

Effective from Session:												
Course Code	MT202	Title of the Course	COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES	L	Т	Р	С					
Year	II	Semester	III	3	1	0	4					
Pre-Requisite	NONE	Co-requisite	NONE									
Course Objectives	<ul> <li>The orgonomy of the second seco</li></ul>	<ul> <li>The course is aimed to develop the skills in mathematics especially in statistics which is necessary for grooming them into successful graduate.</li> <li>The topics introduced will serve as basic tools for specializedstudies in science field.</li> </ul>										

	Course Outcomes
CO1	Recognize the error in the number generated by the solution and Compute solution of algebraic and transcendental equation bynumerical
	methods like Bisection method, Newton Rapshon method and other method.
CO2	Apply method of interpolation for equal and unequal interval.
CO3	Apply and Solve Numerical Differentiation & Integration method like Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.
CO4	Find Best Curve fitting for given data for example, Fitting of straight lines, second degree parabola.
CO5	Understand Statistical Methods for Data Analysis and sampling techniques like Test of significance, t-test, F-test, Chi-squaretest, Analysis of
	Variance.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO							
1	Unit I	Error and Computer Arithmetic: Error and their analysis, Normalized Floating point arithmetic. Algebraic and Transcendental equations: Bisection method, Iteration method, False position method, Newton-Raphson method, Rate of convergence of methods. Solutions of simultaneous equations by Gauss Seidel method.	8	CO1							
2	Unit II	Finite Differences: Difference operators, Difference tables, relation between operators, missing term techniques, Factorial polynomials. Interpolation for Equal Intervals: Newton's forward and backward formula, Gauss forward and backward formula, Stirling's formula, Bessel's formula. Interpolation for Unequal Intervals: Divided difference, Newton's divided difference formula, Lagrange's Interpolation formula	8	CO2							
3	Unit III	8	CO3								
4	Unit IV	8	CO4								
5	Unit V	Time Series and Forecasting: Moving average, forecasting models and methods. Testing of Hypothesis: Test of significance, t-test, F-test, Chi-square test, Analysis of Variance.	8	CO5							
Referen	ce Books:										
1.	Q.S. Ahmad, Zubair k	Khan and S.A. Khan, "Numerical and Statistical Techniques", Ane Books Pvt. Ltd., New Delhi.									
2.	S.S. Sastry, "Introduct	tory Method of Numerical Analysis", PHI, New Delhi.									
3.	P. Kandasamy, "Num	erical Methods", S. Chand and Company, New Delhi.									
4.	Balaguruswamy, "Nu	merical Methods", T.M.H. ,New Delhi.									
5.	Qazi Shoeb Ahmad, M. V. Ismail and S.A.Khan, "Business Mathematics and Statistics", Laxmi Publication, Meerut.										
e-Learn	Learning Source:										
1.	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/106102157/lec22.pdf										
2.	https://nptel.ac.in/con	tent/storage2/nptel_data3/html/mhrd/ict/text/111107105/lec16.pdf									
3.	https://www.whitman	edu/mathematics/multivariable/multivariable_17_Differential_Equations.pdf									

							Course	e Artic	ulation	n Matrix	: (Map	ping of C	Os with P	Os and P	SOs)			
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	2	2	1	3	3	3	3	1					2	2				
CO2	1	3	2	1	2	2	1	3					1	1				
CO3	3	1	3	2	3	2	3	2					3	3				
CO4	2	1	3	1	2	3	3	2					1	2				
CO5	3	2	1	2	3	2	2	1					3	1				



Effective from Session: 2016	5-2017						
Course Code	CA201	Title of the Course	COMBINATORICS AND GRAPH THEORY	L	Т	Р	С
Year	II	Semester	III	3	1	0	4
Pre-Requisite	NONE	Co-requisite	NONE				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>fun</li> <li>To</li> <li>diff</li> <li>To</li> <li>rep</li> <li>To</li> </ul>	study the concepts of Fu learn recurrence relation ction and solution of rec learn the basic concep ferent problems. learn Fundamentals of resentation of graph. learn coloring of graph,	Indamentals of permutation and combination and generating in and their fundamentals. Describe and solve problems using currence relations ts of graph theory and their application in the field of com- planar graph, dual graph and vector representation of graph chromatic number of a graph and chromatic polynomial of a	functi g conc mpute a, Intro a graph	on. epts of r scienc oductior 1.	generat e to so n to mat	ing lve trix

	Course Outcomes
CO1	Understand the different theoretical and cross-disciplinary problems and solve some real time problems using concepts of permutation,
	combination and concept of generating function
CO2	Understand the structure of recurrence relation and Describe and solve some real time problems using concepts of generating function and
	solution of recurrence relations.
CO3	Understand the basic concepts of graph theory and all of the relevant theorems covered in the course.
CO4	Understand the concepts in planar graph and matrix representation of graph.
CO5	Understand the coloring concept of a graph, four color theorems, five color theorem and its applications.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO								
1	Permutation and Combination	Permutation, Combination, Permutation groups and application, Probability, Discrete numeric function and generating function, Combinatorial problems, Difference equation	7	CO1								
2	Recurrence Relation	Introduction, Linear recurrence relation with constant coefficient, Homogeneous solution, Particular solution, Total solution, Solution by the method of generating function.	7	CO2								
3	Graphs, Tree	Graph, Sub-graphs, Different types of graphs, Basic properties of graphs, Walks, Path and circuits, connected graphs, Disconnected graphs and component, Euler and Hamiltonian graphs, Various operations on graphs. Tree: Tree and fundamental circuits, Distance, Diameters, Radius and pendant vertices, Rooted and binary trees, counting trees, spanning trees, Finding all spanning trees of a graph and a weighted graph.	9	CO3								
4	Cut Sets	Cut-sets and cut vertices, Properties of Cut Set, All cut sets in a graph, Fundamental Circuit and cut sets, Connectivity and Seperatability.	9	CO4								
5	Coloring	Coloring and covering, Partitioning of graph, Chromatic number, Chromatic partitioning, Chromatic polynomials, Four color problem. Directed graph: Directed graph, Types of directed graphs, Directed paths and connectedness, Euler digraph, Trees with directed edges, Fundamental circuit in Digraph, Matrices A, B, C of digraph, Adjacency matrix of digraph.	8	CO5								
Referen	ce Books:											
1. Dec	o Narsing, "Graph The	ory with applications to engineering and computer science", PHI.										
2. Joh	n Truss, "Discrete mat	hematics for Computer Science", TMH.										
3. C. 1	3. C. L. Liu, "Discrete Mathematics", TMH.											
4. Swa	apan K Sarkar, "Discre	te Mathematics", S.Chand Publication.										
e-Lear	rning Source:											

#### https://nptel.ac.in/courses/111106102 1.

2. https://onlinecourses.nptel.ac.in/noc21\_ma68/preview, https://nptel.ac.in/courses/111106050

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	1	3	1	2	1								3	1				
CO2	2	3	1	2	1		1						2	2				
CO3	3		2			1	1						3	1				
CO4	2	1	1	1		1							3	2				
CO5	2	1	3	1		2	1						2	1				

Effective from Session: 2016	5-2017						
Course Code	CA203	Title of the Course	OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++	L	Т	Р	С
Year	Π	Semester	III	3	1	0	4
Pre-Requisite	NONE	Co-requisite	NONE				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> </ul>	learn object-oriented pro learn basic concepts, str learn & implement vario learn & implement adva learn error handling tecl	bogramming paradigms and various object-oriented modeling ucture syntax of C++. ous programming problems in C++. anced programming concepts in C++ anique in C++ and improve problem solving ability.				

	Course Outcomes
CO1	Know basic knowledge of object-oriented modeling and its application in computer science.
CO2	Understand basic concepts & structure of object-oriented programming language using C++.
CO3	Design and develop various programming problems using basic concepts of C++.
CO4	Learn and implement advance programming concepts of C++ like Inheritance, operator overloading, etc.
CO5	Learn and implement exception handling mechanism for debugging in C++.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Object-Oriented Analysis and Data Modeling	Introduction to Object Oriented Concepts, Object Oriented Analysis Modeling, Data Modeling. Object-Oriented Design: Origin of Object-Oriented Design, Object Oriented Design Concepts, Object Oriented Design methods, Class and object definition, Refining operations, Program Components and Interfaces, Annotation for Object-Oriented Design, Implementation of Detail Design, An alternative Object-Oriented Design Strategy, Integrating OOD with SA/SD.	8	CO1
2	Introduction to OOP and C++	Advantages of OOP, Need of object-oriented programming, Characteristics of object- oriented languages. C++ Programming Basics: Basic program structure, Input/output using cin/cout, Preprocessor Directives, Comments, Integer, Character, Float data types, Manipulators, Operators, Library functions, Enumerated Data Types.	8	CO2
3	Functions	Basic of functions, Passing arguments to and returning values from functions, Reference Arguments, Overloaded functions, Inline functions, Default Arguments, Friend function, Variable and Storage classes, Call by value and Call by reference. Objects and Classes: Using class and object, Constructors, Destructor, Objects as function arguments	8	CO3
4	Arrays and Operator Overloading	Array Fundamentals, Arrays as class member data, Arrays of objects, Strings, Overloading Unary and Binary operators, Data conversion, Pitfalls of overloading and Conversion. Inheritance: Derived class and their constructs, Inheritance levels, Public and Private Inheritance, Overriding member functions.	9	CO4
5	Pointers	Pointers with Arrays, Functions, Strings, Pointer to objects, new-delete, Linked-Lists. Virtual Functions: Virtual, Static function, this pointer. Error Handling: Try –Catch Block, Finally, Throws.	8	CO5
Referen	ce Books:			
1. Lafor	e, Rober S, "The Waite	z's Group Object Oriented", TMH.		
2. Barka	ıkati, Nabajoti, "Object	Oriented Programming in C++", Prentice Hall of India.		

3. E. Balagrusamy, "Object oriented programming in C++", TMH.

e-Learning Source:

1. https://nptel.ac.in/courses/106105153

2. https://nptel.ac.in/courses/106105151

						Co	urse A	rticula	tion M	latrix: (l	Mappin	g of COs	with POs	s and PSC	Ds)			
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3		1		1		1						3	1				
CO2	3	1	2			1	1						3	1				
CO3		2	3	1	1	2	2						2	2				
CO4	1	1	3	1		2	2						2	2				
CO5	1	1	3	1		1	2						2	2				



Effective from Session: 2023	8-2024						
Course Code	CA204	Title of the Course	FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEM	L	Т	Р	С
Year	Π	Semester	III	3	1	0	4
Pre-Requisite	NONE	Co-requisite	NONE				
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> <li>To</li> </ul>	learn the basic knowled learn the concept and sy learn various constraints learn the basic structure learn the concept of Non learn the various issues learn the recovery system	ge of Database Management System and various types of da ntax of ER Diagram and the extended ER features. s and writing SQL queries. of Oracle system. malization. in transaction processing. m and basics of concurrency control system.	ta mod	lels.		

	Course Outcomes									
CO1	Able to understand the basic concepts of DBMS, Difference between DBMS and File Processing System, applications of DBMS and various									
	DBMS Models.									
CO2	Able to understand the basic concepts of ER Model and How to draw ER Diagrams.									
CO3	Ability to define various constraints and writing queries using SQL syntax.									
CO4	Applying the Relational algebra and Calculus to define expressions for queries and understanding various Normal forms used for									
	Normalization approach.									
CO5	Acquainted with the basic issues while implementing the concept of Transaction and recovery.									

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Introduction to Databases	Introduction to Databases: Advantage of Database System, Database System versus File System, View of Data, Database System Concepts and Architecture: Data Models, Schemas and Instances, Three schema architecture and Data Independence, Database Languages and Interfaces, Classification of Database Management Systems.	8	CO1
2	Entity-Relationship Model	Entity-Relationship Model: Basic Concepts, Constraints, Keys: Primary Key, Super key, Candidate key, Entity Types, Entity Sets, Design issues, Entity-Relationship Diagram, Relations, Relationship types, Roles and Structural Constraints, Weak Entity sets, Extended ER Features, Design of E-R Database Schema, Reduction of an E-R Schema to tables.	8	CO2
3	Relational Model and Constraints	Relational model Concepts, Structure of Relational Databases, Constraints: Entity integrity, Referential Integrity, Domain Constraints, Assertions, Triggers, Security and Authorization, Authentication and Encryption. SQL: Data Definition, Constraints, Schema Changes in SQL, Basic Queries in SQL, More Complex SQL Queries, Insert, Delete and Update Statements in SQL, Views (in SQL), Specifying General Constraints as Assertion, Additional features. Oracle: Basic Structure of the Oracle System.	8	CO3
4	Relational Algebra	The Relational Algebra, Tuple Relational Calculus, Data Normalization. Functional dependencies, Normal form concepts and Types: First Normal Form, Second Normal Form, Boyce-Codd Normal form, Third Normal form and Fourth Normal Form.	8	CO4
5	Transaction Management and Recovery Techniques	Introduction to Transaction Processing, Transaction Concepts and Properties, Schedules, Serializability of Schedules, Conflict and view serializable schedules, Recovery Concepts, Recovery from Transactions, Introduction to Concurrency Control Techniques.	8	CO5
Referen	ce Books:			
1.	Elmasri, Nawathe,"Fun	damentals of Database Systems", Addison Wesley.		
2.	Silberschatz, Korth, Su	idarshan, "Database System Concepts", McGraw-Hill.		
e-Lean	ning Source:			
1. http	s://nptel.ac.in/courses/1	06105177		
2 http	s://nptel.ac.in/courses/1	06105175		

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	1			1	1							3	1				
CO2	3	1	2			1	1	2					2	1				
CO3		2	3	1	1	2	2						3	1				
CO4	1	3	2	2		2	1						2	2				

								I. MTE	RAL UNIVERSIT	)					
					]	Integ	gral	Univ	versit	ty, Li	ickno	W			
CO5	2	2	1	1	1		1					2	2		



Effective from Session: 2019-20												
Course Code	BM228	Title of the Course	ACCOUNTING AND FINANCIAL MANAGEMENT	L	Т	Р	С					
Year	II	Semester	III	3	1	0	4					
Pre-Requisite	NONE	Co-requisite	NONE									
Course Objectives	• The and und	e objective of this cours l help the students to u ler various environment	se is to provide knowledge of Financial Accounting and it nderstand the conceptual framework of financial manager al constraints.	s appl nent a	ication nd its a	in busin applicat	ness ions					

	Course Outcomes
CO1	To get the in-depth knowledge of the concept of accounting. To interpret the accounting principles, standards and accounting terminology and
	its applicability in general and practical life.
CO2	To get the knowledge of Financial Management, its various decision making approaches as well as the methods of analyzing the financial
	statements.
CO3	Preparation of cost accounting statements in accordance with appropriate methods and standards.
CO4	To understand budget, budgetary control and budgeting approaches in accounting and its usage in the basic accounting arena.
CO5	To be able to prepare fund flow and cash flow statements with needed adjustments. To get the basic knowledge of Working Capital
	Management and its use in running the business.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO							
1	Accounting	Meaning, Objective, Scope and Uses of Accounting, Types of Accounting, Fundamentals of Accounting: Concept and Conventions, Meaning of GAAP and IFRS, Books of Accounts: Journal, Ledger, Trial Balance, Profit and Loss Account and Balance Sheet, Accounting for Cash:Cash Book.	8	CO1							
2	Financial Management	Meaning, Objective, Importance and Scope of Financial Management, Finance Functions and Various Decisions: Investment Decisions, Finance Decisions, Dividend Decisions, Capital Budgeting Decisions, Analysis of Financial Statement, Ratio Analysis: Liquidity, Solvency, Profitability and Efficiency Ratio, Cost Volume Profit Analysis (Break Even Analysis).	8	CO2							
3	Cost Accounting	Meaning, Nature, Need, Elements of Cost, Cost Classification and Allocation of Costs, Absorption and Marginal Costing.	8	CO3							
4	Budget and Budgetary Control	Budgetary Approach to Financial Planning, Different types of Budgets, Performance Budgeting, Zero Base Budgeting, Capital Budgeting, Role of Capital Budgeting in Risks and Uncertainties.	8	CO4							
5	Fund Flow Statements	Definition, Meaning and Preparation, Cash Flow Statements: Definition, Meaning and Preparation, Working Capital Management: Concept, Nature, Types and Sources of Working Capital in Business.	8	CO5							
Refer	ence Books:										
1. k 2. (	Kulkarni and Satya Prasa Chandra, Prasanna: Finar	id, "Financial Management", Himalaya Publishing House, Himalaya Publishing House Pvt. Ltd.; Fo Incial Management, Tata McGraw Hill, Delhi, Tata McGraw Hill Education	ourteenth Edi	tion							
3. F	P.C. Tulsion, "Accountant	ncy", Tata McGraw Hill, Tata Mcgraw Hill, 2-12, ISBN-13: 978 748367-5									
4. N	Vand Dhameja and K.S.	Sastry, "Finance and Accounting", Wheeler Publishing, Wheeler Publishing, $11$ TH RPRINT: 2–2									
e-Le	earning Source:										
1. F	undamentals of financia	l and management accounting (https://www.coursera.org/learn/financial-accounting-polimi)									
2. I	<ol> <li>Introduction to Financial and Management Accounting (https://www.classcentral.com/course/edx-introduction-to-financial-and-management-accounting-3552)</li> </ol>										
3. F	inancial Management S	pecialization (https://in.coursera.org/specializations/financial-management)									
4. F	fundamentals of financia	l and management accounting (https://www.coursera.org/learn/financial-accounting-polimi)									

			Course Articulation Matrix: (Mapping of COs with POs and PSOs)											
PO-PSO	POI	PO2	PO3	PO4	PO5	PO6	PO7	POS	PSO1	PSO2				
CO	FOI	F02	105	104	105	100	FO/	108	1301	1302				
CO1	1	2	1		1	1	1	1	3	1				
CO2		2	2		1	1	1	1	2	1				
CO3	1	1	2		1		1		2	1				
CO4		2	1		1				1	2				
CO5		2	1		1			1	2	1				



Effective from Session: 2023	3-2024						
Course Code	CA218	Title of the Course	DATA COMPRESSION AND MULTIMEDIA SYSTEM	L	Т	Р	С
Year	II	Semester	III	3	1	0	4
Pre-Requisite	NONE	Co-requisite	NONE				
Course Objectives	<ul> <li>Expl</li> <li>Desc</li> <li>To u</li> <li>To u</li> </ul>	ain digital audio, percep ribe different lossless ar nderstand the concept o earn and understand tech nderstand the standards	tual audio coding and MPEG audio compression standard. Id lossy image and video compression techniques and standa f scalar and vector quantization. Inical aspect of multimedia systems. available for different audio, video and text applications.	rds.			

	Course Outcomes								
CO1	Describe and apply various techniques for text compression and also evaluate performance of the coding techniques.								
CO2	Understand the operation of scalar and vector quantizer.								
CO3	Describe different lossless and lossy image and video compression techniques and standards.								
CO4	Developed understanding of technical aspect of multimedia systems.								
CO5	Understand various file formats for audio, video and text media.								

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1.	Introduction to Compression Techniques	Loss less compression, Lossy Compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression. Introduction to Information Theory and Models: Physical models, Probability models, Markov models.	8	CO1
2.	Huffman Coding Algorithms	Minimum variance Huffman codes. Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure, Applications of Hoffman coding.	8	CO2
3.	Arithmetic Coding, Scalar and Vector Quantization	Coding a sequence, Generating a Binary code, Comparison of Arithmetic and Huffman coding. Static Dictionary: Diagram Coding, Adaptive Dictionary, The LZ77 Approach. Mathematical Preliminaries for Lossy Coding, Distortion criteria, Models. Advantages of Vector Quantization over Scalar Quantization, The Linde-BuzoGray Algorithm, Tree structured Vector Quantizers,	8	CO3
4.	Introduction	Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work, Convergence of Computer, Communication and Entertainment products. Stages of Multimedia Projects: Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, Tools for object generations, Video, Sound, Image capturing, Authoring tools.	8	CO4
5.	Multimedia Building Blocks	Text, Sound MIDI, Digital Audio, Audio file formats, MIDI under windows environment, Audio &Video Capture.	8	CO5
Referen	ce Books:			
1. Kh	alid Sayood, "Introducti	on to Data Compression", Morgan Kaufmann Publishers.		
2. Day	vid Salomon, "Data Con	npression: The Complete Reference", Springer.		
3. But	ford, "Multimedia Syst	ems", Addison Wesley.		
e-Lea	rning Source	stem, Addison westey.		
1 htte	uning Source.	ma/al agaithman mant2/intraduction to data communication OtmIIII		
1. nttp	bs://m.coursera.org/lectl	nerargonums-partz/muoduction-to-data-compression-OtmHU		

2. https://archive.nptel.ac.in/courses/117/105/117105083/

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	1	1	3		1		2						3	1				
CO2	3	1	1			1							3	1				
CO3	2	2	1	1		2							3	1				
CO4	1	1	3			1	2	2					1	2				
CO5		3	1	2	1	1							2	3				



Effective from Session: 2016	5-2017						
Course Code	CA206	Title of the Course	C++ LAB	L	Т	Р	С
Year	II	Semester	III	0	0	3	2
Pre-Requisite		Co-requisite					
Course Objectives	<ul> <li>To</li> <li>To</li> <li>To</li> <li>Den</li> <li>To</li> </ul>	explain basic concepts explain concepts and t explain concepts and t nonstrate the significar explain concepts and t	and techniques of C++. echniques to implement overloading. echniques to implement functions. nee of constructors and destructor and inheritance. echniques to implement polymorphism, exception handlin	g and	searchi	ing, sor	ting.

	Course Outcomes								
CO1	To develop a program using classes and objects.								
CO2	Able to design a program for operator overloading and function overloading.								
CO3	To develop a program using friend function, inline function and static member function.								
CO4	To develop a program using constructors and destructor and inheritance.								
CO5	To develop a program for polymorphism using virtual function, exception handling and searching, sorting.								

Experiment No.	Title of the Experiment	Content of Unit	Contact Hrs.	Mapped CO							
1	OOP	Program illustrating Classes and Objects.	2	CO1							
2	Operator Overloading	Program illustrating use of Operator Overloading	2	CO1							
3	Function Overloading	Program illustrating use of Function Overloading.	2	CO2							
4	Functions	Program illustrating use of Friend function	2	CO2							
5	Constructor	Program illustrating Inline function, Static Member functions.	2	CO3							
6	Constructor	Program illustrating use of Constructor and various types of Constructor.	2	CO3							
7	Inheritance.	Program illustrating various forms of Inheritance.	2	CO4							
8	Virtual functions	Program illustrating use of Virtual functions.	2	CO-4							
9	Exception Handling	Program illustrating how Exception Handling is done.	2	CO5							
10	Implement Algorithms	Program implementing various kinds of Sorting algorithms, Search algorithms.	2	CO5							
Reference Bool	xs:										
1. Lafore, Robe	r S, "The Waite's Group	Object Oriented", TMH.									
2. Barkakati, N	abajoti, "Object Oriented ]	Programming in C++", Prentice Hall of India.									
3. E. Balagrusa	3. E. Balagrusamy, "Object oriented programming in C++", TMH.										
e-Learning Se	e-Learning Source:										
1. https://npte	1.ac.in/courses/106105153										
2. https://npte	1.ac.in/courses/106105151										

		Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	1	1	3		1	1							2	1				
CO2	1	1	3	2		1	1						3	1				
CO3	2	1	3	1	1	2	1						1	2				
CO4	1	2	3	2		1	1						2	1				
CO5	2	1	3	1	1	1							2	2				



Effective from Session: 2016-2	017					
Course Code	CA207	Title of the Course	DBMS LAB	L	Т	P
Year	II	Semester	III	0	0	2
Pre-Requisite	NONE	Co-requisite	NONE			
Course Objectives	<ul> <li>To explain b</li> <li>To demonst Clause).</li> <li>To familiari</li> <li>To develop concept of</li> <li>To demonst</li> </ul>	basic database concepts trate the use of constr ze with use of Aggrega an understanding of e Sub-query, Data constr rate the concept of crea	and how to implement the DDL and DML commands in a raints, relational algebra operations and Grouping (Grou the function in queries, concept of granting permissions (G essential DBMS concepts such as joins, union, intersecti aints (Unique Key, Primary Key, Foreign Key). Iting Views, Indexes and Introduction to PL/SQL	SQL. 1p by rant, R on and	clause, tevoke) d also	

	Course Outcomes
CO1	Creating and altering Databases, tables and writing a query using SQL DML/DDL commands.
CO2	Implementing the constraints like Primary key, Foreign key, Unique Key, Null, Not null and various relational algebra operations.
CO3	Using Aggregate functions in SQL with the concept of Grant and Revoke commands.
CO4	Implementing the various joins, sub-queries, set theory commands and Data constraints.
CO5	Using the commands to create Views, Indexes and PL/SQL basics.

Experiment No.	Title of the Experiment	Content of Unit	Contact Hrs.	Mapped CO
1	Tables	Creating tables.	2	CO1
2	Manipulation	Insertion, Deletion, Updation and Retrieval of data	2	CO1
3	Operations	Arithmetic operations, Logical operations and Pattern matching.	2	CO2
4	Aggregate Functions	Use Aggregate function in query.	2	CO2
5	Permissions	Granting permissions (Grant, Revoke).	2	CO3
6	Joins	Write commands for Joins, Union and Intersection.	2	CO4
7	Sub query	Concept of Sub-query.	2	CO4
8	Constraints	Concept of Data constraints (Unique Key, Primary Key, Foreign Key). Creating Views and Indexes. Introduction to PL/SQL. Concept of Grouping (Group by clause, Having Clause).	2	CO5
Reference Book	<b>(S:</b>			
1. Elmasri, N	awathe ,"Fundamentals of	Database Systems", Addison Wesley.		
2. Silberschat	z, Korth, Sudarshan, "Dat	abase System Concepts", McGraw-Hill.		
e-Learning So	ource:			
1. https://npte	l.ac.in/courses/106105177			
2. https://npte	l.ac.in/courses/106105175			

		Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	1	1	3		1	1							2	2				
CO2	2		2	1		2	1						1	2				
CO3	3	1	2	1	1	2							2	1				
CO4	2	2	3	1		2	2						2	2				
CO5	1		3	1	1	1	1						2	1				



Effective from Session: 2023	3-2024						
Course Code	CA219	Title of the Course	SEMINAR	L	Т	Р	C
Year	II	Semester	III	0	0	6	3
Pre-Requisite	NONE	Co-requisite	NONE				
Course Objectives	<ul> <li>Awa</li> <li>Learn</li> <li>Learn</li> <li>Incre</li> <li>Learn</li> </ul>	reness of how to use val ning about personal and ning presentation styles ase knowledge of recen ning management of val	ues in improving your own professionalism communication styles t technologies lues				

	Course Outcomes								
CO1	Identify recent technical topics from interested domains.								
CO2	Describing the future aspects of technology and problem addressed in the research								
CO3	Analyze the applicability of modern software tools and technology.								
CO4	Develop presentation and Communication skills.								
CO5	Develop technical report preparation skills.								

Experiment	Title of the Experiment	Content of Unit	Contact Hrs.	Mapped CO
1	Phase1	The presentation should provide sufficient background of the current technology and research.	8	CO1
2	Phase2	Future aspects of technology and problem addressed in the research	8	CO2
3	Phase3	Plan on approximately a 20 minute presentation with about 10 minutes for questions	8	CO3
4	Phase4	The title should be relevant to the domain of computer science	8	CO4
5	Phase5	Future directions of the presented topic should be discussed	8	CO5
e-Learning	Source:			
1. https://v	www.topicsforseminar.c	com/2020/09/seminar-topics-for-youth.html?m=1#gsc.tab=0		
2. https://v	www.kirkeberg.com/ser	ninarobjectives.html		

		<b>Course Articulation Matrix: (Mapping of COs with POs and PSOs)</b>																
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	1	3	2	2	1		1						2	2				
CO2	2	1	3	1		2	1						3	1				
CO3	3	1	1	2	1	1							1	3				
CO4	2	1	2	1		1	1						2	1				
CO5	3	1		1	1		2						2	1				