DEPARTMENT PROFILE

The Department of Master of Computer Applications was established in 1998 with the approval of AICTE, New Delhi. This Programme is offered with an intake of 60 students. Currently the strength of teaching faculty is 8 and that of non-teaching staff is 4. The teacher - student ratio is 1:20. The Department is equipped with all the required infrastructure, laboratories, class rooms, departmental library. The Department wishes to achieve the mission of developing and nourishing Computer Applications course through well-trained, committed and experienced faculty members. Faculty members of the Department are involved in research activities in different fields such as Bioinformatics, Image Processing, Pattern Recognition, Data Mining, Wireless Networks and Big Data Analytics.

VISION

The Department shall create professionally competent and socially responsible MCA students capable of working in global environment and to act as one of the Best college of Computer Applications recognized at the National and International levels.

MISSION

- Enforce best practices in teaching-learning, with dedicated faculty and upportive infrastructure to impart the knowledge in emerging technologies to create professionally competent computer professionals.
- Improve Industry-Institute relationship for mutual benefit to create professionally competent computer professionals.
- Inculcate ethical values, communication and entrepreneurial skills to create professionally competent and socially responsible computer professionals.
- Sensitize social, legal, environmental and cultural diversity issues through professional training and balanced curriculum to create computer professionals capable of working in global environment.

Signature of the Chairman/HOD

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22) 656

ELIGIBILITY :

Passed BCA/ Bachelor Degree in Computer Science Engineering **or** equivalent Degree.

OR

Passed B.Sc./ B.Com./ B.A. with Mathematics at 10+2 Level **or** at Graduation Level (with additional bridge Courses as per the norms of the concerned University).

Obtained at least 50% marks (45% marks in case of candidates belonging to reserved category) in the qualifying Examination.

Refer: AICTE Approval Process Hand Book 2020-21

Duration:
The duration of the Programme shall be two academic years comprising four semesters with two semesters in each academic year.

Medium of Instruction: English

Course Assessment Methods:

	Theory	Practical	Project & Viva-voce
Internal	25	40	40
External	75	60	60
Total	100	100	100

Internal Assessment:

Theory Marks		**Practical Marks**		**Project & Viva-voce Marks**	
Two Test and the average	15	Two Lab Assessment and average	30	1st Viva-voce	15
Seminar /Quiz	5	Observation	5	2nd Viva-voce	15
Assignment	5	Record Note	5	Project Report	10
Total	**25**		**40**		**40**

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OBJECTIVE

To provide to the country a steady stream of the necessary knowledge, skills and foundation for acquiring a wide range of rewarding careers into the rapidly expanding world of the Information Technology.

Curricula would focus on learning aspect from four dimensions viz. Conceptual Learning, Skills Learning and Practical / Hands on with respect to four specialized tracks viz. Software and Application Development, Infrastructure and Security Management, Information Management & Quality Control and Networking

PROGRAMME OUTCOMES:

On successful completion of MCA Programme, the students are expected to

1. **Computational Knowledge:** Able to apply knowledge of Computing and Technological advances appropriate to the programme, Basic Mathematics, Computing Specialization and Domain Knowledge for the abstraction and conceptualization of proper computing models from defined problems related to various real-life applications for any given requirement..
2. **Problem Analysis and Solution development:** Ability to Identify, critically analyze, invent, formulate research related activities to provide solutions for complex computer science related real-life problems using concepts of Mathematics, Computing Science and Relevant Domains with appropriate consideration reaching valid conclusions and feasible computing solutions.
3. **Research Activity:** Apply Research based knowledge and methodologies to design, analyze and interpretation of data and find the solutions for complex problems by Creating, identifying and applying appropriate techniques, resources, and modern computing tools. Hence ability to select modern computing tools, skills and techniques necessary for innovative software solutions.
4. **An ability to design,** implement, and evaluate a computer-based system, process, component, or program to meet stakeholder needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations in domains like Banking, Insurance, Healthcare Systems and Multimedia and Mass Communications.
5. **Professional Ethics**: Ability to apply and commit professional ethics and cyber regulations in a global economic environment for professional computing practices and develop the youth with social commitments.

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6. **Life-long Learning:** Identify and recognize the need and have the ability to engage in independent and continuous learning as a computing professional, which will boost self confidence
7. **Communication Efficacy:** Communicate effectively with the computing community and with society by being able to comprehend effective documentations and presentations to attract a wide range of audiences. They will be able to communicate technical information effectively, both orally and in writing
8. **Individual and Team Work**: An ability to function effectively individually and on teams, including diverse and multidisciplinary, to accomplish a common goal. Develop ability to demonstrate team work with the ability of leadership, analytical reasoning for solving time critical problems and strong human values for responsible professional.
9. **Innovation and Entrepreneurship:** Identify a timely opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society. Find out right opportunity for entrepreneurship and create and add value for the betterment of an individual and society at large.
10. **Social Responsibility**: An ability to analyze the local and global impact of business solutions on individuals, organizations and society. Find and access Social and Environmental issues for local and global needs and give relevant solutions for them.

Program Educational Objectives

MCA students will be able:

1. To prepare our MCA students as successful professionals ready for Industry, Government sectors, Academia, Research, Entrepreneurial Pursuit and Consultancy firms by acquiring in-depth knowledge of fundamental concepts in Mathematical and Programming skills for holistic development.
2. Contribute to research of their chosen field and function and communicate effectively to perform both individually and in a multi-disciplinary team by applying current tools, technologies and research to create systems for solving industry oriented problems.
3. Exhibit professionalism, effective work ethics, effective communication skills, team work in their profession and be able to adapt current trends by engaging in life-long learning through professional activities to admit themselves as high ethical, professional standards and responsible citizens with social commitments.
4. Analyze real life problems, design and develop computing systems appropriate to its solutions to problems across a broad range of application domains that are technically sound, economically feasible and socially acceptable

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Programme Specific Objectives

1) Ability to understand, analyze, design, develop and maintain the software application with latest technologies in the areas allied to Algorithms, System Software, Multimedia, Web Design and Big Data Analytics to deliver a quality product for business success..

2) Utilizeskillsandknowledgeforcomputingpracticewithcommitmentonsocial,ethical, cyber and legal values. And also communicate in both oral and written forms, demonstrating the practice of professional ethics and the concerns for social welfare.

3) Ability to pursue careers in IT industry/ consultancy/ research and development, teaching and allied areas related to Computer Science.

Mapping of PEOs with PSO and PSOs:

Program Educational Objectives	Programme Outcomes										PSOs			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	2	2	1	1	1	1	1	1	1	3	3	2	1.7
2	2	2	3	2	1	1	1	1	1	2	3	2	2	1.8
3	1	2	1	3	2	1	1	2	2	2	1	1	1	1.5
4	1	1	1	1	1	3	3	2	2	1	2	1	2	1.6
Total	1.8	1.8	1.8	1.8	1.3	1.5	1.5	1.5	1.5	1.5	2.3	2.3	2.3	2.2

Note the mean value is 2.2 i.e 73% will be accepted

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

MASTER OF COMPUTER APPLICATIONS
COURSE STRUCTURE

I SEMESTER

S. No.	Sub. Code	Subject Title	Category	Hours	Credits	Internal	External	Total Marks
1	21MCAC11	Mathematical Foundation for Computer Applications	FC	4	3	25	75	100
2	21MCAC12	Problem Solving through C and C++	FC	4	3	25	75	100
3	21MCAC13	Digital Principles and Computer Organization	PC	4	3	25	75	100
4	21MCAC14	Data Structures	PC	4	3	25	75	100
5	21MCAC15	Relational Database Management System	PC	4	3	25	75	100
6	21MCAP11	Data Structure Using C& C++ - **Lab**	PC	4	3	40	60	100
7	21MCAP12	RDBMS - **Lab**	PC	4	3	40	60	100
8	21MCAP13	Professional Communication - **Lab**	EEC	2	2	40	60	100
9		Self-paced Learning(NPTEL/SWAYAM)	EEC	0	2	25	75	100
		Bridge course*						
		TOTAL		**30**	**25**			**900**

***Bridge course is a non-credit course introduced to the students who admits into MCA programme from non-computer science background.**

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II SEMESTER

S. No.	Sub. Code	Subject Title	Category	Hours	Credits	Internal	External	Total Marks
1	21MCAC21	Java Programming	PC	5	4	25	75	100
2	21MCAC22	Algorithm Analysis	PC	3	3	25	75	100
3	21MCAC23	Operating System	PC	3	3	25	75	100
4	21MCAC24	Data Communications and Networking	PC	3	3	25	75	100
5	21MCAC25	Research Methodology and IPR	PC	2	2	25	75	100
6	21MCAE21 21MCAE22 21MCAE23 21MCAE24	Cloud Computing Soft Computing Financial Management Accounting Optimization Techniques	PE	4	4	25	75	100
7	21MCAP21	Java Programming - **Lab**	PC	4	3	40	60	100
8	21MCAP22	Algorithm Analysis Using C++ **Lab**	PC	4	3	40	60	100
9	21MCAP23	Linux Shell Programming - **Lab**	PC	2	2	40	60	100
10		Self-paced Learning (NPTEL/SWAYAM)	EEC	0	2	25	75	100
		TOTAL		**30**	**29**			**1000**

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III SEMESTER

S. No.	Sub. Code	Subject Title	Category	Hours	Credits	Int.	Ext.	Total
1		Software Engineering	PC	4	3	25	75	100
2		Big data Analytics	PC	4	3	25	75	100
3		Web Programming	PC	4	3	25	75	100
4		**NME**: Enterprise Resource Planning	PC	4	3	25	75	100
5		Cyber Security Artificial Intelligence Human Resource Management Graph Theory	PE	4	4	25	75	100
6		Data Analytics using R - **Lab**	PC	4	3	40	60	100
7		Web Programming - **Lab**	PC	2	2	40	60	100
8		Python Programming - **Lab**	PC	2	2	40	60	100
9		Mini Project using .Net	EEC	2	2	40	60	100
10		Value Added Course (.NET)		-	-	-	-	-
		TOTAL		**30**	**25**			**900**

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IV SEMESTER

S. No.	Sub. Code	Subject Title	Category	Hours	Credits	Int.	Ext.	Total
1		Internet of Things	PC	4	3	25	75	100
2		Machine Learning Digital Image Processing Digital Marketing Topology	PE	4	4	25	75	100
3		Project	EEC	22	12	40	60	100
4		**TOTAL**		**30**	**19**			**300**

a) Contact hours and credits for each semester

Semester	Hours	Int	Ext	Tot	Credit
1	**30**	**270**	**630**	**900**	**25**
2	**30**	**295**	**705**	**1000**	**29**
3	**30**	**285**	**615**	**900**	**25**
4	**30**	**90**	**210**	**300**	**19**
Total	**120**	**940**	**2160**	**3100**	**98**

b) Credit Distribution

S. No.	Category of Courses	Credits	% of Credits to Total Credits
1	Foundation courses	**6**	**6.12**
2	Professional Core - Theory	**39**	**39.80**
3	Professional Core – Practical	**21**	**21.43**
4	Professional Electives	**12**	**12.24**
5	Self- paced Learning	**4**	**4.08**
6	Employability Enhancement courses	**16**	**16.33**
Total Credits		**98**	**100**

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I SEMESTER

S. No.	Sub. Code	Subject Title	Category	Hours	Credits	Internal	External	Total Marks
1	21MCAC11	Mathematical Foundation for Computer Applications	FC	4	3	25	75	100
2	21MCAC12	Problem Solving through C and C++	FC	4	3	25	75	100
3	21MCAC13	Digital Principles and Computer Organization	PC	4	3	25	75	100
4	21MCAC14	Data Structures	PC	4	3	25	75	100
5	21MCAC15	Relational Database Management System	PC	4	3	25	75	100
6	21MCAP11	Data Structure Using C& C++ - **Lab**	PC	4	3	40	60	100
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		Bridge course*						
		TOTAL		**30**	**25**			**900**

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Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	I	Theory	03	04	0	0	60
Course Code		**Course Title**				**Prerequisites**	
21MCAC11		**Mathematical Foundation for Computer Applications**				Mathematical exposure	

COURSEOBJECTIVES:

To provide mathematical background and sufficient experience on various topics of discrete mathematics like statistics, mathematical logic, relations and functions, formal languages and finite state automata.

To extend student's Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in Computer Applications courses and application of ideas to solve practical problems.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. implement statistical measures and explore its applications
2. understand the logical operations and predicate calculus needed for computing skill
3. basic knowledge of functions and relations concepts needed for designing and solving problems.
4. apply the acquired knowledge of formal languages to the engineering areas like Compiler
5. design the finite automata theory and to design discrete problems to solve by computers.

MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

UNIT - I

Set Theory: Introduction – Sets – Subsets- Venn Diagram – Operations – Properties – Duality. Relations: Cartesian Product – Relations – Operations – Equivalence Relations – Closer and Warshall's Algorithm.

UNIT - II

Mathematical Logic: Introduction - TF Statements – Connectives – Atomic and Compound Statements – Well Formed Formulae – Truth Tables – Tautology – Tautological Implications and Equivalence of Formulas – Replacements Processes – Normal Forms – Principal Normal Forms.

UNIT - III

Lattices and Boolean Algebra: Lattices – Properties – New Lattices – Modular and Distributive Lattices- Boolean Algebra – Boolean Polynomials- K – Map.

UNIT - IV

Automata Languages and Computations: Introduction – Finite Automata – Definition – Representation – Acceptability of a String – Language accepted by FA- Non –Deterministic FA- Acceptability of a string by NFA- Equivalence of FA and NFA –Properties of Regular sets.

UNIT - V

Finite State Machines – The Monoid of a Finite State Machine –Chomsky Hierarchy of Languages – Finite Automata and Regular Languages –Derivation Trees for CFG-Normal Forms for CFG – Ambiguity, Parsing and Polish Notation.

TEXT BOOK:

1. Discrete Mathematics by Dr. M.K. Venkataraman, Dr .N. Sridharan, N. Chandrasekaran, The National Publishing Company.

REFERENCES:

1. David Makinson, "Sets, Logic and Maths for Computing", Springer Indian Reprint,2017.
2. Hopcroft J . E and Ullman,J.D, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi,20015.
3. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", Tata McGraw Hill, 4 th Edition, 2016.
4. Trembley, J.P. and Manohar, R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, New Delhi, 2017.

Passed in the BOS Meeting held on 10-03-2021

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	M	W	W	M	S	M	S	S	W	S	W
CO2	S	S	W	M	W	S	W	M	M	W	M	W	M
CO3	S	S	S	W	M	M	M	W	S	M	S	S	S
CO4	S	S	S	W	M	S	W	M	S	W	M	W	M
CO5	S	S	S	W	W	M	W	S	M	W	M	W	M

CO	Program Outcomes										Program Specific Outcome			Mean
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	
1	3	3	2	1	1	2	3	2	3	3	1	3	1	2.2
2	3	3	2	2	1	3	1	2	2	1	2	1	2	1.9
3	3	3	3	1	2	2	2	1	3	2	3	3	3	2.4
4	3	3	3	1	2	3	1	2	3	1	2	1	2	2.1
5	3	3	3	1	1	2	1	3	2	1	2	1	2	1.9
TOTAL														2.1

Result: The score for this course is 2.1 i.e 70% is correlated

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SYLLABUS (Under CBCS based on OBE)

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Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	I	Theory	03	04	0	0	60
Course Code		**Course Title**				**Pre-requisites**	
21MCAC12		**Problem Solving through C& C++**				Mathematical and Programming knowledge	

COURSE OBJECTIVE:

To impart programming skills to students and make them understand the concept of problem-solving using C and C++.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. understand the use of structured program development in C as applied to both large software systems and to small programming projects.
2. implement the concept of operators and control structures.
3. understand the use of arrays, functions, structures, unions and pointers.
4. developing skill of object-oriented programming concept.
5. gain the knowledge regarding File concepts in C++Programming.

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PROBLEM SOLVING THROUGH C& C++

Unit 1: Overview of C: History – Basic Structure of C Program – Constants – Variables – Data types – Overflow and Underflow of data. **Operators and Expression:** Arithmetic- Relational- Logical - Assignment - Increment and decrement – Conditional – Bitwise - Special Operators – Arithmetic Expression – Evaluation of expressions – Precedence of Arithmetic Operators- Type Conversion in Expression – Operators Precedence and associatively. **Managing I/O Operations:** Reading and Writing a character formatted input, output.

Unit 2: Decision making and Branching: if Statement- if …..else Statement- nesting of if ---- else Statement – Else if ladder – Switch Statement – The ?: Operator – goto Statement- the while Statement – The do Statement – The for Statement – jumps in loops. **Arrays:** Introduction – One Dimensional Array – Declaration – Initialization – Two Dimensional – Multi Dimensional array- Dynamic arrays. **Strings:** Declaration – Initialization – reading and writing of String – Arithmetic Operation on Strings – Putting Strings together – Comparison- String Handling Function – Table of Strings – Feature of Strings.

Unit 3:User defined Functions: Need- Function Definition – Function Calls- Category's of function call. **Structures and Unions:** Definition – Declaration - Access – Initialization – Copying and comparing – Operations – Unions. **Pointers:** Declarations – Initialization – Accesses – Chain of Pointers – Pointers Expressions – Pointer Increment and Scale factor pointers and Arrays- Pointers Character Strings – Array of Pointers – Pointers and Structures.

Unit 4: Principles of Object Oriented Programming: Basic concepts – Benefits of OOP – Applications of OOP – A simple C++ program – Structure of C++ program – Creating, compiling and linking. **Tokens, Expressions and Control structures -** Token – keyword – identifier and Constant – data type – type compatibility – operators – manipulators**. Classes and Objects**– specifying class – defining member functions – making an outside function inline – nesting of member function – **Constructors and Destructors** – Introduction – constructors – types of constructor - destructor.

Unit 5: Inheritance - introduction – single inheritance – multilevel inheritance – multiple inheritance – hierarchical inheritance – hybrid inheritance – **Virtual Function** – this pointer – virtual function – **Files -** Introduction – classes for file stream operations – opening and closing a file – file pointers and their manipulations – error handling during file operations – command line argument.

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TEXT BOOKS:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 2012
2. E. Balagurusamy, "Object-Oriented Programming with C++", Tata McGraw Hill, 2012

REFERENCE BOOKS:

1. Byron Gottfried S, Jitender Kumar Chhabra, Programming with C, Schaum's Outline Series, TMH, New Delhi, 2011.
2. Ravichandran, Programming in C, Tata McGraw Hill, NewDelhi.
3. Gary Bronson, the First Book of ANSI C: Fundamentals of C Programming, 2nd edition West PublishingCompany.
4. Let US C by Yashavant P. Kanetkar, 10thEdition
5. Brian W Kernighan & Dennis Ritchie, "The C programming language", 2nd Edition, Prentice Hall,2015
6. Darnell and Margolis, "ANSI C- A Systematic programming Approach", Narosa publications,2010.
7. Ravi Sethi, Viswanatha. K.V "Programming Languages – Concepts & Constructs" , Pearson Education, Second Edition,2007

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	M	S	S	M	M	W	W	M	S	S	M
CO2	S	S	M	S	S	M	W	W	W	W	S	M	M
CO3	S	S	S	S	S	S	W	M	W	M	S	S	M
CO4	S	S	S	S	S	S	W	W	M	W	S	M	M
CO5	S	S	S	S	S	S	M	W	M	W	S	S	M

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	3	2	3	3	2	2	1	1	2	3	3	2	2.3
2	3	3	2	3	3	2	1	1	1	1	3	2	2	2.1
3	3	3	3	3	3	3	1	2	1	2	3	3	2	2.5
4	3	3	3	3	3	3	1	1	2	1	3	2	2	2.3
5	3	3	3	3	3	3	2	1	2	1	3	3	2	2.5
TOTAL														2.34

Result: The score for this course is 2.34 i.e 78% is correlated

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Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	I	Theory	03	04	0	0	60

Course Code	Course Title	Prerequisites
21MCAC13	Digital Principles and Computer Organization	Digital electronics exposure

COURSEOBJECTIVE:

To gather some exposure regarding computer organization and its architecture.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. gain knowledge about logical circuits and number system.
2. understand the basics of computer architecture.
3. construct an instruction set capable of performing a specified set of operations. demonstrate a memory system for a given set of specifications.
4. explain pipelining concepts.
5. compare the different ways of communicating with I/O devices and standard I/Interfaces.

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DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION

UNIT - I

Digital Computers and Digital Systems – Binary Numbers – Number Base conversion – Octal and Hexadecimal numbers – Binary addition and subtraction. **Boolean Algebra and Logic Gates:** Basic definitions – Axiomatic definition of Boolean Algebra – Basic theorems and properties of Boolean Algebra – Boolean functions –Canonical and standard forms – Other logic operations – Digital logic gates – Basic gates and Universal gates.

UNIT - II

Simplification of Boolean Function: The Karnough map method – Two and Three variable maps - Four variable maps - Five and Six variable maps - Don't-care conditions- Adders – Subtractors. **Combinational logic:** Decoders – Multiplexers. **Sequential Logic:** Introduction - Flip-Flops.

UNIT - III

Functional Units: Basic operational concepts, Bus structures, Machine instructions, memory locations, addressing modes, assembly language.

UNIT - IV

Processing Unit: Concepts, Execution of complete instruction, Multi bus organization, ALU; Control Unit: Hardwired Control, Micro programmed Control; Micro Instructions, Micro program sequencing, Micro instructions with next address field and pre-fetching.

UNIT - V

Memory: RAM, ROM, Cache Memories, and Virtual memory; Input and output organization: Accessing I/O devices, Interrupts, DMA, and Interface circuits. **Advanced Processor Architecture:** RISC, Pipelining, Super Scalar Processors, VLIW, Parallel and Vector Processors.

TEXT BOOKS:

1. M.Morris Mano, ***Digital Logic and Computer Design,*** Pearson Prentice Hall, Thirteenth Impression, 2011.
2. Carl Hamacher, ZvonkoVranesic, safwatZaky, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2011.

REFERENCE BOOKS:

1. William Stallings, "Computer Organization and Architecture", Tenth Edition, Pearson Education,2015.
2. David A. Patterson, John L.Hennessy, "Computer Organization and Design", Fourth Edition, Morgan Kauffmann Publishers,2011.

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	M	W	S	W	M	S	M	M	S	S	M	M	S
CO2	M	W	S	W	M	S	M	M	S	M	M	M	S
CO3	M	W	S	W	M	S	M	M	S	M	M	M	S
CO4	M	M	S	W	M	S	W	W	S	M	M	M	S
CO5	M	M	S	W	W	S	W	W	S	S	M	M	S

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	2	1	3	1	2	3	2	2	3	3	2	2	3	2.2
2	2	1	3	1	2	3	2	2	3	2	2	2	3	2.2
3	2	1	3	1	2	3	2	2	3	2	2	2	3	2.2
4	2	2	3	1	2	3	1	1	3	2	2	2	3	2.1
5	2	2	3	1	1	3	1	1	3	3	2	2	3	2.1
TOTAL														1.8

Result: The score for this course is 1.8 i.e 60% is correlated

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	I	Theory	03	04	0	0	60
Course Code		**Course Title**				**Pre-requisites**	
21MCAC14		**Data Structures**				Mathematical exposure	

COURSE OBJECTIVE:

To impart some data structure- oriented exposure.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. understand abstract data types such as arrays, structures, strings and polynomials.
2. understand the concepts regarding the dynamic memory allocation
3. implement various ADTs such as STACK, QUEUE, LIST and Tree.
4. implement various searching and sorting algorithms.
5. implement efficient linear and non-linear data structures.

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DATA STRUCTURES

UNIT - I

Introductions and Overview: Definitions – Concept of Data Structure – Overview of Data Structure – Implementation of Data Structures. **Arrays:** Definition – Terminology – One Dimensional Array – Multidimensional Array – Pointer Array.

Linked List: Definition – Single Linked List – Circular Linked List – Double Linked List – Circular Double Linked List – Application of Linked List – Memory Representation – Boundary Tag System – De allocation Strategy – Buddy System – Compaction.

UNIT - II

Stacks: Introduction – Definition – Representation of Stack – Operation of Stacks – Applications of Stack.

Queue: Introduction – Definition – Representation of Queue – Various Queue Structure – Applications of Queue.

UNIT - III

Trees: Basic Terminology – Definition and Concepts – Representation of Binary Tree – Operation of Binary Tree – Types of Binary Tree.

UNIT - IV

Graphs**:** Introduction – Graph Terminologies – Representation of Graphs – Operation on Graphs – Application of Graph Structures – BDD and its Application**.**

UNIT - V

Tables: Rectangular Tables – Jagged Tables – Inverted Tables – Hash Tables. Sets: Definition and Terminologies – Representation of Sets – Operation of Sets – Application of Sets.

TEXT BOOK:

Classic Data Structure – D Samantha, PHI, 2008

Passed in the BOS Meeting held on 10-03-2021

REFERENCES:

1. Data Structure and Problem Solving Using C++, 2/E, Allen Weiss, Addison Wesley Longman Publishing company 2006
2. LipschutzSchaum's, "Data Structure", Outline Series, MH
3. Data Structures with C++: Schaum's Outlines by Hubbard JohnBressard,

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	M	M	S	S	M	M	M	S	M	M	S	M
CO2	S	M	M	S	M	M	S	S	M	M	W	M	W
CO3	S	M	M	S	M	S	S	M	S	M	W	W	S
CO4	S	M	M	S	M	M	M	M	M	M	W	W	W
CO5	S	S	S	S	S	M	S	M	M	M	W	W	S

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	2	2	3	3	2	2	2	3	2	2	3	2	2.4
2	3	2	2	3	2	2	3	3	2	2	1	2	1	2.2
3	3	2	2	3	2	3	3	2	3	2	1	1	3	2.3
4	3	2	2	3	2	2	2	2	2	2	1	1	1	1.9
5	3	3	3	3	3	2	3	2	2	2	1	1	3	2.4
TOTAL														2.24

Result: The score for this course is 2.24 i.e 75% is correlated

Passed in the BOS Meeting held on 10-03-2021

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	I	Theory	03	04	0	0	60
Course Code		**Course Title**				**Pre-requisites**	
21MCAC15		**Relational Database Management System**				DBMS Concepts	

COURSE OBJECTIVE:

To gather knowledge regarding RDBMS and to implement for some suitable applications

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. understand the modern data management issues, advantages of RDBMS over conventional file handling
2. analyze the concepts of data models and modeling notations, use of SQL, algebraic expressions/ operations on relational database.
3. handle the RDB, extraction / evaluation of DB using SQL using tuple relations and calculus and understand the No SQL concepts.
4. exposed to entity-relation model, design of schema.
5. justify the need of normalization, normalize the RDB up to BCNF

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RELATIONAL DATABASE MANAGEMENT SYSTEM

UNIT 1 – Introduction

Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database Users and Administrators, History of Database Systems. Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

UNIT 2 – Introduction to SQL

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

UNIT 3 - Advanced SQL

Accessing SQL From a Programming Language, Functions and Procedures, Triggers, Recursive Queries, Advanced Aggregation Features, OLAP. Formal Relational Query Languages: The Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus. **No SQL Databases:** Introduction – Types of NoSQL – Need of NoSQL Databases – Use Cases.

UNIT 4-Database Design and the E-R Model

Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity- Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design.

UNIT 5 – Relational Database Design

Features of Good Relational Design, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional Dependency Theory, Algorithm for Decomposition, Decomposition Using Multi valued Dependencies, More Normal Forms, Database-Design Process, Modeling Temporal Data.

TEXT BOOKS:

1. "Database System Concepts", A.Silberschatz, Henry.F.Korth, S.Sudharshan, 6thEdition.
2. "Database Systems", RamezElmasri, Shamkant.B.Navathe, 6thEdition.

REFERENCE BOOKS:

1. "Database Management Systems", Raghu Ramakrishnan and J Gehrke 3rdEdition
2. "An Introduction to Database System" C.J.Date , AKannan, S..Swamynathan 8thEdition

CO to PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	W	S	W	M	M	S	M	M
CO2	S	S	M	S	M	W	M	W	M	M	M	S	W
CO3	S	S	S	S	M	W	M	W	W	M	M	S	M
CO4	S	M	M	M	W	W	W	W	W	M	M	W	M
CO5	S	W	M	S	W	W	M	M	M	W	W	W	W

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	3	3	3	2	1	3	1	2	2	3	2	2	2.3
2	3	3	2	3	2	1	2	1	2	2	2	3	1	2.1
3	3	3	3	3	2	1	2	1	1	1	2	3	2	2.1
4	3	2	2	2	1	1	1	1	1	1	2	1	2	1.6
5	3	1	2	3	1	1	2	2	2	2	1	1	1	1.7
Overall mean square for COs														**1.96**

Result: The score for this course is 1.96 i.e 65.6% is correlated

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	I	Lab	03	00	04	00	60
Course Code		**Course Title**				**Prerequisites**	
21MCAP11		**Data Structure Using C & C++ - Lab**				Knowledge in DS and programming.	

COURSE OBJECTIVE:

To Understand Programming Languages.

To familiarize with C Programming

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. implement C and C++ programming aspects.
2. understand the importance of abstract data type, arrays and string as ADT.
3. understand the linked implementation, and its uses both in linear and non-linear data structure.
4. implement various data structure such as stacks, queues, trees, etc. to solve various computing problems.
5. implement various kinds of searching and sorting techniques and know when to choose which technique.

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List of Programs

1. To demonstrate the usage of data types and operators using C.
2. To learn about control statements using C.
3. To learn about arrays and string using C.
4. To demonstrate OOPs concept (class, inheritance, polymorphism) using C++.

Write the following data structure program using C/C++

1. To check the presence of an element in an array using binary search.
2. To find the transpose of a non-square matrix.
3. To find the row sum and column sum of a non-square matrix
4. To do any five string operations
5. To manipulate a stack using array data structure.
6. To balance the parenthesis in an expression
7. To manipulate a queue using array data structure
8. Using structures prepare an address book
9. To do inventory control using file
10. To prepare student mark list using file
11. To manipulate a linked list
12. To manipulate a circularly linked list
13. To traverse a binary tree
14. To search an identifier in a binary search tree.

TEXT BOOKS:

1. Programming in ANSI C, Third Edition, E. Balaguruswamy. 6th Edition(2013).
2. Data Structures Using C and C++ by Aaron.M. Tenenbaum, YedidyahLangsam and Moshe J. Augustine, PHI, Edition,2011.

REFERENCE BOOKS:

1. Data structures, Algorithms and Applications in C++, S. Sahani, University Press (India) Pvt Ltd, 2nd Edition.
2. The complete reference C, Herbert Schildt, Fifth Edition, Tata McGrawHill.

Passed in the BOS Meeting held on 10-03-2021

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	M	M	M	S	M	M	S	M
CO2	S	M	M	S	M	M	S	M	M	M	W	M	S
CO3	S	M	M	S	M	S	S	M	S	M	W	W	W
CO4	S	M	M	S	M	M	M	M	M	M	W	W	M
CO5	S	S	S	S	M	M	S	M	M	M	W	W	M

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	
1	3	3	3	3	2	2	2	2	3	2	2	3	2	2.5
2	3	2	2	3	2	2	3	2	2	2	1	2	3	2.2
3	3	2	2	3	2	3	3	2	3	2	1	1	1	2.2
4	3	2	2	3	2	2	2	2	2	2	1	1	2	2.0
5	3	3	3	3	2	2	3	2	2	2	1	1	2	2.2
TOTAL														2.2

Result: The score for this course is 2.2 i.e 74% is correlated

Passed in the BOS Meeting held on 10-03-2021

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	I	Lab	03	00	04	0	60
Course Code		**Course Title**				**Pre-requisites**	
21MCAP12		**Relational Database Management System Lab**				DBMS Concepts	

COURSE OBJECTIVE:

To get practical exposure in various queries and the concepts related to relational database system.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. analyse the concepts of data models and modeling notations
2. use of SQL, algebraic expressions/ operations on relational database
3. introduce the concepts of transactions and transaction processing
4. design the queries to handle all the basic and advanced operations on RDBMS
5. design of applications which handles the operations involved in RDBMS

Passed in the BOS Meeting held on 10-03-2021

List of Programs

1. Consider the following relations:

Student (snum: integer, sname: string, major: string, level: string, age: integer) Class (name: string, meets at: string, room: string, d: integer)

Enrolled (snum: integer, cname: string)

Faculty (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, enrolled has one record per student class pair such that the student is enrolled in the class. Level is a two-character code with 4 different values (example: Junior: JRetc)

Write the following queries in SQL. No duplicates should be printed in any of the answers.

Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof.XYZ

Find the names of all classes that either meet in room R128 or have five or more Students enrolled.

Find the names of all students who are enrolled in two classes that meet at the same time.

Find the names of faculty members who teach in every room in which some class is taught.

Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

2. The following relations keep track of airline flightinformation:

Flights (no: int, from: string, to: string, distance: int, Departs: time, arrives: time, price:real)

Aircraft (aid: integer, fname: string, cruising range: integer)

Certified (eid: integer, aid: integer)

Employees (eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; certified for some aircraft, and only pilots are certified to fly.

Write each of the following queries in SQL.

Find the names of aircraft such that all pilots certified

Find the names of aircraft such that all pilots certified to operate have salaries more than Rs.80, 000.

For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising range of the aircraft for which she or he is certified.

Find the names of pilots whose salary is less than the price of the cheapest routefrom Bengaluru to Frankfurt

For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
Find the names of pilots certified for some Boeing aircraft.

Find the aids of all aircraft that can be used on routes from Bengaluru to NewDelhi.

3. **Consider the following database of student enrollment in courses & books adopted for each course.**

   STUDENT (regno: string, name: string, major: string,bdate:date)
   COURSE (course:int, cname:string, dept:string)
   ENROLL (regno:string, course:int, sem:int, marks:int)
   BOOK _ ADOPTION (course:int, sem:int, book-ISBN:int)

   TEXT (book-ISBN:int, book-title:string, publisher:string, author:string)

   - Create the above tables by properly specifying the primary keys and the foreign keys.
   - Enter at least five tuples for each relation.
   - Demonstrate how you add a new text book to the database and make this book be adopted by some Department.
   - Produce a list of text books (include Course #, Book-ISBN, Book-title) in the alphabetical order for Courses offered by the 'CS' department that use more than two books.
   - List any department that has all its adopted books published by a specific publisher.
   - Generate suitable reports. Create suitable front end for querying and displaying the results.

4. **The following tables are maintained by a book dealer.** AUTHOR (author-id:int,name:string, city:string,country:string)
   PUBLISHER (publisher-id:int, name:string, city:string, country:string)

   CATALOG (book-id:int, title:string, author-id:int, publisher-id:int, category-id:int, year:int, price:int) CATEGORY (category-id:int, description:string)
   ORDER-DETAILS (order-no:int, book-id:int, quantity:int)

   - Create the above tables by properly specifying the primary keys and the foreign

keys.

- Enter at least five tuples for each relation.
- Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after2000.
- Find the author of the book which has maximum sales.
- Demonstrate how you increase the price of books published by a specific publisher by10%. Generate suitable reports.
- Create suitable front end for querying and displaying the results.

5. Consider the following database for a banking enterprise

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

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

TEXT BOOKS:

1. "Database System Concepts", A. Silberschatz, Henry. F. Korth, S. Sudharshan, 6thEdition.
2. "Database Systems", Ramez Elmasri, Shamkant. B. Navathe, 6thEdition.

REFERENCE BOOKS:

1. "Database Management Systems", Raghu Ramakrishnan and J Gehrke 3rdEdition
2. "An Introduction to Database System" C.J.Date , AKannan, S..Swamynathan 8thEdition

CO to PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	W	S	W	M	M	M	M	M
CO2	S	S	M	S	M	W	M	W	M	M	M	M	M
CO3	S	S	S	S	M	W	M	W	M	M	W	W	W
CO4	S	M	M	M	W	W	W	W	W	M	W	W	W
CO5	S	W	M	S	W	W	M	M	M	W	M	M	W

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	
1	3	3	3	3	2	1	3	1	2	2	2	2	2	2.2
2	3	3	2	3	2	1	2	1	2	2	2	2	2	2.1
3	3	3	3	3	2	1	2	1	2	2	1	1	1	1.9
4	3	2	2	2	1	1	1	1	1	2	1	1	1	1.5
5	3	1	2	3	1	1	2	2	2	1	2	2	1	1.8
Overall mean square for COs														**1.9**

Result: The score for this course is 1.95 i.e 65% is correlated

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

688

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	I	Lab	02	00	02	0	30
Course Code		**Course Title**				**Pre-requisites**	
21MCAP13		**Professional Communication - Lab**				Language Skill	

COURSE OBJECTIVE:

- To provide opportunities to learners to practice their communicative skills to make them become proficient users of English by fine-tuning their linguistic skill with the help of technology.
- To enhance the learners at placement interviews and group discussions.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

1. develop the ability to work as a team member as an integral activity in the workplace.
2. increase confidence in their ability to read, comprehend, organize, and retain written information. Improve reading fluency.
3. write coherent speech outlines that demonstrate their ability to use organizational formats with a specific purpose.
4. deliver effective speeches that are consistent with and appropriate for the audience and purpose.
5. develop proper listening skills; articulate and enunciate words and sentences clearly and efficiently.

Passed in the BOS Meeting held on 10-03-2021

PROFESSIONAL COMMUNICATION -LAB

1. Group Discussion: participating in group discussions- understanding group dynamics.
2. GD strategies-activities to improve GD skills. Practical based on Accurate and Current Grammatical Patterns.

   Interview Etiquette-dress code, body language attending job interview – Telephone/Skype interview one to one interview &Panel interview.
3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistic/ Kinesics, practicing word stress, rhythm in sentences, weak forms, intonation.
4. Oral Presentation Skills for Technical Paper/Project Reports/ Professional Reports based on proper Stress and Intonation Mechanics voice modulation, Audience Awareness, Presentation plan visual aids.
5. Speaking: Fluency & Accuracy in speech- positive thinking, Improving Self-expression Developing persuasive speaking skills, pronunciation practice (for accept neutralization) particularly of problem sounds, in isolated words as well as sentences.
6. Individual Speech Delivery/Conferences with skills to defend Interjections/Quizzes.
7. Argumentative Skills/Role Play Presentation with Stress and Intonation.
8. Comprehension Skills based on Reading and Listening Practical's on a model Audio-Visual Usage.

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	S	M	W	M	M	S	W	S
CO2	S	S	S	S	M	S	M	W	S	M	S	W	S
CO3	S	S	S	S	W	M	M	W	S	W	S	M	S
CO4	S	S	S	S	W	M	M	W	M	W	S	M	S
CO5	S	S	S	S	W	M	M	W	M	M	S	M	S

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	
1	3	3	3	3	2	3	2	1	2	2	3	1	3	2.4
2	3	3	3	3	2	3	2	1	3	2	3	1	3	2.5
3	3	3	3	3	1	2	2	1	3	1	3	2	3	2.3
4	3	3	3	3	1	2	2	1	2	1	3	2	3	2.2
5	3	3	3	3	1	2	2	1	2	2	3	2	3	2.3
TOTAL														2.34

Result: The score for this course is 2.34 i.e 79% is correlated

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

II SEMESTER

S. No.	Sub. Code	Subject Title	Category	Hours	Credits	Internal	External	Total Marks
1	21MCAC21	Java Programming	PC	5	4	25	75	100
2	21MCAC22	Algorithm Analysis	PC	3	3	25	75	100
3	21MCAC23	Operating System	PC	3	3	25	75	100
4	21MCAC24	Data Communication and Network	PC	3	3	25	75	100
5	21MCAC25	Research Methodology and IPR	PC	2	2	25	75	100
6	21MCAE21 21MCAE22 21MCAE23 21MCAE24	Cloud Computing Soft Computing Financial Management Accounting Optimization Techniques	PE	4	4	25	75	100
7	21MCAP21	Java Programming - **Lab**	PC	4	3	40	60	100
8	21MCAP22	Algorithm Analysis Using C++ **Lab**	PC	4	3	40	60	100
9	21MCAP23	Linux Shell Programming - **Lab**	PC	2	2	40	60	100
10		Self-paced Learning (NPTEL/SWAYAM)	EEC	0	2	25	75	100
		TOTAL		**30**	**29**			**1000**

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SOURASHTRA COLLEGE, MADURAI– 625004

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MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

692

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	04	05	0	0	60
Course Code		**Course Title**				**Prerequisites**	
21MCAC21		**Java Programming**				OOPS Concepts	

COURSE OBJECTIVE:

- To understand the fundamentals of JAVA.
- To learn about OOPS Concepts, Packages, Interfaces, Multithreading, Applets, Servlets, Swing and GUI Components, JDBC and RMI.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

1. understand the concepts about creation of Class and objects.
2. develop Java Programs with exception handling
3. design and implement the concepts of Multithread and multitasking.
4. get an awareness about creation of Windows using Swing
5. understand the concept of JDBC, RMI and Servlets.

Passed in the BOS Meeting held on 10-03-2021

JAVA PROGRAMMING

UNIT I

Introduction – literals, data types and variables – structure of a java program – operators – control statements - arrays– strings. **Classes** – defining a class – the new operator and objects – the dot operator – method declaration and calling – constructors – Instance variable hiding – this in constructor – method overloading – passing objects as parameters to methods –inheritance- creating subclasses – method overriding – final class – final method – final variables – recursion – static methods, block and variables – abstract classes.

UNIT II

Packages and **Interfaces**– wrapper classes. **Exceptions** – types of exceptions – catching exceptions – creating our own exceptions – the finally block. **Input and output classes** – I/O streams – The File class – Byte stream – Disk file handling – Memory handling – Filtered Byte streams – Sequence Input stream – Object Output stream – Object Input stream – Random access file – Character stream.

UNIT III

Threads – multitasking – creating a thread – states of thread – multithreaded programming – thread priorities – controlling the threads – synchronizing methods – Inter- thread communication. **Applet** – applet basics – methods of Building an Applet – general methods of applet – Embedding applet information – the HTML Applet tag – Reading parameters into applet – Multimedia in Applet - **Event handling** – Events – Event listeners - example programs.

UNIT IV

Swing and GUI components – The origin of swing – Swing features - creating windows in swing– Jbutton – Jlabel – JcheckBox – JradioButton – Jlist – JscrollBar – JtextField – JpasswordField – JtextArea – JcomboBox – JmenuItem, Jmenu, JMenuBar – Jdialog – JoptionPane – Jfilechooser – Layout Managers - **Networking** – InetAddress – Socket Programming – Datagram – URL.

UNIT V

JDBC & RMI – Types of JDBC Drivers – The connectivity model –Navigation – Data manipulation.RMI Architecture – A simple server client applications using RMI. **Servlet &JSP** - Background – Life cycle of servlet – Servlet API – Get and Post request – Accessing a servlet using HTML page. JSP Basics – Architecture – Life cycle of JSP Model – JSP objects – Working with databases.

Passed in the BOS Meeting held on 10-03-2021

TEXT BOOKS:

1. Java Complete Reference Schildt Herbert, TMH.
2. Java How to Program by Paul Deitel& Harvey Deitel, VI-Edn,2011.
3. Programming in JAVA2 by Dr. K. Somasundaram, JAICO Publishing House,2005.

REFERENCE BOOKS:

1. Ken Arnold and James gosling, the java programming language, Addison Wesley, II-Edition.
2. J.P. Mueller, active x from the ground up, Tata McGrawhill.
3. Herley Hahn, the internet-complete reference, Tata McGrawHill.
4. D.E. Comer and D.L. Stevens, Internetworking with TCP/IP-Vol 1, Prentice hall of India, II- Ed.
5. Michael Morrison et al., Java 1.1 Unleashed, Techmedia, New Delhi, III-Edn.
6. J.McCoy, Mastering Web Design, BPB Publications, New Delhi.
7. Stephen R. Schach, Software Engineering with java, Tata McGrawHill.

Recommended Learning Material:

1. www.javatpoint.com
2. www.oracle.com
3.www.tutorialspoint.com
4.www.geeksforgeeks.org/java

Recommended Certification:

1. OCA- Oracle Certified Associate
2. OCP- Oracle Certified Professional

Passed in the BOS Meeting held on 10-03-2021

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	S	M	W	M	M	S	W	S
CO2	S	S	S	S	M	S	M	W	S	M	S	W	S
CO3	S	S	S	S	W	M	M	W	S	W	S	M	S
CO4	S	S	S	S	W	M	M	W	M	W	S	M	S
CO5	S	S	S	S	W	M	M	W	M	M	S	M	S

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	
1	3	3	3	3	2	3	2	1	2	2	3	1	3	2.4
2	3	3	3	3	2	3	2	1	3	2	3	1	3	2.5
3	3	3	3	3	1	2	2	1	3	1	3	2	3	2.3
4	3	3	3	3	1	2	2	1	2	1	3	2	3	2.2
5	3	3	3	3	1	2	2	1	2	2	3	2	3	2.3
TOTAL														2.34

Result: The score for this course is 2.34 i.e 79% is correlated

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

696

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	03	03	0	0	45
Course Code		**Course Title**				**Prerequisites**	
21MCAC22		**Algorithm Analysis**				Computer algorithm	

COURSE OBJECTIVES:

- To stress the importance of the efficiency in writing programs
- To write algorithms efficient in terms of design and time complexity

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

1. analyze the time and space complexity of given Algorithms.
2. demonstrate algorithms like Variable Based Search, Branch and Bound.
3. identify appropriate sorting/searching technique for given problem.
4. apply the dynamic programming technique to solve the problems.
5. discuss Graph and its applications

Passed in the BOS Meeting held on 10-03-2021

ALGORITHM ANALYSIS

UNIT – I

Introduction: Algorithm – scope of algorithm – steps of development of algorithm – types of problem – types of solution procedure/algorithm – components of algorithm.

UNIT II

Graph: Introduction – Terminology of Graph – Network – Tree –Tree traversal Distance based Network Algorithm: Introduction – Dijkstra's Algorithm Floyd's Algorithm – Minimum Spanning Tree Problems.

UNIT - III

Searching Algorithm: Introduction – Variable Based Search Algorithm – Branch and Bound Algorithm.

UNIT - IV

Sorting Algorithm: Straight Insertion Sort – Bubble Sort – Heap Sort – Quick Sort – Merge Sort – Analysis of volume and time complexity.

UNIT - V

Heuristics: Introduction – Traveling sales problem – Simple Heuristic to minimize total tardiness in single machine scheduling problem. Dynamic Programming: Introduction – Terminology – Dynamic Programming Algorithm – Application Area of Dynamic Programming.

Sl.No	Unit	Chapter	Page No.
1	**I**	**1**	1 – 19
2	**II**	**2,4**	23 – 49, 78 – 108
3	**III**	**5**	118 – 171
4	**IV**	**6**	185 – 216
5	**V**	**7**	223 – 232 , 296-306

Passed in the BOS Meeting held on 10-03-2021

TEXT BOOK:

1. Design an analysis of Algorithm, R.Paneerselvam, Eastern Economy Edition PHI, New Delhi 2007.

REFERENCE:

1. Fundamentals of Computer algorithm, Ellis Horowitz, Sartajsahni.
2. V. Aho and J.D. Ullman, "Design and Analysis of Algorithms", Addison Wesley

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	M	W	W	M	M	S	S	M
CO2	S	S	S	S	M	M	W	W	M	M	S	S	M
CO3	S	S	S	S	M	M	W	M	M	M	S	M	M
CO4	S	S	S	S	M	M	W	M	M	M	S	M	M
CO5	S	S	S	S	M	M	W	M	M	M	S	M	M

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	3	3	3	2	2	1	1	2	2	3	3	2	2.3
2	3	3	3	3	2	2	1	1	2	2	3	3	2	2.3
3	3	3	3	3	2	2	1	2	2	2	3	2	2	2.3
4	3	3	3	3	2	2	1	2	2	2	3	2	2	2.3
5	3	3	3	3	2	2	1	2	2	2	3	2	2	2.3
TOTAL														2.3

Result: The score for this course is 2.3 i.e 77% is correlated

Passed in the BOS Meeting held on 10-03-2021

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	03	03	0	0	45
Course Code		**Course Title**				**Pre-requisites**	
21MCAC23		**Operating System**				System concepts	

COURSE OBJECTIVE:

Comprehensive introduction to understand the underlying principles, techniques and approaches which constitute a coherent body of knowledge in operating systems.

In particular, the course will consider inherent functionality and processing of program execution.

The emphasis of the course will be placed on understanding how the various elements that underlie operating system interact and provides services for execution of application software.

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

1. understand of design issues associated with operating systems.
2. be aware of concepts of memory management including virtual memory.
3. be familiar with various types of operating systems including Linux and Mobile OS.

OPERATING SYSTEM

UNIT - I

Operating system structures: Introduction –Computer Systems Structures: Computer System Operation–I/O Structure –Storage Structure –Storage Hierarchy–Hardware Protection – Operating System Structures: System Components –Operating System Services –System Calls. Process Management: Process Concept, Process scheduling, operations on processes, cooperating processes, interprocess communication, threads overview.

UNIT - II

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm evaluation. Process Synchronization: The critical –Section problem, synchronization hardware, and semaphore, classic problems of synchronization, critical regions.**Deadlock:** System Model, Deadlock Characterization, Resource-Allocation Graph, Methods for Handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection.

UNIT - III

Memory Management: Concept, Memory Management Techniques, Swapping, Contiguous Memory Allocation, Memory Protection, Memory Allocation, Fragmentation, Paging, Basic Method, Segmentation with Paging, Virtual Memory Concept, Demand Paging, Page Replacement, **Mass storage structure:** Disk Structure – Disk scheduling – Disk Management – Swap space management – RAID structure.

UNIT - IV

File System: File System Implementation, Allocation Methods, Free Space Management, Efficiency and Performance. **I/O Systems and Mass Storage:** I/O Hardware, Polling, Interrupts, DMA, Disk Structure, Disk scheduling, FCFS Scheduling, SSTF Scheduling, Selection of Disk Scheduling Algorithm, Disk Management.

UNIT - V

Case study – Linux: History – Design Principles – Process management – Memory management – File system – Inter process communication – Network structure – Security. **Mobile operating system –**Introduction -Basics of Android – Components – Applications – Component life cycle – Life cycle states – Life cycle events – Application life time – Life cycle method.

Passed in the BOS Meeting held on 10-03-2021

TEXT BOOKS:

1. Operating Systems: Concepts: By Abraham Siberschatz, Peter Galvin- Willey, Sixth edition, 2003.
2. Operating Systems: Seventh Edition by William Stallings, Pearson Publications.

REFERENCES:

1. Operating Systems: Andrew S. Tanenbaum-Pearson Education- Second Edition.
2. System Programming and Operating Systems by D.M. Dhamdhere-TMH –Second Edition.
3. Operating Systems: Internals and Design Principles, Seventh Edition by William Stallings, Pearson Publications

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	M	M	M	S	M	W	M	M	M	S	S	S
CO2	M	S	M	M	S	W	S	M	M	M	M	S	W
CO3	S	M	M	M	S	S	S	W	M	M	S	W	S

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	2	2	2	3	2	1	2	2	2	3	3	3	2.3
2	2	3	2	2	3	1	3	2	2	2	2	3	1	2.2
3	3	2	2	2	3	3	3	1	2	2	3	1	3	2.3
TOTAL														2.3

Result: The score for this course is 2.3 i.e 77% is correlated

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

702

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	03	03	0	0	45
Course Code		**Course Title**				**Pre-requisites**	
21MCAC24		**Data Communications And Networking**				Networking Concepts	

COURSE OBJECTIVE:

1. Understand the properties of digital and analog signals, functionality of different layers in OSI and TCP/IP network models and the factors which impact performance of data communication systems
2. Understand the analog and digital transmission, properties of communication medias, and the concept of multiplexing of data on common communication channel
3. Understand different switching circuits, link layer addressing and exemplify the different coding methods and error detection and correction methods for digital data.
4. Understand data link protocols and different media access control.
5. Understand the architecture of wired and wireless Local Area Networks (LANs).

COURSE OUTCOMES (COs):

Upon successful completion of this course, students will be able to:

1. understand the components of a data communications system
2. identify key considerations in selecting various transmission media in networks.
3. learn the role of digital communications devices in a data communications network.
4. describe the various types of signals and their features.
5. identify and de.ne roles and features of various data transmission protocols.
6. use the various error detection and correction schemes

Passed in the BOS Meeting held on 10-03-2021

DATA COMMUNICATIONS AND NETWORKING

UNIT - I

Introduction: Data Communication – Networks – Distributed Processing, Network criteria, Applications -Protocols and Standards, - Standards Organizations – Standards Creation committees, Forums, Regulatory Agencies. Basic Concepts: Line Configuration – Point-to-Point, Multipoint - Topology – Mesh, Star, Tree, Bus, Ring, Hybrid Topologies -Transmission Mode – Simplex, Half-Duplex - Full Duplex - Categories of Networks – LAN, WAN, MAN - Internetworks. The OSI Model: The Model – Functions of the Layers.

UNIT - II

Transmission of Digital Data: Interfaces and Modems: Digital Data Transmission – Parallel Transmission, Serial Transmission - Transmission Media: Guided Media – Twisted-Pair Cable, Coaxial Cable, Optical Fiber - Unguided Media – Radio Frequency Allocation, Propagation of Radio Waves, Terrestrial Microwave, Satellite Communication, Cellular Telephony. Error Detection and Correction: Types of Errors, Detection, Vertical Redundancy Check, Longitudinal Redundancy Check, Cyclic Redundancy Check, Checksum, Error Correction.

UNIT - III

Data Link Control: Line Discipline – ENQ/ACKJ, Poll/Select - Flow Control – Stop- and-Wait, Sliding Window - Error Control – Automatic Repeat Request, Stop-and-Wait ARQ, Sliding Window ARQ. Switching: Circuit Switching – Space-Division Switches, Time-Division Switches, TDM Bus, Space -and Time division switching combinations, Public switched telephone network – Packet Switching – Datagram Approach, Virtual circuit approach, Circuit-switched connection versus virtual-circuit connection - Message Switching.

UNIT - IV

Local Area Networks: Project 802 – IEEE 802, LLC, MAC, PDU – Ethernet – Access method: CSMA/CD, Addressing, Electrical specifications, Frame format, Implementation -Other Ethernet Networks – Switched Ethernet, Fast Ethernet, Gigabit Ethernet – Token Bus – Token Ring – Access method: Token passing, Addressing, Electrical specifications, Frame format, Implementation - FDDI – Access method: Token passing, Addressing, Electrical specifications, Frame format, Implementation - Comparison.

Metropolitan Area Networks: IEEE 802.6 (DQDB) – Access method: Dual Bus, Distributed Queues – Ring Configuration – Operation, and Implementation. Networking and Internetworking Devices: Repeaters – Bridges – Routers – Gateways – Other Devices – Multiprotocol Routers, Brouters, Switches, Routing Switches.

UNIT - V

Network Security: Security Attacks - Security Services – A model for network security Symmetric encryption principles –Symmetric block encryption algorithms – Public-Key cryptography Principles – Public-Key cryptography algorithms – X.509 certificates.

Passed in the BOS Meeting held on 10-03-2021

TEXT BOOKS:

1. Data Communications and Networking, Behrouz A. Forouzan, Tata McGraw Hill Publishing Company Limited, New Delhi, 2nd Edition, Third Reprint2001.
2. Network Security Essentials: Applications and Standards by William Stallings, Fourth Edition, Second Impression 2012, Pearson Education Publications

REFERENCE BOOKS:

1. Computer Networks, Andrew S. Tanenbaum, Prentice Hall of India, 4th Edition,2006.
2. Communication Networks-Fundamental Concepts and key architectures, Alberto Leon Garcia and Indra Widjaja, Tata Mc-Graw-Hill 2nd Edition, Pearson Edition, 2014

Relationship matrix for CO, PO and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1		S	S							M	S		
CO2			S	M						M	M		
CO3		S	S							M	S		
CO4			S							M	M		
CO5		S	M							M	M		

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1		3	3							2	3			2.8
2			3	2						2	2			2.3
3		3	3							2	3			2.8
4			3							2	2			2.3
5		3	2							2	2			2.3
Avg		**3**	**2.8**	**2**						**2**	**2.4**			2.5

Result: The score for this course is 2.5 i.e 83% is correlated

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	02	02	0	0	30
Course Code		**Course Title**				**Pre-requisites**	
21MCAC25		**Research Methodology and IPR**					

COURSE OBJECTIVE:

To give an overview of the research methodology and explain the technique of defining a research problem and to explain the functions of the literature review in research. This course can explain the art of interpretation and the art of writing research reports. Also, it explains various forms of the intellectual property, its relevance and business impact in the changing global business environment

COURSE OUTCOMES (COs):

Upon successful completion of this course, students will be able to:

1. identify the suitable research methods and articulate the research steps in a proper sequence for the given problem.
2. carry out literature survey, define the problem statement and suggest suitable solution for the given problem and present in the format of the research paper (IEEE).
3. analyse the problem and conduct experimental design with the samplings.
4. perform the data collection from various sources segregate the primary and secondary data
5. apply some concepts/section of Copy Right Act /Patent Act /Cyber Law/Trademark to the given case and develop –conclusions

RESEARCH METHODOLOGY AND IPR

UNIT - I

Research Methodology: Introduction, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, and Problems Encountered by Researchers in India.

UNIT - II

Defining the Research Problem: Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration. Reviewing the literature: Place of the literature review in research, Bringing clarity and focus to your research problem, Improving research methodology, Broadening knowledge base in research area, Enabling contextual findings, How to review the literature, searching the existing literature, reviewing the selected literature, Developing a theoretical framework, Developing a conceptual framework, Writing about the literature reviewed.

UNIT - III

Research Design: Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs. Design of Sample Surveys: Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs

UNIT - IV

Data Collection: Experimental and Surveys, Collection of Primary Data, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method. Interpretation and Report Writing: Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout. Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports.

UNIT - V

Intellectual Property (IP) Acts: Introduction to IP: Introduction to Intellectual Property (IP), different types of IPs and its importance in the present scenario, Patent Acts: Indian patent acts 1970.Design Act: Industrial Design act 2000. Copy right acts: Copyright Act 1957. Trade Mark Act, 1999

TEXT BOOKS:

1. Research Methodology: Methods and Techniques, C.R. Kothari, Gaurav Garg New Age International 4th Edition, 2018.
2. Research Methodology A Step-by- Step Guide for Beginners, Ranjit Kumar SAGE Publications Ltd 3rd Edition, 2011.(For the topic Reviewing the literature under Unit 2)
3. Intellectual property, Debirag E. Bouchoux, Cengage learning, 2013.

REFERENCE BOOKS:

1. Research Methods: the concise knowledge base Trochim, Atomic Dog Publishing, 2005.
2. Conducting Research Literature Reviews: From the Internet to Paper Fink A Sage Publications, 2009.

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	S	M	W	M	M	S	W	S
CO2	S	S	S	S	M	S	M	W	S	M	S	W	S
CO3	S	S	S	S	W	M	M	W	S	W	S	M	S
CO4	S	S	S	S	W	M	M	W	M	W	S	M	S
CO5	S	S	S	S	W	M	M	W	M	M	S	M	S

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	3	3	3	2	3	2	1	2	2	3	1	3	2.4
2	3	3	3	3	2	3	2	1	3	2	3	1	3	2.5
3	3	3	3	3	1	2	2	1	3	1	3	2	3	2.3
4	3	3	3	3	1	2	2	1	2	1	3	2	3	2.2
5	3	3	3	3	1	2	2	1	2	2	3	2	3	2.3
TOTAL														2.34

Result: The score for this course is 2.34 i.e 79% is correlated

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	04	04	0	0	60
Course Code		**Course Title**				**Pre-requisites**	
21MCAE21		**Cloud Computing**				Client server concepts and Security issues	

COURSE OBJECTIVE:

- To learn Parallel and distributed communication
- To understand distributed resource management
- To study about virtualization and cloud resource management

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. understand the architecture of Cloud Computing.
2. understand and use the service models and Deployment.
3. work on any real cloud service.
4. understand the service Management and Security of Cloud.
5. understand the Computing Paradigms and Cloud Computing.

Passed in the BOS Meeting held on 10-03-2021

CLOUD COMPUTING

UNIT - I

Introduction to Cloud Computing: Defining Cloud Computing, Cloud types, The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the role of open standards. Assessing the Value Proposition: Measuring the Cloud's Value, Early adopters and new application, Cloud computing obstacles, Behavioral factors relating to cloud adoption, measuring cloud computing costs, Avoiding Capital Expenditures, Right-sizing, Computing the total cost of ownership, specifying service level agreements, Defining licensing models.

UNIT - II

Understanding Service and Application by Type: Defining Infrastructure as a service (IaaS), Defining Platform as a Service (PaaS), Defining Software as a Service (SaaS), Defining Identity as a Service (IDaaS), and Defining Compliance as a Service (CaaS). Understanding Abstraction and Virtualization: Using Virtualization technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications. Capacity Planning: Capacity Planning, Defining Baseline and Metrics, Network Capacity, Scaling.

UNIT - III

Cloud Platforms and Applications: Cloud Platforms in Industry: Amazon Web Services - Google AppEngine - Microsoft Azure – Observations, Cloud Applications: Scientific Applications - Business and Consumer Applications.

UNIT - IV

Understanding Cloud Security: Securing the cloud, securing data, Establishing identity and Presence. Working with cloud-based storage: Measuring the digital universe, Provisioning Cloud Storage, Exploring Cloud Backup Solutions, Cloud Storage Interoperability.

UNIT - V

Advanced Topics in Cloud Computing: Advanced Topics in Cloud Computing: Energy Efficiency in Clouds - Market Based Management of Clouds - Federated Clouds / InterCloud - Third Party Cloud Services.

Passed in the BOS Meeting held on 10-03-2021

TEXT BOOKS:

1. Barrie Sosinsky "Cloud Computing Bible" 2011 by Wiley Publishing,Inc.
2. Mastering Cloud computing, RajkumarBuyya, Christian Vecchiola&S.Thamaraiselvi, McGraw Hill Education, Pvt. Ltd.,2016.

REFERENCE BOOKS:

1. Cloud Computing Principles and Paradigms by RajkumarBuyya 2011, Published byJohn Wiley &Sons
2. Cloud Computing Theory and Practice by Dan C.Marinescu, 2013, Published by Morgan Kaufmann.
3. Cloud Computing A Practical Approach, Anthony T.Velte, Toby J. Velte, Robert Elsenpeter Tata-McGraw- Hill, New Delhi,2010.
4. Distributed Systems Concepts and Design, George Coulouris, Jean Dollimore, Tim Kindberg, 5th Edition, Pearson Education Asia,2012.
5. Boris Lublinsky, Kevin T. Smith, Alexey Yakubovich, ProfessionalHadoop Solutions, Wrox, Wiley,2013.
6. Distributed and Cloud Computing From Parallel Processing to the Internet of Things, Kai Hwang, Geofrey C. Fox and Jack J. Dongarra, 1st Edition, Elsevier Science Publication, 2013.

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	W	M	S	S	W	S	W	W	M	W
CO2	M	M	M	M	M	S	S	W	S	M	W	M	W
CO3	W	M	M	S	S	S	M	S	M	S	M	M	M
CO4	W	S	M	M	S	M	M	S	M	M	S	M	M
CO5	S	S	M	S	W	W	M	M	M	M	S	S	S

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	
1	3	3	3	1	2	3	3	1	3	1	1	2	1	2.1
2	2	2	2	2	2	3	3	1	3	2	1	2	1	2.0
3	1	2	2	3	3	3	2	3	2	3	2	2	2	2.3
4	1	3	2	2	3	2	2	3	2	2	3	2	2	2.2
5	3	3	2	3	1	1	2	2	2	2	3	3	3	2.3
TOTAL														2.2

Result: The score for this course is 2.2 i.e 73% is

Passed in the BOS Meeting held on 10-03-2021

correlated

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	04	04	0	0	60
Course Code		**Course Title**				**Pre-requisites**	
21MCAE22		**Soft Computing**				Artificial Intelligence	

COURSE OBJECTIVE:

The objective of the course is to design and implement soft applications, to realize the role of fuzzy and ANN. To give an introduction to the enabling technologies of soft computing.

COURSE OUTCOMES (COs):

Upon successful completion of this course, students will be able to:

1. learn various soft computing framework.
2. familiarize with design of various neural networks.
3. explore to fuzzy logic.
4. learn genetic programming concepts.
5. explore hybrid systems of soft computing.

SOFT COMPUTING

UNIT - I

Introduction: Artificial neural network: Introduction, characteristics- learning methods – taxonomy – Evolution of neural networks- basic models – important technologies – applications. Fuzzy logic: Introduction – crisp sets- fuzzy sets – crisp relations and fuzzy relations: Cartesian product of relation – classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Genetic algorithm- Introduction – biological background – traditional optimization and search techniques – Genetic basic concepts.

UNIT - II

Neural Networks: McCulloch-Pitts neuron – linear separability – hebb network – supervised learning network: perception networks – adaptive linear neuron, multiple adaptive linear neuron, BPN, RBF, TDNN associative memory network: auto-associative memory network, hetero-associative memory network, BAM, hopfield networks, iterative auto associative memory network & iterative associative memory network – unsupervised learning networks: Kohonenself-organizing feature maps, LVQ – CP networks, ART network.

UNIT - III

Fuzzy Logic: Membership functions: features, fuzzification, methods of membership value assignments Defuzzification: lambda cuts – methods – fuzzy arithmetic and fuzzy measures: fuzzy arithmetic – extension principle – fuzzy measures – measures of fuzziness - fuzzy integrals – fuzzy rule base and approximate reasoning : truth values and tables, fuzzy propositions, formation of rules-decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning-fuzzy inference systems-overview of fuzzy expert system-fuzzy decision making.

UNIT - IV

Genetic Algorithm: Genetic algorithm and search space – general genetic algorithm– operators – Generational cycle – stopping condition – constraints – classification genetic programming – multilevel optimization – real life problem advances in GA.

UNIT - V

Hybrid Soft computing Techniques and Applications: Neuro-fuzzy hybrid systems– genetic neuro hybrid systems – genetic fuzzy hybrid and fuzzy genetic hybrid systems – simplified fuzzy ARTMAP – Applications: A fusion approach of multispectral images with SAR, optimization of traveling salesman problem using genetic algorithm approach, soft computing-based hybrid fuzzy controllers

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TEXT BOOKS:

1. J.S.R. Jang, C.T. Sun and E. Mizutani, "Neuro-Fuzzy and Soft Computing", PHI / Pearson Education,2004.
2. S.N. Sivanandam and S.N. Deepa, "Principles of Soft Computing", Wiley India Pvt Ltd, 2011.

REFERENCE BOOKS:

1. S. Rajasekaran and G.A. VijayalakshmiPai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications", Prentice-Hall of India Pvt. Ltd.,2006.
2. David E. Goldberg, "Genetic Algorithm in Search Optimization and Machine Learning" Pearson Education India,2013.

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	M	M	M	M	M	W	W	W	W	W	W	W	M
CO2	M	M	M	M	M	W	W	W	W	W	W	W	M
CO3	M	M	M	M	M	W	W	W	W	W	W	W	M
CO4	M	M	M	M	M	W	W	W	W	W	W	W	M
CO5	M	M	M	M	M	W	W	W	W	W	W	W	M

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	2	2	2	2	2	1	1	1	1	1	1	1	2	1.5
2	2	2	2	2	2	1	1	1	1	1	1	1	2	1.5
3	2	2	2	2	2	1	1	1	1	1	1	1	2	1.5
4	2	2	2	2	2	1	1	1	1	1	1	1	2	1.5
5	2	2	2	2	2	1	1	1	1	1	1	1	2	1.5
TOTAL														1.5

Result: The score for this course is 1.5 i.e 50% is correlated

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SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	04	04	0	0	60
Course Code		**Course Title**				**Prerequisites**	
21MCAE23		**Financial Management Accounting**				Accounting and Management concepts	

COURSE OBJECTIVE:

- Todevelopaworkingknowledgeofaccountingsoastoenablethestudentstoapplytheseinsoftware development.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. gain knowledge about Accounting and its golden rules for preparation of Final accounts.
2. understand the stability of finance for a business when making investment decisions.
3. analyse the current status of business by applying some ratios.
4. understand the concepts regarding BEP and its importance for any business.
5. preparation of budgeting for any business.

FINANCIAL MANAGEMENT ACCOUNTING

UNIT – I

Principles of Accounting-Need for Accounting-purpose and advantages of accounting-Branches of Accounting-Important terms used in accounting-Accounting concepts- Methods of Accounting: Single entry, double entry system of book keeping-Types of Accounts: Personal account, Impersonal Accounting- Journal-Ledger- Trial Balance.

UNIT – II

Final Account: Trading Account, Profit and loss account, Balance sheet-Accounting for material-Meaning for material control- Objective for material control-Essential of material control-Re-ordering level-Economic Ordering Quantity –Minimum level or safety stock level- Maximum level-Danger level-Store Records Difference between Bin card and Store ledger-ABC Analysis

UNIT – III

Financial statements--Nature-Importance of financial statement – limitations- Process of financial statement analysis and interpretation-Types of Analysis-Techniques and tools of financial statement analysis.

UNIT – IV

Standard for control-variable/Fixed Costs-Contribution-Break Even Analysis- Standard/Actual cost-Material Price/Usage variance-Labour cost/time variance-sales price/quantity variance.

UNIT – V

Budgeting and forecasting-Objectives-Sales, Production, Purchase Labour, Capital Expenditure and Cash budgets.

TEXT BOOKS

1. Maheswari S N,Financial and Management Accounting, Sultan Chand &Sons,2003.
2. Pandey I M, Financial Management, 7th Edition, vikasPublications.
3. Reddy T.S Hari Prasad Reddy Y.MarghamPublication,2008.
4. Jain S.P,Narang K.L Cost Accounting,KalyaniPublishers,2009.

REFERENCE BOOKS:

1. S. Nagarathnam, Management Accounting Financial ManagementandHolding Company Accounts, S. Chand Company Ltd.,1989.
2. Jain S.P,Narang K.L Financial Accounting, Kalyani Publishers,2009.
3. Gupta R.L ,Advanced Accountancy,Sultan Chand& sons ,1981

CO TO PO AND PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	W	W	M	S	S	S	S	S
CO2	S	S	S	S	M	W	W	M	S	M	M	S	S
CO3	S	S	S	S	M	W	W	W	S	W	M	S	S
CO4	S	S	S	S	W	W	W	M	S	S	M	S	S
CO5	S	S	S	S	W	W	W	M	S	M	M	S	S

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	3	3	3	2	1	1	2	3	3	3	3	3	2.5
2	3	3	3	3	2	1	1	2	3	2	2	3	3	2.4
3	3	3	3	3	2	1	1	1	3	1	2	3	3	2.2
4	3	3	3	3	1	1	1	2	3	3	2	3	3	2.4
5	3	3	3	3	1	1	1	2	3	2	2	3	3	2.3
TOTAL														2.4

Result: The score for this course is 2.3 i.e 79% is correlated

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Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	04	04	0	0	60
Course Code		**Course Title**				**Prerequisites**	
21MCAE24		**Optimization Techniques**				Mathematical Skill	

COURSE OBJECTIVE:

To develop a working knowledge of mathematics so as to enable the students to apply these in software development.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. apply problem solving techniques through OR approaches.
2. formulate the problem using linear programming technique.
3. analyze the optimal solution for the given problem by applying Transportation problems.
4. analyze the strategies with different players through game theory approach.
5. analyze the sequence of jobs to be executed by machines for the given problem.

OPTIMIZATION TECHNIQUES

UNIT - I

Linear programming problem (LPP): introduction, structure of linear programming model, advantages, general model of Linear programming problem(LPP), examples of LP formulation, graphical solutions of LP problem and Solution of LPP by simplex method.

UNIT - II

Linear programming problem(LPP): Artificial variables-two-phase method, Big M method. Duality in linear programming, formulation of dual linear programming and examples.

UNIT - III

Transportation and Assignment Problems: Mathematical model of transportation problem, methods of finding initial solution (Northwest corner rule, Least cost method, Vogel's approximation method), test for optimality in TP using MODI Method. Mathematical model of assignment problem, Hungarian method for solving assignment problem.

UNIT - IV

Theory of games: introduction, two-person zero sum games, pure strategies (MinMax and MaxMin principles), mixed strategies. The rules of principles of dominance, algebraic method to solve games without saddle point, graphical methods to solve games.

UNIT - V

Network Analysis: PERT and CPM, Network construction and determination of critical path, Calculation of ES, EF, LS, LF, TF, FF and IF, Crashing of a project, Scheduling of a project and resource levelling.

TEXT BOOKS:

1. Operations Theory and Applications, J.K. Sharma, 5th edition, MacMillan publisher India(Chapter 1,2,3,4,5,910,11,12,20).
2. Operations Research S.D Sharma, Kedarnath, Ramnath and Co, 2002.

REFERENCE BOOKS:

1. Operations Research – An Introduction Taha H A- Low price edition 7th edition,2006.
2. Introduction to operation Research, Hiller and Liberman, McGRawHill, 5th edition ,2001.
3. Operation Research, Prem Kumar Gupta, D S Heera, S Chand Pub., New Delhi, 2007

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	S	M	W	M	M	S	W	S
CO2	S	S	S	S	M	S	M	W	S	M	S	W	S
CO3	S	S	S	S	W	M	M	W	S	W	S	M	S
CO4	S	S	S	S	W	M	M	W	M	W	S	M	S
CO5	S	S	S	S	W	M	M	W	M	M	S	M	S

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	3	3	3	2	3	2	1	2	2	3	1	3	2.4
2	3	3	3	3	2	3	2	1	3	2	3	1	3	2.5
3	3	3	3	3	1	2	2	1	3	1	3	2	3	2.3
4	3	3	3	3	1	2	2	1	2	1	3	2	3	2.2
5	3	3	3	3	1	2	2	1	2	2	3	2	3	2.3
TOTAL														2.34

Result: The score for this course is 2.34 i.e 79% is correlated

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SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

720

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Theory	03	00	04	0	60
Course Code		**Course Title**				**Prerequisites**	
21MCAP21		**Java Programming - lab**				Knowledge in OOPs and programming.	

COURSE OBJECTIVE:

To gather the knowledge regarding OOPS and Programming exposure.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. understand the enabling technologies for building internet applications.
2. write Java programs for techniques and features of the networking and remote method development to Construct an internet application.
3. implement packages, access specifies and interfaces in program
4. implement Program for Events and interactivity using Layout Manager.
5. generate program for network chatting

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JAVA PROGRAMMING - LAB

LIST OF PROGRAMS

1. Display Helloworld.
2. Check entered number is ODD orEVEN.
3. Find factorial ofnumber.
4. Find the sum of the digits of a givennumber.
5. Swap two numbers without using a temporaryvariable.
6. Accept a name and display the name with greeting message usingClass.
7. Generate a salary for an employee using class, object, constructors, methods and access control. Different parameters to be considered are Emp_No, Emp_Name, Age, Basic, DA, HRA, CA, PT, IT.
8. Generate a sales report for a sales executive using class, object, constructors, methods and access control. Different parameters to be considered are Emp_No, Emp_Name, Sales_Q1, Sales_Q2, Sales_Q3,Sales_Q4.
9. Demonstrate Constructor Overloading and Method Overloading.
10. Implement Inner class and demonstrate its Accessprotection.
11. Write a program in Java for String handling which performs thefollowing:

    Checks the capacity of StringBufferobjects.

    Reverses the contents of a string given on console and converts the resultant string in uppercase.

    Reads a string from console and appends it to the resultant string.
12. Demonstrate Inheritance.
13. Simple Program on Java for the implementation of Multiple inheritanceusinginterfaces to calculate the area of a rectangle and triangle.
14. Write a JAVA program whichhas

    A Class called Account that creates account with 500Rs minimum balance, a deposit() method to deposit amount, a withdraw() method to withdraw amount and also throws LessBalanceException if an account holder tries to withdraw money which makes the balance become less than 500Rs.

A Class called LessBalanceException which returns the statement that says withdraw amount (Rs) is notvalid.

A Class which creates 2 accounts, both account deposit money and one account tries to withdraw more money which generates a LessBalanceException take appropriate action for thesame.

15. Write a JAVA program using Synchronized Threads, which demonstrates Producer Consumerconcept.
16. Write a JAVA program to implement a Queue using user defined Exception Handling (also make use of throw,throws.).
17. Complete thefollowing:

    Create a package namedshape.

    Create some classes in the package representing some common shapes like Square,

    Triangle and Circle. Import and compile these classes in otherprogram.
18. Write a JAVAProgram to create an enumeration Day of Week with seven values SUNDAY through SATURDAY. Add a method is Workday( ) to the DayofWeek class that returns true if the value on which it is called is MONDAY through FRIDAY. For example, the call DayOfWeek.SUNDAY.IsWorkDay ( ) returnsfalse.
19. Write a JAVA program whichhas

    A Interface class for StackOperations

    A Class that implements the Stack Interface and creates a fixed lengthStack.
20. Class that implements the Stack Interface and creates a Dynamic lengthStack.

    A Class that uses both the above Stacks through Interface reference and does the Stack operations that demonstrates the runtimebinding.
21. Print a chessboardpattern.
22. Write a JAVA Program which uses FileInputStream / FileOutPutStreamClasses.
23. Demonstrate utilities of LinkedListClass.
24. Write a JAVA applet program, which handles keyboardevent.
25. Write a JAVA Swing program, to design aform.
26. Create a simple Student_Registration application using Swings, JDBC andMySQL.
27. Write a JAVA program which uses Datagram Socket for Client ServerCommunication.

TEXT BOOKS:

1. Herbert Schildt. Java - The Complete Reference, Ninth Edition. Oracle Press, McGraw Hill Education (India) Edition- 2014.

REFERENCE BOOKS:

1. Cay S. Horstmann, Gary Cornell. Core Java, Core Java Volume-1 – Fundamentals, 9 th edition, Pearson Education,2014.
2. Timothy Budd, "Understanding Object-oriented programming with Java",Updated Edition, Pearson Education,2000.

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	W	W	S	M	M	S	M	M	M	M	M	M
CO2	S	M	S	S	W	M	S	M	M	M	S	M	M
CO3	S	M	S	S	M	M	S	M	M	M	S	M	M
CO4	S	W	M	S	W	M	S	M	M	M	M	M	M
CO5	S	M	M	S	M	M	S	M	M	M	S	M	M

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	
1	3	1	3	3	2	2	3	2	2	2	2	2	2	2.2
2	3	2	3	3	1	2	3	2	2	2	3	2	2	2.3
3	3	2	3	3	2	2	3	2	2	2	3	2	2	2.4
4	3	1	3	3	1	2	3	2	2	2	2	2	2	2.2
5	3	2	3	3	2	2	3	2	2	2	3	2	2	2.4
TOTAL														2.3

Result: The score for this course is 2.3 i.e 77% is correlated

Passed in the BOS Meeting held on 10-03-2021

SOURASHTRA COLLEGE, MADURAI– 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

MASTER OF COMPUTER APPLICATIONS (M.C.A)

SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Lab	03	00	04	00	60
Course Code		**Course Title**				**Prerequisites**	
21MCAP22		**Algorithm Analysis Using C++ Lab**				Knowledge in algorithm & programming.	

COURSE OBJECTIVE:

- To gather the knowledge regarding various algorithm like Greedy, Dynamic, Backtracking, Branch & bound and programming exposure.

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

- develop various linear data structures like List, Stack and Queue.
- build the various Non-linear structures programming like Tree and Binary Tree.
- implement real time problems using the graph data structure and apply Divide and Conquer Technique
- apply the Greedy and Dynamic programming to graphical problems
- use Back Tracking and Branch and Bound Technique to solve complex problems

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Write C++ Programs for the following:

1. Implementation of Singly and Doubly Linked Lists.
2. Implementation of Producer and Consumer Problem using Circular Queue.
3. Implementation of Binary tree using Array.
4. Implementation of Binary Search tree using Linked list.
5. Dynamic implementation of Hash table using Separate chaining.
6. Implementation of Graph traversals – BFS and DFS.
7. Implementation of prim's and dijkstra's algorithm.
8. Construct a minimum spanning tree using greedy kruskal's algorithm.
9. Construct optimal binary search trees using dynamic programming method of problem solving.
10. Find the solution for knapsack problem using dynamic programming approach. Implement the 8 Queens Problem using backtracking.
11. Find the solution of traveling salesperson problem using branch and bound technique

TEXT BOOKS:

1. Programming in ANSI C, Third Edition, E. Balaguruswamy. 6th Edition(2013).
2. Data Structures Using C and C++ by Aaron.M. Tenenbaum, YedidyahLangsam and Moshe J. Augustine, PHI, Edition,2011.

REFERENCE BOOKS:

1. Data structures, Algorithms and Applications in C++, S. Sahani, University Press (India) Pvt Ltd, 2nd Edition.
2. The complete reference C, Herbert Schildt, Fifth Edition, Tata McGrawHill.

Passed in the BOS Meeting held on 10-03-2021

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	M	M	M	S	M	M	S	M
CO2	S	M	M	S	M	M	S	M	M	M	W	M	S
CO3	S	M	M	S	M	S	S	M	S	M	W	W	W
CO4	S	M	M	S	M	M	M	M	M	M	W	W	M
CO5	S	S	S	S	M	M	S	M	M	M	W	W	M

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	2	3	4	5	6	7	8	9	10	1	2	3	
1	3	3	3	3	2	2	2	2	3	2	2	3	2	2.5
2	3	2	2	3	2	2	3	2	2	2	1	2	3	2.2
3	3	2	2	3	2	3	3	2	3	2	1	1	1	2.2
4	3	2	2	3	2	2	2	2	2	2	1	1	2	2.0
5	3	3	3	3	2	2	3	2	2	2	1	1	2	2.2
TOTAL														2.2

Result: The score for this course is 2.2 i.e 74% is correlated

Passed in the BOS Meeting held on 10-03-2021

Course Year	Course Semester	Course Type	Credits	Contact Hours/week			Total hours / Semester
				Theory	Lab	Tutorial	
I	II	Lab	02	00	02	00	30
Course Code		**Course Title**				**Prerequisites**	
21MCAP23		**Linux Shell Programming - Lab**				Knowledge in OS concepts.	

COURSE OBJECTIVE:

- To identify and apply various Linux commands and to develop shell scripts and GUI for specific needs

COURSE OUTCOMES(COs):

Upon successful completion of this course, students will be able to:

1. understand the knowledge about Linux commands is needed to solve complex problems.
2. gain the Knowledge of Linux commands help to design solutions.
3. acquire the knowledge of Linux commands helps to develop software skills.
4. use the knowledge of shell scripts and GUI helps to enrich the software skills.

LINUX SHELL PROGRAMMING - LAB

LIST OF PROGRAMS

1. Execution of various file/directory handling commands
2. Simple shell script for basic arithmetic and logical calculations
3. Shell scripts to check various attributes of files and directories
4. Shell scripts to perform various operations on given strings
5. Shell scripts to explore system variables such as PATH, HOME, etc.
6. Shell scripts to check and list attributes of processes
7. Execution of various system administrative commands
8. Writing awk script that uses all of its features
9. Using seed instruction to process/etc/password file
10. Shell script to display list of users currently logged in
11. Shell script to delete all the temporary files
12. Shell script to search an element from an array using binary search
13. Write a C program that takes one or more file/directory names as command line input and reports the following information on the file:
    (a) File type (b) Number of links (c) Time of last access (d) Read, write and execute permissions

CO to PO and PSO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	S	S	S	S	M	S	M	W	M	M	S	W	S
CO2	S	S	S	S	M	S	M	W	S	M	S	W	S
CO3	S	S	S	S	W	M	M	W	S	W	S	M	S
CO4	S	S	S	S	W	M	M	W	M	W	S	M	S
CO5	S	S	S	S	W	M	M	W	M	M	S	M	S

Relationship matrix for CO, PO and PSOs

CO	Program Outcomes										Program Specific Outcome			Mean
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	
1	3	3	3	3	2	3	2	1	2	2	3	1	3	2.4
2	3	3	3	3	2	3	2	1	3	2	3	1	3	2.5
3	3	3	3	3	1	2	2	1	3	1	3	2	3	2.3
4	3	3	3	3	1	2	2	1	2	1	3	2	3	2.2
5	3	3	3	3	1	2	2	1	2	2	3	2	3	2.3
TOTAL														2.34

Result: The score for this course is 2.34 i.e 79% is correlated

Passed in the BOS Meeting held on 10-03-2021