BHARATHIDASAN UNIVERSITY TIRUCHIRAPPALLI - 620024

B.Sc., INFORMATIONTECHNOLOGY

CHOICE BASED CREDIT SYSTEM

LEARNING OUTCOMES -BASED CURRICULUM FRAME WORK (CBCS-LOCF)

(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

Sem.	Part	Course	Title	Ins. Hrs	Credits	Exam Hours	Marks		Total
							Int.	Ext.	
I	I	Language Course–I Tamil/Other Languages		6	3	3	25	75	100
	II	English Course-I		6	3	3	25	75	100
	III	Core Course–I (CC)	Programming in C and Data Structures	5	5	3	25	75	100
		Core Practical–I(CP)	Programming in C Lab	4	4	3	40	60	100
		First Allied Course–I (AC)		4	4	3	25	75	100
		First Allied Course–II(AC)		3	-	-	-	-	-
	IV	Value Education		2	2	3	25	75	100
	TOTAL			**30**	**21**	**-**	**-**	**-**	**600**
II	I	Language Course-II Tamil$/Other Languages+ #		6	3	3	25	75	100
	II	English Course-II		6	3	3	25	75	100
	III	Core Course–II(CC)	Programming in Java	5	5	3	25	75	100
		Core Practical - II(CP)	Programming in Java Lab	4	4	3	40	60	100
		First Allied Course–II(AC)		3	2	3	25	75	100
		First Allied Course–III(AC)		4	4	3	25	75	100
		Add on Course–I##	Professional English I	6*	4	3	25	75	100
	IV	Environmental Studies		2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS) @@	Language Proficiency for Employability- Effective English	-	2	3	25	75	100
	TOTAL			**30**	**29**	**-**	**-**	**-**	**900**

III	I	Language Course–III Tamil$/Other Languages+ #		6	3	3	25	75	100
	II	English Course-III		6	3	3	25	75	100
	III	Core Course–III(CC)	Database Management Systems	5	5	3	25	75	100
		Core Practical -III(CP)	Database Management Systems Lab	4	4	3	40	60	100
		Second Allied Course –I (AC)		4	4	3	25	75	100
		Second Allied Practical–II (AP)		3	-	-	-	-	-
		Add on Course–II##	Professional English II	6*	4	3	25	75	100
	IV	Non-Major Elective I@-Those who chooses Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level **or** b) Special Tamil if Tamil language was studied up to 10th& 12th std.	Fundamentals of Information Technology	2	2	3	25	75	100
	TOTAL			**30**	**25**	**-**	**-**	**-**	**700**
IV	I	Language Course–IV Tamil$/Other Languages+ #		6	3	3	25	75	100
	II	English Course–IV		6	3	3	25	75	100
	III	Core Course-IV (CC)	ASP Dot Net	5	5	3	25	75	100
		Core Practical -IV(CP)	ASP Dot Net Lab	4	4	3	40	60	100
		Second Allied Practical–II (AP)		3	2	3	40	60	100
		Second Allied Course –III (AC)		4	4	3	25	75	100
	IV	Non-Major Elective II@-Those who chooses Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either Basic Tamil if Tamil language was not studied in school level **or** Special Tamil if Tamil language was studied up to 10th& 12th std	Working Principles of Internet	2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS)@@	Digital Skills for Employability	-	2	3	25	75	100
	TOTAL			**30**	**25**	**-**	**-**	**-**	**800**

List of Allied Courses

First Allied Course	Second Allied Course
Mathematics	Applied Physics

PROGRAMMING IN C AND

DATA STRUCTURES

Code: 22SCCIT1 **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To know about the basics of C Programming, Control and Looping Structures and programming with it.
- Tounderstand Arrays, Pointers and String Processing in C language
- To know about the basic concepts in Data Structures.

UNIT-I:

Basic of C: History of C and its importance–Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Order of Precedence, Evaluating of Arithmetic Expressions – Type Conversion- Decision Statements: if, if-else, and nested if statements.

UNIT-II:

Loops Structures: For Loop, While, Do-while loop –Arrays:-One Dimensional Array, Two-dimensional Arrays, Character Arrays and Strings–Functions: Function with arrays-Function with decision and looping statements-Recursion.

UNIT-III:

Pointers: Introduction – Pointer Expressions – Chain of Pointers – Pointers and Arrays – Array of Pointers – Pointers as function arguments – Functions returning Pointers – Pointers to Functions – Function pointer – Structures - declaration, initialization, Array of Structures–Pointer to structures, Structures and functions– Typed of Enumerated data types, Unions.

UNIT-IV:

Strings Processing, Standard string library functions– Files: introduction and files functions – Writing and reading in Text mode– Simple application: Display the contents of a file. Write data to a file. Append data to an existing file–File IO –Reading and writing structures.

UNIT-V:

Stack: LIFO concept, Stack operations, Array implementation of stack –Queue: FIFO concept, Queue operations, Array implementation of queue–Singly Linked List: concepts, operations–Doubly Linked List: concepts, Operations– Trees: General trees, Binary trees.

UNIT–VI CURRENT CONTOURS (For continuous internal assessment only):
Contemporary Developments Related to the Course during the Semester Concerned.

REFERENCES:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.
2. E.Horowitz, S.Sahni and Susan Anderson Freed, "Fundamental Data Structures in C", 2ed, Orient Black Swan Publisher, 2009.
3. Byron S.Gottfried, "Programming with C", Schaum's Outline Series, Tata- McGraw Hill Edition, New Delhi, 1991.
4. E.Karthikeyan, "A Text book on C Fundamentals, Data Structures and Problem Solving", Prentice-Hall of India Private Limited, New Delhi, 2008.
5. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition, New Delhi, 2010.
6. Szuhay, Jeff, and Szuhay, Jeff, "Learn C Programming: A Beginner's Guide to Learning C Programming the Easy and Disciplined Way", Packt Publishing, 2020.
7. Jena, Sisir Kumar, and Jena, Sisir Kumar, "C Programming: Learn to Code", CRC Press, 2021.
8. https://www.tutorialspoint.com/cprogramming/index.htm
9. https://www.w3schools.in/data-structures/intro

COURSE OUTCOMES:

After completion of the course the students will be able to realize the following outcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	To Summarize the basic knowledge to develop C programs	K2
CO2	To Manipulate Looping, arrays and functions	K4
CO3	To Apply and write programs for solving real world problems	K3, K2
CO4	To Create open, read, manipulate, write and close files.	K5
CO5	To Understand the basic concepts in data structures	K2

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES:

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	-	2	3	2	2	3	2
CO2	1	2	2	1	1	1	2	3	3	2
CO3	2	1	3	1	2	3	1	2	3	1
CO4	1	2	2	-	3	1	2	2	3	2
CO5	2	2	3	-	3	2	1	1	2	3

PO, PSO ATTAINMENT LEVEL

HIGH LEVEL - 3, MODERATE LEVEL - 2, LOW LEVEL - 1

First Year **CORE PRACTICAL I** **Semester I**

PROGRAMMING IN C LAB

Code: 22SCCIT1P (**Practical)** **Credit: 4**

COURSE OBJECTIVES:

- To understand the programming fundamentals of C language.
- To impart writing skill of C programming and data structures for a list of problems.
- To impart hands on training for writing a C program using computers.

1. Write a Program
   (i) To convert temperature from degree Centigrade to Fahrenheit,
   (ii) Find whether given number is Even or Odd,
   (iii) Find the greatest of three numbers.
2. Write a Program to display Monday to Sunday using switch statement
3. Write a Program to display first Ten Natural Numbers and their sum.
4. Write a Program to perform Multiplication of Two Matrices.
5. Write a Program
   (i) To find the maximum number in an Array using pointer.
   (ii) To reverse a number using pointer.
   (iii) To add two numbers using pointer.
6. Write a Program to solve Quadratic Equation using functions.
7. Write a Program to find factorial of a number using Recursion.
8. Write a Program to demonstrate Call by Value and Call by Refere
9. Write a Program to create a file containing Student Details.
10. Write a program to implement a stack using singly linked

    list, Implement Queue using Linked List.

COURSE OUTCOMES:

After completion of the course the students will be able to realize the following outcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	To Relate the use of language constructs to solves impel programs	K4
CO2	To Develop programs for various concepts in C language	K4
CO3	To Understand and trace the execution of the list of programs	K2
CO4	To Understand the usage of file handling in C programming Solved at a problems related to data structures	K2
CO5	To Understand the basic concepts in C	K2

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES:

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	-	2	3	2	2	3	2
CO2	1	2	2	1	1	3	3	3	3	1
CO3	2	1	3	1	2	3	1	1	2	1
CO4	1	2	2	-	3	3	2	2	3	3
CO5	2	2	3	-	3	3	2	2	3	3

ALLIEDCOURSE I

ALGEBRA AND CALCULUS

Code: **(Theory)** **Credit:4**

COURSEOBJECTIVES:

- To train the students to solve the problems in theory of equations
- To provide knowledge about the matrix, differentiation and various methods for evaluation of integrals.

UNIT-I:

Theory of Equations: Relation between roots & coefficients –Transformations of Equations–Diminishing, Increasing &multiplying the roots by a constant-Forming equations with the given roots–Rolle's Theorem, Descarte's rule of Signs(statement only)– simple problems.

UNIT-II:

Matrices: Singular matrices–Inverse of a non-singular matrix using adjoint method-Rankofa Matrix – Consistency - Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) –Simple applications onlyUNIT-III:

Differentiation: Maxima & Minima– Concavity, Convexity – Points of inflexion -Partial differentiation – Euler's Theorem - Total differential coefficients (proof not needed)– Simple problems only.

UNIT-IV:

Integration: Evaluation of integrals of types:

$$px+q \qquad px+q \qquad dx \qquad dx$$

1) $\int \frac{dx}{ax^2+bx+c}$ 2) $\int \frac{dx}{\sqrt{ax^2+bx+c}}$ 3) $\int \frac{}{a+bcosx}$ 4) $\int \frac{}{a+bsinx}$

Evaluation using Integration by parts–Properties of definite integrals– Fourier Series in the range $(0, 2\pi)$ – Odd & Even Functions – Fourier Half range Sine &Cosine Series

UNIT-V:

Differential Equations: Variables Separable–Linear equations–Second order of types$(aD^2 + bD + c)y = F(x)$where a,b,c are constants and $F(x)$is one of the following types (i)e^{Kx}(ii)$\sin(kx)$ or $\cos(kx)$ (iii)x^n, n being an integer(iv)$e^{Kx}f(x)$

UNIT-VI CURRENT CONTOURS (For Continuous Internal Assessment Only): Derivatives of Implicit and parametric Functions

REFERENCES:

1. T.K.ManickavasagamPillai&others,Algebra,VolumeI,S.VPublications,1985RevisedEdition(UnitsI,II)
2. S.Narayanan, T.K. Manicavachagam Pillai, Calculus,Vol.II,S.ViswanathanPvtLimited,2003.(UnitsIII,IVandV)
3. M.L.Khanna,DifferentialCalculus,JaiprakashnathandCo.,Meerut-2004.

COURSE OUTCOMES :

After completion of the course the students will be able to realize the following outcomes:

CO	COURSE OUTOME	K LEVEL
CO1	Train the students to solve the problems in theory of equations.	**K1**
CO2	Apply Cayley Hamilton theorem for finding the inverse of square matrices.	**K3**
CO3	Get exposed the basic concepts of differentiation and integration.	**K2**
CO4	Acquire the knowledge about differential equations.	**K5**
CO5	Learn the concepts of second – order differential equations with constant coefficients and train the students to solve it	**K4,K5**

Mapping with Programme and Programme specific Outcomes:

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	1	2	3	3	3	3	1
CO2	1	2	2	1	1	3	3	3	3	1
CO3	2	1	3	1	2	3	3	3	2	1
CO4	1	2	2	2	3	3	2	3	3	3
CO5	2	2	3	1	3	3	2	3	3	3

First Year | **CORE COURSE II** | **Semester II**

PROGRAMMING IN JAVA

Code : 22SCCIT2 | **(Theory)** | **Credit: 5**

COURSE OBJECTIVES:

- To acquire the programming skills with java.
- To implement the object-oriented concepts with java language
- To learn the art of GUI programming with Applet.

UNIT - I:

Foundation, Essentials, Control Statement and Classes & Objects. Stage of Java – origin of Java – challenges - features - Object-Oriented Programming; Java Essentials: Elements - API - variables - primitive data types – String Class - operators –combined assignment operators - conversion –scope – comments - keyboard input; Control Statements: if, if-else, nested if & if-else-if statements – logical operators – comparison – conditional operator – switch – increment and decrement – while, do-while &f or loops – nested loops – break and continue; Classes and Objects: classes and objects -modifiers - passing arguments– constructors - package & import - static class members –method overloading– constructor overloading –returning objects – this variable – recursion – nested & inner classes – abstract classes & methods.

UNIT - II:

Arrays, String Handling, Inheritance, Interface and Packages. Introduction –processing array – passing arrays – returning arrays – String arrays – two Dimensional Arrays - Arrays with Three or More Dimensions; String Handling : String class – concatenation – comparison – substring – methods – other methods–String Buffer, String Builder &String Tokenizer classes; Inheritance: basics –inheriting and overriding superclass methods – calling superclass constructor – polymorphism – inherit from different classes – abstract classes – final Class; Interfaces: Basics – multiple Interfaces – multiple inheritance using interface – multilevel interface – Packages – Create and access packages in NetBeans IDE – static Import and package class – access specifiers.

UNIT - III:

Exception Handling, I/O and File Handling and Multithreading. Introduction - try and catch block - multiple catch block - nested try - finally Block – throw Statement – exception propagation – throw Clause - custom exception – built-in exception; Multithreading: Introduction – threads – thread creation – life cycle – joining a thread – scheduler &priority – synchronization – inter-thread communication – thread control – thread Pool – thread group – daemon thread; Files and I\O Streams: file Class – streams – byte streams – filtered byte streams – Random Access File class – character streams.

UNIT - IV:

Applet and GUI Part I. Fundamentals – applet class – life cycle – steps for applet program – passing values through parameters – graphics – event handling; GUI I: GUI – creating windows – dialog boxes – layout managers – AWT component classes – Swing component classes – applications of AWT controls.

UNIT - V:

GUI Part II and Java Database Connectivity Event handling – AWT components – AWT graphics classes – Swing controls – application using Swing and AWT; Java Database Connectivity: types of drivers – JDBC architecture – JDBC classes &interfaces – steps in JDBC applications – creating a new Database and table with JDBC.

REFERENCES:

1. S. Sagayaraj, R. Denis, P. Karthik & D. Gajalakshmi, "Constructive Java Programming", Universities Press, 2021.
2. E. Balagurusamy, "Programming with JAVA", Tata McGraw Hill, New Delhi, 2019.
3. C. Muthu, "Programming with JAVA", Vijay Nicole Imprints Private Limited, Chennai, Second Edition, 2011.
4. Bruce Eckel, Chuck Allison, "Thinking in Java", Prentice Hall Publications, 2006
5. Malina Pronto, "Java: How To Learn Java Programming: How To Improve Your Java Coding In 2020/2021: 5 Programming Languages To Learn For Beginners In Tech", Independently Published, 2020.
6. Nick Samoylov, "Learn Java 12 Programming: A Step-by-step Guide to Learning Essential Concepts in Java", Packt Publishing, 2019.
7. https://www.javatpoint.com/java-tutorial

COURSE OUTCOMES (CO)

After completion of the course the students will be able to realize the following outcomes:

CO	COURSE OUTOME	K LEVEL
CO1	Understand the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.	K2
CO2	Identify members of a class and to implement them.	K1
CO3	Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifies, and create user define package for specific task (reusability concepts) error exception handling).	K3
CO4	Develop programs using the Java standard class library.	K5
CO5	Develop software using Java programming language (using applet, AWT controls, and JDBC).	K5

Mapping with Programme Outcomes and Programme Specific Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3	2	2	3	1	2	3	1
CO2	1	2	2	1	2	3	2	1	3	1
CO3	2	2	3	1	2	3	1	2	2	1
CO4	1	2	2	1	3	3	2	1	3	3
CO5	2	2	3	2	3	3	3	2	3	3

PROGRAMMING IN JAVA LAB
(Practical) **Credit: 4**

COURSE OBJECTIVES

- To understand the basics of JAVA programs and their execution.
- To learn concepts like inheritance, packages and interfaces.
- To understand the life cycle of the applets, database connectivity and their functionality.

1. Write a program to sort the given numbers using arrays.

2. Write a program to implement the FIND and REPLACE operations in the given text.

3. Write a program to implement a calculator to perform basic arithmetic Operations, doing with constructers.

4. Write a program to find the student's percentage and grade using command line arguments.

5. Write a program to draw circle or triangle or square using polymorphism and inheritance.

6. Implement multiple inheritance concepts in java using interface, you can choose your own example of a company or education institution or a general concept which requires the use of interface to solve a particular problem.

7. Write a program to create threads and perform operations like start, stop, suspend, resume.

8. Write a program to develop an applet to play multiple audio clips using multithreading.

9. Write a program to retrieve employee data from a file.

10. Write a program to retrieve student data from a Database.

COURSE OUTCOMES (CO)

After completion of the course the students will be able to realize the following outcomes:

CO	COURSE OUTOME	K LEVEL
CO1	Develop java programs to understand the OOP concepts.	K5
CO2	Write java programs for classes and objects	K2
CO3	Develop simple programs with multiple threads	K5
CO4	Write java programs using Applets	K2
CO5	Develop java programs to connect databases and files.	K5

Mapping with Programme Outcomes and Programme Specific Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	3	3	3	3	3	3	2
CO2	2	2	1	3	3	3	3	3	3	1
CO3	2	2	2	2	2	2	3	2	2	1
CO4	2	2	2	3	3	3	3	3	3	3
CO5	2	2	3	2	2	3	3	3	3	3

ALLIED COURSE II
NUMERICAL ANALYSIS
AND
PROBABILITY

Code: 22SCACMM2B **(Theory)** **Credit: 2**

COURSE OBJECTIVES:

- To learn knowledge about an algebraic and transcendental equations.
- To make the students gain wide knowledge in probability which plays a mainrole in solving real life problems.

UNIT – I:

Algebraic & Transcendental equations: Bisection Method, Newton Raphson Method, Iteration method - Finite differences – Forward, Backward differences – Newton‘s forward & backward difference interpolation formulae – Lagrange‘s interpolating polynomial.

UNIT – II:

Numerical differentiation - Numerical Integration using Trapezoidal rule and Simpson‘s first & second rules (proof not needed) - Solutions to Linear Systems – Gaussian Elimination Method – Jacobi & Gauss Siedal iterative methods – Theory and problems.

UNIT – III:

Numerical solution of ODE: Solution by Taylor Series Method, Euler‘s Method, Runge - Kutta 2nd order method- Adam‘s Predictor Corrector Method and Milne‘s Predictor Corrector Methods.

UNIT – IV:

Arithmetic Mean – Geometric Mean – Harmonic Mean - Median, Mode, Standard Deviation - Quartile Deviation – Percentiles - Expectation – Variance and covariance.

UNIT – V:

Correlation and Regression –Properties of Simple Correlation and regression coefficients – Simple Numerical Problems only.

REFERENCES:

1. S.S. Sastry, Numerical Analysis (Unit 1, 2, 3)
2. Gupta. S.C & Kapoor, V.K, Fundamentals of Mathematical Statistics, Sultan Chand & sons, New Delhi -1994. (Units 4 & 5)
3. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Private Limited, 1999.
4. C.E. Froberg, Introduction to Numerical Analysis, II Edn., Addison Wesley,1979.

COURSE OUTCOMES (CO)

After completion of the course the students will be able to realize the following outcomes:

CO	COURSE OUTOMES	K LEVEL
CO1	Solve algebraic and transcendental equations.	K3
CO2	Apply the various methods of Numerical differentiation and Integration.	K3
CO3	Get exposed the basic concepts of mean, median and mode.	K2
CO4	Understand the students to solve the problems of Correlation and Regression.	K2
CO5	Appreciate the importance of probability of random variables and understandthe correlation and regression coefficients.	K4

Mapping with Programme Outcomes and Programme Specific Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	1	3	3	2	1	3
CO2	3	2	3	1	2	3	3	3	1	1
CO3	1	3	1	2	2	3	3	3	1	1
CO4	2	2	1	3	3	3	3	3	3	2
CO5	2	1	2	3	2	2	3	3	1	2

ALLIED COURSE III
OPERATIONS RESEARCH

Code: 22SCACMM2C **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

- To learn the basic concepts about Linear Programming Problem, Transportation Problem Assignment Problem, Sequencing Problem and Network.
- To make students solve real life problems in Business and Management.

UNIT – I:

Operations Research: Introduction - Basics of OR – OR & decision making – Role of Computers in OR - Linear programming formulations & graphical solution of two variables – Canonical & standard forms of LPP

UNIT – II:

Simplex Method: Simplex Method for <, =, > constraints – Charne‘s method of penalties– Two phase Simplex method.

UNIT – III:

Transportation problem: Transportation algorithm –Degeneracy algorithm – Degeneracy in Transportation Problem, Unbalanced transportation problem- Assignment algorithm – Unbalanced Assignment problem

UNIT – IV:

Sequencing problem: Processing of n jobs through two machines – Processing of n jobs through 3 machines – processing of two jobs through m machines.

UNIT – V:

Networks: Network – Fulkerson‘s rule - measure of activity – PERT computation –CPM computation - Resource scheduling.

REFERENCES:

1. Manmohan & Gupta, Operations Research, Sultan Chand Publishers, NewDelhi
2. Prem Kumar Gupta and D.S. Hira, Operations Research: An Introduction,
3. S. Chand and Co., Ltd. New Delhi,
4. Hamdy A. Taha, Operations Research (7th Edn.), McMillan Publishing Company, New Delhi, 1982.

COURSE OUTCOMES (CO)

After completion of the course the students will be able to realize the following outcomes:

CO	COURSEC OUTOME	K LEVEL
CO1	Acquire the basic concepts of LPP.	K2
CO2	Apply various methods for finding a solution of an LPP.	K3
CO3	Categorize the various simplex methods.	K2
CO4	Evaluate transportation and degeneracy algorithms.	K4
CO5	Use the basic concepts of TP, AP and Network Problems to develop the problem solving skills.	K3

Mapping with Programme Outcomes and Programme Specific Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**3**	**2**	**2**	**3**	**1**	**3**	**3**	**3**	**3**	**1**
CO2	**2**	**1**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**1**
CO3	**2**	**3**	**2**	**1**	**2**	**2**	**3**	**3**	**2**	**1**
CO4	**1**	**2**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**
CO5	**2**	**2**	**1**	**2**	**2**	**3**	**3**	**3**	**3**	**3**

Second Year **CORE COURSE III** **Semester III**

DATABASE MANAGEMENT SYSTEMS

Code:22SCCIT3 **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To impart the basic database concepts, applications, data models, schemas and instances.
- To familiarize Entity Relationship model for a database.
- To Demonstrate the use of constraints and relational algebra operations.

UNIT - I:

Introduction: Database-System Applications- Purpose of Database Systems - View of Data -Database Languages - Relational Databases - Database Design -Data Storage and Querying Transaction Management -Data Mining and Analysis - Database Architecture - Database Users and Administrators - History of Database Systems.

UNIT - II:

Relational Model: Structure of Relational Databases -Database Schema - Keys – Schema Diagrams - Relational Query Languages - Relational Operations Fundamental Relational-Algebra Operations Additional Relational-Algebra Operations- Extended Relational-Algebra Operations - Null Values - Modification of the Database.

UNIT - III:

SQL Overview of the SQL Query - Language - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - Set Operations - Null Values Aggregate Functions - Nested Subqueries - Modification of the Database -Join Expressions - Views - Transactions - Integrity Constraints - SQL Data Types and Schemas – Authorization.

UNIT - IV:

Relational Languages: The Tuple Relational Calculus - The Domain Relational Calculus Database Design and the E-R Model: Overview of the Design Process - The Entity-Relationship Model - Reduction to Relational Schemas - Entity-Relationship Design Issues - Extended E-R Features - Alternative Notations for Modeling Data - Other Aspects of Database Design

UNIT - V:

Relational Database Design: Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies-More Normal Forms - Database-Design Process

UNIT - VI: CURRENT CONTOURS (for Continuous Internal Assessment Only):

Contemporary Developments Related to the Course during the Semester Concerned.

REFERENCES:

1. Database System Concepts, Sixth edition, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill-2010.

2. Jagdish Chandra Patni, Hitesh Kumar Sharma, Ravi Tomar, Avita Katal., "Database Management System: An Evolutionary Approach", CRC Press, 2022.
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7. https://tutorialspoint.dev/computer-science/dbms

COURSE OUTCOMES:

Upon successful completion of this course the students would be able to:

- Understand the basic concepts of Database Systems
- Know about SQL queries to interact with Database
- Design a Database using ER Modelling
- Apply normalization on database design to eliminate anomalies
- Analyze database transactions and to control them by applying ACID properties.

COURSEOUTCOMES (CO)

Semester: III	Core Course : III	Database Management Systems	Credit : 5	Allotted hours per week: 5

CO	COURSEC OUTOME	K LEVEL
CO1	Understand the basic concepts of Database Systems	K2
CO2	Know about SQL queries to interact with Database	K2
CO3	Design a Data base using ER Modeling	K6
CO4	Apply normalization on database design to eliminate anomalies	K3
CO5	Analyze database transactions and to control them by applying ACID properties	K4

PSO-PO-CO MAPPING MATRIX										
PO & PSO / CO	PO01	PO02	PO03	PO04	PO05	PSO01	PSO02	PSO03	PSO04	PSO04
CO01	2	3	3	1	3	3	1	2	1	1
CO02	2	3	2	2	2	3	2	3	1	1
CO03	1	2	1	1	1	3	1	2	1	1

CO04	**2**	**1**	**2**	**2**	**1**	**3**	**2**	**3**	**3**	**3**
CO05	**2**	**2**	**2**	**1**	**2**	**3**	**2**	**1**	**3**	**1**

Second Year **CORE PRACTICAL III** **Semester III**

DATABASE MANAGEMENT SYSTEMS LAB

Code **(Practical)** **Credit: 4**

COURSE OBJECTIVES:

- To understand the basic concepts and the applications of database systems using MYSQL.
- To create and perform basic operation with MYSQL.
- To interact with MYSQL by using nested queries, set of aggregate operations and views.

1. Create a table and perform the following basic mysql operations

   a. Set the primary key
   b. Alter the structure of the table
   c. Insert values
   d. Delete values based on constraints
   e. Display values using various forms of select clause
   f. Drop the table

2. Develop mysql queries to implement the following set operations

   a. Union
   b. Union all
   c. Intersect
   d. Intersect all

3. Develop mysql queries to implement the following aggregate functions

   a. Sum
   b. Count
   c. Average
   d. Maximum
   e. Minimum
   f. Group by clause & having clause

4. Develop mysql queries to implement following join operations:

   a. Natural join
   b. Inner join
   c. Outer join-left outer, right outer, full outer
   d. Using join conditions

5. Develop mysql queries to implement nested sub-queries

a. Set membership (int, not int)
b. Set comparison (some, all)
c. Empty relation (exists, not exists)
d. Check for existence of Duplicate tuples(unique, not unique)

6. Develop mysql queries to create a view and expand it.

7. Develop mysql queries to implement

   a. String operations using %
   b. String operations using '_'
   c. Sort the element using asc,desc
   [*create necessary reletions with requires attribute]

8. Consider the following database for a banking enterprise

   BRANCH (branch-name:string, branch-city:string, assets:real)
   ACCOUNT (accno:int, branch-name:string, balance:real)
   DEPOSITOR (customer-name:string, accno:int)
   CUSTOMER (customer-name:string, customer-street:string, customercity: string)
   LOAN (loan-number:int, branch-name:string, amount:real)
   BORROWER (customer-name:string, loan-number:int)

   i. Create the above tables by properly specifying the primary keys and the foreign keys
   ii. Enter at least five tuples for each relation
   iii. Find all the customers who have at least two accounts at the Main branch.
   iv. Find all the customers who have an account at all the branches located in a specific city.
   v. Demonstrate how you delete all account tuples at every branch located in a specific city.
   vi. Generate suitable reports.
   vii. Create a suitable front end for querying and displaying the results.

COURSE OUTCOMES:

Upon successful completion of this course the students would be able to:

- Write SQL queries to manipulate data.
- Demonstrate the aggregate functions and set operations.
- Apply the join operations.
- Know about usage of nested sub queries
- Understand the method to create views

COURSEOUTCOMES (CO)

Semester: III	Core Practical:	Database Management	Credit: 4	Allotted hours

	III	**Systems Lab**		**per week: 4**

CO	**COURSEC OUTOME**	**K LEVEL**
CO1	Write queries to manipulate data.	K1
CO2	Demonstrate the aggregate functions and set operations.	K4
CO3	Apply the join operations.	K3
CO4	Know about usage of nested sub queries.	K2
CO5	Understand them method to create views.	K2

PSO-PO-CO MAPPING MATRIX										
PO & PSO / **CO**	**PO01**	**PO02**	**PO03**	**PO04**	**PO05**	**PSO01**	**PSO02**	**PSO03**	**PSO04**	**PSO05**
CO01	**2**	**1**	**2**	**2**	**3**	**3**	**2**	**2**	**3**	**2**
CO02	**2**	**1**	**2**	**2**	**3**	**3**	**2**	**2**	**3**	**1**
CO03	**2**	**1**	**2**	**2**	**3**	**3**	**2**	**2**	**2**	**1**
CO04	**2**	**1**	**2**	**2**	**2**	**3**	**3**	**2**	**3**	**3**
CO05	**2**	**1**	**2**	**2**	**2**	**3**	**3**	**3**	**3**	**3**

ALLIED COURSE I
APPLIED PHYSICS I

Code:22SCACAP1 **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

- To bring out the subjects related with the computer field which help students to keep pace with these topics.
- To make the students understand the basic concepts of current electricity alternating current and the related laws.
- To enable the learners to acquire knowledge about four different number systems, conversion, Boolean algebra, Logic gates and semiconductor memories.

UNIT - I CURRENT ELECTRICITY:

Ohm's Law- Verification of Ohm's Law-Kirchhoff's law- Applications of Kirchhoff's law Wheat stone's bridge - Metre bridge- Carey Foster's bridge- Potentiometer Measurement of Current and Resistance- Calibration of low range Voltmeter.

UNIT - II ALTERNATING CURRENT:

AC circuits with double components – measurement of current and voltage – power in an AC Circuit-Power Factor (derivation)- Wattless current – Choke - series and parallel resonant circuits - Impedance-Q factor- Sharpness of resonance.

UNIT - III NUMBER SYSTEMS CODES AND LOGIC GATES:

Number Systems - Conversions - Binary: Addition, Subtraction, Multiplication, Division- 8421 Code - BCD Code - Excess 3 code - Gray code - Binary to Gray and Gray to Binary Conversion - ASCII code – Basic and Derivative Gates: AND, OR, NOT, NAND, NOR, EX-OR - NAND & NOR as Universal Gates.

UNIT - IV BOOLEAN ALGEBRA, ARITHMETIC AND COMBINATIONAL LOGIC CIRCUITS:

Basic laws of Boolean algebra - De Morgan's theorem - Verification of Boolean expression using Boolean laws - Half-adder - Full adder - Half-Sub tractor- Full sub tractor (using basic gates) – Encoder - Decimal to BCD encoder- Decoder -BCD to decimal decoder.

UNIT - V SEMICONDUCTOR MEMORIES:

Introduction – ROM using diodes and transistors – ROM in terms of digital circuits – Building memory of larger capacity – PROM – EPROM – EEPROM – ROM as a unit in microcomputers – RAM – Static RAM – Dynamic RAM – Memory Parameters.

UNIT - VI CURRENT CONTOURS (For continuous internal assessment only):

Solar electricity- Hydroelectricity -Digital camera-Digital television-CRO-Digital computer

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COURSE OUTCOMES :

After completion of the course the students will be able to realize the followingoutcomes:

CO	***COURSEC OUTOME***	***K LEVEL***
CO1	Recall the basic concepts of current electricity and its various laws.	**K1**
CO2	Solve basic electronics problems with ac circuits that involve capacitance,inductance, impedance, reactance and power calculations.	**K1**
CO3	Differentiateall the four number systems studied.	**K2**

CO4	Review Boolean algebra and draw arithmetic circuits.	**K3**
CO5	Analyse the calibration of electrical instruments.	**K4,K5**

PSO-PO-CO MAPPING MATRIX										
PO & PSO / CO	**PO01**	**PO02**	**PO03**	**PO04**	**PO05**	**PSO01**	**PSO02**	**PSO03**	**PSO04**	**PSO05**
CO1	2	2	2	2	3	2	3	3	3	2
CO2	2	2	2	2	3	3	3	3	3	1
CO3	1	1	3	1	3	2	2	2	2	1
CO4	2	3	1	3	2	1	3	3	3	3
CO5	2	3	2	2	3	1	3	3	3	3