Computer Science (कम्प्यूटर विज्ञान)

Year	Paper No.	Course Code	Title of the Course	Credits	Compulsory Elective
Compulsory Core Course विषय केन्द्रित अनिवार्य पाठ्यक्रम					
प्रथम वर्ष	244	UGCS-01	Computer Fundamentals	3	अनिवार्य
	247	UGCS-04	'C' Programming	3	
	2790	UGCS-13(P)	Practical Based on UGCS -04	2	
द्वितीय वर्ष	249	UGCS-06	Database Management System	3	अनिवार्य
	251	UGCS-08	Discrete Mathematics	3	
	2791	UGCS-14 (P)	Practical Based on UGCS -06	2	
तृतीय वर्ष	252	UGCS-09	Computer Network	3	अनिवार्य
	254	UGCS-11	'C++' and Object Oriented Programming	3	
	2792	UGCS-15 (P)	Practical Based on UGCS -11	2	
Discipline-Centric Elective Course/ विषय केन्द्रित वैकल्पिक पाठ्यक्रम (Select any two Papers)					
	246	UGCS-03	Introduction to System Software	4	वैकल्पिक
	250	UGCS-07	Elements of System Analysis and Design	4	
	255	UGCS-12	Project Work	4	
	2793	UGCS-16	Statistical Methods	4	
	2794	UGCS - 17	Operation Research	4	
Compulsory Foundation Course अनिवार्य आधार पाठ्यक्रम					
प्रथम वर्ष	2700	UGFODL	Foundation Course in Open and Distance Learning मुक्त एवं दूरस्थ शिक्षा में आधार पाठ्यक्रम	नॉन क्रेडिट	अनिवार्य
द्वितीय वर्ष	012	CHEQ/EA	Foundation Course in Enviroment Awarness पर्यावरण सम्बन्धी योग्यता प्रदायी आधार	नॉन क्रेडिट	अनिवार्य

			पाठ्यक्रम		
तृतीय वर्ष	003	UGFIT	Foundation Course in Information Technology सूचना एवं प्रौद्योगिकी में आधार पाठ्यक्रम	नॉन क्रेडिट	अनिवार्य
वैकल्पिक आधार पाठ्यक्रम /Elective foundation Course					
प्रथम वर्ष	001	UGFHS	Foundation Course in Humanities and Social Science मानविकी एवं समाज विज्ञान में आधार पाठ्यक्रम	4	वैकल्पिक
द्वितीय वर्ष	004 or 005	UGFEG or UGFHD	Foundation Course in English अंग्रेजी में आधार पाठ्यक्रम अथवा **Foundation course in Hindi** हिन्दी में आधार पाठ्यक्रम	4 or 4	
तृतीय वर्ष	2501 or 007 or 009 or 2701	DM or AOCHE Or AOCNC Or SWM	**Foundation course in Disaster Management** आपदा प्रबंधन में आधार पाठ्यक्रम अथवा **Human Environment** मानव पर्यावरण में आधार पाठ्यक्रम अथवा **Nutrition for the Community** समुदाय एवं पोषण आधार पाठ्यक्रम अथवा **Solid waste Management** ठोस अपशिष्ट का प्रबन्धन	4 or 4 or 4 or 4	
Skill Based Programs/ कौशल विकास कार्यक्रम (द्वितीय अथवा तृतीय वर्ष में)					
द्वितीय वर्ष अथवा तृतीय वर्ष में	2654 or 2655 or 2660 or 2661	UGSSC-04 or UGSSC-05 or UGSSC-10 or UGSSC-11	Diet Therapy or Public Health & Hygiene or Energy & Environment or Environment & Development	8 or 8 or 8 or 8	वैकल्पिक

नोट– 1. A student of computer science, who opts for mathematics as a subject, can not opt. UGMM-13 in any of his/her years.

2. प्रथम चयनित विषय का विषय केन्द्रित वैकल्पिक पाठ्यक्रम (8 क्रेडिट का) प्रथम वर्ष में, द्वितीय चयनित विषय का विषय केन्द्रित वैकल्पिक पाठ्यक्रम (8 क्रेडिट का) द्वितीय वर्ष में तथा उसी प्रकार तृतीय विषय का विषय केन्द्रित वैकल्पिक पाठ्यक्रम (8 क्रेडिट का) तृतीय वर्ष में अध्ययन करना होगा।

3. कौशल विकास कार्यक्रमों के अन्तर्गत चयनित विषयों में सम्बन्धित एक–एक 08 क्रेडिट का पाठ्यक्रम द्वितीय एवं तृतीय वर्ष में पढ़ना अनिवार्य है।

UGCS-01 COMPUTER FUNDAMENTAL

BLOCK-1 HARDWARE CONCEPTS

UNIT-1 Introduction and Data Representation
UNIT-2 Digital Logic Circuits
UNIT-3 Memory Organization
UNIT-4 Input/ Output Organization

BLOCK-2 CPU ORGANIZATION

UNIT-5 Instruction Sets
UNIT-6 Register Organizations and Micro-operation
UNIT-7 ALU and Control Unit Organization
UNIT-8 Micro-programmed Control Unit

BLOCK-3 MICROPROCESSOR AD ASSEMBLY LANGUAGE PROGRAMMING

UNIT-9 Microprocessor Architecture
UNIT-10 Introduction to Assembly Language
UNIT-11 Assembly Language Programming (part-1)
UNIT-12 Assembly Language Programming (part-2)

BLOCK-4 PARLLET ORGANIZATION AND REDUCED INSTRUCTION SET COMPUTERS

UNIT-13 Introduction to Parallel Organization
UNIT-14 Pipeline and Vector Processing
UNIT-15 Dataflow computers and Parallet Alrothims
UNIT-16 Reduced Instruction Set Computers Architecture-part-1
UNIT-17 Reduced Instruction Set Computers Architecture-part-2

UGCS-02 PC SOFTWARE APPLICATIONS SKILLS

BLOCK-1 PROBLEM SOLVING TECHINQUES

UNIT-1 Classical Problem and Puzzels
UNIT-2 The Higher Arithmetic-1
UNIT-3 The Higher Arithmetic-2
UNIT-4 General Methods

BLOCK-2 INTRODUCTION OF MS-EXCEL

UNIT-5 Introduction to EXCEL
UNIT-6 Formatting and Printing Worksheet
UNIT-7 Customising Workphace
UNIT-8 Calculation in Worksheet
UNIT-9 Chart
UNIT-10 Database power of Excel
UNIT-11 Focus on analysis
UNIT-12 Automating worksheet

BLOCK-3 INTERNET AWARENESS

UNIT 13 Internets: An Overview
UNIT-14 Internet Tools : E mail, FTP & Telnet
UNIT-15 Browsers
UNIT-16 Visiting Web Sites

UGCS-03 INTRODUCTION OTO SYSTEM SOFTWARE

BLOCK-1 PROGRAMMING CONCEPTS AND SOFTWARE TOOLS

UNIT-1 Introduction to programming concept
UNIT-2 Introduction to Assembler
UNIT-3 Introduction to Compiler
UNIT-4 Graphic User Interface
UNIT-5 Introduction to a Text Editor & Debugging System

BLOCK-2 FUNAMENTALS OF OPERATIN SYSTEM

UNIT-6 Introduction to Operation System
UNIT-7 Process Management
UNIT-8 Memory Management
UNIT-9 File Management

BLOCK-3 UNIX-OPERATING SYSTEM-1

UNIT-10 Theoretical Concepts on UNIX Operating System
UNIT-11 UNIX- Getting Started-1
UNIT-12 UNIX- Getting Started-2
UNIT-13 Text Manipulation
UNIT-14 Editors

BLOCK-4 UNIX-OPERATING SYSTEM-2

UNIT-15 User to User Communication
UNIT-16 Shell Progarmming
UNIT-17 Progarmming Tools
UNIT-18 System Administration

UGCS-04 'C' PROGARMMING & DATA STRUCTURES

BLOCK-1 INTRODUCTION TO THE PROGRAMMING LANGUAGE

UNIT-1 Introductory
UNIT-2 Data Types in 'C'
UNIT-3 Operators and Expression in C
UNIT-4 Decision Structures in 'C'
UNIT-5 Control Structures-1

BLOCK-2

UNIT-6 Control Structures-2
UNIT-7 Pointers and Arrays
UNIT-8 Functions
UNIT-9 Functions
UNIT-10 Files and Structs, Unions and Bit-fields

BLOCK-3 DATA STRUCITURES

UNIT-11 Introduction to Data Structures: Array
UNIT-12 Lists
UNIT-13 Stacks and Queues
UNIT-14 Graphs

BLOCK-4 TREES AND FILE ORGANIZATION

UNIT-15 Trees
UNIT-16 AVL-Tree and B-Tree
UNIT-17 Files

BLOCK-5

UNIT-18 Searching Techniques
UNIT-19 Sorting Techniques
UNIT-20 Sorting Techniques

UGCS-05 DATA STRUCTURES THROUGH C AND PASCAL

BLOCK-1 PROGRAMMING IN PASCAL

UNIT-1 Problem Solving and Pascal
UNIT-2 Control Structures in Pascal
UNIT-3 Arrays and Records
UNIT-4 Subprograms : Functions and Procedures
UNIT-5 Pointers, Files and Sets

BLOCK-2 INTRODUCTION TO THE PROGRAMMING LANGUAGE

UNIT-6 Introductory
UNIT-7 Data Types in 'C'
UNIT-8 Operators and Expression in C
UNIT-9 Decision Structures in 'C'
UNIT-10 Control Structures-1

Block-3

UNIT-11 Control Structures-2
UNIT-12 Pointers and Arrays
UNIT-13 Functions
UNIT-14 Functions
UNIT-15 Files and Structs, Unions and Bit-fields

Block-4 DATA STRUCITURES

UNIT-16 Lists
UNIT-17 Stacks and Queues
UNIT-18 Graphs

BLOCK-5 TREES AND FILE ORGANIZATION

UNIT-19 Trees
UNIT-20 AVL-Tree and B-Tree
UNIT-21 Files

BLOCK-6

UNIT-22 Searching Techniques
UNIT-23 Sorting Techniques
UNIT-22 Sorting Techniques

UGCS-06 INTRODUCTION TO DATABASE MANAGEMENT SYSTEM

Block-1

INTRODUCTORY CONCEPTS OF DATA BASE MANAGEMENT SYSTEMS

UNIT-1 Basic Concepts
UNIT-2 Database Models and Its Implementations
UNIT-3 File Organization for Conventional DBMS
UNIT-4 Management Consideratons
UNIT-5 Enterprises Wide Information System of the Times of India Group (A Case Study)

BLOCK-2 RDBMS AND DDBMS

UNIT-6 Relation Model
UNIT-7 Normalization
UNIT-8 Structural Query Language
UNIT-9 Distributed Database

BLOCK-3 EMERGING TRENDS IN DATABASE MANAGEMENTS SYSTEMS

UNIT-10 Introduction to Object Oriented Database Management System
UNIT-11 Introduction to Client/ Server Database
UNIT-12 Introduction to knowledge Database

UGCS-07 ELEMENTS OF SYSTEM ANALYSIS AND DESIGN

BLOCK-1 SYSTEM ANALYSIS

UNIT-1 Overview of System Analysis and Design
UNIT-2 Project Selection
UNIT-3 Feasibility Study
UNIT-4 System Requirement Specification and Analysis

BLOCK-2 SYSTEM DESIGN

UNIT-5 Structured System design
UNIT-6 Input Design and Control
UNIT-7 Output System Design
UNIT-8 File and Database Design

BLOCK-3 SYSTEM DEVELOPMENT AND IMPLEMENTATION

UNIT-9 System Development
UNIT-10 System Control and Quantity Assurance
UNIT-11 Documentation
UNIT-12 System Implementation

BLOCK-4 MANAGEMENT INFORAMTION SYSTEM

UNIT-13 Introduction to MIS
UNIT-14 The Technology Component
UNIT-15 The Organization Impact of MIS
UNIT-16 Building Management Information System

BLOCK-5 CASE STUDIES

UNIT-17 Case (A) Information System Planning
UNIT-18 Case (B) Preparing for System Analysis
UNIT-19 Case (C) System Analysis Completions
UNIT-20 Case (D) System design Proposal
UNIT-21 Case (E) Evaluation and Selection of Systems
UNIT-22 Case (F) Implementation Plan and Activites

BLOCK-6 SAD: EMERGING TRENDS

UNIT-23 The Analyst as a Professional
UNIT-24 Human Computer Interaction
UNIT-25 Introduction to Multimedia

UGCS-08 DISCRETE MATHEMATICS

BLOCK-1 ELEMENTRY LOGIC

UNIT-1 Proposetional Calculus
UNIT-2 Methods of Proof
UNIT-3 Boolean Algebra and Cercuits

BLOCK-2 BASIC COMBENATORIES

UNIT-4 Combinatory- An Introduction
UNIT-5 Partitions and Distribution
UNIT-6 More about Counting

BLOCK-3 RECURRENCE

UNIT-7 Recurrence Relation
UNIT-8 Generating Function
UNIT-9 Solving Recurrence

BLOCK-4 GRAPH TEHORY

UNIT-10 Basic properties of graph
UNIT-11 Special graph
UNIT-12 Euleream and Handtonies Graph
UNIT-13 Graph Colouring and Planar Graphs

UGCS-9

COMPUTER NETWORKS

BLOCK-1 AN INTRODUCTION TO COMPUTER NETWORKS

UNIT-1 Network Classification and Reference Models.

UNIT-2 Data Transmission and multiplexing.

UNIT-3 Network, Transport and Application Layers

BLOCK-2 NETWORK DEVICES AND TECHNOLOGY

UNIT-4 Network Devices – Repeaters, Bridge, Switches, Hubs

UNIT-5 Network devices- Routers, gateways modems

UNIT-6 ISDN

UNIT-7 ATM

UGCS-10

TCP/IP PROGRAMMING

UNIT-1 Introduction to TCP/IP

UNIT-2 Internet Protocol

UNIT-3 Transmission Control Protocol

UGCS-11

C++ AND OBJECT ORIENTED PROGRAMMING

BLOCK-1

UNIT-1 What is Object Oriented Programming?

UNIT-2 Object Oriented Programming System

UNIT-3 Advanced Concept

UNIT-4 Introduction to Object Oriented Languages.

UNIT-5 An Introduction to UML

BLOCK-2

UNIT-6 Overview of C++

UNIT-7 Classes and Objects

UNIT-8 Operator Overloading

UNIT-9 Inheritance- Extending Classes

UNIT-10 Streams and Templates

UGCS-16(N)/ UGSTAT-01
Statistical Methods

BLOCK – I . Data Collection and Its Representation

Unit-I- Data Collection and Tabulation :

Meanings, Definitions and Applications of Statistics, Measurements and Scale, Measurements of qualitative data, Methods of data collection, Types of data.

Unit-II- Representation of Data- I (Diagrammatical representation):

Frequency distribution, Tabulation of data, Diagrammatical Representation of data, Bar diagram, Multiple bar diagram, Divided bar diagram, Percentage bar diagram, Pie chart, Pictogram, leaf chart,

Unit-II- Representation of Data- I (Graphical representation):

Graphical representation of frequency distribution, Histogram, Frequency polygon, Frequency curve, Ogive.

BLOCK – II . Measures of Central Tendency and Dispersion

Unit-I- Measures of Central Tendency :

Types of measures of central tendency, Arithmetic mean, Fundamental Theorems on

Arithmetic mean, Geometric mean, Harmonic mean, Median, Mode, Percentiles, Deciles, and Quartiles.

Unit-II- Measures of Dispersion :

Types of measures of Dispersion, Range, Mean Deviation, Variance and Standard deviation, Effect of change of origin and scale, Relationship between measures of central tendency and measures of dispersion, Coefficient of variation.

BLOCK – II . Moments, Skewness and Kurtosis

Unit-I- Moments, Raw Moments and Central Moments :

Definition of moments, raw moments for ungrouped data, raw moments for grouped data, Central moments, Factorial moments, Interrelationship between various moments, effect of change of origin and scale on moments, Charlier's checks, Sheppard"s correction for moments.

Unit-II- Skewness and Kurtosis :

Definition of skewness, Measures of skewness, Pearson's coefficient, Bowley's coefficients, Kurtosis, Measures of Kurtosis, effect of change of origin and scale.

UGCS-17(N)/ UGSTAT-07(O) *Operation Research*

BLOCK – I . Formulation of Linear Programming Problems

Unit-I- Introduction to Operation Research:

Introduction, Phases of OR Problem, Operation Research Modeling Approach, Defining the Problem & Gathering Data, Formulating a Mathematical Models, Deriving Solution from the Model Introduction to Linear Programming, Formulation of a Linear Programming Problem with examples.

Unit-II- Graphical Method top Solve LPP: Introduction, Graphical Solution to Linear Programming Problem.

BLOCK – II . Simplex Method of Solving LPP

Unit-I- Simplex Method :

Introduction, Principle of Simplex Method, Simplex Method with Several Decision Variables, Two Phase & M-Method, Multiple, Unbounded Solution & Infeasible Problems, Sensitivity Analysis.

Unit-II- Duality Problem in LPP:

Introduction, Dual Linear Programming Problem, Formulation of a Dual Problem with example.

BLOCK – III . Transportation Problem & Assignment Problem

Unit-I- Representation of Transportation Problem (Non-Generated & Balanced Cases only) & Assignment Problem as Linear Programming Problem:

Introduction of T.P. & A.P., Transportation Problem as LPP, Non-Degenerate Transportation Problem, Balanced Transportation Problem, Assignment Problem &LPP, Balanced Assignment Problem.

Unit-II- Different Methods of Finding Initial Feasible Solution of a Transportation Problem (T.P., MODI Method of Finding Optimal Solution of a T.P.) :

Introduction, Basic Feasible Solution of a Transportation Problem, Modified Distribution Method (MODI), Vogel's Approximation Method (VAM), Maximization in a Transportation Problem .

Unit-III- Solution of Assignment Problem With using Hungarian Method :

Introduction, Solution of an Assignment Problem, Hungarian Method, Maximization in an Assignment Problem.

BLOCK – IV . Theory of Games

Unit-I- Basic Concepts of Game Theory :

Introduction, A Game, Pure & Mixed Strategies, Two- Person Zero- Sum Game, Pay-Off Matrix, Games without Saddle Point and Mixed Strategies, Methods of Solving Game Problems.

Unit-II- Dominance Rule, Equivalence of Rectangular Games with Linear Programming :

Introduction, Rectangular Games without Saddle Point, Dominance Property of reducing the Size of the Game, Solution Methods of Games without Saddle Point, Equivalence of Rectangular Games with Linear Programming.