



Uttar Pradesh Rajarshi Tandon Open University

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Syllabus

for

Bachelor in Computer Science (B.Sc. Computer Science)

(THE NEW COURSE STRUCTURE AND SYLLABUS WILL BE EFFECTIVE FROM THE ACADEMIC SESSION JULY 2015-16. THEREFORE THOSE STUDENTS WHO WILL BE ENROLLED/ADMITTED IN FIRST YEAR FROM SESSION JULY 2015-16 & ONWARDS WILL STUDY ACCORDING TO THIS NEW SYLLABUS AND THE STUDENTS ADMITTED BEFORE JULY 2015-16 WILL FOLLOW OLD SYLLABUS.)

November 2016

Contents

Contents i

1 Bachelor in Computer Science (B.Sc. Computer Science)	1
1.1 Course Details and Structure	1
1.2 UGCS-01 (Computer Fundamental)	2
1.3 UGCS-03 (Introduction to System Software)	3
1.4 UGCS-04 ('C' Programming)	4
1.5 UGCS-06 (Database Management System)	5
1.6 UGCS-07 (Elements Of System Analysis And Design)	6
1.7 UGCS-08 (Discrete Mathematics)	7
1.8 UGCS-09 (Computer Networks)	7
1.9 UGCS-11 (C++ And Object Oriented Programming)	8
1.10 UGCS-16 (Statistical Methods)	9
1.11 UGCS-17 (Operation Research)	10

1

Bachelor in Computer Science (B.Sc. Computer Science)

1.1 Course Details and Structure

8.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 3 8 2	} अनिवार्य
	247	UGCS-04	'C' Programming		
	2790	UGCS-13(P)	Practical Based on UGCS -04		
द्वितीय वर्ष	249	UGCS-06	Database Management System	3 3 8 2	} अनिवार्य
	251	UGCS-08	Discrete Mathematics		
	2791	UGCS-14 (P)	Practical Based on UGCS -06		
तृतीय वर्ष	252	UGCS-09	Computer Network	3 3 8 2	} अनिवार्य
	254	UGCS-11	'C++' and Object Oriented Programming		
	2792	UGCS-15 (P)	Practical Based on UGCS -11		
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 Environment Awareness पर्यावरण सम्बन्धी योग्यता प्रदायी आधार पाठ्यक्रम	नॉन क्रेडिट	अनिवार्य

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	UGFEG	Foundation Course in English अंग्रेजी में आधार पाठ्यक्रम	4	
	or 005	or UGFHD	Foundation course in Hindi हिन्दी में आधार पाठ्यक्रम	or 4	
तृतीय वर्ष	2501	DM	Foundation course in Disaster Management आपदा प्रबंधन में आधार पाठ्यक्रम	4	
	or 007	or AOCHE	अथवा Human Environment मानव पर्यावरण में आधार पाठ्यक्रम	or 4	
	or 009	Or AOCNC	अथवा Nutrition for the Community समुदाय एवं पोषण आधार पाठ्यक्रम	or 4	
	or 2701	Or SWM	अथवा Solid waste Management ठोस अपशिष्ट का प्रबन्धन	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।

1.2 UGCS-01 (Computer Fundamental)

HARDWARE CONCEPTS: Introduction and Data Representation, Digital Logic Circuits, Memory Organization, Input/Output Organization

CPU ORGANIZATION: Instruction Sets, Register Organizations and Micro-operation, ALU and Control Unit Organization, Micro-programmed Control Unit.

MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING: Micro-processor Architecture, Introduction to Assembly Language, Assembly Language Programming (part-1), Assembly Language Programming (part-2)

PARALLEL ORGANIZATION AND REDUCED INSTRUCTION SET COMPUTERS: Introduction to Parallel Organization, Pipeline and Vector Processing, Data-flow computers and Parallel Algorithms, Reduced Instruction Set Computers Architecture-part-1, Reduced Instruction Set Computers Architecture-part-2.

1.3 UGCS-03 (Introduction to System Software)

Introduction to System Software

Programming Concepts and Software Tools: Introduction to Programming Language Concepts: Algorithm, Flowcharting, Problem and its Algorithm, Concept of a Programming Language, Categories of Languages, Elements of a Programming language.

Introduction to Assembler: Advocates of a translator, types of translators, Assembler implementation, Macro processor, Loaders.

Introduction to Compiler writing: Compiler, Approaches to compiler development, compiler Designing Phases, Software tools.

Graphical user interface : Graphical user interface, Evolution of the human and Machine interaction, Common Graphical user interface terms, functionality of graphical user interfaces, A look at some graphical user interfaces.

Introduction to a text editor and debugging system: Introduction to a text editor, overview of the Editing process, Types of Editors and user interface, Editor structure, Interactive debugging systems, Debugging Functions and Capabilities, Relationship with other parts of the system, user interface criteria.

Fundamentals of operating system

Introduction to operating system: Operating System, Evolution of operating systems, serial processing, Batch processing, Multiprogramming, types of operating System, Batch Operating system Multiprogramming Operating system, Network operating system, Distributed Operating System, Operating System Structure, Layered Structure Approach, Kernel Approach, Virtual Machine, Client Server Model, Future Operating System trends.

Process Management: Process concept Processor scheduling, Types of Schedulers, Scheduling and performance Criteria, Scheduling algorithms, Interprocess Communications and synchronization, Basic concepts of concurrency, Basic Concepts of Interprocess Communication and Synchronization, Mutual Exclusion, Semaphores, Hardware support for mutual Exclusion, Mechanism for Structured form of Interprocess Communication and synchronization, Deadlocks, System model, Deadlock Characterization and Modelling.

Memory Management: Introduction, single process monitor, Multiprogramming with Fixed partitions, Multiprogramming with dynamic partitions, Paging Address mapping in a paging system, Hardware Support for Paging, Address Translation by Associative Memory, Sharing and Protection in a Paging System, Segmentation, Address Mapping in a Segmented System, Implementation of segment tables, sharing and Protection in a Segmented System, Virtual memory, Advantages of virtual memory, Demand Paging Virtual memory management policies.

File Management: Introduction, File concept, Directories, Disk organization, Disk Space Management methods, Linked List, Bit Map, Disk Allocation Methods, Contiguous Allocation, Non Contiguous Allocation, Disk Scheduling, FCFS, Shortest seek time-first scheduling, scan scheduling, File Protection, Passwords, Access Lists, Access Groups.

UNIX Operating System-I

Theoretical Concepts of UNIX operating System: Introduction, Basic features of unix operating system, UNIX system Architecture, File Structure processing Environment, CPU Scheduling, Memory Management, Swapping, Demand Paging, File System, Blocks and Fragment and Inodes, Directory Structure.

UNIX-GETTING STARTED I: Introduction, Getting started, user Names and Groups, Logging in, Correcting Typing Mistakes, Format of UNIX commands, changing your Password, Characters with special Meaning, UNIX documentation, Files directories, Current Directory, Locking at the Directory Contents, Absolute and Relative, Pathnames, Some UNIX Directories and Files.

UNIX Getting Started II: Introduction, Looking at file contents, your own directories, file permissions, Basic operations on files, Links between Files, Changing permission modes, standard files, Standard Output, Standard Input, Standard Error, Filters and Pipelines, Processes, Finding out about Processes, stopping Background Processes.

TEXT Manipulation: Introduction, Inspecting files, file statistics, Searching for Patterns, Comparing Files, Operating on files, printing files, Rearranging Files, Sorting files, Splitting files, Translating characters,

Editors: Introduction, General characteristics of vi , Starting up and quitting from vi , Adding text and Navigation, changing Text, Searching for Text, Copying and Moving Text, The Features of ex, The live editors Ex and Ed. starting up and Quitting, Addressing Lines, Looking at Text, Adding Deleting and changing text, Searching for and replacing text, cut and paste operations, files and Miscellaneous features, The Stream Editor SED, changing several files in SED, AWK.

UNIX operating System I

User to user Communication: Introduction, Online communication. Communication, Off-line

Shell Programming: Introduction, Programming in the Bourne and the C- shell, wild cards, simple shell programs, variables, Programming Constructs, interactive shell scripts, advanced Features.

Programming Tools: Introduction, The UNIX C compiler, other tools (Lint- the – C verifier, Program Profiles, Program listings), Cross References and Program flow, Maintaining Programs, the source code control system (Initializing a file, Examining and Altering files, Identification Keywords, Miscellaneous Commands).

System Administration: Introduction, System Administration – A Definition, Booting the system, Maintaining user accounts, file systems and special files, Backups and Restoration.

1.4 UGCS-04 ('C' Programming

INTRODUCTION TO THE PROGRAMMING LANGUAGE: Introductory, Data Types in 'C', Operators and Expression in C, Decision Structures in 'C', Control Structures-1 : Control Structures-2, Pointers and Arrays, Functions, Files and Structs, Unions and Bit-fields

DATA STRUCTURES: Introduction to Data Structures: Array, Lists, Stacks and Queues, Graphs

TREES AND FILE ORGANIZATION: Trees, AVL-Tree and B-Tree, Files : Searching Techniques, Sorting Techniques, Sorting Techniques

1.5 UGCS-06 (Database Management System)

Introductory Concepts of Data Base Management Systems

Basic Concepts: Introduction, Traditional file Oriented approach, Motivation for database approach, database basics, three views of data, The three level Architecture of DBMS Mapping between different levels database Management System facilities, DDL, DML, Elements of a database Management System (DML Pre Compiler, DDL Compiler, File Manager, Database Manager, query Processor, database Administrator, Data dictionary) , Advantages and disadvantages of database management system.

Data base Models and its Implementation: Introduction, File Management System Entity, Relationship (E-R) Model, The hierarchical model, DBTG set, the network model, The Relational model, Advantages and Disadvantages of Relational Approach, Difference between Relational and other models.

File Organization for Conventional DBMS: Introduction, File Organization, Sequential file organization, Index-sequential file organization (Types of Indexes, Structure of Index Sequential Files, VSAM, Implementation of Indexing through Tree- Structure), Direct file organization, Multi key file Organization (Need for the multiple Access path, multicost , File organization, Inverted file organization, cellular Partitions, comparison and Tradeoff in the Design of Multikey file).

Management Considerations: Introduction, Organizational Resistance to DBMS Tools (Political observation, Information transparency, Fear of future potential, Reasons for Success), Conversion from An Old system to a new system, Evaluation of a DBMS, Administration of a database Management System.

Enterprise Wide Information System of the Times of India Group (A Case Study): Introduction, organization and the operating environment unique nature of the Business, Information System goals and how to achieve the Goal The Response System and Respnet Choices, Benefits.

RDBMS and DBMS

Relational Model: Concepts, Formal Definition of a Relation, the Codd, Commandments, Relational Algebra, Relational Completeness.

Normalization: Functional dependency, Anomalies in a database, Properties of Normalized Relations, 1st NF, 2nd NF, 3rd NF, BCNF, Fifth Normal form examples of Database Design.

Structured Query Language: Categories of SRL Commands Data Definition, Data Manipulation , views.

Distributed Databases: Structure of Distributed database Trade-OFFS in distributing the database, Design of Distributed Databases.

Emerging Trends in DBMS

Introduction to object oriented Database Management System: Next Generation database System, New database applications, object oriented database Management system, Promises and Advantages of object oriented Database Mgt. system, Difference between RDBMS and OODBMS, Alternative object oriented Database strategies.

Introduction to client/Server Database: Evaluation of client/Server, Emergence of client server Architecture, the client/server Computing, the critical products, Developing on Application, SQL (DDL, DML), Client/Server. Where to Next?

Introduction to Knowledge Databases: Definition and Importance of knowledge, Knowledge base system, Difference between a knowledge base system and a database system, knowledge Representation Schemes.

1.6 UGCS-07 (Elements Of System Analysis And Design)

System Analysis

Overview of System Analysis and Design: System, Systems study, Systems analysis and systems approach, characteristics of a system, Elements of systems analysis, types of systems, System Development life cycle, Software Crisis (Programmer's point of view, user's point of view), Role of a systems analyst.

Project Selection: System projects, sources of Project requests, Managing Project Review and selection, Preliminary investigation, Problems classifications and definitions.

Feasibility Study: Preliminary study, different types of feasibility (Technical, Operational, Economic, Social, Management, Legal and Time feasibility), Investigative study, cost/ Benefit analysis, Fact Findings (interviewing questionnaires, observing the current system, Determination of DFD, New System).

System Requirement Specifications and analysis: DFD, data dictionaries, HIPO (VTOC,IPO), decision tables and decision trees, warnier-ORR diagrams, NASSI-SHNEIDERMAN CHARTS

System Design

Structured System Design: System Design Considerations, Design, Methodologies, Structured Design, Modularization, Design Process, System Specifications, Prototype Design.

Input Design and control: Processing Transaction data, Elements of input data, Input Media and Devices, Input Media and Devices, Input Design Guidelines, Input verification and Control, Data Dictionaries, How to layout terminal screen, Major concerns Regarding CRT-Input Screen Design.

Output System Design: Types of output, output Devices, output Design Consideration, Design of output Reports Designing Screen output, Menu design, Form Design and Control, Computer Graphics.

File and Data Base Design: Selecting data storage Media Types of File (Master, Transaction, Table, Report Backup, Archival, Dump, Library), File organization, File Design, Data base Design, Types of database coding system, Types of Code (Classification, Function, Card, Sequence, Significant digit, Subset code, Mnemonic code, Acronym).

System Development and Implementation

System Development: Task of System Development, Prototype installation Hardware and Software selection and performance, Benchmark Testing, Preparing software development cycle, software specification language selection criteria.

System Control and Quality Assurance: Quality Assurance in Software life, cycle, Levels of Quality Assurance, Design objectives, Reliability and maintenance, Maintenance issues, Maintainable Designs, Testing practice and plans, Levels of tests, special sstes tests, Designing test data, system control, AuditTrial.

Documentation: Characteristics of a good documentation, types Software Design and documentation tools, need for documentation, Format for preparing documentation Package.

System Implementation: Training of Personnel involved with system, Training Methods, Conversion Methods, Review plan, System Maintenance, Hardware, Acquisitions, criteria for vendor's selection, service Bureaux.

Management Information System

Introduction to MIS: Definition, Historic Development, Typical Systems,

The Technology Component: Overview of computing Technology, Overview of Communication Technology, Database Technology, Decision Support Systems, knowledge Based systems.

The Organizational Impact of MIS: Information as a Resource, Information for Competitive Advantage, Organization, Information and Decision, MIS as a profession.

Building Management Information Systems: System Analysis, Techniques of Systems Analysis.

Case Studies: Case (A) Information System Planning, Case (B) Preparing for systems analysis, Case (C) Systems Analysis Completion, Case (D) System Design Proposal, Case (E) Evaluation and selection of Systems Case (F) Implementation plan and Activities.

Emerging Trends

The Analyst As A Professional: Attributes of a good analyst, Organizational issues, The Systems Analyst and law.

Human Computer Interaction: The What, Why, When and where of Human Computer Interaction, Communicating with Computers, Ergonomics, Human problems in the Automated Office, Designing Human Machine Systems.

Introduction to Multimedia: Multimedia – The Concept, Design, Production and Distribution, Components of Multimedia, Software and Hardware for Multimedia.

1.7 UGCS-08 (Discrete Mathematics)

ELEMENTARY LOGIC: Propositional Calculus, Methods of Proof, Boolean algebra and Circuits

BASIC COMBINATORICS: Combinatory- An Introduction, Partitions and Distribution, More about Counting

RECURRENCE: Recurrence Relation, Generating Function, Solving Recurrence

GRAPH THEORY: Basic properties of graph, Special graph, Euler and Hamiltonian Graph, Graph Coloring and Planar Graphs

1.8 UGCS-09 (Computer Networks)

An Introduction to Computer Networks

Network, Classification and Reference Models: Introduction, Network, Network Goals/Motivation, Applications of Networks, Types of network, Reference Model (OSI, TCP) IEEE standards for LAN.

Data transmission and Multiplexing: Introduction, Transmission, Terminology, Time-domain Concepts, Frequency domain Concepts, Relationship between Data Rate and Bandwidth, Analog and digital data transmission, transmission media, Multiplexing.

Medium Access Control and D.L.L.: Introduction, D.L.L., Medium Access Control Sub-layer (Contention based media access protocols, polling based MAC protocols, IEEE standard 802.3 and Ethernets, IEEE standard 802.4 Token bus, IEEE standard 802.5 Token Ring).

Network, Transport (TCP/IP) And Application layer: Introduction, Network layer (Routing Algorithms, Shortest path routing, Flooding), Congestion Control Algorithms, Comparison of virtual circuit and datagram subnets, Internetworking (Repeaters, Bridges, Routers), Transport layer (Transport service and Mechanism, Types of Service/Quality of Service), Transport Control Mechanism (Addressing, Flow Control and buffering , Multiplexing, Connection establishment and Management , Crash Recovery), TCP/UDP, Application layer (The domain name system (DNS), TCP/IP Internet Domain Name, Electronic Mail, www, Mail-based Applications), Remote procedure Call (RPC), File transfer protocol (FTP), Telnet.

Network Devices and Technology Network Devices –I: Introduction, Network devices (Repeaters, Bridges, Switches, Hubs).

Network Devices-II: Introduction, Network devices (Routers, Comparison of Bridges and Routers, Gateways, Modem).

Integrated Services Digital Network (ISDN): Introduction, Baseband and Broadband Communication, ISDN Services, Advantages of ISDN,. ISDN applications (Internet Access, Telephony, Telecommunicating, Video conferencing, Education, Large-Scale file transfers).

Asynchronous Transfer Mode (ATM): Introduction, Switching Techniques (Circuit switching, Packet Switching, Multirate Circuit Switching, Frame Relay, Cell Relay), How compatible is ATM as Technology? , ATM layered Architecture in Comparison with OSI Model, How ATM protocol works?, The ATM Network, The ATM CELL, ATM classes of services (ATM Service classes, ATM Technical Parameters), ATM, Traffic Control (Network Resource Management, Connection Admission Control, (Network Resource Management, Connection Admission Control, Usage Parameter Control and Network Parameter Control, Priority Control, Congestion Control), Benefits of ATM, ATM Applications (ATM Services, ATM workgroup and Campus networks, ATM enterprise network consolidation, multimedia virtual private networks and managed services, frame relay backbones, Internet backbones, Residential broadband networks, Carrier infrastructures for the telephone and private line networks).

1.9 UGCS-11 (C++ And Object Oriented Programming)

An Introduction to Object Oriented Programming

Object Oriented Programming: OOP Paradigm, the soul of OOP, OOP characteristics, Advantages of OOP, Applications of object Oriented Programming (System software, DBMS, Applications of OODBMS, Advantages and Disadvantages of OODBMS), The Object Orientation, OO Languages, Advantages of C++.

Object Oriented Programming System: What is OOPS?, Class, Inheritance, Abstraction (Procedural language, Object-oriented language), Mechanisms of Abstraction, Encapsulation and information hiding, Polymorphism, overloading,

Advanced concepts: Dynamism (Dynamic Typing, Dynamic Binding, Late Binding, Dynamic Loading, Structuring programs, Reusability, Organizing Object-oriented Projects (Large scale

designing, Separate Interface and Implementation, Modularizing, Simple Interface, Dynamic decisions, Inheritance of Generic Code, Reuse of tested code.

Introduction to Object Oriented Languages: Objective-C, Features of objective-C, Python, Features of Python, C # (C SHAR), Features of C#, Eiffel, Modula-3, Features of modula-3, Small talk, object REXX, Java, Features of Java(Object Oriented, Distributed, Interpreted, Robust, Secure, Architecturally neutral, Portable High performance, Dynamic) , Beta various object oriented programming languages Comparative chart.

An Introduction to Unified Modelling Language (UML): UML (Goals, History, use), Definition, UML Diagrams (Use case, class, interaction diagrams), State diagrams, Activity Diagrams, Physical diagrams.

C++ — An Introduction

Overview of C++: Programming Paradigms (Procedural Programming, Modular Programming, Data Abstraction, Object Oriented Programming), Concepts of C++ functions and files.

Classes and Objects: Definition and Declaration of a class, Scope Resolution Operator, Private and Public member functions, Creating Objects, Accessing class data members and member functions, Arrays of objects, Objects as Function Arguments.

Operator overloading: Operator Functions, large objects, Assignment and initialization, Function Call, Increment, Decrement Operator, Friends.

Inheritance-Extending classes: Concept of inheritance, Base class and Derived class, visibility Modes, Single inheritance Multiple Inheritance, Nested classes, virtual functions.

Streams and Templates: Output, Input, Files Exception, handling. and streams, Templates,

1.10 UGCS-16 (Statistical Methods)

Data Collection and Its Representation:

Data Collection and Tabulation : Meanings, Definitions and Applications of Statistics, Measurements and Scale, Measurements of qualitative data, Methods of data collection, Types of data.

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,

Representation of Data- I (Graphical representation): Graphical representation of frequency distribution, Histogram, Frequency polygon, Frequency curve, Ogive.

Measures of Central Tendency and Dispersion

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.

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.

Moments, Skewness and Kurtosis

Moments, Raw Moments and Central Moments : Definition of moments, raw moments

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

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.

1.11 UGCS-17 (Operation Research)

Formulation of Linear Programming Problems

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.

Graphical Method to Solve LPP: Introduction, Graphical Solution to Linear Programming Problem.

Simplex Method of Solving LPP

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

Duality Problem in LPP: Introduction, Dual Linear Programming Problem, Formulation of a 12Dual Problem with example.

Transportation Problem & Assignment Problem

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.

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 .

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

Theory of Games

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.

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.