KANNUR UNIVERSITY
കണ്ണൂർ സർവകലാശാല

**(Abstract)**

Five Year Integrated Programme in Master of Computer Applications at the Information Technology Education Centre (ITEC) , Dr . Janaki Ammal Campus , Palayad- Scheme and Syllabus of Second semester (Only) - Approved and Implemented w .e .f 2025 Admission -Orders issued.

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**ACADEMIC C SECTION**

ACAD/ACAD C1/17099/2025 Dated: 05.01.2026

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Read:-1. ACAD D/ ACAD D5/4513/2024 dated 28.03.2025

2 .Email dated 06.08.2025 from the Dean , Faculty of Technology

3. ACAD/ACAD C1/17099/2025 dated 16.09.2025

4. Email dated 30.11.2025 from the Dean , Faculty of Technology

5 Orders of Vice Chancellor in file of even no, dated 03.12.2025

6. Minutes of the meeting of Standing Committee of Academic Council held on 05.12.2025

**ORDER**

- The proposal to start the Five Year Integrated Programme in Master of Computer Applications at the Information Technology Education Centre (ITEC), Dr. Janaki Ammal Campus, Palayad, with effect from the 2025 admission, was approved vide paper read (1) above.
- Subsequently, the Head, Dept. of Information Technology had forwarded the Scheme and Syllabus of the Programme (up to sixth semesters ) for approval , along with the minutes of the Department Council.
- The Scheme and Syllabus of First Semester of the Five Year Integrated Programme in Master of Computer Applications were approved and implemented with effect from the 2025 admission, vide paper read (3) above.
- The Scheme and Syllabus (Second to Sixth Semesters) of the above programme, submitted by the Head, Dept. of Information Technology were forwarded to the Dean, Faculty of Technology, and the Dean, vide paper read (5) above, submitted the remark "Verified."
- Considering the matter, the Vice-Chancellor ordered to place the syllabus before the Standing Committee of the Academic Council for consideration.
- The Standing Committee of the Academic Council, vide paper read (6) above, considered the Second Semester Scheme and Syllabus of the Five Year Integrated Programme in Master of Computer Applications at the Information Technology Education Centre (ITEC), Dr. Janaki Ammal Campus, Kannur University, to be implemented with effect from the 2025 admission, and recommended to approve the same.

- The Vice-Chancellor, after considering the recommendations of the Standing Committee of the Academic Council and in exercise of the powers of the Academic Council conferred under Section 11(1), Chapter III of the Kannur University Act, 1996, and all other enabling provisions read together, approved the Second Semester Scheme and Syllabus of the Five Year Integrated Programme in Master of Computer Applications and accorded sanction to implement the same at the Information Technology Education Centre (ITEC), Dr. Janaki Ammal Campus, Palayad, with effect from the 2025 admission.
- The approved Second Semester Scheme and Syllabus of the Five Year Integrated Programme in Master of Computer Applications at the Information Technology Education Centre (ITEC), Dr. Janaki Ammal Campus, implemented with effect from the 2025 admission, are appended to this University Order and uploaded in the University website (www.kannuruniv.ac.in).

Orders are issued accordingly.

*Sd/-*
**Jisha K P**
**Assistant Registrar II**
For REGISTRAR

To: 1. Head, Dept.of Information Technology ,
2.Controller of Examinations (Through PA )
3. Nodal Officer, FYIMP

Copy To: 1. PS to VC, PA to R, PA to CE
2. JR II (Exam)
3. EP IV/EG I/EXC I Sections (Exam)
4. IT Cell (to publish in the website)
5. Computer Programmer
6. SF/DF/FC

KANNUR UNIVERSITY
CIVIL STATION P.O.
KANNUR
Pin-670 002
THAVAKKARA

Forwarded / By Order

SECTION OFFICER

# INTEGRATED MASTER OF COMPUTER APPLICATIONS

# (BCA LEADING TO BCA WITH HONS & MCA)

## Semester I

| No | Level | Course Code | Course Name | Total Hours | C | Hrs./wk. | | | Assessment Weightage (%) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | L | P | Tt | ESE | CCE | T |
| 1.1 | 100 | KU01DSCMCA101 | Introduction to Computational Informatics | 60 | 4 | 4 | 0 | 1 | 50 | 50 | 100 |
| 1.2 | 100 | KU01DSCMCA102 | Principles of Programming | 90 | 4 | 2 | 4 | 2 | 50 | 50 | 100 |
| 1.3 | 100 | KU01DSCMCA103 | Mathematical foundations for computer application | 60 | 4 | 4 | 0 | 1 | 50 | 50 | 100 |
| 1.4 | 100 | | MDC-1- | 60 | 3 | 2 | 2 | 1 | 50 | 50 | 100 |
| 1.5 | 100 | | AEC 1- English 1 | 45 | 3 | 3 | 0 | 1 | 50 | 50 | 100 |
| 1.6 | 100 | | AEC 2-English 2 | 45 | 3 | 3 | 0 | 1 | 50 | 50 | 100 |
| | | | | 360 | 21 | 18 | 6 | 6 | 300 | 300 | 600 |

## Semester II

| No | Level | Course Code | Course Name | Total Hours | C | Hrs./wk. | | | Assessment Weightage (%) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | L | P | Tt | ESE | CCE | T |
| 2.1 | 100 | KU02DSCMCA104 | Object Oriented Programming using C++ | 90 | 4 | 2 | 4 | 1 | 50 | 50 | 100 |
| 2.2 | 100 | KU02DSCMCA105 | Digital Electronics and Computer Organization | 60 | 4 | 4 | 0 | 1 | 50 | 50 | 100 |
| 2.3 | 100 | KU02DSCMCA106 | Statistical Foundations for Computer Applications | 60 | 4 | 4 | 0 | 1 | 50 | 50 | 100 |
| 2.4 | 100 | KU02DSCMCA107 | Database Management Systems | 90 | 4 | 2 | 4 | 1 | 50 | 50 | 100 |
| 2.5 | 100 | | MDC-2 | 60 | 3 | 2 | 2 | 1 | 50 | 50 | 100 |
| 2.6 | 100 | | AEC-3 Additional Language | 45 | 3 | 0 | 0 | 1 | 50 | 50 | 100 |
| | | | | 405 | 22 | 14 | 10 | 06 | 300 | 300 | 600 |

# Semester II

## KU02DSCMCA104: OBJECT ORIENTED PROGRAMMING USING C++

| Semester | Course Type | Course Level | Course Code | Credits | Total Hours |
|---|---|---|---|---|---|
| 2 | DSC | 100 | KU02DSCMCA104 | 4 | 90 |

| Learning Approach (Hours/ Week) | | | Marks Distribution | | | Duration of ESE (Hours) |
|---|---|---|---|---|---|---|
| Lecture | Practical/ Internship | Tutorial | CE | ESE | Total | |
| 2 | 4 | 1 | 50 | 50 | 100 | 2 |

*** ESE Duration : 2 hours for theory and 3 hours for Lab**

**Course Description:**

This course provides an introduction to the principles and practices of object-oriented programming (OOP) using the C++ programming language. Students will learn fundamental concepts of OOP and how to apply them to develop software solutions using C++.

**Course Objectives:**

- Understand the principles of Object-Oriented Programming (OOP) using C++
- Master the syntax and semantics of the C++ programming language
- Gain proficiency in defining and utilizing classes and objects in C++
- Learn techniques for code reusability and flexibility through the use of templates and generic programming, along with mastering concepts like interface classes, operator overloading, and friend functions

**Course Outcomes:**

At the end of the Course, the Student will be able to:

| SL # | Course Outcomes |
|---|---|
| CO1 | Understand the fundamental principles of Object-Oriented Programming (OOP) |
| CO2 | Gain a deep understanding of the concepts of inheritance, polymorphism, virtual functions. |
| CO3 | Master the concept of interface classes and implementation inheritance and acquire proficiency in exception handling |
| CO4 | Master the concept of file handling in C++ and learn the principles of file stream classes in the Standard Template Library (STL). |

## Mapping of COs to PSOs

| CO - PSO Mapping | | | | | |
|---|---|---|---|---|---|
| | **PSO1** | **PSO2** | **PSO3** | **PSO4** | **PSO5** |
| **CO1** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO2** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO3** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO4** | ✔ | ✔ | ✔ | ✔ | ✔ |

## COURSE CONTENT

| | |
|---|---|
| **UNIT 1**<br><br>05 Hours Theory + 10 Hours Lab | Introduction to Programming Concepts, Overview of C++ and its Features, Writing Your First C++ Program, Structure of C++ program, Tokens, Keywords, identifiers, Variables, Data Types, Operators, manipulators, Basic Input/Output (cin, cout), type cast, type conversion, Control Structures: if-else, switch-case, loops (for, while, do-while), Introduction to Functions and Scope of Variables. |

| | |
|---|---|
| **UNIT 2**<br><br>10 Hours Theory + 20 Hours Lab | Detailed Study of Functions (Parameters, Return Types), Function Overloading, Introduction to Arrays and Strings, Basics of Pointers and References- Pointers to objects; Pointers to derived classes. Introduction to Object-Oriented Programming (OOP) Concepts, Classes and Objects: Definitions and Usage, Constructors and Destructors. |
| **First series internal examination including theory + Laboratory if any** | |
| **UNIT 3**<br><br>10 Hours Theory + 20 Hours Lab | Inheritance: Basics and Types, Polymorphism and Virtual Functions, Operator Overloading, Introduction to Templates (Basics), Working with the Standard Template Library (STL): Vectors, Lists, Introduction to Exception Handling. |
| **UNIT 4**<br><br>05 Hours Theory + 10 Hours Lab | C++ streams; stream classes; unformatted I/O operations; Formatted console I/O operations; Managing output with manipulators. Files – classes for file stream operations; Opening and closing a file; file modes; file pointers and their manipulations; Sequential input and output operation. |
| **Second series internal examination including theory + Laboratory if any** | |

**References:**


1. 'Programming: Principles and Practice Using C++', Bjarne Stroustrup

2. Programming in C++, M.T. Somashekara, Prentice Hall of India, New Delhi

3. Object Oriented Programming with ANSI & Turbo C++, Ashok N. Kamthane, Pearson Education

4. Let us C++, Yeshwanth Kanethkar, BPB

5. Object Oriented Programming with C++; E. Balagurusamy; 3rd Edn; TMH 2006


## TEACHING LEARNING STRATEGIES

- Lecturing, case study/mini projects, Team Learning, presenting seminars on selected topics, Digital Learning

## MODE OF TRANSACTION

- Lecture, Seminar, Discussion, Demonstration, Questioning and Answering, Video tutorial

**KU02DSCMCA105 DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION**

| Semester | Course Type | Course Level | Course Code | Credits | Total Hours |
|---|---|---|---|---|---|
| 2 | DSC | 100 | KU02DSCMCA105 | 4 | 60 |

| Learning Approach (Hours/ Week) | | | Marks Distribution | | | Duration of ESE (Hours) |
|---|---|---|---|---|---|---|
| Lecture | Practical/ Internship | Tutorial | CE | ESE | Total | |
| 4 | 0 | 1 | 50 | 50 | 100 | 2 |

**Course Description:** Digital Electronics and Computer Organization is an introductory course that delves into the fundamental principles underlying modern digital systems and computer architecture. The course is designed to provide students with a comprehensive understanding of digital circuits, logic design, CPU architecture, and the organization of computer systems. Students will explore the concepts of binary arithmetic, Boolean algebra, Combinational and sequential logic, instruction execution, and CPU operation.

**Course Objectives:**

- Understand different number systems and Boolean algebra.
- Design of Combinational and sequential logic circuits
- Understand different Computer Instructions
- Understand concepts of register transfer logic and arithmetic operations.

**Course Outcomes:**

At the end of the Course, the Student will be able to:

| SL # | Course Outcomes |
|---|---|
| CO1 | Able to perform the conversion among different number systems. |
| CO2 | Able to design Combinational and sequential logic circuits |
| CO3 | To present the Digital fundamentals, Boolean algebra and its applications in digital systems |
| CO4 | To familiarize with the design of various digital circuits using logic gates |

## Mapping of COs to PSOs

| CO - PSO Mapping | | | | | |
|---|---|---|---|---|---|
| | **PSO1** | **PSO2** | **PSO3** | **PSO4** | **PSO5** |
| **CO1** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO2** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO3** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO4** | ✔ | ✔ | ✔ | ✔ | ✔ |

## COURSE CONTENT

| | |
|---|---|
| **UNIT 1**<br>**05 Hours** | Number Systems – Decimal, Binary, Octal, Hexadecimal number, Number Conversion, binary arithmetic, 1‘s and 2‘s complement arithmetic, BCD arithmetic, Boolean Laws: Commutative Laws, Associative Laws and Distributive Laws, Boolean Theorems, Sum of Products and Product of Sums. |
| **UNIT 2** | De-Morgan’s Laws, Digital Logic Gates:-AND, OR, NOT,XOR,XNOR functions, Universal Logic Gates: NAND and NOR gates, Realization of Boolean expressions using logic gates, |

| | |
|---|---|
| **10 Hours** | Circuit simplification using Boolean Algebra, Logic Diagrams, Combinational Logic Circuits, Simplification of Logic functions, Karnaugh map simplification. |
| **First series internal examination including theory + Laboratory if any** | |
| **UNIT 3**<br><br>**20 Hours** | Multiplexer, and De-multiplexer: Truth table and logic expression, Implementation using logic gates, Design of Half adder and full adder, Construction of full adder using half-adders, Decoder, Encoder, Digital to analog converter, Analog to digital converter. |
| **UNIT 4**<br><br>**25 Hours** | Concept of Flip-flops, SR latch, Gated SR latch, Shift Registers, Serial in – Serial out Shift Register (SISO), Serial In – Parallel out shift Register (SIPO), Parallel in – Parallel out Shift Register (PIPO), Parallel in – Serial out Shift Register (PISO), Bidirectional Shift Registers, Accessing I/O Devices, Interrupts – Interrupt Hardware, Direct Memory Access, Buses, Basic concepts of Pipe lining. (25 hours) |
| **Second series internal examination including theory + Laboratory if any** | |
| **UNIT X** | **Module X:** Instruction formats, Instruction sets, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, memory organization: Memory Hierarchy, Main memory, Auxiliary memory, Associate memory, Cache memory, Complex Instruction Set Computer (CISC) Reduced Instruction Set Computer (RISC),Register Transfer Language, Register Transfer, Bus and Memory Transfers. |

Books/References


1. M. Morris Mano, Michael D. Ciletti, “Digital Design”, Pearson, 2013.
2. A. K. Maini, “Digital Electronics: Principles, Devices And Applications, Wiley, 2007.
3. R. Gaonkar, “Microprocessor Architecture, Programming and Applications with the 8085”, Prentice Hall, 2014.
4. "Digital Design and Computer Architecture" by David Harris and Sarah Harris.


## TEACHING LEARNING STRATEGIES

- Lecturing, case study/mini projects, Team Learning, presenting seminars on selected topics, Digital Learning

## MODE OF TRANSACTION

- Lecture, Seminar, Discussion, Demonstration, Questioning and Answering, Video tutorial

## ASSESSMENT RUBRICS

Refer to section 7

**KU02DSCMCA106: STATISTICAL FOUNDATIONS FOR COMPUTER APPLICATIONS**

| Semester | Course Type | Course Level | Course Code | Credits | Total Hours |
|---|---|---|---|---|---|
| 2 | DSC | 100 | KU02DSCMCA106 | 4 | 60 |

| Learning Approach (Hours/ Week) | | | Marks Distribution | | | Duration of ESE (Hours) |
|---|---|---|---|---|---|---|
| Lecture | Practical/ Internship | Tutorial | CE | ESE | Total | |
| 4 | 0 | 1 | 50 | 50 | 100 | 2 |

**Course Description:** The course on probability and statistics covers fundamental topics including descriptive statistics (measures of central tendency and dispersion), probability theory (events, sample spaces, probability laws, random variables, and distributions), inferential statistics (regression analysis), and applications in various fields such as science, engineering, economics, and social sciences, emphasizing critical thinking, data analysis, and problem-solving skills.

**Course Objectives:**

- Understand fundamental statistical methods for evaluating data samples
- Familiarises the concept of descriptive statistics
- Understand the concept of probability and its applications
- Analysing the data using various statistical methods.

**Course Outcomes:**

At the end of the Course, the Student will be able to:

| SL # | Course Outcomes |
|---|---|
| CO1 | Apply fundamental statistics concepts |
| CO2 | Analyze data using descriptive statistics |

| | |
|---|---|
| CO3 | Apply probability and statistics in real-world situations |
| CO4 | Communicate statistical findings effectively |

## Mapping of COs to PSOs

| CO - PSO Mapping | | | | | |
|---|---|---|---|---|---|
| | **PSO1** | **PSO2** | **PSO3** | **PSO4** | **PSO5** |
| **CO1** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO2** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO3** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO4** | ✔ | ✔ | ✔ | ✔ | ✔ |

## COURSE CONTENT

| | |
|---|---|
| **UNIT 1**<br>**05 Hours** | Statistical methods: Concepts of statistical population and sample. Collection of Data: Primary and Secondary Data, Methods of Collecting Primary Data. Measures of Central Tendency: Characteristics of a good measure of central tendency, Mean, median, mode, harmonic mean, geometric mean, weighted mean. Measures of Dispersion: Range, quartile deviation, mean deviation, standard deviation and variance. **[05 Hours]** |
| **UNIT 2**<br>**15 Hours** | Random experiment, sample space and events, impossible events, mutually exclusive and exhaustive events, independent and dependent events, equally likely events with examples, Operation of events (Union, Intersection, Complement of Events), Definitions of probabilities, Axioms of probability, De'Morgans Law, Theorems of probability - Addition Theorem, Multiplication, Conditional probability, Baye's Theorem. **[15 Hours]** |
| **First series internal examination including theory + Laboratory if any** | |
| **UNIT 3**<br>**20 Hours** | Basic principles of sample surveys, advantages of sample survey over census, sampling and non-sampling errors , probability sampling, judgment sampling and non-probability sampling, Simple Random Sampling, Systematic Sampling, Stratified Sampling, Cluster Sampling, Multistage sampling **[20 Hours]** |

| | |
|---|---|
| **UNIT 4**<br><br>**20 Hours** | Correlation analysis - Definition and properties of correlation coefficient, Pearson's Coefficient of Correlation , Rank correlation coefficient, Method of least squares and Fitting of Straight Line , Scatter diagram, Regression analysis - linear regression, fitting of regression lines, regression coefficients and their properties, relation between correlation and regression coefficients. **[20 Hours]** |
| **Second series internal examination including theory + Laboratory if any** | |

**Books/References:**


1. B L Agrawal (2013): Basic Statistics – New Age International Publishers.
2. Probability and Statistics for Computer Scientists by Michael Baron
3. Gupta, S.P. Statistical Methods. Sultan Chand and Sons: New Delhi
4. Gupta, S. C. and Kapoor, V. K. (2020)Fundamentals of Mathematical Statistics. Sultan Chand and Sons' Publishers, New Delhi.
5. Probability and Statistics for Engineers, Miller I Freund J E, Prentice Hall of India
6. Statistics for Management, Levin R I, Prentice Hall of India


**TEACHING LEARNING STRATEGIES**

- Lecturing, case study/mini projects, Team Learning, presenting seminars on selected topics, Digital Learning

**MODE OF TRANSACTION**

- Lecture, Seminar, Discussion, Demonstration, Questioning and Answering, Video tutorial

**ASSESSMENT RUBRICS**

Refer to section 7

## KU02DSCMCA107: DATABASE MANAGEMENT SYSTEMS

| Semester | Course Type | Course Level | Course Code | Credits | Total Hours |
|---|---|---|---|---|---|
| 2 | DSC | 100 | KU02DSCMCA107 | 4 | 90 |

| Learning Approach (Hours/ Week) | | | Marks Distribution | | | Duration of ESE (Hours) |
|---|---|---|---|---|---|---|
| Lecture | Practical/ Internship | Tutorial | CE | ESE | Total | |
| 2 | 4 | 1 | 50 | 50 | 100 | 2 |

*** ESE Duration: 2 hours for theory and 3 hours for Lab**

**Course Description:** This course provides a comprehensive study of database management systems (DBMS), covering both theoretical concepts and practical implementations. Students will gain an understanding of the fundamental principles underlying the design, implementation, and management of modern database systems.

**Course Objectives:**

- Understand the fundamental concepts of database systems
- Learn about the relational data model, including relations, keys, and referential integrity
- Develop a solid understanding of relational algebra operators and their application in querying databases
- Learn SQL (Structured Query Language)
- Learn about the normalization process and the desirable properties of decompositions up to BCNF
- Understand transaction management, concurrency control, and error recovery mechanisms in database systems

**Course Outcomes:**

At the end of the Course, the Student will be able to:

| SL # | Course Outcomes |
|---|---|

| | |
|---|---|
| CO1 | Understand the fundamental concepts of database systems |
| CO2 | Develop proficiency in developing queries and subqueries |
| CO3 | Gain a deep understanding of the definitions and properties of 1NF, 2NF, 3NF, and BCNF |
| CO4 | Equips students with the knowledge and skills necessary to design, implement, and manage transaction processing systems effectively |

## Mapping of COs to PSOs

| CO - PSO Mapping | | | | | |
|---|---|---|---|---|---|
| | **PSO1** | **PSO2** | **PSO3** | **PSO4** | **PSO5** |
| **CO1** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO2** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO3** | ✔ | ✔ | ✔ | ✔ | ✔ |
| **CO4** | ✔ | ✔ | ✔ | ✔ | ✔ |

## COURSE CONTENT

| | |
|---|---|
| **UNIT 1**<br><br>**05 Hours** | Introduction to database systems, Data Abstraction and System structure, View of Data, Data Models, database structure, DBA, Data Base Users. E-R model, Basic concepts; design issues; Conceptual data modeling - entities, entity types, various types of attributes, relationships, relationship types, E/R diagram notation. Mapping Constraints; Relational Data Model - Concept of relations, keys: Primary, Foreign, candidate, referential integrity and foreign keys. |
| **UNIT 2**<br><br>**07 Hours**<br><br>**25 Hours** | Relational algebra operators, various types of joins, set operation, division, example queries, tuple relational calculus, domain relational calculus. SQL - Introduction, data definition in SQL, table. Querying in SQL - basic select-from-where block and its semantics, nested queries - correlated and uncorrelated, notion of aggregation, aggregation functions group by and having clauses. DDL, DML, DCL, SQL Functions, Data types in SQL. Developing queries and subqueries |

| First series internal examination including theory + Laboratory if any | |
|---|---|
| **UNIT 3**<br><br>**10 Hours Theory +**<br><br>**25 Hours Lab** | Dependencies and Normal forms - Problems encountered with bad schema designs, motivation for normal forms, dependency theory - functional dependencies, Armstrong's axioms for FD's, closure of a set of FDs, minimal covers, definitions of 1NF, 2NF, 3NF and BCNF, decompositions and desirable properties of them, multi-valued dependencies and 4NF, join dependencies and definition of 5NF. |
| **UNIT 4**<br><br>**08 Hours Theory + 10 Hours Lab** | Integrity constraints, views, Trigger and Sequences, Relational model – Structure of Transaction processing and Error recovery - ACID properties. Transactions and Schedules – Characterizing Schedules based on Recoverability, Serializability of schedules. Concurrency Control in databases: Locking Techniques-Timestamp ordering, Multi version concurrency Control – Granularity of data items, error recovery and logging, undo, redo, undo-redo logging and recovery methods. |
| **UNIT X** | Overview and History of NoSQL Databases. Definition of the Four Types of NoSQL Databases, NoSQL Key/Value databases, Document Databases, Document oriented Database Features, Graph data model, Column family data model |
| **Second series internal examination including theory + Laboratory if any** | |

**Books/References:**


1. H Silbersehatz, Korth and Sudarshan, Database system concepts, 6th edition MGH 2011

Ramakrishnan and Gehrke, Database Management Systems, 3rd Edn, Mc Graw Hill, 2003

Elmasri and Navathe, Fundamentals of Database systems, 5th Edition, Pearson 2009

C.J.Date-A.Kannan, S.Swamynathan, An introduction to Database System, 8th Edition, Pearson education

O'Reilly, Practical PostgreSQL Shroff Publishers (SPD) 2002.

Redmond, E. & Wilson, J. (2012). Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement (1st Ed.). Raleigh, NC: The Pragmatic Programmers, LLC. ISBN-13: 978-1934356920 ISBN-10: 1934356921


## TEACHING LEARNING STRATEGIES

- Lecturing, Demonstration, Digital Learning, Team Work

## MODE OF TRANSACTION

- Lecture, Seminar, Discussion

## ASSESSMENT RUBRICS

Refer to section 7