Courses up to 12 Credits, subject to a maximum of 1 in one semester (totalling a maximum of 132 Credits in 3 Years) from the available Courses in the College.
- Such Courses shall be added as AUDIT COURSE in the Grade sheet along with the Grades obtained, if successfully passed.
- This will facilitate fulfilling students' desire to acquire additional subject knowledge, as well as to have additional required subjects for admission into certain Master's.
- Failed Audit Courses shall be dropped from the Grade sheet.

COA0100104: FUNDAMENTALS OF COMPUTER AND PROGRAMMING

1. Learning Outcome:

- The student will be able to learn about the basics of the computer system, which includes both the concept of computer hardware and software.
- Student will be able to learn about what a programming language is, and how to design an algorithm to solve a particular problem
- The student will be able to learn about the C programming language.

2. Prerequisite: NIL

3. Semester:1

4. Course Type: Compulsory

5. Course Level:100-199

6. Theory Credit: 3

7. Practical Credit:1

8. Number of required hours:

- a) Theory:45hrs
- b) Practical:30hrs
- c) Non-Contact:5 hrs

9. List of reference books

- Anita Goel, *Computer Fundamentals*, Pearson.
- Comdex: *Hardware and Networking Course Kit*, DreamTech Press.
- V.Rajaraman, Neeharika Adabala, *Fundamentals of Computers*, PHI.
- Ron Gilster, *PC Hardware: A Beginner's Guide*, Tata McGraw-Hill.
- E.Balaguruswamy, *Computer Fundamentals and C Programming*, Tata McGraw-Hill.
- B.S.Gottfried, *Programming with C*, Tata McGraw-Hill.
- B.W.Kernighan, D.M.Ritchie, *The C Programming Language*, PHI.

10. Detailed Syllabus

Unit no.	Unit content	No .of classes
1	Basics of the Computer System Evolution of Computer System, Classification of Computer, Modern Computer, Hardware and Software, Major components of a computer (A brief introduction of CPU, Main Memory, I/O units), Keyboard, Display, Mouse, Printers etc., Secondary Storage Devices (Hard Disks, Optical Disks, Flash Memory), Cache Memory and Virtual Memory concepts, Backup Devices, SMPS, BIOS, Processor, Motherboard, Sockets and Slots, Power Connectors, Peripheral Connectors, Bus Slots, USB, Pin Connectors, Network Interface Card, Network Cabling, I/O Box, Switches, RJ45 Connectors, Patch Panel, Patch Cord, Racks, Evolution of OS, Types of OS, Functions of OS.	7

2	Hard Disk Drive Logical Structure and File System, FAT, NTFS. Hard Disk Tools: Disk Clean-up, Error Checking, Defragmentation, Scanning for Virus, Formatting, Installing Additional HDD, New trends in HDD, Optical Media, CDROM, Theory of Operation, Drive Speed, Buffer, CD-R, CD- RW, DVD ROM, DVD Technology, Preventive Maintenance for DVD and CD Drives, Driver Installation, Writing-Cleaning CD and DVD.	5
3	Number System Representation of Numbers and Characters in Computer, Binary, Hexadecimal, Octal, BCD, ASCII, EBCDIC, and Grey codes, Conversion of Bases, Representation of Signed Integers, Sign and Magnitude, 1's Complement and 2's Complement Representation, Arithmetic Operations using 2's Complement Representation, Conditions for Overflow/Underflow and Its Detection.	7
4	Concept of Algorithm Programming Language, Bootstrapping, Assembler, Compiler, Interpreter, Linker and Loader, Definition and Concept of Algorithm and Flow Chart, Writing Simple Algorithms and Drawing Flow Charts for Simple Problems like Finding Sum, Max, Min, Average of a List of Numbers, etc.	6
5	Introduction to C Programming Elementary Data Types, Variables, Constants, Identifiers and Reserved Word, Constant Data Types, Syntax and Semantics, Variable Declarations, Initialization of Variable during Declarations, Scope and Lifetime of Variables, Operand, Operators in C: Definition of Unary, Binary and Ternary Operators, Arithmetic Operators, Assignment Operators, Relational Operators, Logical Operators and Bitwise Operators, Precedence and Associativity of C Operators, Expression in C, L-value and R-value, Side Effects of Operators, Cast and Size of Operator, Type Conversion. Expression Statement, Conditional Statement: if, if-else, switch, Iterative Statement: while, do-while, for, Other Statement: break, continue, goto, return, null Statement, block Statement. Definition and Declaration of Array, Accessing Elements in One-Dimensional and Two-Dimensional Arrays. Function Declaration, Function Declaration and Definition, Calling a Function, Parameters Passing Methods: Call by Value and Call by Address, Recursive Function. Basic Concept of Strings, Pointer and Structure in C, Different Storage Classes, Basic Concept of Files in C	20

Practical Part

Part A: Computer Fundamentals

(5 Classes/10 hours)

1. Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU, along with the configuration of each peripheral, and submit it to your instructor.

2. Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva.
3. Every student should individually install Microsoft Windows on their personal computer. The lab instructor should verify the installation and follow up with a Viva.
4. Hardware Troubleshooting: Students have to be given a PC that does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva
5. Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Part B: Programming in C

(10Classes/20hours)

(This is a suggestive list only. Questions are not limited to this list)

6. Write a program to display the ASCII value of a character.
7. Write a program to check whether a number is perfect or not.
8. Write a program to find out the biggest of three numbers using nested if.
9. Write a program to read a list of positive integers terminated by -1 and display the odd and even numbers separately, and also their respective counts.
10. Write a program to read values of n and x and print the value of y using switch case, where
 - i. $y=n+x$ when $n=1$
 - ii. $y=1+x/n$ when $n=2$
 - iii. $y=n+3x$ when $n=3$
 - iv. $y=1+nx$ when $n>3$ or $n<1$.
11. Write a program to find out the minimum, maximum, sum and average of n numbers without using an array.
12. Write a program to find out the minimum, maximum, sum and average of n numbers using an array.
13. Write a program to display the prime numbers within a given range.
14. Write a program to print the digits of a number in words (e.g. if a number 841 is entered through the keyboard, your program should print "Eight Four One")
15. Write a program to read numbers in a sorted array and insert a given element in a particular position.
16. Write functions to compute the factorial of a number using both recursive and non-recursive procedures.
17. Write a program to display the first n Fibonacci numbers using both recursive and non-recursive procedures.
18. Write a function to check whether a given integer is prime or not, and use it.
19. Write a program to multiply two matrices using a function.
20. Write a program to read an m x n matrix and calculate the Row sum and Column sum of the matrix.
21. Write a program to concatenate two strings using a function (without using a library function).
22. Write a program to convert a string from upper case to lower case and vice versa.
23. Write a program to swap two numbers using a function (pass the pointers).
24. Declare a structure of a student with details like roll number, student name and total marks. Using this, declare an array with 50 elements. Write a program to read details of n students and print the list of students who have scored 75 or more marks.
25. Write a program to copy a text file to another file.

COA0200104: DATABASE MANAGEMENT SYSTEM

1. Course Objectives:

- Learn database concepts and their architectural components.
- Describe different data models used for designing a database.
- To create a database using relational models and entity relationships concepts
- Normalise a database into various normal forms
- Design SQL queries to handle a relational database.

2. Course Outcomes:

3. Prerequisite: NIL

4. Semester: II

5. Course Type: Compulsory

6. Course Level:200-299

7. Theory Credit: 3

8. Practical Credit:1

9. Number of required hours:

- a) Theory:45hrs
- b) Practical:30hrs
- c) NonContact:5 hrs

10. List of reference books

- a) Dr. SatinderBal Gupta and Aditya Mittal, *Introduction to Database Management System*, University Science Press
- b) A. Silberschatz, S.Sudarshan, *Database System Concepts*, McGraw-Hill
- c) R.Elmasri, S.B.Navathe, *Fundamentals of Database Systems*, Pearson Education
- d) DrRajive Chopra, *Database Management System (DBMS): A Practical Approach*, S.Chand Publication

11. Detailed Syllabus

Unit no.	Unit content	No .of classes
1	Introduction to Database Management Systems Data and Information, Concepts of Fields, Records and Files, Definition of DBMS, Traditional File approach, Traditional file approach versus database management system approach, Disadvantages of Traditional File System, Need of a DBMS, Components of a DBMS, Advantages of DBMS, Disadvantages of Database Systems, Various uses of database System Applications, Database Users: <i>end users or naïve users, Online users, Application Programmers, DatabaseAdministrator(DBA)</i> , Responsibilities of DBA	7
2	Database Management System Architecture Data Independence and Three-tier architecture of DBMS, basic concept of data model, Database Languages (Data Definition Languages, Data Manipulation Languages)	4

3	E-R Model Entity, Strong and weak entities, Entity Sets, Attributes, various attribute types: <i>Simple and Composite Attributes, Single Valued and Multi-valued Attributes, Derived Attributes and Stored Attributes</i> , Domain of an attribute, Concept of Relationship, Types of Relationship: One-to-One, One-to-Many, Many-to-One and Many-to-Many, Various Symbols used in ER Diagram, Mapping constraints: <i>Mapping Cardinalities and Participation Constraints</i> in ER diagram	7
4	Relational Model Database Schema, sub schema and Instances, Attributes, Attribute domains, Relations, Tuples, Relational Schema, Column, Properties of Relations, Degree of a Relation, Constraints in Relational Model: Domain Constraints, Key Integrity, Referential Integrity. Keys: Primary keys, Foreign keys, Candidate Keys, SuperKeys, Alternative Keys, Advantages of relational model	8
5	Normalisation for Relational Databases Definition of Functional Dependency, Armstrong's Axioms in Functional Dependency, Types of Functional Dependency: <i>Partial Dependency, Full Functional Dependency, Transitive and Non-transitive Functional Dependency</i> , anomalies In relational database: <i>Insertion, Deletion and Update</i> anomalies, Concepts of Normalization, benefits of Normalization, Types of Normal Forms: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF) and Boyce-Codd Normal Form (BCNF)	7
6	SQL queries Characteristics of SQL, Basic data types in SQL, Data-definition language (DDL) commands: <i>Create Database, Create Table, Drop Table, Alter Table</i> . SQL Constraints: <i>Primary Key, Foreign Key, Not Null, Unique, Check, Default</i> . Data Manipulation Language (DML) commands: <i>Insert Into, Delete, Select, Update</i> . SQL clauses: <i>Where, Order By, Having, Group By, and Like</i> . SQL join operations: <i>Inner Join, Left Outer Join, Right Outer Join, and Full Join</i> . SQL aggregate functions: <i>sum(), count(), max(), min()</i> and <i>avg()</i>	12

Lab Content

Practical/ Lab work to be performed:

Lab No	Topics for the Laboratory work	No of contact Classes (1 Class = 2 hr)
1	Implementation of SQL DDL statements in MySQL DBMS: CREATE DATABASE, CREATE TABLE, ALTER TABLE, RENAME, DROP DATABASE / TABLE	3
2	Use of SQL DML statements in MySQL DBMS: INSERT, SELECT, UPDATE, DELETE SQL commands	3
3	Implementing the following constraints in MySQL DBMS: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE and DEFAULT	3

4	Handling the following SQL clauses in MySQL DBMS: WHERE, GROUP BY, ORDERBY, HAVING, IN, BETWEEN, LIKE	3
5	Working with the following aggregate functions in MySQL DBMS: COUNT,AVG, MAX, MIN and SUM	3
	Total Contact Classes:	15

COA0300104: BASIC OF OPERATING SYSTEM AND NETWORKING

1. Course Objectives:

- To give students the role of an operating system in a computer.
- To provide students the concept of process management
- To familiarize students with the concept of Networking
- To provide the practical concept of OS and Networking.

2. Course Outcomes:

3. Prerequisite: NIL

4. Semester:III

5. Course Type: Compulsory

6. CourseLevel:300-399

7. Theory Credit: 3

8. Practical Credit:1

9. Number of required hours:

- a) Theory: 45 hrs
- b) Practical:30 hrs
- c) NonContact:5 hrs

10. List of reference books

- (a) Operating System Concepts, Abraham Silberschatz, Peter B.Galvin, Greg Gagne, Wiley
- (b) DataCommunicationsandNetworking,BehrouzA.Forouzan, Sophia Chung Fegan, McGraw-Hill
- (c) Operating Systems: Internals and Design Principles, William Stallings, Pearson
- (d) Computer Networks, Andrew Stuart Tanenbaum, Pearson Education

11. Detailed Syllabus

Unit no.	Unit content	No. of classes
1	Introduction to Operating System Types of software, application software, system software, operating system, types of operating systems,operating system structure, systemcalls, protection and security, history and generations of operating systems, Open source operating systems	5
2	Process and Memory Management Process, process states, process scheduling algorithms, scheduling criteria, turnaround time, waiting time, response time, First Come First Serve (FCFS) scheduling, Shortest-Job-First (SJF) Scheduling, Shortest Remaining Time First scheduling, Priority Scheduling, Round Robin Scheduling, thread,deadlock, memory management, swapping, contiguousmemory allocation, first fit strategy, best fit strategy, worst fit strategy, paging, segmentation, page replacement algorithms, internal fragmentation, external fragmentation, virtual memory, demand paging	14
3	Networking Introduction Computer network, network topologies, LAN and WAN, internet, network models: ISO OSI, TCP/IP, protocols and standards, transmission media: guided and unguided transmission media, twisted pair cable, coaxial cable, fibre optic cable, radio waves, microwaves, infrared	5

4	Networking concepts Analogue and digital signals, error detection and correction, IPv4 addressing, dotted decimal notation, classful addressing, classless addressing, IPv6 addresses, routing protocols, distance vector routing protocol, link state routing protocol, physical address, ARP, RARP, ports, sockets, frames and packets, TCP and UDP protocols, hub, repeater, bridge, router, gateway	14
5	Internet and services Internet, ISP, types of ISPs, WWW, web server, web client, HTTP, HTTPS, web browsers, domain name, URL, DNS, hierarchy of name servers, root servers, primary and secondary servers, telnet, electronic mail, e-mail architecture, SMTP, POP, IMAP, FTP	7

Practical

1. Installation of the Windows operating system (2 classes)
2. Commands in Windows: cd, mkdir, ren, assoc, attrib, mv, cp, cls, del, dir, etc. (1 class)
3. Installation of Linux operating system (2 classes)
4. Commands in Linux: ls, mkdir, cd, touch, pwd, chmod, cat, echo, su, rm, mv, cp, locate, ps, top, man, etc. (3 classes)
5. Installing open source software in Linux (3 classes)
6. Networking commands and tools in Windows: ipconfig, nslookup, ping, netstat, arp, tracert, get mac, etc. (2 classes)
7. Networking commands and tools in Linux: ifconfig, ip, traceroute, tracepath, ping, netstat, ss, dig, nslookup, arp, hostname, who is, etc. (2 classes)
8. How to fix a slow computer (2 class)

COA0300204: Introduction to Desktop Publishing

1. Course Objectives:

- Define the key concepts of Desktop Publishing (DTP), including its history, evolution, and practical applications across industries such as advertising, publishing, and marketing.
- Explain foundational design principles, including typography, colour theory, and the use of image formats, and how they contribute to effective DTP work.
- Evaluate design choices in different DTP projects, assessing aspects such as layout, typography, and visual appeal, to improve readability and impact.
- Develop visually compelling publications and marketing materials that align with brand guidelines and project goals, demonstrating creativity and technical skill.

2. Course outcomes:

- At the end of the course, students will be able to:
- CO1: Recall the fundamental concepts, history, and significance of Desktop Publishing (DTP), including its applications across various industries.
- CO2: Explain basic design principles relevant to DTP, such as typography, colour theory, and the appropriate use of various image file formats.
- CO3: Demonstrate proficiency in utilising DTP software tools.
- CO4: Analyse and evaluate design elements and layouts in DTP projects to ensure effective communication and aesthetic appeal.
- CO5: Create professional-quality publications and digital content by integrating text, images, and design principles, tailored to specific audiences and purposes.

3. Prerequisite: NIL

4. Semester: 3

5. Course Type: Minor

6. Course Level: 300-399

7. Theory Credit: 1

8. Practical Credit: 3

9. Number of required hours:

- a) Theory: 15hrs
- b) Practical: 90hrs
- c) Non-Contact: 0 hrs

10. List of reference books:

- a. Basics of Designing - Desktop Publishing - With step-by-step instructions, screenshots, colour pages & CD Script (English, Paperback, Kumar Bittu Kumar)
- b. <https://www.w3schools.com/colors/default.asp>
- c. <https://helpx.adobe.com/in/indesign/user-guide.html>
- d. <https://helpx.adobe.com/in/photoshop/user-guide.html>
- e. <https://en.wikibooks.org/wiki/LaTeX>
- f. <https://www.canva.com/learn/how-to-canva-beginners-guide/>
- g. <https://docs.gimp.org/3.0/en/>
- h. <https://support.microsoft.com/en-us/publisher>

11. Detailed Syllabus

Unit no.	Unit content	No. of classes
1	Introduction Definition and Importance of DTP, History and Evolution of DTP, Applications of DTP in Various Industries (Advertising, Publishing, Marketing, Education, etc.), DTP Software: InDesign, Publisher, CorelDRAW, Inkscape, Scribus, LaTeX, Canva,	2

	Overview of Image and graphic editing tools: GIMP, Photoshop, Canva.	
2	Basic Design Principle Typography, Character and Line spacing, Fonts: Sans Serif, Serif, Glyphs, Colour Theory: RGB, CMYK, Colour Palettes, Image File Formats (JPG, PNG, TIFF, EPS, SVG) and Their Uses.	2
3	DTP using MS Tools Introduction to MS Word and Publisher, Indent, Tab, Page Layout: Rulers, Margins, Header, Footer, Backgrounds and Watermarks, Text Boxes, Drop Cap, WordArt, SmartArt, Working with images, graphics and icons, Working with Tables and Charts, Mail Merge.	2
4	DTP using InDesign Overview of panels, tools, and workspace customisation, choosing document presets, setting margins, bleeds, and columns, Master pages, page numbers and sections, Text and Typography, Placing and Managing Images, working with Graphics, grids, and layers.	3
5	DTP using LaTeX Tex, LaTeX, Setting up MikTex and TexWorks, Document classes (article, report, book, letter, thesis, leaflet, moderncv), Basic document structure (<code>\documentclass</code> , <code>\begin{document}</code> , <code>\end{document}</code>), Basic text formatting, Paragraph structuring, Tables and Figures, Drawing with TikZ.	3
6	Image and Graphics work for DTP Understanding Raster and Vector Graphics, GIMP: Overview and installation, Cropping, resizing, and rotating images, rectangular, elliptical, and free selection tools, fuzzy select and color tools, adjusting brightness, contrast, and color balance, removing backgrounds and unwanted elements, Photoshop: working with Layers and Masks, Quick selection, magic wand, and lasso tools, Healing brush and clone stamp tools, Canva: Introduction to Canva, Creating Posters, brochures using brand elements.	3

12. Lab Activities:

1. Use MS Word to

- a. create a Professional Resume:
 - i. Use tables to structure different sections.
 - ii. Apply consistent heading styles and bullet points.
 - iii. Insert a header with your name and contact information.
- b. Develop a Table of Contents for a book:
 - i. Create a multi-page document with various headings.
 - ii. Use the "References" tab to generate an automatic Table of Contents.
 - iii. Update the Table of Contents after modifying headings.

2. Use MS Publisher to

- a. design a Tri-Fold Brochure for a conference:
 - i. Use guides to divide the page into three equal sections.
 - ii. Incorporate images, shapes, and text boxes.
 - iii. Apply a consistent colour scheme and font style.

b. Create a Business Card:

- i. Set the page size to standard business card dimensions.
- ii. Include a logo, contact information, and social media icons.
- iii. Ensure proper alignment and spacing for a professional look.

c. Develop an Event Poster:

- i. Choose an appropriate page size for a poster.
- ii. Use large, bold fonts for the event title.
- iii. Incorporate high-quality images and relevant details.

3. Use LaTeX to

a. Design a Resume:

- i. Use the moderncv class for a clean layout.
- ii. Customise sections like education, experience, and skills.
- iii. Add a professional photo and contact information.

b. Prepare a formatted project report or thesis using LaTeX, including:

- i. A title page
- ii. Table of contents
- iii. Sections with text formatting, tables, and figures

4. Use Adobe InDesign to

a. design a Magazine Cover:

- i. Set up a new document with appropriate dimensions.
- ii. Use high-resolution images and bold typography.
- iii. Apply layer effects and gradients for depth.

b. Create a Multi-Page Booklet:

- i. Use master pages for consistent headers and footers.
- ii. Implement paragraph and character styles.
- iii. Insert page numbers and a Table of Contents.

5. Use GIMP to

a. Retouch a Photograph:

- i. Use the clone and healing tools to remove blemishes.
- ii. Adjust brightness, contrast, and colour balance.
- iii. Apply sharpening filters to enhance details.

b. Design a Web Banner:

- i. Set the canvas size to standard web banner dimensions.
- ii. Incorporate text, images, and shapes.

6. Use Adobe Photoshop to

a. Design a Movie Poster:

- i. Develop a compelling poster for a fictional film.
- ii. Incorporate dramatic typography and imagery to capture attention.
- iii. Apply filters and adjustments to create a cinematic look.

b. Design a Video Thumbnail:

- i. Set the canvas to the appropriate dimensions for Video thumbnails.
- ii. Combine images, text, and graphics to create an eye-catching design.
- iii. Ensure the main elements are legible even at smaller sizes.

7. Use Canva to

a. Create an Infographic:

- i. Use a template or start from scratch.
- ii. Incorporate icons, charts, and data points.
- iii. Apply a cohesive colour scheme and typography.

COA0400104: INTERNET AND WEB TECHNOLOGIES

1. **Course Objectives:** At the end of the course, students will be able to
 - Understand the concept of the Internet and the World Wide Web
 - Understand the basic concept of web applications and web services.
 - Design a basic, well-structured web page using HTML and CSS
2. **Course Outcome:**
3. **Prerequisite:** NIL
4. **Semester:** IV
5. **Course Type:** Compulsory
6. **Course Level:** 400-499
7. **Theory Credit:** 3
8. **Practical Credit:** 1
9. **Number of required hours:**
 - a) Theory: 45hrs
 - b) Practical: 30hrs
 - c) Non-Contact: 5 hrs

9. List of reference books

- a) Deitel, P.(2021), 5th ed. Internet and World Wide Web: How to Program. Pearson.
- b) Jackson J.C.(2007). Web Technologies: A Computer Science Perspective. Pearson.
- c) Duckett, J.(2011) .HTML and CSS: Design and Build Websites. John Wiley & Sons.
- d) Robbins, J.N. (2018). Learning Web Design: A Beginner's Guide. O'Reilly Media.

10. Detailed Syllabus

Unit no.	Unit content	No. of classes
1	Computer Networks and the Internet Concepts of the Internet and its evolution, Review of Networking basics – LANs and WANs, Network topologies, protocols and layers, Different networking devices – End devices, Hub, Switch, Router, Server. Brief concept of Internet Protocol and addressing, Concept of DNS and NAT – their role in the Internet, Proxy and VPN, Browsers and their add-ons, Brief concept of Cloud Computing and CDN.	8
2	Introduction to Web Technologies Concept of World Wide Web (WWW), Overview of web browsers and their functionalities. Client-Server Architecture in Web Applications. Communication Protocols – HTTP, HTTPS, FTP. URI and URL. Request Response cycle. Working of DNS. Brief concepts of port, cache and cookies. Introduction to Web Hosting and Control Panels.	8
3	Front End Development using HTML Website and Web page. Basic concept of Markup Language, Introduction to HTML, Basic HTML structure, Text formatting Tags – headings, paragraph, line break, horizontal rule, Link and Navigation – anchor tags, Lists -ordered, unordered, definition list, Image and multimedia tags, Tables in HTML, Forms and Input types– text, email, password, radio, select, checkbox, text area, date, url, submit, button, Brief concept of Semantic HTML–header, nav, main, section, article, aside, footer.	10

4	Front End Design using CSS Introduction to CSS. CSS syntax and rule structure. Inline, Internal and External CSS, CSS selectors – element, class, ID, attribute. Understanding the CSS Box Model – content, padding, border, and margin. CSS colours and backgrounds–background-colour,background-image,background-repeat, CSStypography–font Properties,textproperties.	9
5	XML and Client-Server Computing Basics of SGML. Understanding DTD and its role in validating markup languages. Introduction to XML. Creating XML DTDs. Concept of Client-Server Computing. 2-tier, 3-tier architecture. Fat client vs Fat server. Overview of CGI and JSP. Brief concept of JavaScript.	5
6	Web Security Understanding network security and Firewalls. Proxy Servers and Their Role in Caching and Security. Common web security vulnerabilities–XSS, SQLinjection. Brief concept of SSL/TLS and HTTPS for secure communication.	5

List of Practical**30 hours**

(This is a suggestive list only. Questions need not be restricted to this list.)

1. Create a basic HTML web page structure with a heading, paragraph, and an image.
2. Build a navigation menu using an unordered list () with clickable links.
3. Create a multi-level list of items.
4. Implement a form with input fields for name, email, and a submit button.
5. Create a table with multiple rows and columns to display tabular data.
6. Design an image gallery using HTML and CSS.
7. Implement an ordered list () to display a step-by-step tutorial or instructions.
8. Create a drop-down select menu (<select>) with multiple options.
9. Use HTML5 semantic tags (such as <header>, <nav>, <section>, <article>, <footer>) to structure and organize content on a webpage.
10. Build a registration form with fields for name, email, password, date of birth, address and other such fields with a submit button. Include appropriate input types, labels, and placeholders.
11. Style a heading element with a custom font, colour and background.
12. Apply different background colours to alternate rows in a table.
13. Implement a hover effect on a button that changes its background colour or adds a solid border.
14. Style a form input field with custom border, padding, and background color.

COA0400204: COMPUTER HARDWARE AND INSTALLATION

1. Course Objectives:

- To learn the fundamentals of personal computing with basic networking concepts.
- To develop basic skill of PC hardware installation with various operating systems, and application software.

2. Course Outcome:

- Identify the basic components of desktop computer including its various internal and external connectors.
- Identify and troubleshoot the power supply of computer.
- Proper configuration of hardware and software to run a PC.
- Complete Assemble and disassemble a computer system.

3. Prerequisite: Nil

4. Semester: 4

5. Course Type: Compulsory

6. Course Level: 400-499

7. Theory Credit: 2

8. Practical Credit: 2

9. Number of required hours:

- a. Theory: 30hrs
- b. Practical: 60 hrs
- c. Non-Contact: 5 hrs

10. List of reference books:

1. Comdex: Hardware and Networking Course Kit, Dream tech Press
2. Dynamic Memory Computer Hardware & Networking by D.S Minhas
3. Computer Fundamentals by Anita Goel, Pearson
4. Fundamentals of Computers by V. Rajaraman, PHI
5. Ron Glister, PC hardware: A Beginners Guide, Tata McGraw Hill

11. Detailed Syllabus

Unit no.	Unit content	No. of classes
1	Basics of Computer Hardware Different types of Hardware and Software used in a computer system, Input and Output Devices, Various computer ports and their characteristics, Introduction of SMPS, Different types of hard disk drives and its controllers (IDE, SATA, USB etc.), HDD vs SSD, Different types of Processors.	5
2	Computer System Unit Working of Motherboard, its components, Motherboard Form Factor (ATX, BTX), Chipset, Internal Connectors (Power Supply Connectors, PCI, ISA, AGP, PCI Express, and DIMM), External Connectors (Serial Port, Parallel Port, Game Port, USB, RJ-45, VGA or Monitor, PS/2, Din, Sound Card), Motherboard ROM BIOS, Northbridge, and Southbridge.	10
3	Computer Monitor and Graphics Different types of monitors (CRT, LCD, LED, and Plasma), power consumption, Energy star, Refresh rate, Resolution (SD, HD, FHD, and 4K), Basics of Graphic card, its uses and advantages.	5

4	Software Installation and Troubleshooting Operating System Installations, Upgrades Hardware Device Driver Installation (Hardware requirements, Hardware compatibility, Handling common errors during installation), Printer installation, Dealing with failed installation, Installation methods (Control Panel, Installer), Installing application software (MS-Office, Anti-Virus, Network games programs etc.)	10
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Practical Work:

1. Installing Windows and Linux operating system.
2. Device driver upgradation.
3. Hardware drivers, searching for drivers in the internet, Installing device drivers (Video card, LAN card, Modem, printers etc.), Post install operations.
4. Determining hardware model & manufacturer of computer peripherals.
5. Hard disk configurations (Hard disk partition, Primary Partition, Extended Partition, Logical Drive, Volume, Preparing a brand new hard drive)
6. Partitioning a Hard Drive
7. Formatting a Hard Drive
8. Deleting Hard Disk partitions
9. Repairing Hard Disk with Bad Sectors.
10. Uninstalling Software
11. Manual Removal of installed Software etc.
12. Removing SMPS from the Computer case
13. Printer installation and configuration
14. Complete assemble and dissemble of desktop computer

COA0500104: Multimedia Applications

1. Learning Outcome:

- Recall the **stages of a multimedia project** (planning, designing, production, delivery).
- Explain the importance of **text, images, sound, animation, and video** in multimedia projects.
- Use image editing software to create and modify **bitmaps, vector images, and 3D models**.
- Examine how **audio file formats** impact **quality and storage** in multimedia projects.
- Critique the **effectiveness of multimedia design** in real-world applications.

2. Course outcomes:

At the end of the course, students will be able to:

- CO1: Explain Multimedia Concepts & Components
- CO2: Apply Multimedia Tools for Content Creation
- CO3: Develop Animation & Video Content
- CO4: Analyze Multimedia Design & Project Management
- CO5: Design & Deliver Multimedia Projects

3. Prerequisite: NIL

4. Semester: V

5. Course Type: Minor

6. Course Level:

7. Theory Credit: 2

8. Practical Credit: 2

9. Number of required hours:

- a) Theory: 30 hrs
- b) Practical: 60 hrs
- c) Non-Contact: 0 hrs

10. List of reference books

- a) Vaughan, T. (2014). Multimedia: Making it work. McGraw-Hill Education Group.
- b) Parekh, R. (2006). Principles of multimedia (p. 727). Tata McGraw-Hill

11. Detailed Syllabus

Unit no.	Unit content	No. of classes
1	What Is Multimedia Definitions, Where to Use Multimedia, Delivering Multimedia	2
2	Text The Power of Meaning, About Fonts and Faces, Using Text in Multimedia, Computers and Text, Font Editing and Design Tools, Hypermedia and Hypertext	3
3	Images Plan Approach, Organize Tools, Configure Computer Workspace, Making Still Images, Bitmaps, Vector Drawing, Vector-Drawn Objects vs. Bitmaps, 3-D Drawing and Rendering, Color, Understanding Natural Light and Color, Computerized Color, Color Palettes, Image File Formats	4
4	Sound The Power of Sound, Digital Audio, Making Digital Audio Files, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Audio File Formats, Adding Sound to Your Multimedia Project	4

5	Animation and Videos The Power of Motion, Principles of Animation, Animation by Computer, Making Animations That Work. Using Video, How Video Works and Is Displayed, Digital Video Containers, Obtaining Video Clips, Shooting and Editing Video.	5
6	Making Multimedia The Stages of a Multimedia Project, What You Need: The Intangibles; Hardware; Software; Authoring Systems.	5
7	Multimedia Skills, Planning and Costing The Team, The Sum of Parts, The Process of Making Multimedia, Scheduling, Estimating, RFPs and Bid Proposals.	3
8	Designing and Producing, Delivering Designing, Producing, Delivering, Testing, Preparing for Delivery, Delivering on CD-ROM, Delivering on DVD, Wrapping It Up, and Delivering on the World Wide Web.	4

12. Lab Activities:

Unit no.	Unit content	No. of classes
1	You have been given the task of creating an interactive Web presentation for marketing a new bicycle. Visit four different bicycle websites using a suitable search tool. For each website you visit, write in the table below the name of the site, its URL, and: - Describe each site in terms of its multimedia incorporation. - Discuss whether its multimedia content is appropriate and where and how additional media content might improve the site. - Describe what multimedia presentation formats it uses. Video? Virtual reality? 3-D animations?	2
2	- Access a computer. Identify two programs that allow you to manipulate text. Write some text in varied styles and fonts. Print the results. For each, list: - The program's name. - The ways in which that program allows you to change text. Can you easily change the font, the color, the style and the spacing? - Create a new document in a word processing application. Next, type in a line of text and copy the line five times. Now change each line into a different font. Recopy the entire set of lines three times. Finally, change the size of the first set to 10-point text, the second set to 18-point text, and the third set to 36-point text. - Which of the smallest lines of text is most readable? - Which line of text stands out the most?	2
3	Using the capture tool built into the operating system or another dedicated tool, capture and save five different screens. Use the tools to save the entire screen, areas of the screen, the frontmost window, an image with a menu pulled down, and an image with the cursor (some capture programs may not be able to capture all these different types of images). Save the files.	4

	Open an image in an image-editing program (for example GIMP) capable of identifying colors. Select three different pixels in the image. Sample the color and write down its value in RGB, HSB, CMYK, and web (hexadecimal) color.	
4	- Go online and locate three sound editors (either from a shareware site or demo versions of commercial software). Document their capabilities. What file formats can they import from and export to? How many tracks can they handle? What DSP effects do they provide? - Record two sounds using a simple recording device—a cassette recorder will work. One sound should be of speech, and one should be music. Connect the output from the recorder to a computer's audio input. Using a sound capture and editing tool, capture both clips in 44 kHz, 16-bit stereo (if you can't record in stereo, ignore the applicable directions). Capture the clips three times—once at a very low level, once at the correct level (just below peaking), and once at levels that are well over the maximum. Listen to the six clips. Note your observations regarding noise and distortion. Run all three clips through the editor's Normalize effect. Again, listen to the clips and note your observations. - Down-convert the two normalized samples recorded at the correct level to 22.05, 11, and 5 kHz. Convert each of these eight (four sampling rates × two files) to mono. You should now have 16 different files: 8 of the speech and 8 of music. Document the file size of each, and make a note of how each sounds (even better, enlist the aid of someone else who can listen while you play the sounds back, without telling them which you are playing). Which are acceptable? At what point does the lowered quality become unacceptable?	5
5	- Locate a GIF animation at any web site. (Go to Google and do an image search using the term “animated GIF.” You may get as many as 6,460,000 hits!) Save the file of your choice to your computer's hard drive. Using one of the shareware or freeware GIF animators available, open the file. Save the individual frames as separate files. Note how the GIF89a specification enables files to be saved so that only the differences between keyframes are saved. - Conceptualize a brief animated sequence. Include a number of moving elements that move into and out of the frame. Consider where the keyframes should be. How do the elements move? Do they get bigger or smaller? Do they rotate? Do they “deform” (change shape)? Create a storyboard with sketches showing at least ten of the keyframes. - Locate three web sites that include video clips. What format are they served in? Examine the HTML source code to discover what method of video delivery is used. Make a note of your findings. Some clips are available in a streaming format and are not easily downloadable. Others can be downloaded. Download the clips you can and open them in QuickTime or Windows Media Player. List the codecs that were used to compress the clips.	5
6	Visit the web sites of three video-editing programs, and locate a page that summarizes the capabilities of each. List the formats each is able to import from and export or output to. How do they handle clips? Is there	5

	an easy, intuitive, “drop and drag” interface? How many audio and video tracks are included? How are transitions and filters included? What features do all of them have in common? What unique features does each one have? Document your findings.	
7	1. Select a project—perhaps a promotional DVD, a marketing web site, or a corporate intranet. Be creative, and specify the kind of organization you will be creating the project for. List the tasks required in developing the project. Specify how long each task will take. 2. Create a budget based on the task durations and rates for the project you have developed. Calculate both the internal cost (costs × hours) and the billing (rates × hours). Is the project profitable? Don’t forget to include a reasonable amount for contingencies and overhead.	3
8	1. Go online and locate three stock photo and video sources. Download comps of a photograph and a video clip from each of the sources. (Comps are small, low-resolution copies of the work that can be used for placement and testing.) Compare the cost, quality, and range of the offerings. 2. Go online and locate three royalty-free music sources. Download two samples from each of the sources. Compare the cost, quality, and range of the offerings. 3. Use a shareware or freeware compression utility to compress five files—for example, a text file, a JPEG image, an executable file (an application). What percentage compression can you achieve? Repeat the compression, saving the files as self-extracting archives. Document your findings by creating a table that compares original size, compressed, and size compressed as self-extracting file.	4

COA0500204: CYBER LAW AND COMPUTER SECURITY

1. **Course Objectives:**
 - Provide an overview of the field of information security and assurance
 - Develop an understanding of cryptography and to find the vulnerabilities in programs and to overcome them
 - Identify the different kinds of security threats and their solutions.
2. **Course Outcome:**
 - CO1: Develop and familiarize with various types of cyberattacks, cybercrimes, vulnerabilities and remedies.
 - CO2: Identify and evaluate the importance of personal data its privacy and security.
 - CO3: Analyze and evaluate the cyber security risks.
 - CO4: Implement preventive measures for self-cyber-protection as well as societal cyber-protection.
3. **Prerequisite: Computer Networks**
4. **Semester: 5**
5. **Course Type: Compulsory**
6. **Course Level: 200-299**
7. **Theory Credit: 2**
8. **Practical Credit: 2**
9. **Number of required hours:**
 - a) Theory: 30 hrs
 - b) Practical: 60 hrs
 - c) Non-Contact: 0 hrs
10. **List of reference books:**
 - Donaldson, S., Siegel, S., Williams, C.K., Aslam, A., “Enterprise Cyber security -How to Build a Successful Cyber defense Program against Advanced Threats”, Apress, 1st Edition, 2015.
 - Nina Godbole, Sumit Belapure, “Cyber Security”, Willey, 2011.
 - Roger Grimes, “Hacking the Hacker”, Wiley, 1st Edition, 2017.
 - Cyber Law By Bare Act, Govt of India, It Act 2000
11. **Detailed Syllabus**

Unit no.	Unit content	No. of classes
1	Components of Cyber Security Introduction, Computer Security, Threats, Harm, Vulnerabilities, Controls, Authentication, Access Control and Cryptography, Cyber security terminologies- Cyberspace, attack, attack vector, attack surface, threat, risk, vulnerability, exploit, exploitation, hacker, Malware and its types, Web attacks: Browser Attacks, Web Attacks Targeting Users, Obtaining User or Website Data, Network Vulnerabilities.	8
2	Cyber Law Cyber-crime and legal landscape worldwide, Defining data, meta-data, big data, and non-personal data. Data protection, Data privacy and data security, Cyber-attacks, types of attacks motivation, Wireless security, Authentication and password security, social media- data privacy and security issues.	3
3	Cyber-crimes Classification of cybercrimes, Cybercrimes targeting computer systems and mobiles: data diddling attacks, spyware, logic bombs, DoS, DDoS, APTs, viruses, Trojans, ransomware, data breaches; cybercrime against	7

	women and children, financial fraud, social engineering attacks, malware and ransomware attacks, zero-day and zero-click attacks; online job fraud, online sextortion, debit/ credit card fraud, online payment fraud, cyberbullying, website defacement, cybersquatting, pharming, cyber espionage, crypto-jacking, darknet illegal trades, drug trafficking, human trafficking; social media scams and frauds: impersonation, identity theft, job scams, misinformation, fake news; cybercrime against persons: cyber grooming, child pornography, cyberstalking, social engineering attacks; cyber police stations, crime reporting procedures, case studies.	
4	Hacking Techniques& Cryptography Overview of Hacking, System Hacking, Sniffers, Trojans, Backdoors, Viruses and Worms, Social Engineering, Denial of Service, SQL Injection, IDS, Hacking Wireless Networks, Cross-site Scripting, Single Sign On, Buffer Overflow, password Cracking, Keyloggers and Spyware, Cryptography Techniques: GCD Computation, Modular Arithmetic, Key Exchange, Public Key Cryptosystem, AES, RSA, Hash Function: MAC, MD4&MD5, SHA, Digital Signatures, Ciphers, Data compression-- Lossless & Lossy.	7
5	Cyber security Password policy, Data backup, Downloading and managing third-party software, Device security policy, Cyber Security best practices, the Significance of host firewall and Antivirus, and Wi-Fi security.	2
6	Security Analysis Introduction to digital forensics, understanding storage media and file systems, Recovering from Information Loss, Web and email attacks, Email Security Analysis, and Malware Analysis	3

Practical Work:

1. Introduction to Cyber Security Tools

- Explore basic cybersecurity tools like Kali Linux, Wireshark, and Nmap.
- Learn how to set up a virtual lab using VirtualBox/VMware.

2. Identifying Network Vulnerabilities using Nmap

- Perform network scanning using Nmap to detect open ports and services.
- Analyze vulnerabilities based on scan results.

3. Basic Cryptography: Encoding & Hashing

- Encrypt and decrypt messages using base64 encoding.
- Generate hash values using MD5, SHA-256, and SHA-512.

4. Password Security & Cracking Methods

- Create strong passwords and test their strength using online tools.
- Use John the Ripper to understand brute-force password cracking.

5. Sniffing Network Traffic using Wireshark

- Capture live network packets using Wireshark.
- Identify HTTP traffic and analyze basic packet details.

6. SQL Injection Demonstration (Using XAMPP & DVWA)

- Set up DVWA (Damn Vulnerable Web App) on a local server.
- Perform SQL injection attacks on login forms and retrieve data.

7. Phishing Awareness & Email Security

- Identify phishing emails based on headers and links.
- Create a simulated phishing attack using Social Engineering Toolkit (SET).

8. Identifying & Preventing Malware Attacks

- Use VirusTotal to scan suspicious files and URLs.
- Simulate a basic Trojan attack and learn how to detect it.

9. Web Security Basics: Cross-Site Scripting (XSS)

- Understand XSS attacks using DVWA.
- Perform stored and reflected XSS attacks and discuss prevention techniques.

10. Wireless Security & Packet Sniffing

- Scan for nearby Wi-Fi networks using airomon-ng (Kali Linux).
- Discuss WPA2 security and how attackers exploit weak passwords.

11. Digital Forensics: Analyzing Deleted Files

- Use Autopsy or FTK Imager to recover deleted files from a USB drive.
- Understand metadata analysis and file recovery techniques.

12. Data Privacy & Secure Browsing

- Explore the Tor browser for anonymous web browsing.

13. Social Engineering & Awareness

- Conduct a survey on common social engineering tactics.
- Perform a safe demonstration of a simple social engineering attack (e.g., fake login pages).

14. Implementing Firewall Rules

- Configure basic firewall rules using iptables (Linux) or Windows Defender Firewall.
- Block or allow specific traffic based on IP addresses and ports.

15. Data Backup: Implement secure data backup and recovery methods.

16. Security Analysis of a Website

- Use OWASP ZAP or Burp Suite to analyze website vulnerabilities.
- Identify weak security headers and missing HTTPS configurations.

17. Mobile Security & App Permissions

- Analyze Android app permissions using APK Analyzer.
- Identify risks associated with excessive app permissions.

18. Implementing Secure File Transfer (SSH & SFTP)

- Use SSH to connect to a remote system securely.
- Transfer files securely using SFTP.

19. Cybercrime Reporting & Case Studies

- Study real-world cybercrime cases.
- Discuss the process of reporting cybercrimes in India.

20. Final Project: Securing a Personal Computer

- Apply all learned techniques to secure a personal system.
- Document and present findings as a security report.

COA0500304: Internship

1. **Course Objectives:**
2. **Course Outcome:**
 - CO1:
 - CO2:
 - CO3:
 - CO4:
3. **Prerequisite:**
4. **Semester: 5**
5. **Course Type: Compulsory**
6. **Course Level: 500-599**
7. **Theory Credit:**
8. **Practical Credit:**
9. **Number of required hours:**
 - a) Theory:
 - b) Practical:
 - c) Non-Contact:

COA0600104: OFFICE OPERATION AND MANAGEMENT

1. **Course Objectives:**
2. **Course Outcome:**
 - CO1:
 - CO2:
 - CO3:
 - CO4:
3. **Prerequisite: Computer Networks**
4. **Semester: 5**
5. **Course Type: Compulsory**
6. **Course Level: 500-599**
7. **Theory Credit: 1**
8. **Practical Credit: 3**
9. **Number of required hours:**
 - a) Theory: 15 hrs
 - b) Practical: 90 hrs
 - c) Non-Contact: 0 hrs
10. **List of reference books:**
 - Rajiv Mathur, *Learning Word 97 for Windows Step-By-Step*, BPB Publication
 - Rajiv Mathur, *Learning Excel 97 for Windows Step-by-Step*, BPB Publication
 - Lonnie E. Moseley and David M. Boodey, *Mastering Office 97*, BPB Publications
 - Perry; *Teach Yourself Office 97 in 24 Hours* - Techmedia
 - Hart; *ABC of Office 97 Professional*, BPB Publications
 - M.E. ThukaramRao, *Office Organisation and Management*
 - Dr I.M Sahai, *Office Management*
 - Dr. R.C. Bhatia, *Principles of Office Management*

11. Detailed Syllabus

Unit no.	Unit content	No. of classes
1	Office Administration Office management, Importance of office management, software and hardware used in office management, Major roles and responsibilities of an office assistant, Official task management, Protection of official documents, Professional behaviour, Importance of communication skills, Workplace confidentiality, Health, safety and security measures in workplace, Basic idea of common policies followed in organizations.	3
2	Word Processing Introduction to Word Processing, Features, Learning Document Window, Creating, Saving & Closing a Document, Opening an Existing Document, Editing a Document, Formatting Features (Paragraph Formats, Aligning Text & Paragraph, Border and Shading, Header & Footers, Bullet & Numbering), Inserting & Editing a Table, Inserting Picture, Checking & Spelling Correction, Page Setup, Print Preview, Printing a Document, Mail Merge, Document Template & Wizards.	3

3	Spreadsheet Introduction to Spreadsheet, Creating, Saving and Editing a Workbook, Inserting, Deleting Worksheets, Opening & Moving around in Existing Worksheets, Working with Formula & Cell Referencing, Functions, Working with Ranges - Creating, Editing and Selecting Ranges, Format Feature: AutoFormat Feature, Changing Alignment, Character Styles, Date Format, Border & Colors etc. Previewing & Printing a Worksheet, Creating Charts & Graphs, Database in Worksheet, Macro, Linking and Embedding.	3
4	Presentation Tools Creating & Saving Presentations, Opening an Existing Presentation, Working in Different Views, Working with Slides, Adding and Formatting Text, Formatting Paragraphs, Checking Spelling and Correcting Typing Mistakes, Adding Clip Art and Other Pictures, Inserting Animation, Designing Slide Shows, Running and Controlling Slide Show, Printing Presentation. Portable Document Format: Storing, Creation, Conversion.	3
5	DTP Software Local Language Pack in Office Packages: Installation and Use, Document Design using any DTP Package, Graphics Design and Manipulation using any currently Available Package.	3

Practical / Lab work to be performed

A. Lab 1: Windows

(16 Hours)

- Create a new folder and do the following:
 - Make a word document in it.
 - Make an Excel document in it.
 - Make a new folder in it
 - Rename the initial folder
 - Move the initial folder
 - Copy the initial folder.
 - Delete the initial folder
- Implement the various well known features of Windows operating system such as Notepad, WordPad, Paint, System tools, Entertainment etc. enclosed in
 Start→Programs→Accessories.
- Implement various display properties by right clicking on the Windows Desktop.
- Explore the taskbar of Windows.
- Set the wallpaper and screen saver.
- Set the data/time.

B. Lab 2: MS-Word

(30 Hours)

- Create a document and
 - Put Bullets and Numbers
 - Apply various Font parameters.
 - Apply Left, Right, and Centre alignments.

- d. Apply hyperlinks
- e. Insert pictures
- f. Insert ClipArt
- g. Show the use of WordArt
- h. Add Borders and Shading
- i. Show the use of Find and Replace.
- j. Apply header/footers
- 2. Create any document and show the use of File→versions.
- 3. Create any document and show the difference between paste and paste special.
- 4. Create a document to show the use of Washout/Watermark.
- 5. Implement the concept of mail merge.
- 6. Implement the concept of macros.
- 7. Implement the concept of importing a file/document.
- 8. Implement the concept of merging the documents.
- 9. Create a student table and do the following:
 - a. Insert new row and fill data
 - b. Delete any existing row
 - c. Resize rows and columns
 - d. Apply border and shading
 - e. Apply merging/splitting of cells
 - f. Apply sort
 - g. Apply various arithmetic and logical formulas.
- 10. Create your resume using General Templates.

C. Lab 3: MS-PowerPoint

(24 Hours)

- 1. Make a presentation of College Education System using
 - a. Blank Presentation
 - b. From Design Template
 - c. From Auto Content Wizard
- 2. Make a presentation on “Wild Life” and apply the following:
 - a. Add audio and video effects
 - b. Apply various Color Schemes
 - c. Apply various animation schemes.
 - d. Apply Slide Show

D. Lab 4: Digital Office Tools

(20 Hours)

- 1. Google Docs, Sheets, and Slides
- 2. Email management (Outlook/Gmail)
- 3. Virtual meeting tools (Zoom, Microsoft Teams)

COA0600204: E-commerce Technologies

1. Course Objectives:

- Describe key concepts, types, and history of e-commerce and differentiate between e-commerce and e-business
- Explain the role of internet technology as the backbone of e-commerce.
- Build a basic e-commerce website.
- Explain digital marketing strategies including SEO, email, display, affiliate, and mobile marketing.
- Explain privacy issues, data collection practices, and intellectual property rights in e-commerce.

2. Course Outcome:

- Identify and describe the unique features of e-commerce technology and discuss their online significance.
- Understand the limitations of today's Internet and the potential capabilities of the Internet of the future.
- Describe the major types of e-commerce
- Understand the differences between traditional online marketing and the new social-mobile-local marketing platforms, as well as the relationships between social, mobile, and local marketing.
- Understand basic concepts related to privacy and information rights, the practices of e-commerce companies that threaten privacy, and the different methods that can be used to protect online privacy.

3. Prerequisite: Internet and Web Programming

4. Semester: 6

5. Course Type: Compulsory

6. Course Level: 600-699

7. Theory Credit: 2

8. Practical Credit: 2

9. Number of required hours:

- a) Theory: 30 hrs
- b) Practical: 60 hrs
- c) Non-Contact: 0 hrs

10. List of reference books:

- i. Laudon, K. C., & Traver, C. G. (2023). E-commerce: Business, technology, society (17th ed.). Pearson Education.
- ii. Bajaj, K. K., & Nag, D. (2005). E-commerce: The cutting edge of business (2nd ed.). McGraw-Hill Education.
- iii. Turban, E., King, D., & Lee, J. (2004). Introduction to e-commerce (2nd ed.). Pearson Education.

11. Detailed syllabus:

Unit no.	Unit content	No. of classes
1	Introduction to E-commerce What is E-commerce, the difference between e-commerce and e-business, features in E-commerce Technology, Types of E-commerce: B2B, B2C, C2C, Mobile, Social, Local. Brief History of E-commerce.	5
2	E-commerce Infrastructure Internet as a Technology Background and backbone, Limitations of current	7

	Internet, Internet2® project, The web – its features and services, Mobile Apps: the next big thing. E-Commerce portals – types and current major players.	
3	Building an E-commerce Presence Imagining and building an E-Commerce presence: a systematic approach – planning (SDLC), System Design, in-house vs. Outsourcing, Software setups, E-Commerce site tools, Mobile websites, and applications. Payment Systems, Electronic billing presentation, and payments, Management policies, Security (encryption, SSL, Firewalls)	11
4	Social Media marketing Knowing internet audience and consumer behavior, digital tools for marketing and advertising strategies – search engine, display-ad, email, affiliate, viral leads, Lead generation marketing, social, mobile, and local marketing – Marketing on Meta, X, Pinterest. Overview on M-commerce	7
5	Online Ethics, Law in E-commerce Understanding Ethical, social and political issues in E-Commerce, Privacy and information rights – data collection, social networks, mobile and location-based, profiling and behavioral targeting, Intellectual Property rights	5

Case Studies:**20 Lectures (4 lectures each)****Unit-1:** Amazon – From Online Bookstore to Global E-commerce Giant**Unit-2:** Jio's Internet Revolution and Its Impact on Indian E-Commerce**Unit-3:** Nykaa – In-house vs. Outsourced Tech Development **OR** Shopify – Empowering Small Businesses to Go Online**Unit-4:** Zomato's Social Media & Meme Marketing Strategy **OR** D2C Brands on Instagram (e.g., BoAt, Mamaearth)**Unit-5:** Facebook-Cambridge Analytica Scandal **OR** IT Act 2000 & Data Protection Bill in India**Practical Works:****(20 lectures)**

1. Create a Basic Product Catalog using *Excel* or *Google Sheets*
2. Create a Basic Static E-commerce Website (*html-css-js*)
3. Build a Mini Online Store using *WordPress*.
4. Product Page with Buy Button using *Bootstrap/Tailwind*.
5. Create a Simple Shopping Cart in *JavaScript*
6. Analyze an Existing E-Commerce Website (Amazon, Flipkart, Ebay).
7. Explore *Shopify* – Build a Trial Store
8. Draft a plan for launching a hypothetical e-commerce business using the Software Development Life Cycle (SDLC) using *Flowchart*.
9. Create a Social Media Campaign for a Product
10. Set Up a *Facebook/Instagram* Business Page (Mock)
11. Use free SEO tools like *Ubersuggest* or *Google Keyword Planner* to research keywords for an e-commerce product
12. Draft an E-Commerce Privacy Policy for a company.

COA0600304: PROJECT AND PRESENTATION

1. Course Objectives:

- Students will recall and describe the problem statement, objectives, and methodologies employed in their project.
- Students will demonstrate an understanding of the technologies explored during the project, explaining their relevance, functionality, and potential applications.
- Students will apply the acquired knowledge and skills to develop a solution or prototype addressing the identified problem, utilizing the chosen technologies effectively.
- Students will critically analyze the project outcomes, assessing the strengths and weaknesses of their approach, and identifying areas for improvement or further exploration.
- Students will synthesize their findings into a coherent dissertation, presenting their research methodology, results, and conclusions while evaluating the implications and significance of their work within the broader context of the field.

2. Course Outcomes:

Attendees of the course, students will be able to:

- CO1: Students will be able to recall and recognize fundamental concepts, principles, and terminology relevant to the course.
- CO2: Students will demonstrate a comprehensive understanding of theoretical frameworks, methodologies, and models discussed in the course.
- CO3: Students will be able to apply acquired knowledge and skills to solve practical problems, analyze case studies, and develop solutions in real-world scenarios relevant to the course content.
- CO4: Students will demonstrate the ability to synthesize diverse sources of information, integrate multiple perspectives, and propose innovative solutions or designs.
- CO5: Write their findings and analysis in the form of a dissertation.

3. Prerequisite: Basic Subject knowledge

4. Semester: 6

5. Course Type: Compulsory

6. Course Level: 600-699

7. Theory Credit: 0

8. Practical Credit: 4

9. Number of required hours:

- a) Theory: 0 hrs
- b) Practical: 120 hrs
- c) Non-Contact: 0hrs

10. COURSE CONTENT:

At the onset of their sixth semester, each student will receive an assignment for a project. Students, either individually or in pairs, will delve into a unique problem under the mentorship of a faculty member from the department. The chosen problem should allow students to delve deeply into one or two specific technologies, fostering a strong understanding and proficiency in those areas upon project completion.

To promote innovation and avoid redundancy, previously tackled problems should be avoided unless they hold exceptional research significance and expansive scope. While application-based problems spurred by specific demands may be considered, simplistic information management systems comprising only a few database tables or data entry forms should be discouraged.

Interdisciplinary collaboration where applicable, enabling students to draw insights from diverse fields and perspectives to enrich their projects will be encouraged. Students also have the option to conduct their projects in collaboration with other institutes or organizations, subject to approval from the relevant institute organization. However, at least one project supervisor must be affiliated with the institute or organization.

Regular progress updates must be reported by meetings with the project supervisor throughout the project duration.

Students should look for opportunities to publish their project findings in academic journals, conferences, or other relevant platforms to disseminate their research outcomes and contribute to the academic community.

Projects must culminate in the submission of a dissertation. Evaluation and presentation of projects will adhere to the regulations outlined in the PG course semester system of G.U., with choice-based credit and grading system.

11. COURSE ASSESSMENT DETAILS:

Internal assessment: seminars, presentations, viva, project implementation

COA0700104: System Analysis and Design

1. Course Objectives:

- To understand the concepts, principles, and methodologies of systems analysis and design.
- To study the phases of the System Development Life Cycle (SDLC).
- To develop skills in requirements gathering, system modeling, and analysis techniques.
- To learn the design of system architecture, user interfaces, programs, and databases.
- To understand system implementation, testing, documentation, maintenance, and security mechanisms.

2. Course Outcome:

After successful completion of the course, students will be able to:

- Explain the role of systems analysts and the phases of the SDLC in information system development.
- Analyze system requirements using elicitation techniques, use cases, DFDs, and ER diagrams.
- Design system architecture, user interfaces, program structures, and data storage solutions.
- Apply testing, documentation, maintenance, and security practices during system implementation.
- Develop structured solutions for organizational information system problems using appropriate design methodologies.

3. Prerequisite: NIL

4. Semester: 7

5. Course Type:

6. Course Level: 700-799

7. Theory Credit: 4

8. Practical Credit: 0

9. Number of required hours:

- a) Theory: 60 hrs
- b) Practical: 0 hrs
- c) Non-Contact: 5hrs

10. List of reference books:

- Dennis, Alan R., Barbara H. Wixom, and Roberta M. Roth. *Systems Analysis and Design*.
- Senn, James A. *Analysis and Design of Information Systems*.
- Lucas, Henry C. *The Analysis, Design, and Implementation of Information Systems*.

11. Detailed syllabus:

Unit no.	Unit content	No. of classes
1	Introduction to system design and analysis. Phases of system design. System Analysis. Practical use cases of system designs.	10
2	Planning Phase Introduction The Systems Analyst and Information Systems Development; The Systems Analyst: Systems Analyst Skills and Systems Analyst Roles; The Systems Development Life Cycle: Project selection, Feasibility analysis,	10

	Design, Implementation, Testing and Evaluation.	
3	Analysis Phase Introduction: The Analysis Phase; Requirements Determination; Requirements Elicitation Techniques; Requirements Analysis Strategies. Introduction, Use cases, Elements of a Use case, The Functional Requirements, Use cases, Building Use cases. Introduction: Data Flow Diagrams; Elements of Data Flow Diagrams; Creating Data Flow Diagrams; The Level 0 Data Flow Diagram; Level 1 Data Flow Diagrams. Introduction: The Entity Relationship Diagram; Elements of an Entity Relationship Diagram; Building Entity Relationship Diagrams.	10
4	Design Phase Introduction: Architecture design; Elements of an Architecture design; Architectural Components; Client-Server Architecture; Client-Server Ties. Introduction, User Interface Design, Principle for User Interface Design, User Interface Design Process, Navigation Design, Input Design, Output Design. Introduction, Program design, and Data storage Design.	15
5	Implementation Phase Introduction System implementation overview; System testing: Unit Tests, Integration Tests, System Tests, Acceptance Tests; Development documentation; type of documentation, Maintenance of the system; type of maintenance; Security and control of The System implemented.	15

COA0700204: AI TOOLS FOR SMART OFFICE AUTOMATION

1. Course Objectives

The objective of this course is to provide students with theoretical knowledge and practical exposure to Artificial Intelligence-based office productivity and automation tools. The course focuses on intelligent documentation, AI-assisted communication, workflow automation, data analysis, and smart collaboration systems used in modern digital workplaces.

2. Learning Outcomes:

At the end of the course, students will be able to:

- a) Understand the fundamentals of Artificial Intelligence and Smart Office Automation.
- b) Apply AI tools for professional documentation, communication, and office productivity tasks.
- c) Utilize AI-assisted spreadsheet and data analysis tools for decision making.
- d) Develop AI-enabled automated workflows for office management.
- e) Analyse ethical, privacy, and security aspects associated with AI-powered office systems.

3. Prerequisites: NIL

4. Semester: 7

5. Course type: Compulsory

6. Course level: 700-799

7. Theory credit: 2

8. Practical credit: 2

9. Number of required hours:

- a) Theory: 30 hrs (30 classes)
- b) Practical: 60 hrs (30 classes)
- c) Non Contact: NIL

10. Reference books:

- (a) Automation & AI Tools for Productivity: Master No-Code Workflows, Smart Tools & Time-Saving Systems for Work and Life (Future Skills Mastery Series)
- (b) AI for the Office: A Practical Guide for Non-Tech Professionals to Save Time, Boost Productivity, and Accelerate Career Growth Using Artificial Intelligence Kindle Edition, by Ashe Jordan (Author)

11. Detailed Syllabus:

A. Theory

Unit No	Unit Content	No of Lectures
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		(T+P)
1	Introduction to AI and Smart Office Automation Introduction to Artificial Intelligence, Evolution of Office Automation Systems, AI in Modern Workplace Environment, Smart Office Concepts and Applications	7
2	AI Tools for Documentation and Communication Introduction to AI writing tools such as ChatGPT, Google Gemini and Microsoft Copilot. AI-assisted document preparation using Microsoft Word Copilot, Google Docs AI and Notion AI. Automated report writing, resume creation and letter drafting using ChatGPT and Canva Docs. AI-based summarisation of articles, PDFs and notes using ChatGPT, Gemini and QuillBot. Grammar checking and writing improvement using Grammarly and LanguageTool. AI-based voice transcription and note generation using Otter.ai and Google Recorder. AI tools for email writing, reply suggestions and professional communication using Gmail Smart Compose and Microsoft Copilot.	8
3	Automation, Data Analysis, multimedia and collaboration using AI AI-powered presentation creation using Canva AI, Gamma AI, Toastmasters and Microsoft PowerPoint Designer. AI image generation using DALL·E, Canva AI Image Generator and Leonardo AI. AI features in Microsoft Excel and Google Sheets. AI-assisted spreadsheet operations such as sorting, filtering and automatic table generation. Intelligent formula suggestions and data analysis using Excel Copilot and Google Sheets AI features. Introduction to AI video generation tools such as CapCut AI and InVideo AI. Creating simple multimedia projects using AI tools for education and business presentations. AI-enabled task management using Notion AI, Trello and Microsoft To Do. Cloud-based collaboration and file-sharing using Google Drive, OneDrive and Dropbox AI features.	10

4	Ethics, Security and Future Trends in AI Introduction to ethical issues in Artificial Intelligence and responsible AI usage, Privacy and data security concerns while using AI tools and online platforms, Understanding AI bias, misinformation and deepfake technologies through simple examples. Emerging trends in AI tools for smart offices, education, healthcare and creative industries.	5
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B. List of Practical

1. Creating and formatting AI-assisted documents using Microsoft Word Copilot, Google Docs AI and ChatGPT.
2. Generating formal letters, resumes and reports using ChatGPT and Canva Docs.
3. Grammar correction and writing enhancement using Grammarly and QuillBot.
4. Summarising articles, PDFs and notes using ChatGPT, Gemini and QuillBot.
5. Voice-to-text transcription and automatic note generation using Otter.ai and Google Recorder.
6. Drafting professional emails and automated replies using Gmail Smart Compose and Microsoft Copilot.
7. Creating spreadsheets and performing basic data entry using Microsoft Excel and Google Sheets.
8. Using AI-assisted spreadsheet features for sorting, filtering and formula generation in Excel Copilot and Google Sheets AI.
9. Generating charts, graphs and dashboards using Microsoft Excel, Google Sheets and Canva Charts.
10. Performing basic data analysis and prediction using Excel Forecasting and Google Sheets Explore feature.
11. Creating AI-assisted presentations using Canva AI, Gamma AI and Microsoft PowerPoint Designer.
12. Designing presentation slides with automatic layouts, icons and templates using Canva and PowerPoint Designer.
13. Generating AI images for posters and presentations using DALL·E, Canva AI Image Generator and Leonardo AI.
14. Creating infographics and social media posters using Canva and Piktochart AI tools.
15. Generating AI voiceovers using ElevenLabs and text-to-speech applications.
16. Creating short AI-assisted videos using CapCut AI and InVideo AI.
17. Managing tasks and to-do lists using Trello and Microsoft To Do.
18. Scheduling meetings, reminders and smart calendar events using Google Calendar and Motion AI.
19. Collaborative document editing and cloud sharing using Google Drive, Google Workspace and Microsoft OneDrive.
20. Exploring AI chatbot assistants such as ChatGPT, Google Gemini and Microsoft Copilot for academic and office tasks.

COA0700304 INTRODUCTION TO ARTIFICIAL INTELLIGENCE

1. Course Objectives

2. Course Outcomes:

- a. Understand the basic concepts, history, and evolution of Artificial Intelligence.
- b. Identify different types of AI systems and their real-world applications.
- c. Explain the fundamentals of Machine Learning and Deep Learning techniques.
- d. Understand the working principles and applications of Generative AI models.
- e. Develop effective prompts for AI systems using prompt engineering techniques.
- f. Analyse ethical, social, and responsible use issues related to AI technologies.

3. Prerequisite: Nil

4. Semester: 7

5. Course Type:

6. Course Level: 700-799

7. Theory Credit: 2

8. Practical Credit: 2

9. Number of required hours:

- a) Theory: 30 hrs (30 classes)
- b) Practical: 60 hrs (30 classes)
- c) Non Contact: NIL

10. List of Reference Books:

1. Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, Pearson.
2. Ethem Alpaydin, *Introduction to Machine Learning*, MIT Press.
3. Bernard Marr, *Artificial Intelligence in Practice*, Wiley.
4. Tom Taulli, *Generative AI: How ChatGPT and Other AI Tools Will Revolutionise Business*, Apress.

11. Detailed syllabus:

A. Theory

Unit No	Unit Content	No of Lectures
1	Introduction to Artificial Intelligence and Its Evolution Introduction to Artificial Intelligence, Definition and Goals of AI, History and Evolution of AI, Types of AI (Narrow AI, General AI, Super AI), AI in daily life, advantages and limitations of AI.	5
2	INTELLIGENT SYSTEMS AND PROBLEM SOLVING Intelligent agents, problem-solving concepts, introduction to search techniques, and simple examples of AI systems.	10

3	INTRODUCTION TO MACHINE LEARNING Meaning of machine learning, types of machine learning, basic concepts of training and testing data, and simple applications of machine learning.	10
4	EMERGING TRENDS AND APPLICATIONS OF AI AI in healthcare, education, banking, agriculture, robotics, virtual assistants, recommendation systems and smart devices.	5

B. Laboratory Components

1. Introduction to AI-based applications and tools such as ChatGPT, Google Gemini, Microsoft Copilot, Grammarly and Canva AI.
2. Exploring AI assistants and chatbots, including ChatGPT, Google Assistant, Siri and Alexa, for information retrieval and task automation.
3. Basic dataset handling using Microsoft Excel and Google Sheets, including sorting, filtering, charts and simple data visualisation.
4. Demonstration of Machine Learning applications using Teachable Machine, Orange Data Mining and Google Colab notebooks.
5. Hands-on activities with image and text generation tools such as Canva AI, DALL·E, Leonardo AI and ChatGPT for creative content generation.
6. Writing prompts for text generation using ChatGPT and Gemini for paragraph writing, story generation and question answering.
7. Prompt engineering for summarisation, translation, email writing and content creation using ChatGPT, Gemini and Grammarly AI.
8. Exploring AI tools for education, business and creativity, including Notion AI, Canva AI, GitHub Copilot, Duolingo AI and PowerPoint Designer.
9. Case studies and discussions on ethical use of AI, including deepfakes, AI bias, plagiarism, misinformation and data privacy issues.
10. Mini-project or presentation on AI applications using tools such as ChatGPT, Canva AI, Teachable Machine or Google Colab in domains like healthcare, education, agriculture or business.

COA0800104: Basic Python Programming

1. Learning Outcome:

After completing this course, students will be

- Comfortable with basic Python Programming and problem-solving.

2. COURSE OUTCOMES:

CO1: Install Python 3.12+ and use basic syntax, variables, operators, strings, and control structures.

CO2: Implement lists, tuples, dicts, and sets with indexing, slicing, and comprehensions.

CO3: Design functions (*args/**kwargs, recursion, lambda) and import standard modules

CO4: Perform file I/O (CSV/JSON) and exception handling (try/except, custom errors).

CO5: Use collections, NumPy/Pandas/Matplotlib in virtual environments for data apps.

3. Prerequisites: NIL

4. Semester: 7

5. Course Type: Core

6. Course Level: 800-899

7. Theory Credit: 3

8. Practical Credit: 1

9. No of Hours:

- a) Theory: 45 hrs
- b) Practical: 30 hrs
- c) Non Contact: NIL

10. List of Books:

- a) *Core Python Programming*, R. Nageswara Rao, Dreamtech Press.
- b) *Python: The Complete Reference*, Martin C. Brown, McGraw-Hill Education.

12. Detailed syllabus:

A. Theory

Unit No	Unit Content	No of Lectures
1	Python Foundations Python installation alongside an IDE setup, such as VS Code or Jupyter notebooks. Variables, data types (int, float, str, bool), type conversion functions (int(), str()), and operators including arithmetic (+, -, *, /, //, %, **), comparison (==, !=, >), and logical (and, or, not). Strings indexing, slicing, f-strings, and methods like upper(), split(), and format(). Control statements: if/elif/else for decision-making, and loops using for (with range()) and while, incorporating break, continue, and pass for flow control.	5

2	Data Structures Lists with indexing/slicing syntax, methods like append(), pop(), sort(), and list comprehensions for concise operations. Tuples: immutability and unpacking techniques. Dictionaries: key-value storage, using get(), keys()/values()/items(), and nested structures. Sets for unique elements with operations like union, intersection, add, and remove.	10
3	Functions and Modularity Defining functions with def, handling parameters (positional, *args, **kwargs, defaults), return statements, lambda expressions, and scope via the LEGB rule. Include recursion basics, such as factorial, and docstrings for documentation. Explore modules by importing standard libraries (math, random, datetime, os), and creating custom modules	10
4	File Handling and Errors File I/O with open() modes (r, w, a), readlines(), writelines(), and context managers (with statement). Processing CSV and JSON data using dedicated modules and implementing exception handling via try/except/else/finally blocks, raising custom errors, and addressing common issues like ValueError and KeyError.	10
5	Packages Numpy: array creation (np.array(), np.zeros(), np.arange()), indexing/slicing (arr[0:5, 1:3]), broadcasting, vectorized operations (+, *, np.dot()), universal functions (np.sin(), np.exp()), and linear algebra (np.linalg.solve()), Pandas: data loading (pd.read_csv(), pd.read_excel()), cleaning (dropna(), fillna()), selection (loc/iloc, query()), grouping (groupby()), merging (pd.merge()), and pivot tables. Matplotlib: line plots (plt.plot()), bar charts (plt.bar()), scatter plots (plt.scatter()), histograms (plt.hist()), subplots (plt.subplot()), customisation (titles, labels, legends, colours), and saving figures	10

(b) Practical

- Introduction to Python console, operators, input and output statements.
- Python control statements and functions
- Data Structures in Python
- Exception Handling
- File Handling
- Introduction to libraries (NumPy, Pandas, Matplotlib)

COA0800204: Digital Marketing

1. Course Outcome:

- Explain the concepts, scope, and importance of digital marketing.
- Develop and optimize websites and content for digital platforms.
- Apply SEO and SEM strategies to improve online visibility.
- Design and manage social media and email marketing campaigns.
- Analyze digital marketing performance using analytics tools.
- Create integrated digital marketing strategies for businesses and startups.

2. Prerequisite: NIL

3. Semester: 8

4. Course Type: Compulsory

5. Course Level: 800-899

6. Theory Credit: 3

7. Practical Credit: 1

8. Number of required hours:

- a. Theory: 45 hrs
- b. Practical: 30 hrs
- c. Non-Contact: 5hrs

9. List of reference books:

- Ryan Deiss and Russ Henneberry – Digital Marketing for Dummies
- Seema Gupta – Digital Marketing
- Puneet Singh Bhatia – Fundamentals of Digital Marketing
- Philip Kotler – Marketing 4.0
- Damian Ryan – Understanding Digital Marketing
- Ian Dodson – The Art of Digital Marketing

10. Detailed syllabus:

- Theory

Unit no.	Unit content	No. of classes
1	Introduction to Digital Marketing Concept and evolution of marketing, Traditional Marketing vs Digital Marketing, Scope and importance of digital marketing, Digital marketing ecosystem, Online consumer behaviour, Digital marketing channels, Digital marketing trends and opportunities, Role of digital marketing in business and entrepreneurship, Ethics and legal issues in digital marketing.	8
2	Website Planning and Content Marketing Website fundamentals, Domain names and web hosting, Website structure	8

	and user experience (UX), Responsive and mobile-friendly websites, Introduction to CMS (WordPress basics), Landing pages and conversion optimisation, Content marketing concepts, Types of digital content, Blogging and article writing, Visual and video content creation, Content strategy and storytelling.	
3	Search Engine Optimisation (SEO) and Search Engine Marketing (SEM) Introduction to Search Engines, Working principles of search engines, Keywords and keyword research, On-page SEO techniques, Off-page SEO techniques, Technical SEO basics, Link building strategies, Local SEO, Introduction to Google Search Console, Search Engine Marketing (SEM), Pay-Per-Click (PPC) advertising, Google Ads basics, Campaign planning and bidding strategies, Ad creation and optimisation.	10
4	Social Media Marketing and Email Marketing Social media platforms overview, Facebook marketing, Instagram marketing, YouTube marketing, LinkedIn marketing, Twitter/X marketing, Social media content planning, Social media advertising, Influencer marketing, Online reputation management, Email marketing concepts, Email campaign design, Newsletter creation, Email automation, Spam regulations and ethics, Customer relationship management (CRM)	10
5	Web Analytics, Online Advertising and Emerging Trends Introduction to web analytics, Google Analytics basics, Website traffic analysis, Key Performance Indicators (KPIs), Conversion tracking, Digital campaign performance analysis, Online advertising models, Affiliate marketing, Mobile marketing, E-commerce marketing, AI in digital marketing, Chatbots and automation, Emerging trends in digital marketing, Digital marketing strategy formulation.	9

- **Practical**

- Lab 1: Introduction to Digital Platforms
Creating professional email accounts
Setting up Google account tools
Overview of digital marketing tools
- Lab 2: Website and Blog Creation
Creating a basic website/blog using WordPress or Blogger
Designing webpages and menus
Publishing blog posts
- Lab 3: Content Creation
Creating marketing content
Designing posters using Canva
Creating social media posts and banners
- Lab 4: SEO Practice
Keyword research using online tools
On-page SEO optimization
Meta title and meta description writing
SEO audit basics
- Lab 5: Google Ads and SEM

- Creating sample Google Ads campaigns
- Ad groups and keyword setup
- Budget planning and bidding simulation

- Lab 6: Social Media Marketing
 - Creating business pages
 - Scheduling posts
 - Social media campaign planning
 - Hashtag optimization
- Lab 7: Email Marketing
 - Designing email templates
 - Creating newsletters
 - Email list management
 - Email campaign simulation
- Lab 8: Web Analytics
 - Using Google Analytics demo
 - Monitoring website traffic
 - Preparing analytics reports

Suggested Software and Tools

Google Analytics, Google Ads, Google Search Console, Canva, WordPress, Mailchimp, Meta Business Suite, SEMrush (demo), Ahrefs (demo), Hootsuite (demo)

COA0800304: Management Information System

1. Course Objective:

2. Course Outcome:

- a. Student will be able to understand the fundamental concepts and components of Management Information Systems (MIS).
- b. Student will be able to understand the basics of databases, data processing, and information security concepts related to MIS.
- c. Student will be able to identify different types of information systems and their applications in business and other organisational environments.
- d. Apply concepts of system analysis and system design in the development of information systems.

3. Prerequisite: NIL

4. Semester: 8

5. Course Type: Compulsory

6. Course Level: 800-899

7. Theory Credit: 4

8. Practical Credit: 0

9. Number of required hours:

- a. Theory: 60 hrs
- b. Practical: 0 hrs
- c. Non-Contact: 5 hrs

10. List of reference books:

- a. Goyal, A. P. (2014). *Management Information Systems: Managerial perspective*. Vikas Publishing House.
- b. Waman S Jawadekar, Sanjiva Shankar Dubey (2020). *Management Information System*. Mc Graw Hill.

11. Detailed syllabus:

Unit no.	Unit content	No. of classes
1	INTRODUCTION TO MIS The meaning and use MIS, Concepts of MIS; Definition of MIS Components of MIS, Characteristics of MIS, Development of MIS within the organization, Management Process, Information Needs, Concept of Data & Information, evolution and development of MIS, role of MIS in decision making and organizational management process.	8
2	INFORMATION SYSTEMS AND BUSINESS APPLICATIONS Types of information systems, transaction processing systems, decision support systems, executive information systems, office automation systems, enterprise systems, business applications of MIS in finance, marketing, HR and production management.	10

3	Management information system Basics of management information systems. Decision-Making Information, Knowledge, Business Intelligence, Systems Engineering: Analysis and Design. Development Process of MIS	10
4	Database and information security DBMS, Client Server and Service Oriented Architecture. Data Warehouse: Architecture to Implementation Data Resource Management, Data Models, Application of DBMS.	8
5	System Design and Development System analysis and design concepts; system development life cycle (SDLC); feasibility study; requirements analysis; system planning; input and output design; testing and implementation; maintenance and evaluation of information systems. MIS Applications in Manufacturing and Service Sector	9