E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

NAGAPATTINAM – 611 002.

(Affiliated to Anna University, Chennai | Accredited by NAAC with 'A++' Grade

Accredited by NBA | Approved by AICTE, New Delhi)

B. TECH – COMPUTER SCIENCE & BUSINESS SYSTEMS (R-2023)

CURRICULUM AND SYLLABUS FOR SECOND YEAR: THIRD SEMESTER (III)

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	C	MAX. MARKS		
							CA	ES	TOTAL
Theory Courses									
2302BS301	Formal language and automata theory	PCC	3	1	0	4	40	60	100
2302BS302	Computer oriented programming	PCC	3	1	0	4	40	60	100
2302BS303	Object oriented programming	PCC	3	0	0	3	40	60	100
2302BS304 - T	Computational statistics - T	PCC	3	0	2	3	50	50	100
2302BS305 - T	Database management system - T	PCC	3	0	2	4	50	50	100
2302BS306	Marketing Research and Marketing Management	PCC	3	0	0	3	40	60	100
2301MC301	Environmental science and sustainability	BSC	2	0	0	1	100	0	100
Laboratory Courses									
2302BS351	Object Oriented Programming Laboratory	PCC	0	0	2	2	50	50	100
TOTAL			**20**	**2**	**6**	**24**	**410**	**390**	**800**

2302BS301	FORMAL LANGUAGE AND AUTOMATA THEORY	L	T	P	C
		3	1	0	4

PREREQUISITE:

Basic Mathematics Concepts, Graph Theory

COURSE OBJECTIVES:

1. To understand the concepts of regular languages and finite automata.
2. To derive of context free-grammars with CFG and to design pushdown automata.
3. To construct the linear bounded automata and turing machines.
4. To manage undecidable problems.
5. To know the complexity theory of turing machines.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Illustrate the concepts of finite automata, regular expressions and reduce the states in finite automata.
CO2:	Design pushdown automata and context free grammars for various languages.
CO3:	Construct basic Turing machine for its recursive languages and functions.
CO4:	Determine and classify the various undecidability.
CO5:	Relate P, NP and NP completeness problems.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	-	-	2	-	-	-	-
CO2	2	3	3	2	3	-	-	-	-	-	-	-
CO3	3	2	3	2	2	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	2	3	2
CO5	3	2	3	2	2	-	-	2	-	-	-	2

COs VsPSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3	-	2
CO2	3	2	2
CO3	3	2	2
CO4	3	2	-
CO5	3	2	2

COURSE CONTENTS:

MODULE I	REGULAR LANGUAGES AND FINITE AUTOMATA	9 Hours

Alphabet-languages and grammars- Productions and derivation-Chomsky hierarchy of languages. Regular expressions and languages- Deterministic finite automata (DFA) and equivalence with regular expressions Nondeterministic finite automata (NFA) and equivalence with DFA- Regular grammars and equivalence with finite automata - Properties of regular languages - Kleene‟s theorem - Pumping lemma for regular languages My hill- Nerode theorem and its uses- Minimization of finite automata.		
MODULE II	**CONTEXT-FREE LANGUAGES AND PUSHDOWN AUTOMATA**	**9 Hours**
Context-free grammars (CFG) and languages (CFL)- Chomsky and Greibach normal forms - Nondeterministic pushdown automata (PDA) and equivalence with CFG - Parse trees- Ambiguity in CFG - Pumping lemma for context-free languages – Deterministic pushdown automata- Closure properties of CFLs.		
MODULE III	**LINEAR BOUNDED AUTOMATA AND TURING MACHINES**	**9 Hours**
Context-sensitive grammars (CSG) and languages - Linear bounded automata and equivalence with CSG. The basic model for Turing machines (TM) - Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties - Variants of Turing machines - Nondeterministic TMs and equivalence with deterministic TMs - Unrestricted grammars and equivalence with Turing machines – TMs as enumerators.		
MODULE IV	**UNDECIDABILITY**	**9Hours**
Church-Turing thesis -Universal Turing machine – The universal and diagonalization languages - Reduction between languages – Rice‟s theorem -Undecidable problems about languages		
MODULE V	**COMPLEXITY THEORY**	**9 Hours**
Introductory ideas on Time complexity of deterministic and nondeterministic Turing machines - P and NP, NP completeness –Cook „s Theorem, other NP - Complete problems..		
		TOTAL: 45 HOURS

REFERENCES:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education, Third Edition, 2014.

2. Harry R. Lewis and Christos. H. Papadimitriou, Elements of the theory of Computation, Pearson Education/PHI, 2007

3. John C. Martin, Introduction to Languages and the Theory of Computation, TMH, 2007.

4. MichealSipser, Introduction of the Theory and Computation, Thomson Brokecole, 2005.

5. M. R. Garey and D. S. Johnson, "Computers and Intractability: A Guide to the Theory of NP Completeness", 1979.

2302BS302	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3

PREREQUISITE:

Fundamentals of computer science

COURSE OBJECTIVES:

1. To introduce the principles of computer organization and the basic architectural concepts.
2. To reinforce the concepts of Boolean Algebra and arithmetic operations on data.
3. To analyze instruction set design, micro programmed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Explain basic organization of a computer and introduces simple register transfer language to specify various computer operations.
CO2:	Describe different formats to represent data and perform various arithmetic operations on them.
CO3:	Devise the basics of hard wired and micro programmed control of the CPU and pipelined architecture.
CO4:	Design I/O interface to transfer information among peripheral devices.
CO5:	Outline the memory concepts and mapping techniques of digital computer.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	-	-	-	-	-	-	-
CO2	3	3	3	2	3	-	-	-	-	-	-	-
CO3	3	3	3	2	2	-	-	-	-	-	-	-
CO4	3	3	3	2	2	-	-	-	-	-	-	-
CO5	3	3	3	2	3	-	-	-	-	-	-	-

COs VsPSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3		
CO2	3	3	
CO3	3	3	
CO4	3	3	
CO5	3	3	

COURSE CONTENTS:

MODULE I INTRODUCTION TO COMPUTER ARCHITECTURE 9 Hours

Functional blocks of a computer: CPU, memory, input - output subsystems, control module. Instruction set architecture of a CPU: Registers, instruction execution cycle, RTL interpretation of instructions, addressing

modes, instruction set. Outlining instruction sets of some common CPUs.		
MODULE II	**COMPUTER ARITHMETIC**	**9 Hours**
Data representation: Signed number representation, fixed and floating – point representations, character representation. Integer addition and subtraction, ripple carry adder, carry look-ahead adder. multiplication – shift-and-add, Booth multiplier,carrysavemultiplier.Divisionrestoringandnon-restoringtechniques, Floating point arithmetic.		
MODULE III	**CONTROL MODULE AND PIPELINING**	**9 Hours**
Introduction to x86 architecture. CPU control MODULE design: Hardwired and micro-programmed design approaches, design of a simple hypothetical CPU. Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Introduction to parallel processing.		
MODULE IV	**PERIPHERAL DEVICES AND THEIR CHARACTERISTICS**	**9 Hours**
Input-output subsystems, I/O device interface, I/O transfers– program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes–role of interrupts in process state transitions, I/O device interfaces–SCII,USB.		
MODULE V	**MEMORY ORGANIZATION AND SYSTEMDESIGN**	**9 Hours**
Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies. Memory system design: Semiconductor memory technologies, memory organization.		
		TOTAL: 45HOURS
REFERENCES:		
1.MorrisMano,"ComputerSystemArchitecture"3rd Edition,PrenticeHallofIndia,NewDelhi,2014.		
2.DavidA.PattersonandJohnL.Hennessy,"ComputerOrganizationandDesign:TheHardware/SoftwareInterface",Elsevier,5thEdition2013.		
3.CarlHamacher,ZvonkoVranesic,SafwatZaky,NaraigManjikian,"ComputerOrganizationandEmbedded Systems"McGraw-Hill,6thEdition2014.		
4.JohnP.Hayes,ComputerArchitectureandOrganization,McGraw-Hill,3rdEdition,2013.		
5.WilliamStallings,"ComputerOrganizationandArchitecture– DesigningforPerformance",10thEdition,PearsonEducation,2015.		
6.Vincent P.HeuringandHarryF.Jordan," ComputerSystemDesignandArchitecture",PrenticeHall,2ndEdition,2004.		
7. https://nptel.ac.in		

2302BS303	OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	0	0	3

PREREQUISITE:

Programming in C

COURSE OBJECTIVES:

1. To comprehend the fundamental principles of object-oriented programming, including encapsulation, inheritance, polymorphism, and abstraction, and apply these concepts to design and develop C++ programs.
2. To define classes and create objects, utilize constructors and destructors, implement member functions, and manage access specifiers to encapsulate data and behavior within classes.
3. To design and implement class hierarchies using various types of inheritance (single, multiple, hierarchical), understand the concept of base and derived classes, and override methods to extend class functionality.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Object Oriented Programming
CO2:	Concepts of Object Oriented Programming
CO3:	Essentials of Object Oriented Programming
CO4:	Files, I/O and Generic Programming
CO5:	Object Oriented Design and Modeling

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	-	-	2	2	2	3	2
CO2	2	3	-	2	-	-	-	2	2	2	3	2
CO3	2	2	2	3	3	-	-	2	2	2	2	3
CO4	2	2	2	2	3	-	-	2	3	2	2	2
CO5	2	2	2	2	3	-	-	2	2	2	2	2

COs VsPSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	2	-	-
CO2	2	2	-
CO3	2	2	-
CO4	2	2	-
CO5	2	2	-

COURSE CONTENTS:

MODULE I	INTRODUCTION TO OBJECT ORIENTED PROGRAMMING	9 Hours

Single line comments, Local variable declaration within function scope, function declaration, function overloading, stronger type checking, Reference variable, parameter passing -value vs reference, passing pointer by value or reference, Operator new and delete, the typecasting operator, Inline Functions in contrast to macro, default arguments.		
MODULE II	**CONCEPTS OF OBJECT ORIENTED PROGRAMMING**	**9 Hours**
.Necessity for OOP, Data Hiding, Data Abstraction, Encapsulation, Procedural Abstraction, Class and Object, Scope of Class and Scope Resolution Operator, Member Function of a Class, private, protected and public Access Specifier, this Keyword, Constructors and Destructors, friend class, error handling (exception)		
MODULE III	**ESSENTIALS OF OBJECT ORIENTED PROGRAMMIG**	**9 Hours**
Operator overloading, Inheritance, Single and Multiple, Class Hierarchy, Pointers to Objects, Assignment of an Object to another Object, Polymorphism through dynamic binding, Virtual Functions, Overloading, overriding and hiding		
MODULE IV	**FILES, I/O AND GENERIC PROGRAMMING**	**9 Hours**
Streams, Files, Library functions, formatted output Template concept, class template, function template, template specialization		
MODULE V	**OBJECT ORIENTED DESIGN AND MODELING**	**9 Hours**
UML concept, Use case for requirement capturing, Class diagram, Activity diagram and Sequence Diagram for design, Corresponding C++ code from design.		
		TOTAL: 45HOURS

REFERENCES:

1. BjarneStroustrup, The C++ Programming Language, 1e:3rd Edition, Pearson Education, 2015

2.Debasish Jana, C++ and Object-Oriented Programming Paradigm, 3rd Edition, Prentice Hall of India, New Delhi, 2014.

3.https://onlinecourses.nptel.ac.in/noc16_cs17/preview

4.https://www.geeksforgeeks.org/basic-concepts-of-object-oriented-programming-using-c/

5.BjarneStroustrup, The Design and Evolution of C++, Addison-Wesley Professional, 2013.

1902BS304	COMPUTATIONAL STATISTICS	L	T	P	C
		3	0	0	3

PREREQUISITE:

Basic Concepts of C,C++.

COURSE OBJECTIVES:

1. To understand the basics of algorithmic problem solving.
2. To learn to solve problems using Python conditionals and loops.
3. To define Python functions and use function calls to solve problems.
4. To use Python data structures – lists, tuples, dictionaries to represent complex data.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Develop algorithmic solutions to simple computational problems.
CO2:	Develop and execute simple Python programs.
CO3:	Write simple Python programs using conditionals and looping for solving problems.
CO4:	Decompose a Python program into functions.
CO5:	Represent compound data using Python lists, tuples, dictionaries etc.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	-	-	2	-	-	-	-
CO2	2	3	3	2	3	-	-	-	-	-	-	-
CO3	3	2	3	2	2	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	2	3	2
CO5	3	2	3	2	2	-	-	2	-	-	-	2

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3	-	2
CO2	3	2	2
CO3	3	2	2
CO4	3	2	-
CO5	3	2	2

COURSE CONTENTS:

MODULE I	COMPUTATIONAL THINKING AND PROBLEM SOLVING	9 Hours

Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

MODULE II	DATA TYPES, EXPRESSIONS, STATEMENTS	9 Hours

Python interpreter and interactive mode, debugging; values and types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments.		
MODULE III	**FACTOR ANALYSIS AND SEGMENTATION ANALYSIS**	**9 Hours**
Factor Analysis: Factor analysis model, extracting common factors, determining number of factors, Transformation of factor analysis solutions, Factor scores. Clustering and Segmentation Analysis: Introduction, Types of clustering, Correlations and distances, clustering by partitioning methods, hierarchical clustering, overlapping clustering, K-Means Clustering		
MODULE IV	**PYTHON CONCEPTS AND DATA WRANGLING**	**9 Hours**
Python Concepts, Data Structures, Classes: Interpreter, Program Execution, Statements, Expressions, Flow Controls, Functions, Numeric Types, Sequences and Class Constructors, Text & Binary Files - Reading and Writing. Data Wrangling- Combining and Merging Datasets, Reshaping and Pivoting, Data Transformation, String Manipulation, Regular Expressions		
MODULE V	**DATA AGGREGATION AND VISUALIZATION IN PYTHON**	**9 Hours**
Data Aggregation, Group Operations, Time series: Group by Mechanics, Data Aggregation, Group wise Operations and Transformations, Pivot Tables and Cross Tabulations, Time Series Basics, Data Ranges, Frequencies and shifting. Visualization in Python: Matplotlib package, Plotting Graphs, Controlling Graph, Adding Text, More Graph Types, Getting and setting values, Patches.		
		TOTAL: 45 HOURS
LIST OF EXPERIMENTS:		
1.Basic Python Programs		
2. Program using String Operations		
3. Program on python Data structures		
4. Perform various numpy operations and special functions		
5. Draw statistical graphics using seaborn		
6. Implement k-means, logistic and time series algorithm using Scikit-learn		
7. Multi Variable analysis with regression in python		
8. Factor analysis with python		
9. Data Aggregation in python		
10. Visualization in python using Altair		
		TOTAL: 30 HOURS
REFERENCES:		

1.T.W. Anderson, “An Introduction to Multivariate Statistical Analysis”, Wiley, 3rd Edition, 2003

2. J.D. Jobson, “Applied Multivariate Data Analysis”, Vol I & II, Springer, 2012

3. Magnus Lie Hetland, “Beginning Python: From Novice to Professional”, Apress, 2nd Edition,2008

4. Stanley A Mulaik, “Foundations of Factor Analysis”, CRC Press, 2nd Edition, 2009

5. Douglas C. Montogomery, Elizabeth A. Peck, G. Geoffrey Vining, “Introduction to Linear Regression Analysis”, Wiley,5th Edition,2012

6. Mark Lutz, “Programming Python”, Shroff Publishers, 3rd Edition, 2006

7. Tim Hall and J-P Stacey, “Python 3 for Absolute Beginners”, Apress, 2009

8. Wes Mc Kinney, “Python for Data Analysis”, O‟Reilly, 2018

9. https://onlinecourses.nptel.ac.in/noc19_mg13/preview
10. https://nptel.ac.in/courses/110106064/
11. https://www.analyticsvidhya.com/blog/2016/01/complete-tutorial-learn-data-science-pythonscratch-2/
12. https://github.com/cliburn/Computational-statistics-with-Python/tree/master/

2302BS305	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITE:

Computer Programming Languages

COURSE OBJECTIVES:

1.To understand the concept of DBMS and ER Modeling

2. To explain the normalization and relational algebra.

3.To apply the concurrency control, recovery, security and indexing for the real time data

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Demonstrate the basic concept and role of DBMS in an organization
CO2:	Illustrate the design principles for database design, ER model and normalization
CO3:	Apply Concurrency control and recovery mechanisms for the desirable database problem
CO4:	Compare the basic database storage structure and access techniques indexing and hashing
CO5:	Review the fundament alive wonun structured data and its management

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	-	-	-	-	-	-	2
CO2	3	3	3	2	-	-	-	-	-	-	-	2
CO3	3	3	3	3	2	-	-	-	-	-	-	1
CO4	3	3	3	3	3	-	-	-	-	-	-	3
CO5	2	2	-	-	-	-	-	-	-	-	-	2

COs VsPSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	1	-	-
CO2	-	2	-
CO3	2	3	-
CO4	2	3	-
CO5	1	2	-

COURSE CONTENTS:

MODULE I	**INTRODUCTION TO DATABASE SYSTEMS**	**9 Hours**
Overview – Data Models – Database System Architecture – History of Database Systems. Entity-Relationship Model: Basic Concepts – Constraints – Keys – Design Issues – Entity Relationship Diagram – Weak Entity Sets – Extended E-R Features – Design of an E-R Database Schema..		
MODULE II	**RELATIONAL DATABASES**	**9 Hours**
Structure of Relational Databases -Relational Algebra – Extended - Relational Algebra Operations – Modification of Database – Views – Tuple Relational Calculus–Domain Relational Calculus. SQL: Background –Basic Structure–Set- Operations – Aggregate Functions – Null Values – Nested Sub queries –Modification of the database – Joined Relations – Data Definition Language.		
MODULE III	**INTEGRITY SECURITY AND FILE STRUCTURES**	**9 Hours**
Domain Constraints – Referential Integrity – Assertions–Security and Authorization – Authorization in SQL-Relational-Database Design: Normalization -first normal form , second normal form, third normal form, Boyce- Codd normal form-Indexing and Hashing: Basic Concepts –Ordered Indices – Static Hashing – Dynamic Hashing		
MODULE IV	**TRANSACTION CONCEPT**	**9 Hours**
Two-Phase Locking Techniques for Concurrency Control – ConcurrencyControlbasedontimestamp– RecoveryConcepts–Recoverybasedondeferred update – Recovery techniques based on immediate update - Shadow Paging.		
MODULE V	**CLOUD AND NOSQL DATABASES**	**9 Hours**
Cloud databases- Data Storage Systems on the Cloud, Data Representation, Partitioning and Retrieving Data, Challenges with Cloud-Based Databases- No SQL Data model: Aggregate Models, Document Data Model, Key-Value Data Model, Columnar Data Model, Graph-Based Data Model.		
		TOTAL: 45+15 HOURS

LIST OF EXPERIMENTS
1. Study of Basic SQL Commands.
2. DDL and DML
3. Table creation with constraints.
4. Joins operations with views
5. PL/SQL-Procedures
6. PL/SQL- Cursors
7. PL/SQL- Functions, Triggers

REFERENCES:

1. Richard L. Daft, Understanding the Theory and Design of Organizations, Cengage Learning India Private Limited; 11th Edition, 2016

2. Mahajan. J.P., ―Management Theory and Practices‖, 3rd Edition, Ane Books Pvt Ltd. 2011.

3. Stephen P. Robbins, Timothy A. Judge, NeharikaVohra, ―Organizational Behavior", Pearson, 2013.

4. Harold Koontz, Weihrich, ―Essentials of Management: An International, Innovation, and Leadership Perspective‖, 10th Edition, Tata McGraw Hill, 2015.

2302BS306	MARKETING RESEARCH AND MARKETING MANAGEMENT	L	T	P	C
		3	0	0	3

PREREQUISITE:

Marketing research and marketing management courses cover a range of topics, including

COURSE OBJECTIVES:

1. The meaning of Marketing Research
2. To identify opportunities understand market challenges.
3. Market research can help you better understand your current customers.
4. Market research is used to determine the viability of a new product.
5. Research is a vast discipline that caries depending on sub – disciplines.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	1. Define marketing research concepts.
CO2:	2. Understanding the marketing research process.
CO3:	3. Knowledge about the pricing, promotion and distribution strategy.
CO4:	4. Communicate findings from a marketing research project.
CO5:	5. Strategy and planning for internet marketing.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	-	-	2	-	-	-	-
CO2	2	3	3	2	3	-	-	-	-	-	-	-
CO3	3	2	3	2	2	-	-	-	-	-	-	-
CO4	3	3	3	-	-	-	-	-	-	2	3	2
CO5	3	2	3	2	2	-	-	2	-	-	-	2

COs VsPSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	3	-	2
CO2	3	2	2
CO3	3	2	2
CO4	3	2	-
CO5	3	2	2

COURSE CONTENTS:

MODULE I	INTRODUCTION	9 Hours

Marketing Concepts and Applications: Introduction to Marketing & Core Concepts, Marketing of Services, Importance of marketing in service sector-Marketing Planning & Environment: Elements of Marketing Mix, Analyzing needs &trends in Environment -Macro, Economic, Political, Technical & Social- Understanding the consumer: Determinants of consumer behavior, Factors influencing consumer behavior –Market Segmentation: Meaning &Concept, Basis of segmentation, selection of segments, Market Segmentation strategies, Target Marketing, Product Positioning.

MODULE II	**MARKETING MIX**	**9 Hours**

Concept, elements, 7 Ps of Marketing-Product Management: Product decision and strategies, Packaging, Product Life cycle concept, New Product development & strategy, Stages in New Product development, Branding

MODULE III	**PRICING, PROMOTION AND DISTRIBUTION STRATEGY**	**9 Hours**

Pricing Policies & Practices – Pricing Methods & Price determination Policies. Marketing Communication –The promotion mix, Advertising & Publicity, 5 M‟s of Advertising Management, Personal selling, Public Relations. Marketing Channels, Retailing, Logistics & Supply Chain. Marketing Communication, Advertising

MODULE IV	**MARKETING RESEARCH**	**9Hours**

Introduction, Scope, Objectives & Limitations, Types of Market Research, Marketing Research Techniques, Survey Questionnaire design & drafting, Pricing Research, Media Research, Qualitative Research, Data Analysis: Use of various statistical tools – Descriptive & Inference Statistics, Statistical Hypothesis Testing, Multivariate Analysis –Discriminate Analysis, Cluster Analysis, Segmenting, Factor Analysis

MODULE V	**INTERNET MARKETING**	**9 Hours**

Introduction to Internet Marketing. Mapping fundamental concepts of Marketing (7Ps, STP); Strategy and Planning for Internet Marketing.

TOTAL: 45 HOURS

REFERENCES:

1. RajanSaxena,"Marketing Management" ,McGraw Hill Education, 6th edition, 2019

2. S.A.Sherlekar,"MarketingManagement",HimalayaPublishingHouse,2014

3. Service Marketing– S.M. Zha

4. Journals–The IUP Journal of Marketing Management, Harvard Business Review

5. Research for Marketing Decisions by Paul Green, Donald, Tull

6. Business Statistics, A First Course, David M.Levine et al., Pearson Publication

7. Marketing Management (Analysis, Planning, Implementation & Control)–Philip Kotler

2302BS351	OBJECT ORIENTED PROGRAMMINGLABORATORY	L	T	P	C
		0	0	2	1

PREREQUISITE:

Programming in C

COURSE OBJECTIVES:

1. **Understanding and Applying Object-Oriented Principles:**
2. **Mastering Operator and Function Overloading:**
3. **Exploring Inheritance Mechanisms:**

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Understanding Class Structures**:**
CO2:	Mastering Overloading Techniques
CO3:	Applying Inheritance Concepts**:**
CO4:	Using Friend Functions**:**
CO5:	File Handling Expertise**:**

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	-	-	2	2	2	3	2
CO2	2	3	-	2	-	-	-	2	2	2	3	2
CO3	2	2	2	3	3	-	-	2	2	2	2	3
CO4	2	2	2	2	3	-	-	2	3	2	2	2
CO5	2	2	2	2	3	-	-	2	2	2	2	2

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	-	2	-
CO2	2	2	-
CO3	2	2	-
CO4	2	2	-
CO5	2	2	-

LIST OF EXPERIMENTS:

1. Implementation of classes and objects with constructors and destructors
2. Implementation of operator and function overloading.
3. Implementation of types of Inheritance.
4. Implementation of two different classes for adding a private data member using friend function.
5. Implementation of file handling operations
6. Implementation of templates and UML diagrams

TOTAL: 45 HOURS
REFERENCES:
1. *Bjarne Stroustrup, The C++ Programming Language, 1e:3rd Edition, Pearson Education, 2015.*
2. *Debasish Jana, C++ and Object-Oriented Programming Paradigm, 3rd Edition, Prentice Hall of India, New Delhi, 2014.*
3. *Bjarne Stroustrup, Programming Principles and Practice Using C++, 2nd Edition, Addison Wesley, 2014.*
4. *Bjarne Stroustrup, The Design and Evolution of C++, Addison-Wesley Professional, 2013.*