# **EXCEL ENGINEERING COLLEGE**



## (Autonomous) Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai Accredited by NBA, NAAC with "A<sup>+</sup>" and Recognized by UGC (2f &12B) KOMARAPALAYAM – 637303

# DEPARTMENT OF MASTER OF COMPUTER APPLICATION REGULATION 2023 I to IV Semesters Curriculum

I – SEMESTER									
Code No.	Course	Category	Peri	ods /V	Veek		Maxi	imum N	larks
		0,	L	Т	Ρ	С	СА	FE	Total
Theory Cou	irse(s)								
23PMC101	Statistics and Numerical Methods	FC	3	1	0	4	40	60	100
23PMC102	Python Programming	PC	3	1	0	4	40	60	100
23PMC103	Advance Data Structures and Algorithms	PC	3	1	0	4	40	60	100
23PMC104	Object Oriented Software Engineering	PC	3	0	0	3	40	60	100
23PMC105	Research Methodology and IPR	RMC	3	0	0	3	40	60	100
Theory with	Practical Courses								
23PMC106	Advance Database Technology	PC	2	0	4	3	50	50	100
Practical C	ourse								
23PMC107	Advance Data Structures and Algorithms Laboratory	PC	0	0	4	2	60	40	100
23PMC108	Python Programming Laboratory	PC	0	0	4	2	60	40	100
TOTAL				3	12	25	370	430	800

II- SEMESTER									
Codo No	Course	Catagory	Peri	ods /\	Neek	6	Maxi	mum M	arks
Code No.	Course	Category	L	Т	Ρ	C	СА	FE	Total
Theory Cour	ses								
23PMC201	Data Communication Networks	PC	3	0	0	3	40	60	100
23PMC202	Advanced Java Programming	PC	3	1	0	4	40	60	100
23PMC203	Cloud Computing Technologies	PC	3	1	0	4	40	60	100
23PMC204	Full Stack Development	PC	3	1	0	4	40	60	100
23PMCAXX	Professional Elective-I	PE	3	3 0 0		3	40	60	100
Theory with	Practical Courses								
23PMC205	Statistical Computing with R Programming	FC	2	0	2	4	50	50	100
Practical Cou	rse								
23PMC206	Full Stack Development Laboratory	PC	0	0	4	2	60	40	100
23PMC207 Advanced Java Programming Laboratory		PC	0	0	4	2	60	40	100
	TOTAL		17	3	10	26	370	430	800

III – SEMESTER									
Code No.	Course	Category	Peri	ods / V	Neek		Maxim	rks	
		outogory	L	Т	Р	С	СА	FE	Total
Theory Cours	se(s)								
23PMC301	AI and Machine Learning	PC	3	1	0	4	40	60	100
23PMC302	C# and ASP.Net Programming	PC	3	1	0	4	40	60	100
23PMCAXX	Professional Elective–II	PE	3	0	0	3	40	60	100
23PMCAXX	Professional Elective–III	PE	3	0	0	3	40	60	100
Theory with	Practical Courses								
23PMC303	Mobile Application Development	PC	3	0	2	3	50	50	100
Practical Co	urse								
23PMC304	C# and ASP.Net Programming Laboratory	PC	0	0	4	2	60	40	100
23PMC305	Mini Project	EC	0	0	4	2	60	40	100
TOTAL 15 2 10 21 330 370 700									

IV – SEMESTER										
Code No.	Course	Category	Periods / Week			С	Max	imum	Marks	
						•	CA	FE	Total	
Practical C	Practical Course									
23PMC401	23PMC401         Major Project         EC         0         0         20         12         50         50         100									
TOTAL         0         0         20         12         50         50         100										

PROFESSIONAL ELECTIVE – I SEMESTER –II									
Code No.	Course	Category Periods / Week				Maximum Marks			
		,	L	т	Ρ	С	CA	FE	Total
23PMCA01	Software Testing and Quality Assurance	PE	3	0	0	3	40	60	100
23PMCA02	Data Warehousing and Data Mining	PE	3	0	0	3	40	60	100
23PMCA03	Digital Image Processing	PE	3	0	0	3	40	60	100
23PMCA04	Middleware Technologies	PE	3	0	0	3	40	60	100
23PMCA05	Mobile Computing	PE	3	0	0	3	40	60	100

PROFESSIONAL ELECTIVE – II SEMESTER – III									
Code No.	Course	Category	Periods / Week				Maxi	imum	Marks
			L	Т	Ρ	С	СА	FE	Total
23PMCA21	Supply Chain Management	PE	3	0	0	3	40	60	100
23PMCA22	Human Resource Management	PE	3	0	0	3	40	60	100
23PMCA23	Management Information Systems	PE	3	0	0	3	40	60	100
23PMCA24	Professional Ethics	PE	3	0	0	3	40	60	100
23PMCA25	Enterprise Resource Planning	PE	3	0	0	3	40	60	100
23PMCA26	Social Network and Business System	PE	3	0	0	3	40	60	100

PROFESSIONAL ELECTIVE – III SEMESTER –III									
Code No.	Course	Category	Periods / Week L T P		Periods / Week		Max	imum	Marks
					)	CA	FE	Total	
23PMCA41	Service Oriented Architecture	PE	3	0	0	3	40	60	100
23PMCA42	Cloud Computing and Big Data Analytics	PE	3	0	0	3	40	60	100
23PMCA43	Database Tuning	PE	3	0	0	3	40	60	100
23PMCA44	Software Reliability Engineering	PE	3	0	0	3	40	60	100
23PMCA45	Block Chain Technology	PE	3	0	0	3	40	60	100
23PMCA46	Natural Language Processing	PE	3	0	0	3	40	60	100
23PMCA47	Network Programming And Security	PE	3	0	0	3	40	60	100

				CR	EDITS	PER SEI	MESTER		
S.No	CATEGORY	I	II		IV	МАХ	MIN	TOTAL CREDIT	CREDITS in %
1	FC	4	4			8	15	8	09.52
2	PC	18	19	13		40	55	50	59.52
3	PE		3	6		9	15	9	10.71
4	EC			2	12	10	25	14	16.67
5	RMC	3						3	03.58
	25	26	21	12	67	110	84	100	

- FC Foundation Course
- **PC Professional Course**
- **PE Professional Elective**
- **EC Employability Course**
- **RMC Research Methodology Course**

# **BRIDGE COURSES**

# For the MCA Students admitted under Non-Computer Science background category

Semester -I									
Code No.	Code No. Course C				s / Wee	ek			
			L	Т	Р	С			
23PMCA01	Fundamentals of Computers	BC	3	0	0	0			
23PMCA02	Mathematical Foundation of Computer Science	BC	3	0	0	0			

Semester -II									
Code No.	Course	Category		Period	s / Wee	ek			
			L	Т	Р	С			
23PMCA03	Object Oriented Programming Using C++	BC	3	0	0	0			
23PMCA04	Computer Organization	BC	3	0	0	0			

Bridge Course shall be conducted to the students **admitted under non-computer-science background category**, the grades obtained for the prescribed bridge courses will appear on the grade sheet, but will **not be considered for GPA/CGPA calculation**. It will be evaluated internally.

23PMC101	57		L	Т	Р	С
		AND NOMERICAL METHODS	3	1	0	4
Nature of Course		Foundation Course (FC)				
Pre requisites		Fundamentals of Statistics				

# The course is intended to

- 1. Able to understand the methods to solve polynomial equations and Implement the mathematical ideas for interpolation numerically
- 2. Summarize the methodologies involved in solving problems related to ordinary and partial differential equations
- 3. Art of correlating and analyze the data using variance
- 4. Identify the model mathematical patterns in real world and offer appropriate solutions
- 5. Using the Mathematical Knowledge in their interactive and supporting environment

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

CO.No	Course Outcome	Bloom's Level
CO 1	Classify the equations into algebraic, transcendentalor simultaneous techniques	Understand
CO 2	Demonstrate and obtain the differentiation and Integration of functions using the numerical techniques.	Apply
CO 3	Obtain the solutions of all types of differential equations, numerically.	Apply
CO 4	Determine Correlation and Regression to predict the relevant outcome in real life.	Apply
CO 5	Design an experiment for an appropriate situation using ANOVA technique	Analyze

# **Course Contents**

Module – I	SOLUTION OF EQUATIONS, EIGENVALUES AND EIGENVECTORS	9							
Solution of	Solution of algebraic and transcendental equations: Newton- Raphson method - Solution of								
system of linear	equations: Gauss elimination method - Inverse of a matrix: Gauss-Jorda	an method-							
Power method									
Module – II	INTERPOLATION, NUMERICAL DIFFERENTIATION AND INTEGRATION	9							
Interpolation: Ne Newton's forward Simpson's1/3 rule	wton's forward and backward interpolation formulae - Numerical diffed and backward interpolation formulae. Numerical integration: Trapezo for single integrals- Two point Gaussian quadrature formula.	erentiation: Didal rule-							
Module – III	NUMERICAL SOLUTIONS OF DIFFERENTIAL EQUATIONS	9							

Solution of	first order ordinary differential equations: Fourth order Runge- Kutta	method -							
Solution of partial	Solution of partial differential equations: Elliptic equations: Poisson's equation- Parabolic equations by								
Crank Nicholson	method- Hyperbolic equations by explicit finite difference method.								
Module – IV	CORRELATION AND REGRESSION	9							
Correlation-	Multiple correlation – Regression – Multiple Regression-Linear fit- Quadratic	fit.							
Module – V	DESIGN OF EXPERIMENTS	9							
One way and two way classifications – Completely randomized design – Randomized block design – Latin square design – 2 <sup>2</sup> factorial design.									
	Total : 45	5 Periods							

# Text Books

- 1. Steven Chapra, Numerical Methods for Engineers, Tata McGraw Hill Seventh Edition, 2015.
- 2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2012.

# **Reference Books**

- 1. Walpole R.E, Myers R.H, Myers R.S.L and Ye K, Probability and Statistics for Engineers and Scientists, Seventh Edition, Pearsons Education, Delhi, 2002.Burden R. L and Douglas Faires J,Numerical Analysis Theory and Applications, CengageLearning, Ninth Edition, 2005.
- 2. Gerald C. F and Wheatley P.O, Applied Numerical Analysis, Seventh Edition, Pearson Education, New Delhi, 2004.

# **Additional References**

- 1. <u>nptel.ac.in/courses/111/105/111105121</u>
- 2. nptel.ac.in/courses/122/104/122104017

	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
<u> </u>	POs									PSOs					
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	1	2	3		3								1	2	
CO 2	2	2	3		3								3	1	
CO 3	2	2	2		3								2	2	
CO 4	2	2	2		3								2	3	
CO 5	3	2	3		3								3	2	
		3-H	ligh			2-Me	dium		1-Low						

Formative Assessment									
Blooms Taxonomy	Assessment Component	Marks	Total marks						
Remember	Quiz	5							
Understand	Tutorial class / Assignment	5	15						
Apply	Tutonal class / Assignment	5	10						
	Attendance	5							

Summative Assessment										
Bloom's Catogory	Internal As	sessment Exar	minations (IAE)	Final Examinations (FE)						
Bioonin's Category	IAE – I (5)	IAE – II (10)	IAE – III (10)	60						
Remember	20	10	0	0						
Understand	30	10	10	10						
Apply	0	30	20	40						
Analyse	0	0	20	50						
Evaluate	0	0	0	0						
Create	0	0	0	0						

23PMC102		PYTHON PROGRAMMING	L	Т	Ρ	С		
					0	4		
Nature of Course         Professional Course (PC)								
Pre requisite	es	Fundamentals of Object Oriented Programming Language						

# The course is intended to

- 1. Develop Python programs with conditionals, loops and functions.
- 2. Use Python data structures lists, tuples, and dictionaries.
- 3. Do input/output with files in Python
- 4. Use modules, packages and frameworks in python
- 5. Define a class with attributes and methods in python

CO.No	Course Outcome	Bloom's Level
CO 1	Develop algorithmic solutions to simple computational problems	Understand
CO 2	Represent compound data using Python lists, tuples and dictionaries.	Understand
CO 3	Read and write data from/to files in Python Programs	Apply

CO 4	Structure simple Python programs using libraries, modules etc.	Apply
CO 5	Structure a program by bundling related properties and behaviors into individual objects.	Apply

# **Course Contents**

Course contents	5						
Module – I	BASICS OF PYTHON	9					
Introduction to Python Programming – Python Interpreter and Interactive Mode– Variables and Identifiers – Arithmetic Operators – Values and Types – Statements. Operators – Boolean Values – Operator Precedence – Expression – Conditionals: If-Else Constructs – Loop Structures/Iterative Statements – While Loop – For Loop – Break Statement-Continue statement – Function Call and Returning Values – Parameter Passing – Local and Global Scope – Recursive Functions							
Module – II	DATA TYPES IN PYTHON	9					
Lists, Tuple Making Your Owr	es, Sets, Strings, Dictionary, Modules: Module Loading and Execution – Pack Module – The Python Standard Libraries.	<ages td="" –<=""></ages>					
Module – III	FILE HANDLING AND EXCEPTION HANDLING	9					
Files: Introc Position –Exception	Files: Introduction – File Path – Opening and Closing Files – Reading and Writing Files –File Position –Exception: Errors and Exceptions, Exception Handling, Multiple Exceptions						
Module – IV	MODULES, PACKAGES AND FRAMEWORKS	9					
Modules: Introduction – Module Loading and Execution – Packages – Making Your Own Module – The Python Libraries for data processing, data mining and visualization- NUMPY, Pandas, Matplotlib, Plotly-FrameworksDjango, Flask, Web2Py							
Module – V	OBJECT ORIENTED PROGRAMMING IN PYTHON	9					
Creating a C method vs. static	lass, Class methods, Class Inheritance, Encapsulation, Polymorphism, class methods, Python object persistence.	3					

Total : 45 Periods

# Text Books

1.Reema Thareja, "Python Programming using Problem Solving Approach", Oxford University Press, First edition, 2021

2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", Second Edition, Shroff, O'Reilly Publishers, 2021 (http://greenteapress.com/wp/thinkpython/)

# **Reference Books**

1. Guido van Rossum, Fred L. Drake Jr., "An Introduction to Python – Revised and Updated for Python 3.2, Network Theory Ltd., First edition, 2021

2. John V Guttag, "Introduction to Computation and Programming Using Python", Revised and Expanded Edition, MIT Press, 2021

3. Charles Dierbach, "Introduction to Computer Science using Python", Wiley India Edition, First Edition, 2020

# Additional References

- 1. https://nptel.ac.in/courses/106106182
- 2. https://programming-22.mooc.fi/

	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	POs											PSOs			
003	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3		3							2	1	3	
CO 2	3	2	3		3							2	2	3	
CO 3	3	2	3		3							2	2	3	
CO 4	3	2	3		3							2	3	3	
CO 5	3	2	3		3							2	3	3	
	3-High 2-Medium							1-Low							

Formative Assessment									
Blooms Taxonomy	Assessment Component	Marks	Total marks						
Remember	Quiz	5							
Understand	Tutorial class / Assignment /Group Discussion	5	15						
Apply	Tutolial class / Assignment /Gloup Discussion	5	10						
	Attendance	5							

Summative Assessment									
Bloom's Catogony	Internal As	sessment Exar	minations (IAE)	Final Examinations (FE)					
Bioonin's Category	IAE – I (5)	IAE – II (10)	IAE – III (10)	60					
Remember	20	10	10	20					
Understand	30	10	10	20					
Apply	0	30	30	60					
Analyse	0	0	0	0					
Evaluate	0	0	0	0					
Create	0	0	0	0					

23PMC103 Ac		dvance Data Structures and Algorithms	L	Т	Р	С
		vance Data Structures and Algorithms		1	0	4
Nature of Course		Professional Course (PC)				
Pre requisites		Fundamentals of Data Structures				

# The course is intended to

- 1. Understand the usage of algorithms in computing
- 2. Learn and use hierarchical data structures and its operations
- 3. Learn the usage of graphs and its applications
- 4. Select and design data structures and algorithms that is appropriate for problems
- 5. Study about NP Completeness of problems

On succe	ssful completion of the course the students will be able to	
CO.No	Course Outcome	Bloom's Level
CO 1	Design data structures and algorithms to solve computing	Apply

CO 1	problems.	Apply
CO 2	Choose and implement efficient data structures to solve problems.	Apply
CO 3	Design algorithms using graph structure and various string- matching algorithms to solve real-life problems.	Analyze
CO 4	Design one's own algorithm for an unknown problem.	Analyze
CO 5	Apply suitable design strategy for problem solving.	Analyze

# **Course Contents**

Module – I	ROLE OF ALGORITHMS IN COMPUTING & COMPLEXITY ANALYSIS	9				
Algorithms -	- Algorithms as a Technology -Time and Space complexity of algorithms-	Asymptotic				
analysis-Average	and worst-case analysis-Asymptotic notation-Importance of efficient	algorithms				
Program performance measurement - Recurrences: The Substitution Method - The Recursion Tree						
Method- Data structures and algorithms.						
Module – II	HIERARCHICAL DATA STRUCTURES	9				
Binary Sea	rch Trees: Basics – Querying a Binary search tree – Insertion and Deletion-	Red Black				
trees: Properties	of Red-Black Trees – Rotations – Insertion – Deletion -B-Trees: Definition of	of B - trees				
<ul> <li>Basic operation</li> </ul>	s on B-Trees – Deleting a key from a B-Tree- Heap – Heap Implementatior	ı – Disjoint				
Sets - Fibonacci I	Heaps: structure – Merge able-heap operations Decreasing a key and deletin	ng a node-				
Bounding the max	ximum degree.					
Module – III	GRAPHS	9				
Elementary	Graph Algorithms: Representations of Graphs – Breadth-First Search – I	Depth-First				
Search – Topolog	gical Sort – Strongly Connected Components- Minimum Spanning Trees:	Growing a				
Minimum Spanning Tree – Kruskal and Prim- Single-Source Shortest Paths: The Bellman- For						
algorithm Single-Source Shortest paths in Directed Acyclic Graphs Dijkstra's Algorithm						
Dynamic Program	mming All Pairs Shortest Paths: Shortest Paths and Matrix Multiplication –	The Floyd-				
Warshall Algorith	m					

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Module – IV	ALGORITHM DESIGN TECHNIQUES	9			
Dynamic Programming: Matrix-Chain Multiplication – Elements of Dynamic Programm Longest Common Subsequence- Greedy Algorithms: – Elements of the Greedy Strategy- An A Selection Problem - Huffman Coding.					
Module – V	NP COMPLETE AND NP HARD	9			
NP-Completeness: Polynomial Time – Polynomial-Time Verification – NP- Completeness and Reducibility – NP-Completeness Proofs – NP-Complete Problems.					
	Total : 45	5 Periods			

### Text Books

S.Sridhar," Design and Analysis of Algorithms", Oxford University Press, 1st Edition, 2020.
 Adam Drozdex, "Data Structures and Algorithms in C++", Cengage Learning, 4th Edition, 2021.

3. T.H. Cormen, C.E.Leiserson, R.L. Rivest and C.Stein, "Introduction to Algorithms", Prentice Hall of India, 3rd Edition, 2021.

### **Reference Books**

1.Mark Allen Weiss, "Data Structures and Algorithms in C++", Pearson Education, 3rd Edition, 2009.

2. E. Horowitz, S. Sahni and S. Rajasekaran, "Fundamentals of Computer

Algorithms", University Press, 2nd Edition, 2008.

3. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.

### **Additional References**

1. https://nptel.ac.in/courses/106102064

2. https://nptel.ac.in/courses/106102076

	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
<u> </u>		POs							PSOs						
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	2	3							2	2	3	2
CO 2	3	2	3	2	3							2	2	3	3
CO 3	3	2	3	2	3							2	2	3	2
CO 4	3	2	3	2	3							2	2	3	2
CO 5	3	2	3	2	3							2	2	3	2
	3-High			3-High 2-Medium 1-Low											

Formative Assessment						
Blooms Taxonomy	Assessment Component	Marks	Total marks			
Remember	Quiz	5	15			
Understand	Tutorial class / Assignment /Group Discussion	5	10			

Apply			
	Attendance	5	

Summative Assessment							
Bloom's Catogony	Internal As	sessment Exar	Final Examinations (FE)				
Bloom s Category	IAE – I (5)	IAE – II (10)	IAE – III (10)	60			
Remember	10	0	0	0			
Understand	10	10	10	20			
Apply	30	30	30	60			
Analyse	10	10	10	20			
Evaluate	0	0	0	0			
Create	0	0	0	0			

23PMC104 OBJECT ORIENTED SOFTWARE ENGINEERING			L 3	T 0	P 0	C 3
Nature of Course		Professional Course (PC)				
Pre requisites		Basics of Software Engineering				

# The course is intended to

- 1. Understand the phases in object oriented software development
- 2. Gain fundamental concepts of requirements engineering and analysis.
- 3. Know about the different approach for object oriented design and its methods
- 4. Learn about how to perform object oriented testing and how to maintain software
- 5. Provide various quality metrics and to ensure risk management.

CO.No	Course Outcome	Bloom's Level
CO 1	Design object oriented software using appropriate process models.	Understand
CO 2	Differentiate software processes under waterfall and agile methodology.	Understand
CO 3	Design and Develop UML diagrams for software projects.	Apply
CO 4	Design Patterns for a software process.	Apply
CO 5	Categorize testing methods and compare different testing tools for software processes.	Analyze

Course Content	Ş				
Module – I	SOFTWARE DEVELOPMENT AND PROCESS MODELS	9			
Introduction	to Software Development – Challenges – An Engineering Perspective –	Object			
Orientation – Sof	tware Development Process – Iterative Development Process – Process M	, odels –			
Life Cycle Models	s – Unified Process – Iterative and Incremental – Agile Processes.				
Module – II	MODELING OO SYSTEMS	9			
Object Ori	ented Analysis (OOA / Coad-Yourdon), Object Oriented Design (OOD/I	Booch),			
Hierarchical Obje	ect Oriented Design (HOOD), Object Modeling Technique (OMT) – Requ	irement			
Elicitation - Use	Cases - SRS Document - OOA - Identification of Classes and Relation	nships,			
Identifying State	and Behavior – OOD - Interaction Diagrams – Sequence Diagram – Collat	oration			
Diagrams - Unifie	d Modeling Language and Tools.				
Module – III	DESIGN PATTERNS	9			
Design Pri	nciples – Design Patterns – GRASP – GoF – Dynamic Object Modeling -	- Static			
Object 12 Modeli	ng.				
Module – IV	SYSTEM TESTING	9			
Software Testing – Structu Dynamic Testing – Maintenance of	Software testing: Software Verification Techniques – Object Oriented Checklist :- Functional Testing – Structural Testing – Class Testing – Mutation Testing – Levels of Testing – Static and Dynamic Testing Tools - Software Maintenance – Categories – Challenges of Software Maintenance – Maintenance of Object Oriented Software – Regression Testing				
Module – V	SOFTWARE QUALITY AND METRICS	9			
Need of C	Diject Oriented Software Estimation – Lorenz and Kidd Estimation – Use Cas	se			
Points Method –	Class Point Method – Object Oriented Function Point – Risk Management –				
Software Quality	Models – Analyzing the Metric Data – Metrics for Measuring Size and Struct	ure –			
Measuring Software Quality - Object Oriented Metrics					
	Total : 45 P	eriods			

# **Text Books**

- 1. Yogesh Singh, RuchikaMalhotra, "Object Oriented Software Engineering", PHI Learning Private Limited ,First edition,2020
- 2. Ivar Jacobson. Magnus Christerson, PatrikJonsson, Gunnar Overgaard, "Object Oriented Software Engineering, A Use Case Driven Approach", Pearson Education, Seventh Impression, 2021
- 3. Craig Larman, "Applying UML and Patterns, an Introduction to Object-Oriented Analysis and Design and Iterative Development", Pearson Education, Third Edition, 2019.

# **Reference Books**

1. Grady Booch, 13 Kelli A. Houston, "Object Oriented Analysis & Design with Applications, Third Edition, Pearson Education, 2021.

2. Roger S. Pressman, "Software Engineering: A Practitioner's Approach, Tata McGraw-Hill Education, 8th Edition, 2020.

# Additional References

1. https://nptel.ac.in/courses/106105182

2. https://www.mooc-list.com/tags/software-engineering

N	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
<u> </u>		POs PSOs											5		
005	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	3	2	3							2	2	3	
CO 2	3	2	3	2	3							2	2	3	
CO 3	3	2	3	2	3							2	2	3	
CO 4	3	2	3	2	3							2	2	3	
CO 5	5 3 2 3 2 3 2 3 2 3							3							
	3-High 2-Medium 1-Low														

Formative Assessment							
Blooms Taxonomy	Assessment Component	Marks	Total marks				
Remember	Quiz	5					
Understand	Tutorial class / Assignment /Group Discussion	5	15				
Apply	Tutonal class / Assignment /Gloup Discussion	5	15				
	Attendance	5					

Summative Assessment						
Bloom's Catogory	Internal As	sessment Exar	Final Examinations (FE)			
Bloom's category	IAE – I (5)	IAE – II (10)	IAE – III (10)	60		
Remember	20	10	0	0		
Understand	30	10	10	20		
Apply	0	30	30	60		
Analyse	0	0	10	20		
Evaluate	0	0	0	0		
Create	0	0	0	0		

23PMC105	L. L		L	Т	Р	С
			3	0	0	3
Nature of Course		Research Methodology Course (RMC)				
Pre requisites		Basics of Research Methodology				

# The course is intended to

- 1. Give an overview of the research methodology and explain the technique of defining a research problem
- 2. Explain the functions of the literature review in research. To explain carrying out a literature search, its review, developing theoretical and conceptual frameworks and writing a review.
- 3. Explain various research designs and their characteristics.
- 4. Explain the details of sampling designs, and also different methods of data collections.
- 5. Explain the art of interpretation and the art of writing research reports.

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

CO.No	Course Outcome	Bloom's Level
CO 1	Understand the research problem and research process.	Apply
CO 2	Understand research ethics .	Apply
CO 3	Prepare a well-structured research paper and scientific presentations	Apply
CO 4	Explore on various IPR components and process of filing.	Analyze
CO 5	Understand the adequate knowledge on patent and rights	Analyze

# **Course Contents**

Module – I	ule – I RESEARCH DESIGN							
Overview of research process and design, Use of Secondary and exploratory data to answer the research question, Qualitative research, Observation studies, Experiments and Surveys.								
Module – II	DATA COLLECTION AND SOURCES	6						
Measureme Data - Preparing,	Measurements, Measurement Scales, Questionnaires and Instruments, Sampling and methods. Data - Preparing, Exploring, examining and displaying.							
Module – III	DATA ANALYSIS AND REPORTING	6						
Overview of Multivariate analysis, Hypotheses testing and Measures of Association. Presenting Insights and findings using written reports and oral presentation								
Module – IV	INTELLECTUAL PROPERTY RIGHTS	6						

Intellectual Property – The concept of IPR, Evolution and development of concept of IPR, IPR development process, Trade secrets, utility Models, IPR & Biodiversity, Role of WIPO and WTO in IPR establishments, Right of Property, Common rules of IPR practices, Types and Features of IPR Agreement, Trademark, Functions of UNESCO in IPR maintenance.

Module – V	PATENTS	6
Patents -	- objectives and benefits of patent, Concept, features of patent, Inver	ntive step,
Specification, Typ	bes of patent application, process E-filling, Examination of patent, Grant	of patent,
Revocation, Equit	table Assignments, Licences, Licensing of related patents, patent agents, R	egistration
of patent agents.		
		Deviade

# Total : 30 Periods

### Text Books

1. Cooper Donald R, Schindler Pamela S and Sharma JK, "Business Research Methods", Tata McGraw Hill Education, 11e (2012).

2. Catherine J. Holland, "Intellectual property: Patents, Trademarks, Copyrights, Trade Secrets", Entrepreneur Press, 2007.

# **Reference Books**

1. David Hunt, Long Nguyen, Matthew Rodgers, "Patent searching: tools & techniques", Wiley, 2007.

2. The Institute of Company Secretaries of India, Statutory body under an Act of parliament, "Professional Programme Intellectual Property Rights, Law and practice", September 2013.

#### **Additional References**

1. <u>https://onlinecourses.nptel.ac.in/noc22\_ge08/preview</u>

2. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view\_ug/330

	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
<u> </u>	POs											PSOs			
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	2	3	2	3						2		3	2	2
CO 2	3	2	3	2	3						2		3	2	2
CO 3	3	2	3	2	3						2		3	2	3
CO 4	3	2	3	2	3						2		3	2	3
CO 5	3	2	3	2	3						2		3	2	3
	3-High 2-Medium 1-Low														

Formative Assessment							
Blooms Taxonomy	Assessment Component	Marks	Total marks				
Remember	Quiz	5					
Understand	Tutorial class / Assignment /Group Discussion	5	15				
Apply	Tutonal class / Assignment / Croup Discussion	5	15				
	Attendance	5					

Summative Assessment							
Bloom's Category	Internal A	ssessment Exan	Final Examinations (FE)				
Bloom's category	IAE – I (5)	IAE – II (10)	IAE – III (10)	60			
Remember	10	10	0	0			
Understand	10	10	10	20			
Apply	30	30	20	60			
Analyse	0	0	20	20			
Evaluate	0	0	0	0			
Create	0	0	0	0			

23PMC106		ADVANCE DATABASE TECHNOLOGY	L	Т	Ρ	С
			2	0	4	3
Nature of Course		Professional Course (PC)				
Pre requisite	es	Basics of database				

# The course is intended to

- 1. Understand the working principles and query processing of distributed databases.
- 2. Understand the basics of spatial, temporal and mobile databases and their applications.
- 3. Distinguish the different types of NoSQL databases.
- 4. Understand the basics of XML and create well-formed and valid XML documents.
- 5. Gain knowledge about information retrieval and web search.

CO.No	Course Outcome	Bloom's Level
CO 1	Design a distributed database system and execute distributed queries.	Understand
CO 2	Manage Spatial and Temporal Database systems and implement it in corresponding applications.	Apply
CO 3	Use NoSQL database systems and manipulate the data associated with it.	Apply

6

CO 4	Design XML database systems and validate with XML schema.	Analyze
CO 5	Apply knowledge of information retrieval concepts on web databases.	Analyze

# **Course Contents**

Module – I	DISTRIBUTED DATABASES	6							
Distributed	Systems - Introduction - Architecture - Distributed Database Cond	cepts –							
Distributed Data Storage - Distributed Transactions - Commit Protocols - Concurrency Control									
Distributed Query Processing									
Module – II	SPATIAL AND TEMPORAL DATABASES	6							

Active Databases Model – Design and Implementation Issues - Temporal Databases - Temporal Querying - Spatial Databases: Spatial Data Types, Spatial Operators and Queries – Spatial Indexing and Mining – Applications.

Module – III	NOSQL DATABASES	6					
NoSQL – CAP Theorem – Sharding - Document based – MongoDB Operation: Insert, Upda							
Delete, Query, Indexing, Application, Replication, Sharding-Cassandra: Data Model, Key Space,							
Table Operations, CRUD Operations, CQL Types - HIVE: Data types, Database Operations,							
Partitioning – HiveQL – OrientDB Graph database – OrientDB Features.							

|--|

Structured, Semi structured, and Unstructured Data – XML Hierarchical Data Model – XML Documents – Document Type Definition – XML Schema – XML Documents and Databases – XML Querying – XPath – XQuery

Module – V INFORMATION RETRIEVAL AND WEB SEARCH	
---	--

IR concepts – Retrieval Models – Queries in IR system – Text Pre-processing – Inverted Indexing – Evaluation Measures – Web Search and Analytics – Current trends.

# Text Books

- 1. Abraham Silberschatz, Henry F Korth, S. Sudharshan, "Database System Concepts", Seventh Edition, McGraw Hill, 2020
- 2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Education/Addison Wesley, 2020.
- 3. Guy Harrison, "Next Generation Databases, NoSQL, NewSQL and Big Data", First Edition, Apress publishers, 2021

#### **Reference Books**

1. Jiawei Han, Micheline Kamber, Jian Pei, "Data Mining: Concepts and Techniques", Third Edition, Morgan Kaufmann, 2019.

2.Brad Dayley, "Teach Yourself NoSQL with MongoDB in 24 Hours", Sams Publishing, First Edition, 2019

3. C. J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2020

# **Additional References**

- 1. https://nptel.ac.in/courses/106105175
- 2. https://www.classcentral.com/course/advanced-rdb-sql-20181

S.No	List of Exercises	CO Mapping	RBT
1	NOSQL Exercises a. MongoDB – CRUD operations, Indexing, Sharding b. Cassandra: Table Operations, CRUD Operations,CQLTypes c. HIVE:Data types,Database Operations, Partitioning – HiveQL d. OrientDB Graph database – OrientDB Features	CO1	Apply
2	MySQL Database Creation, Table Creation, Query	CO1	Apply
3	MySQL Replication – Distributed Databases	CO1	Apply
4	Spatial data storage and retrieval in MySQL	CO2	Apply
5	Temporal data storage and retrieval in MySQL	CO3	Apply
6	Object storage and retrieval in MySQL	CO4	Apply
7	XML Databases, XML table creation, XQuery FLWOR expression	CO4	Analyze
8	Mobile Database Query Processing using open source DB (MongoDB/MySQL etc)	CO5	Analyze
		То	tal : 30 Periods

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
<u> </u>	POs												PSOs		
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	1	3	2	3								3	2	2
CO 2	3	1	3	2	3								3	2	2
CO 3	3	1	3	2	3								3	2	2
CO 4	3	2	3	2	3								3	2	2
CO 5	3	2	3	2	3								3	2	2
	3-High				2-Me	dium		1-Low							

Summative Assessment									
Bloom's Category	Rubric based Continuous Assessment [50 marks]	Final Examinations [50 marks]							
Remember	0	0							
Understand	0	0							
Apply	30	50							
Analyse	20	50							
Evaluate	0	0							
Create	0	0							

23PMC107	ADVAN	CE DATA STRUCTURES AND ALGORITHMS	L	Τ	Р	С
		LABORATORY	0	0	4	2
Nature of Co	ourse	Practical				
Pre requisite	es	Basic of Data Structures				

# The course is intended to

- 1. Acquire the knowledge of using advanced tree structures
- 2. Learn the usage of heap structures
- Understand the usage of graph structures and spanning trees
   Understand the problems such as matrix chain multiplication, activity selection and Huffman coding
- 5. Understand the necessary mathematical abstraction to solve problems.

CO.No	Course Outcome	Bloom's Level
CO 1	Design and implement basic and advanced data structures extensively	Understand
CO 2	Design algorithms using graph structures	Apply
CO 3	Design and develop efficient algorithms with minimum complexity using design techniques	Apply
CO 4	Develop programs using various algorithms.	Apply
CO 5	Choose appropriate data structures and algorithms, understand the ADT/libraries, and use	Apply

# List of experiments:

S.No	List of Exercises	CO Mapping	RBT						
1	Implementation of recursive function for tree traversal and Fibonacci	CO1	Apply						
2	Implementation of iteration function for tree traversal and Fibonacci	CO1	Apply						
3	Implementation of Merge Sort and Quick Sort	CO1	Apply						
4	Implementation of a Binary Search Tree	CO2	Apply						
5	Red-Black Tree Implementation	CO3	Apply						
6	Heap Implementation	СОЗ	Apply						
7	Fibonacci Heap Implementation	СОЗ	Apply						
8	Graph Traversals	СОЗ	Apply						
9	Spanning Tree Implementation	СОЗ	Apply						
10	Shortest Path Algorithms (Dijkstra's algorithm, Bellman Ford Algorithm)	СОЗ	Apply						
11	Implementation of Matrix Chain Multiplication	CO3	Apply						
12	Activity Selection and Huffman Coding Implementation	CO3	Apply						
	Total : 60 Periods								

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
000	POs												PSOs		
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	1	3	2	3								3	2	2
CO 2	3	1	3	2	3								3	2	2
CO 3	3	1	3	2	3								3	2	2
CO 4	3	2	3	2	3								3	2	2
CO 5	3	2	3	2	3								3	2	2
	3-High				2-Medium 1-Low										

Summative Assessment									
Bloom's Category	Rubric based Continuous Assessment [60 marks]	Final Examinations [40 marks]							
Remember	0	0							
Understand	10	10							
Apply	50	30							
Analyse	0	0							
Evaluate	0	0							
Create	0	0							

23PMC108	ים		L	Т	Р	С
231 100 100	•		0	0	4	2
Nature of Co	ourse	Practical				
Pre requisite	es	Basic of Computer Programming				

# The course is intended to

- 1. Develop Python programs with conditionals, loops and functions
- 2. Represent compound data using Python lists, tuples, dictionaries
- 3. Read and write data from/to files in Python
- 4. Implement NumPy, Pandas, Matplotlib libraries
- 5. Implement object oriented concepts

CO.No	Course Outcome	Bloom's Level
CO 1	Apply the Python language syntax including control statements, loops and functions to solve a wide variety of problems in mathematics and science.	Understand
CO 2	Use the core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data	Apply
CO 3	Create files and perform read and write operations	Apply
CO 4	Illustrate the application of python libraries.	Apply
CO 5	Handle exceptions and create classes and objects for any real time applications	Apply

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

# List of experiments:

S.No	List of Exercises	CO Mapping	RBT
1	Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).	CO1	Apply
2	Scientific problems using Conditionals and Iterative loops.	CO1	Apply
3	Linear search and Binary search	CO1	Apply
4	Selection sort, Insertion sort	CO2	Apply
5	Merge sort, Quick Sort	CO3	Apply
6	Implementing applications using Lists, Tuples.	CO3	Apply
7	Implementing applications using Sets, Dictionaries.	CO3	Apply
8	Implementing programs using Functions.	CO3	Apply

9	Implementing programs using Strings.	СОЗ	Apply
10	Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy)	CO3	Apply
11	Implementing real-time/technical applications using File handling.	CO3	Apply
12	Implementing real-time/technical applications using Exception handling.	СОЗ	Apply
13	Creating and Instantiating classes	CO3	Analyze
		T	otal : 60 Periods

	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
<u> </u>	POs											PSOs			
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	1	3	2	3								3	2	2
CO 2	3	1	3	2	3								3	2	2
CO 3	3	1	3	2	3								3	2	2
CO 4	3	2	3	2	3								3	2	2
CO 5	3	2	3	2	3								3	2	2
		3-H	ligh			2-Me	dium		1-Low						

Summative Assessment									
Bloom's Category	Rubric based Continuous Assessment [60 marks]	Final Examinations [40 marks]							
Remember	0	0							
Understand	0	0							
Apply	30	20							
Analyse	20	10							
Evaluate	0	0							
Create	10	10							

#### Master of Computer Application R-2023

### **BRIDGE COURSES**

23PMC01		Fundamentals of Computers	L	Т	Ρ	С
231 1001			3	0	0	0
Nature of Co	ourse	Bridge Course				
Pre requisite	es	Nil				

# **Course Objectives**

### The course is intended to

- 1. Understand the basic hardware and software of computer.
- 2. Understand the problem solving techniques.
- 3. Understand the branching, looping and array concepts.
- 4. Understand the function and structure of c programs.
- 5. Understand the office automation.

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

CO.No	Course Outcome	Bloom's Level
CO 1	The students will be able to examine the basic fundamentals of computer.	Understand
CO 2	The students will be able to use algorithm, flowchart and pseudo code for solving the problems	Understand
CO 3	The students will be able to apply the array concepts for effective program.	Understand
CO 4	The students will be able to build the coding using functions and structure	Understand
CO 5	The students will be able to implement various office automation techniques	Understand

#### **Course Contents**

Module – I	INTRODUCTION TO COMPUTER SOFTWARE AND HARDWARE 9									
Computer System - Programming Languages – Hardware and Software – Types of Computer – Generations of Computer - Computer Applications – Data Processing – Computer Networking – Electronic Commerce – Computer Security – Threat – Virus.										
Module – II	PROBLEM SOLVING TECHNIQUES AND BASIC STRUCTURE OF C	9								
Representation programs, source variable and data	on of Algorithm, Flowchart, Pseudo code with examples, From algo code. Overview of C: Basic structure of C program, executing a C program. types, Operators and expressions.	orithms to Constant,								
Module – III	BRANCHING, LOOPING AND ARRAY	9								
Conditional Looping: While, D and Array of Strin	Conditional statement: If, If Else, Nested ifBranching: break, continue, return, and goto. Looping: While, Do While, For Loop. Arrays: One Dimensional Array - Two Dimensional Arrays - Strings and Array of Strings.									
Module – IV	FUNCTIONS AND STRUCTURES	9								

Function General Format - Function Arguments: Pass by Value, Pass by Reference, Calling Functions with Arrays - Arguments to Main Function - Return Statement - Recursion. Structures -Nested Structures - Array of Structures - Passing Structures to Functions - Arrays and Structures with in Structures.

Module – V **OFFICE AUTOMATION** 

Word – Spread Sheet – Database – Slide Presentation.

Total: 45 Periods

9

#### **Text Books**

1. Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw Hill, 2017.

2. Reema Thareja, "Programming in C", Second Edition, Oxford University Press, 2016. **Reference Books** 

1. Kernighan B.W. and Ritchie D.M., "The C Programming Language", Second Edition, Pearson Education, 2008.

2. Dr. S. S. Shrivastava, "MS Office", Firewall Media, 2008.

## **Additional References**

1. nptel.ac.in/courses/111/105/111163221

2. nptel.ac.in/courses/122/104/122105076

	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
<u> </u>	POs											PSOs			
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2	1		3							2	2		2
CO 2	1	2	1		3							2	2		2
CO 3	1	2	1		3							2	2		2
CO 4	1	2	1		3							2	2		2
CO 5	1	2	1		3							2	2		2
	3-High			2-Medium				1-Low							

Formative Assessment											
Blooms Taxonomy	Assessment Component	Marks	Total marks								
Remember	Quiz	5									
Understand	Tutorial class /Assignment /Sominar	5	15								
Apply	Tutonal class / Assignment / Seminal	5	15								
	Attendance	5									

Bloom's Category	Internal Assessment Examinations (IAE)									
bioon s category	IAE – I (5)	IAE – II (10)	IAE – III (10)							
Remember	20	20	20							
Understand	30	30	30							
Apply	0	0	0							
Analyse	0	0	0							
Evaluate	0	0	0							
Create	0	0	0							

23PMC02	MATH	EMATICAL FOUNDATIONS OF COMPUTER	L	Т	Р	С
231 10002		SCIENCE	3	0	0	0
Nature of C	ourse	Bridge Course				
Pre requisit	es	Nil				

# Course Objectives The course is intended to

- 1. Develop the use of matrix algebra techniques
- 2. Introduce the basics of set theory and Venn diagrams.
- 3. Enhance the basic concepts and techniques of mathematical logics.
- 4. Enrich the theoretical foundations of computer science from the perspective of formal languages
- 5. Explore the theoretical foundations of computer science from the perspective of Deterministic Finite State Automata and Non-deterministic Finite State Automata Regular languages.

CO.No	Course Outcome	Bloom's Level
CO 1	The students will be able to apply the concept of solving the system of equations by matrix form.	Understand
CO 2	The students will be able to draw and interpret Venn Diagrams of set relations and operations to solve problems.	Understand
CO 3	The students will be able to simplify and evaluate basic logic statements, implications, inverses, converses, and contrapositives using truth tables and normal forms	Apply
CO 4	The students will be able to apply the basic concepts of formal languages and grammars.	Apply
CO 5	The students will be able to find the equivalence between Non- deterministic Finite State Automata and Deterministic Finite State Automata	Apply

# **Course Contents**

Module – I	MATRICES	9									
Characteristics E	Characteristics Equations – Properties - Eigen Values and Eigen Vectors - Cayley Hamilton Theorem.										
Module – II	BASIC SET THEORY	9									
Basic Definitions - Venn Diagrams and Set Operations - Principle of Inclusion and Exclusion - Permutations and Combinations.											
Module – III	LOGIC	9									
Propositional logi – Predicate Logi Method – Proof b	Propositional logic – Logical Connectives – Truth Tables – Normal Forms (Conjunctive and Disjunctive) – Predicate Logic – Universal and Existential Quantifiers – Proof Techniques – Direct and Indirect Method – Proof by Contradiction – Mathematical Induction.										
Module – IV	FORMAL LANGUAGES	9									
Languages and Lemma for Regu	Grammars - Phrase Structure Grammar - Classification of Grammars - lar Languages.	· Pumping									
Module – V	FINITE STATE AUTOMATA	9									
Finite State Automata - Deterministic Finite State Automata (DFA), Non-Deterministic Finite State Automata (NFA) - Equivalence of DFA and NFA - Equivalence of NFA and Regular Languages.											
	Total : 4	5 Periods									

# Text Books

1. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", Tata McGraw Hill, Eighth Edition, 2016.

2. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2015.

### **Reference Books**

1. A. Tamilarasi & A. M. Natarajan, "Discrete Mathematics and its Application", Second Edition, Khanna Publishers, 2005.

2. M. K. Venkataraman, "Engineering Mathematics", Volume II, Second Edition, National Publishing Company, 1989.

# Additional References

1. nptel.ac.in/courses/111/105/1111634521

2. nptel.ac.in/courses/122/104/1221050876

	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	POs												PSOs		
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2	1		3							3	2	1	
CO 2	1	2	1		3							3	2	1	

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Oliah Olian	CO 3 CO 4 CO 5	1 1 1	2 2 2	1 1 1		3 3 3	2.04	dium					3 3 3	2 2 2	2 2 2	
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Formative Assessment											
Blooms Taxonomy	Assessment Component	Marks	Total marks								
Remember	Quiz	5									
Understand	Tutorial class /Assignment /Sominar	5	15								
Apply	Tutonal class /Assignment /Seminal	5	15								
	Attendance	5									

Bloom's Category	Internal Assessment Examinations (IAE)									
Bioonis Category	IAE – I (5)	IAE – II (10)	IAE – III (10)							
Remember	20	20	20							
Understand	30	30	30							
Apply	0	0	0							
Analyse	0	0	0							
Evaluate	0	0	0							
Create	0	0	0							

23PMC03	OBJE	CT ORIENTED PROGRAMMING USING C++	L	T	P	C
Nature of Co	ourse	Bridge Course	5	U	0	U
Pre requisite	es	Basics of Programming in C				

# Course Objectives The course is intended to

- 1. Learn about basic concepts in C++.
- 2. Learn about operator and expressions concepts.
- 3. Provide knowledge of flow control statements
- 4. Learn about object, classes, constructor and destructor.
- 5. Learn about arrays and functions.

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

CO.No	Course Outcome	Bloom's Level
CO 1	The students will be able to understand about basics concepts of C++.	Understand
CO 2	The students will be able to understand about operators and expressions concepts	Understand
CO 3	The students will be able to flow control statements	Understand
CO 4	The students will be able to understand about object, classes, constructor and destructor concepts.	Understand
CO 5	The students will be able to understand about Arrays and Functions.	Understand

# **Course Contents**

Module – I	OVERVIEW OF C++	9								
History of C++ – Constants – Varia	History of C++ – OOPs Concept – Procedural VS OOP Programming – Keywords - Data Types – Constants – Variables- Operators – Expressions. Control Flow Statements.									
Module – II	ARRAYS, FUNCTIONS AND FILES	9								
Array- one dimensional of array-two dimensional array - Functions - Declaration of Functions - Files and its Operations.										
Module – III	OBJECT, CLASS AND CONSTRUCTOR	9								
Create object, Create class, Declaration of class, Scope of class, nested class, Inner Class. ConstructorIntroduction of Constructor – Types of Constructor – Destructor.										
Module – IV	INHERITANCE	9								
Inheritance – Inf Hybrid Inheritanc	neritance Types: Single Inheritance, Multiple Inheritance, Multi level Inhe e, Hierarchical Inheritance.	ritance,								
Module – V	POLYMORPHISM	9								
Polymorphism – Function overloading-Function overriding – operator overloading.										
Total : 45 Periods										
Text Books 1. E. Bala Reference Book	gurusamy, "Object Oriented Programming with C++", Eighth Edition, 2021. <b>s</b>									

1. Herbert Schildt, "C++: The Complete Reference", Fourth Edition, 2017.

# Additional References

- 1. nptel.ac.in/courses/111/105/1111663425
- 2. nptel.ac.in/courses/122/104/1221053234

	Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	POs													PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2	1	2	3							3	1	2	
CO 2	1	2	1	2	3							3	1	2	
CO 3	1	2	1	2	3							3	1	2	
CO 4	1	2	1	2	3							3	1	2	
CO 5	1	2	1	2	3							3	1	2	
	3-High				2-Medium				1-Low						

Formative Assessment						
Blooms Taxonomy	Marks	Total marks				
Remember	Quiz	5				
Understand	Tutorial class /Assignment /Sominar	5	15			
Apply	Tutonal class /Assignment /Seminal	5	15			
	Attendance	5				

Plaam'a Catagory	Internal Assessment Examinations (IAE)						
BIODITI'S Category	IAE – I (5)	IAE – II (10)	IAE – III (10)				
Remember	20	20	20				
Understand	30	30	30				
Apply	0	0	0				
Analyse	0	0	0				
Evaluate	0	0	0				
Create	0	0	0				

23PMC04			L	Т	Р	С
		COMPOTER ORGANIZATION	3	0	0	0
Nature of Co	ourse	Bridge Course				
Pre requisites		Nil				

# The course is intended to

- 1. Impart the knowledge in the field of digital electronics.
- 2. Impart knowledge about the various components of a computer and its internals.
- 3. Realize the functionality of the ALU and Addressing modes.
- 4. Learn about Processor basics and Design
- 5. Learn about Memory and I / O Systems.

CO.No	Course Outcome	Bloom's Level
CO 1	The students will be able to design digital circuits by simplifying the Boolean functions	Understand
CO 2	The students will be able to understand the organization and working principle of computer.	Understand
CO 3	The students will be able to understand logic units and Instructions of computer.	Understand
CO 4	The students will be able to know on the processor organization and design	Understand
CO 5	The students will be able to understand mapping between virtual and physical memory	Understand

Module – I	DIGITAL FUNDAMENTALS	9					
Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolea							
Functions – Logic	Gates – NAND – NOR Implementation.						
-							
Module – II	BASIC STRUCTURE OF COMPUTERS	9					
Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Hardware – Software Interface.							
Module – III	ADDRESSING MODES AND ALU	9					
Addressing modes – Instructions sets – RISC and CISC – ALU design – Fixed point and Floating point operation.							
Module – IV	PROCESSOR DESIGN	9					

Processor basics – CPU Organization – Data path design – Control design – Basic concepts – Hard wired control – Micro programmed control – Pipeline control.

Module – V MEMORY AND I/O SYSTEM

Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input / Output system – Programmed I / O – DMA and Interrupts.

Total : 45 Periods

9

#### Text Books

1. Morris Mano, "Digital Design", Fourth Edition, Prentice Hall of India, 2007.

2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2002.

#### **Reference Books**

1. Charles H. Roth, Jr., "Fundamentals of Logic Design", Eighth Edition, Jaico Publishing House, Mumbai, 2004.

2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software interface", Fourth Edition, Morgan Kaufmann, 2010.

# Additional References

1. nptel.ac.in/courses/111/105/1111865656

2. nptel.ac.in/courses/122/104/1226545463

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
C0c	POs								PSOs						
COS	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	2	3	2	3							3	1	2	
CO 2	1	2	3	2	3							3	1	2	
CO 3	1	2	3	2	3							3	1	2	
CO 4	1	2	3	2	3							3	1	2	
CO 5	1	2	3	2	3							3	1	2	
3-High 2-Medium 1-Low															

Formative Assessment							
Blooms Taxonomy	Marks	Total marks					
Remember	Quiz	5					
Understand	Tutorial class /Assignment /Sominar	5	15				
Apply	Tutonal class /Assignment /Seminal		15				
	Attendance	5					

Bloom's Catogory	Internal Assessment Examinations (IAE)						
Bioonin's Category	IAE – I (5)	IAE – II (10)	IAE – III (10)				
Remember	20	20	20				
Understand	30	30	30				
Apply	0	0	0				
Analyse	0	0	0				
Evaluate	0	0	0				
Create	0	0	0				