SURESH GYAN VIHAR UNIVERSITY
Accredited by NAAC with 'A' Grade

Year- 2021-22

LEARNING CENTRE OF EXCELLENCE WITH GOOGLE

MASTER OF COMPUTER APPLICATION (2 YEAR)

PROGRAM SPECIFIC OUTCOMES OF MASTER IN COMPUTER APPLICATION.

- [PO1] Communication Skills : Improves communication skills so that they can effectively present technical information in oral and written reports
- [PO2] Programming Skills : The program prepares the young professional for a range of computer applications, computer organization, techniques of Computer Networking, Software Engineering, Web development, Database management and Advance Java
- [PO3] Developing Solutions : Prepares to create innovative methodologies for solving complex/ real-life problems for the betterment of the society.
- [PO4] Enhance programming Skills Learning : In order to enhance programming skills of the young IT professionals, the program has introduced the concept of project development in each language/technology learnt during semester.
- [PO5] Ethics : Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- [PO6] Communication : Communicate effectively on computer programming activities with the professional community and with society at large. Some of them are, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- [PO7] Opportunities : Bachelor in computer applications (BCA) gives a number of opportunities to individuals to go ahead and shine in their lives.
- [PO8] Ethics : Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- [PO9] Individual and Team Work : Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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- [PO10] Gives overview of the topics in IT like networking, computer graphics, web development, troubleshooting, and hardware and software skills.
- [PO11] Lifelong learning : Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.
- [PO12] get skill and info not only about computer and information technology but also in common, organization and management.

Programme Specific Outcome

On completion of the Master of Computer Applications degree, the graduates will be able to:

[PSO1] Analyze, design, develop, test and maintain the software applications with latest computing tools and technologies

[PSO2] Comprehend, explore and build up computer programs in the areas allied to Algorithms, System Software, Multimedia, Web Design and Big Data Analytics for efficient design of computer-based systems of varying complexity.

[PSO3] Design and develop applications to analyze and solve all computer science related problems.

[PSO4] Communicate effectively and present technical information in oral and written reports.

[PSO5] Function effectively both as a team leader and team member on multi-disciplinary projects to demonstrate computing and management skills.

[PSO6]Solve and work with a professional context pertaining to ethics, social, cultural and cyber regulations.

[PSO7] Communicate effectively and present technical information in oral and written reports.

[PSO8] Function competently as an individual and as a leader in multidisciplinary projects.

COURSE OUTCOME:

SEM - I		
CA 504	Fundamental of Computer	CO.1- Recognizing and understand binary, hexadecimal and octal number systems and their arithmetic

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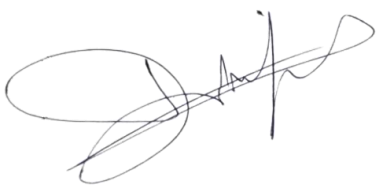
		CO.2- Understand Familiarise operating systems, programming languages, peripheral devices, networking, multimedia and internet.
		CO.3- Implementing and bridge the fundamental concepts of computers with the present level of knowledge of the students.
		CO.4- Organizing and understand how logic circuits and Boolean algebra forms as the basics of digital computers.
		CO.5- Evaluate the building up of Sequential and combinational logic from basic gates.
CA 517	Operating System	CO.1- Explain the structure and functions of Operating system.
		CO.2- Illustrate the concept of concurrency.
		CO.3- Analyze processes, threads and scheduling algorithms.
		CO.4- Outline the concepts of deadlock.
		CO.5- Distinguish between various memory management scheme.
CA 559	Operating System Lab	CO.1- Implement various CPU scheduling algorithms.
		CO.2- Implement various page replacement algorithm.
		CO.3- Explain the process of system call.
		CO.4- Apply the various file operations.
		CO.5- Implement various disk scheduling algorithms.
CA 620	Web Development	CO.1- Understand fundamental operating system abstractions
		CO.2- Design and create integrated IT-based solutions following standards and best practices.
		CO.3- Analyze the impact of technology on individuals, organizations and society, including ethical, legal and policy issues.
		CO.4- Build tools that assist in automating data transfer over the Internet.
		CO.5- Design and develop interactive, client-side, executable web applications.
CA 507	Web Development Lab	CO.1- Understand HTML and Cascading Style Sheets .
		CO.2- Create a web page with multiple types of style sheets used in a single page .
		CO.3- Create a Java Script program by using variables.
		CO.4- Create a javascript program to multiply two numbers and display the result in a separate text box.
		CO.5- Create a javascript program on Form Validations .
CA 513	System Analysis and Designing Fundamentals	CO.1- Knowledge and understanding- Understand the principles and tools of systems analysis and design- Understand the application of computing in different context- Understand the professional and ethical responsibilities of practicing the computer professional including understanding the need for quality



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		CO.2- Cognitive skills (thinking and analysis).- Solve a wide range of problems related to the analysis, design and construction of information systems- Analysis and Design of systems of small sizes
		CO.3- Communication skills (personal and academic).- Be able to present projects
		CO.4- Practical and subject specific skills (Transferable Skills).- Plan and undertake a major individual project, prepare and deliver coherent and structured verbal and written technical reports.
		CO.5- Evaluate information systems projects to identify various aspects of feasibility of these projects.
CA 503	Discrete Mathematics Structure	CO.1- Apply Euclidean Algorithm in finding GCD for two integers.
		CO.2- Establish the decisive properties of relations in order to compute inverses of functions.
		CO.3- Discriminate, identify and prove the properties of groups and subgroups.
		CO.4- Attempt the approach of mathematical induction as demonstrated by the lecturer to prove mathematical statements.
		CO.5- Work in a group to construct finite state-machine and to design quotient machines by using homomorphism theory aptly.
EC 220	Digital Electronics	CO.1- Examine the structure of number systems and perform the conversion among different number systems
		CO.2- Illustrate reduction of logical expressions using boolean algebra, k-map and tabulation methods and implement the functions using logic gates.
		CO.3- Realize combinational circuits for given application.
		CO.4- Design and analyse synchronous and asynchronous sequential circuits using flip-flops.
		CO.5- Implement combinational logic circuits using programmable logic devices.
HS 101	Human Values & Ethics	CO.1- They will understand meaning, nature and scope of ethics and values.
		CO.2- They will learn about human rights.
		CO.3- They will learn about individuals and society.
		CO.4- They will understand the basics of Indian ethics.
		CO.5- They will learn the basics of professional ethics.
FD 101	Foundation course I	Students will learn the computer PC & its components.
		Students will understand the marketing needs & trends.
		Students will understand the difference between programming Languages.
		Students will learn about C, C++, Jawa, and Python Basics.
		Students will understand the marketing needs of the IT Profession.

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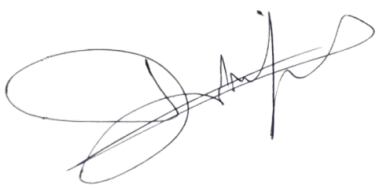
EM 203	Employability Skills I	CO.1- Introspect & develop a planned approach towards his career & life in general.
		CO.2- Explain the use of functional and chronological resumes.
		CO.3- Develop thinking ability and polish his expression in group discussions.
		CO.4- To learn skills for discussing and resolving problems on the work site
		CO.5- To explore and practice basic communication skills
PC 101	Proficiency in Co-Curricular Activities – I	CO.1- Leadership
		CO.2- Inclusiveness
		CO.3- Social Responsibility
		CO.4- Mindfulness
		CO.5- Lifelong and Global Learning
SEM - II		
CP 201	Data Structure & Algorithm	CO.1- Ability to describe stack,queue and linked list operation.
		CO.2- Ability to have knowledge of tree and graphs concepts.
		CO.3- Ability to analyse algorithms and algorithm correctness.
		CO.4- Introduction, single linked list, representation of a linked list in memory, Operations .
		CO.5- Definition, Design Methodology and Implementation of recursive algorithms.
CA 506	Relational Database Management System	CO.1- Demonstrate the basic elements of a relational database management system.
		CO.2- Identify the data models for relevant problems
		CO.3- Understand the theories and techniques in developing database applications and be able to demonstrate the ability to build databases.
		CO.4- Demonstrate their understanding of key notions of query evaluation and optimization techniques.
		CO.5- Extend normalization for the development of application software.
CA 307	Introduction to Android	CO.1- Concept of application development for mobile devices.
		CO.2- Structure of an Android application project. Uses the tools necessary for Android application projects.
		CO.3- Understands the basic technologies used by the Android platform.
		CO.4- Explains the basic concepts of Android phone features and capabilities.
		CO.5- Understands passing objects between Android and javaScript.



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CA 554	Industrial oriented project DBMS lab	CO.1- Use of various software to design and build ER Diagrams, UML.
		CO.2- Understanding Flow charts for related database systems.
		CO.3- Students get practical knowledge on designing and creating relational database systems.
		CO.4- Understand various advanced queries execution such as relational constraints, joins, set operations etc.
		CO.5- Evaluating aggregate functions, triggers, views and embedded SQL.
CA 651	Data Structure & Algorithm Lab	CO.1- Understanding linear and non-linear data structures like stacks, queues, linked lists, trees, etc.
		CO.2- Design and Formulate different sorting algorithms
		CO.3- Understand the concept of array storage
		CO.4- Examine the concept of row-major and column-major order.
		CO.5- Analyzing and implement efficient data structures and apply them to solve problems.
CA 655	Android LAB	CO.1- Understand how to Install and configure Android application development tools.
		CO.2- Design and develop user Interfaces for the Android platform.
		CO.3- Save state information across important operating system events.
		CO.4- Apply Java programming concepts to Android application development.
		CO.5- Develop various Android applications related to layouts & rich uses interactive interfaces.
EM 102	Employability Skills – V	CO.1- Introspect & develop a planned approach towards his career & life in general.
		CO.2- Explain the use of functional and chronological resumes.
		CO.3- Develop thinking ability and polish his expression in group discussions.
		CO.4- To learn skills for discussing and resolving problems on the work site
		CO.5- To explore and practice basic communication skills
CP 202	SOFTWARE ENGINEERING	CO.1- An ability to work in one or more significant application domains .
		CO.2- Work as an individual and as part of a multidisciplinary team to develop and deliver quality software .
		CO.3- Understanding how to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment .

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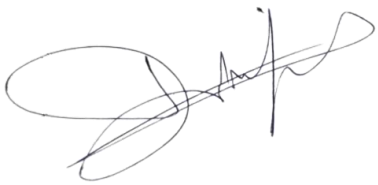
		CO.4- Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle .
		CO.5- Demonstrate an ability to use the techniques and tools necessary for engineering practice .
PE 652	Project Stage –I	CO.1- Understanding of the development of software.
		CO.2- Learning how to work in a team.
		CO.3- Developing analytical skills.
		CO.4- Developing critical thinking so as to come up with effective solutions.
		CO.5- Creating the project on specific area.
PC 102	Proficiency in Co-Curricular Activities –II	CO.1- Leadership
		CO.2- Inclusiveness
		CO.3- Social Responsibility
		CO.4- Mindfulness
		CO.5- Lifelong and Global Learning
FD 102	Foundation Course II	Students will learn the computer PC & its components.
		Students will understand the marketing needs & trends.
		Students will understand the difference between programming Languages.
		Students will learn about C, C++, Jawa, and Python Basics.
		Students will understand the marketing needs of the IT Profession.
CA 615	Java Lab	CO.1- Describe object oriented concepts, java program structure and its installation.
		CO.2- Develop and understand Exception handling.
		CO.3- Demonstrate Object oriented constructs such as various class hierarchies, interfaces and Packages.
		CO.4- To understand the concepts of threads and I/O in Java.
		CO.5- Able to build dynamic user interfaces using applets and Event handling in java.
CA 661	Programing in Java	CO.1- Develop solutions for a range of problems using object-oriented programming.
		CO.2- Develop Java programs using packages, inheritance and interface.
		CO.3- Learn to make Java application programs using OOP principles and proper program structuring.
		CO.4- Identify and fix defects and common security issues in code.
		CO.5- Develop graphical User Interface using AWT.
SEM - III		
CA 469	Computer Network with AWS	CO.1- To understand about LAN,MAN,WAN
		CO.2- To understand about security concepts,
		CO.3- To implement AWS Security Hub, AWS Config.



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		CO.4- Understand about Amazon Virtual Private Cloud (VPC), AWS Route 53, Cloud front, API Gateway, and AWS Direct Connect.
CA 389	Ecommerce and Digital Marketing	CO.1- To understand the concept of E-Commerce, online payment system
		CO.2- To apply the media marketing portals that can be used to promote a company, brand, product, service or person.
		CO.3- Create a Digital marketing plan and track progress in achieving goals with a variety of measurement tools, services, and metrics.
		CO.4- To analyse digital marketing problems and suggest ways of solving these.
		CO.5- To evaluate advertising plan and other communications in achieving behavioral change.
CA 392	Ecommerce and Digital Marketing Lab	CO.1- To understanding about the Digital Marketing,
		CO.2- To create website,
		CO.3- To create SEO and SEM, etc.
		CO.4- To understanding about new terms like Google Analytics and Social Media Traffic etc.
CP 312	Advance Android II	CO.1- To understand android layouts and widgets.
		CO.2- To Learn Storage Techniques and Animation in Android.
		CO.3- To Understand Web Services and Customizations of Widgets.
		CO.4- To Apply advanced android concepts.
		CO.5- To implement / Publishing Android Apps on Google Play .
CA 384	Advance Web Development	CO.1- To create web pages using XHTML and Cascading Style Sheets .
		CO.2- To create a web page with multiple types of style sheets used in a single page
		CO.3 – To build dynamic web pages using JavaScript and PHP (Client side programming).
		CO.4- To understand about connectivity through PHP and oracle
		CO.5- To Apply XML concepts
EM 303	Employability Skills – VIII	CO.1-Introspect & develop a planned approach towards his career & life in general.
		CO.2- Explain the use of functional and chronological resumes.
		CO.3- Develop thinking ability and polish his expression in group discussions.
		CO.4- To learn skills for discussing and resolving problems on the work site
		CO.5- To explore and practice basic communication skills
PC 301		CO.1- Leadership
		CO.2- Inclusiveness

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	Proficiency in Co-Curricular Activities –II	CO.3- Social Responsibility
		CO.4- Mindfulness
		CO.5- Lifelong and Global Learning
PE 701	Project Stage-II	CO.1- To understand the development of software.
		CO.2- Learning how to work in a team.
		CO.3- To develop analytical skills.
		CO.4- Developing critical thinking so as to come up with effective solutions.
		CO.5- To make standardize project using front end and backend languages
SM 701	Project Training Seminar –II	CO.1- anticipate what they will gain from an educational experience.
		CO.2- know in advance how they'll be assessed.
		CO.3- track their progress and know where they stand.
		CO.4- insight into the work tasks at the company or institution.
		CO.5- describe how the work is organized.
CA 709	ERP System	CO.1- To understand basic concepts of ERP systems for manufacturing or service companies.
		CO.2- To develop skills necessary for building and managing relationships with customers, and stakeholders
		CO.3- Identify the important business functions provided by typical business software
		CO.4- . Make basic use of Enterprise software, and its role in integrating business functions
		CO.5- Analyze the strategic options for ERP identification and adoption.
CA 261	Colloquium Lab	CO.1- Students will be able to build up their confidence level.
		CO.2- Students will be able to face placement interviews in an effective manner.
		CO.3- Improve knowledge theory learned in class.
		CO.4- High up for student confidence level.
CP 407	Artificial Intelligence	CO.1- To understand artificial intelligence techniques, including search heuristics, knowledge representation, planning and reasoning.
		CO.2- To understand the components of the artificial intelligence (AI) field.
		CO.3- To analyse search strategies and solve problems by applying a suitable search method .
		CO.4- Describe and list the key aspects of planning in artificial intelligence .
		CO.5- Analyse and apply knowledge representation
CA 723		CO.1- Write a research proposal (grants).

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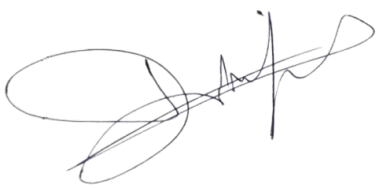
	Research Methodologies	CO.2- Prepare a project proposal (to undertake a project)
		CO.3- To understand some basic concepts of research and its methodologies
		CO.4- To analyse research problems and parameters.
		CO.5- Organise and conduct research (advanced project) in a more appropriate manner.
SEM - IV		
NEW	Industrial Training	CO.1- Ability to identify, formulate and model problems and find engineering solution based on a systems approach.
		CO.2- Awareness of the social, cultural, global and environmental responsibility as an engineer.
		CO.3- Capability to communicate effectively
		CO.4- Awareness of the social, cultural, global and environmental responsibility as an engineer.



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DEPARTMENT OF COMPUTER APPLICATION
Teaching and Examination Scheme for Master of Computer Applications 2-Year
2021-22 Year – I | Semester - I

S.No.	Course Code	Course Name	Credits	Contact Hrs/Week			Exam Hrs.	Weightage (in %)	
				L	T/S	P		CE	ESE
	Program Core								
1.	CA 504	Fundamental of Computer	3	3	0	0	3	40	60
2.	CA 517	Operating System	3	3	0	0	3	40	60
3.	CA 559	Operating System Lab	2	0	0	2	2	60	40
4.	CA 620	Web Development	3	3	0	0	3	40	60
5.	CA 507	Web Development Lab	2	0	0	2	2	60	40
6.	CA 513	System Analysis and Designing Fundamentals	3	3	0	0	2	40	60
	University Core								
7.	CA 503	Discrete Mathematics Structure	3	3	0	0	3	40	60
8.	EC 220	Digital Electronics	3	3	0	0	3	60	40
9.	HS 101	Human Values & Ethics	1	1	0	0			
10.	EM203	Employability Skills I	1	0	2	0	3	40	60
11.	PC 101	Proficiency in Co-Curricular Activities – I	2						
		Total	**25**	**19**	**2**	**4**			

Theory (19 Credits) + Labs (4 Credits) + Proficiency in Co-Curricular Activities (2 Credit) = 25 Credits.

L – Lecture
S – Seminar
T – Tutorial
P – Practical
CE – Continuous Evaluation
ESE – End Semester Evaluation

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DEPARTMENT OF COMPUTER APPLICATION
Teaching and Examination Scheme for Master of Computer Applications 2 Year Course
2021-22 Year – I | Semester – II

S.No.	Course Code	Course Name	Credits	Contact Hrs/Week			Exam Hrs.	Weightage (in %)	
				L	T/S	P		CE	ESE
	Program Core								
1.	CP 201	Data Structure & Algorithm	3	3	0	0	3	40	60
2.	CA 506	Relational Database Management System	3	3	0	0	3	40	60
3.	CA 307	Introduction to Android	3	3	0	0	3	40	60
4.	CA 554	Industrial oriented project DBMS lab	2	0	0	2	2	60	40
5.	CA 651	Data Structure & Algorithm Lab	2	0	0	2	2	60	40
6.	CA 655	Android LAB	2	0	0	2	2	60	40
	University Core								
7.	EM 102	Employability Skills – V	2	0	0	2	2	60	40
8.	CP 202	Software Engineering	3	3	0	0	3	40	60
9.	PE 652	Project Stage –I	2	0	0	2	2	60	40
10.	PC 102	Proficiency in Co-Curricular Activities –II	2	0	2	0		100	
	Program Elective								
12.	CA 615	Java Lab	2	0	0	2	2	60	40
13.	CA 661	Programing in Java	3	3	0	0	3	40	60
		Total	**29**	**15**	**2**	**12**			

Theory (15 Credits) + Labs (12 Credits) + Proficiency in Co-Curricular Activities (2 Credit) = 29 Credits.

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DEPARTMENT OF COMPUTER APPLICATION
Teaching and Examination Scheme for Master of Computer Application 2 Year Course
2022-23 Year – II | Semester – III

S.No.	Course Code	Course Name	Credits	Contact Hrs/Week			Exam Hrs.	Weightage (in %)	
				L	T/S	P		CE	ESE
	Program Core								
1.	CA 469	Computer Network with AWS	3	3	0	0	3	40	60
2.	CA 389	Ecommerce and Digital Marketing	3	3	0	0	3	40	60
3.	CA 392	Ecommerce and Digital Marketing Lab	2	0	0	3	2	60	40
4.	CP 312	Advance Android II	3	3	0	0	3	40	60
5.	CA 384	Advance Web Development	3	3	0	0	3	40	60
	University Core								
6.	EM 303	Employability Skills – VIII	1	0	2	0	3	40	60
7.	PC 301	Proficiency in Co-Curricular Activities - V	2						
8.	PE 701	Project Stage-II	4	0	0	8	2	60	40
9.	SM 701	Project Training Seminar –II	2	0	0	4	2	60	40
10.	CA 709	ERP System	3	3	0	0	3	40	60
11.	CA 261	Colloquium Lab	2	0	0	3	2	60	40
	Program Elective								
12.	CP 407	Artificial Intelligence	3	3	0	0	3	40	60
	University Elective								
13.	CA 723	Research Methodologies	3	3	0	0	3	40	60
		Total	**34**	**21**	**2**	**18**			

Theory (21 Credits) + Labs (11 Credits) + Proficiency in Co-Curricular Activities (2 Credit) = 34 Credits.

L – Lecture T – Tutorial CE – Continuous Evaluation
S – Seminar P – Practical ESE – End Semester Evaluation

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Teaching and Examination Scheme for Master of Computer Application 2 Year Course
2022-23 Year – II | Semester – IV

S.No.	Course Code	Course Name	Credits	Contact Hrs/Week			Exam Hrs.	Weightage (in %)	
				L	T/S	P		CE	ESE
	Practical & Sessional								
1.	New	Industrial Training	18	-	-	-	3	120	80
	Total		18	-	-	-			

Theory = 18 Credits.

L – Lecture
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P – Practical
CE – Continuous Evaluation
ESE – End Semester Evaluation

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DEPARTMENT OF COMPUTER APPLICATIONS

Teaching and Examination Scheme for Master of Computer Applications 2-Year

2021-22 Year – I | Semester – I

S.No.	Course Code	Course Name	Credits	Contact Hrs/Week			Exam Hrs.	Weightage (in %)	
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	Program Core								
1.	CA 504	Fundamental of Computer	3	3	0	0	3	40	60
2.	CA 517	Operating System	3	3	0	0	3	40	60
3.	CA 559	Operating System Lab	2	0	0	2	2	60	40
4.	CA 620	Web Development	3	3	0	0	3	40	60
5.	CA 507	Web Development Lab	2	0	0	2	2	60	40
6.	CA 513	System Analysis and Designing Fundamentals	3	3	0	0	2	40	60
	University Core								
7.	CA 503	Discrete Mathematics Structure	3	3	0	0	3	40	60
8.	EC 220	Digital Electronics	3	3	0	0	3	40	60
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11.	PC 101	Proficiency in Co-Curricular Activities – I	2						
		Total	**25**	**19**	**2**	**4**			

Theory (19 Credits) + Labs (4 Credits) + Proficiency in Co-Curricular Activities (2 Credit) = 25 Credits.

L – Lecture T – Tutorial CE – Continuous Evaluation
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S – Seminar P – Practical

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2021-22 Year – I | Semester – II

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4.	CA 554	Industrial oriented project DBMS lab	2	0	0	2	2	60	40
5.	CA 651	Data Structure & Algorithm Lab	2	0	0	2	2	60	40
6.	CA 655	Android LAB	2	0	0	2	2	60	40
	University Core								
7.	EM 102	Employability Skills – V	2	0	0	2	2	60	40
8.	CP 202	Software Engineering	3	3	0	0	3	40	60
9.	PE 652	Project Stage –I	2	0	0	2	2	60	40
10.	PC 102	Proficiency in Co-Curricular Activities –II	2	0	2	0		100	
	Program Elective								
12.	CA 615	Java Lab	2	0	0	2	2	60	40
13.	CA 661	Programing in Java	3	3	0	0	3	40	60
		Total	**29**	**15**	**2**	**12**			

Theory (15 Credits) + Labs (12 Credits) + Proficiency in Co-Curricular Activities (2 Credit) = 29 Credits.

L – Lecture T – Tutorial CE – Continuous Evaluation
S – Seminar P – Practical ESE – End Semester Evaluation

Learning Centre of Excellence with Google

DEPARTMENT OF COMPUTER APPLICATIONS

Teaching and Examination Scheme for Master of Computer Applications 2 Year Course

2022-23 Year – II | Semester – III

S.No.	Course Code	Course Name	Credits	Contact Hrs/Week			Exam Hrs.	Weightage (in %)	
				L	T/S	P		CE	ESE
	Program Core								
1.	CA 469	Computer Network with AWS	3	3	0	0	3	40	60
2.	CA 389	Ecommerce and Digital Marketing	3	3	0	0	3	40	60
3.	CA 392	Ecommerce and Digital Marketing Lab	2	0	0	3	2	60	40
4.	CP 312	Advance Android II	3	3	0	0	3	40	60
5.	CA 384	Advance Web Development	3	3	0	0	3	40	60
	University Core								
6.	EM 303	Employability Skills – VIII	1	0	2	0	3	40	60
7.	PC 301	Proficiency in Co-Curricular Activities - V	2						
8.	PE 701	Project Stage-II	4	0	0	8	2	60	40
9.	SM 701	Project Training Seminar –II	2	0	0	4	2	60	40
10.	CA 709	ERP System	3	3	0	0	3	40	60
11.	CA 261	Colloquium Lab	2	0	0	3	2	60	40
	Program Elective								
12.	CP 407	Artificial Intelligence	3	3	0	0	3	40	60
	University Elective								
13.	CA 723	Research Methodologies	3	3	0	0	3	40	60
		Total	**34**	**21**	**2**	**18**			

Theory (21 Credits) + Labs (11 Credits) + Proficiency in Co-Curricular Activities (2 Credit) = 34 Credits.

L – Lecture T – Tutorial CE – Continuous Evaluation

S – Seminar P – Practical ESE – End Semester Evaluation

Learning Centre of Excellence with Google
DEPARTMENT OF COMPUTER APPLICATIONS
Teaching and Examination Scheme for Master of Computer Applications 2 Year Course
2022-23 Year – II | Semester – IV

S.No.	Course Code	Course Name	Credits	Contact Hrs/Week			Exam Hrs.	Weightage (in %)	
				L	T/S	P		CE	ESE
	Practical & Sessional								
1.	PT 702	Industrial Training	18	-	-	-	3	120	80
	Total		18	-	-	-			

Theory = 18 Credits.

L – Lecture
S – Seminar
T – Tutorial
P – Practical
CE – Continuous Evaluation
ESE – End Semester Evaluation

Course Title: **Fundamental of Computer**	Course Code: **CA 504**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **3:0:0**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Student should have basic knowledge of computers.

Course Objectives:

The course is designed to aim at imparting a basic level appreciation knowledge in fundamentals of computer.

Course Content:

Topic and Contents	Hours
UNIT-1:	**7**
Types of computers and generations. Basic architecture of computers and its building blocks. Input-Output devices, Memories Overview, definition and function of operating system, need of operating, System, Batch processing, spooling, multi-programming, multi-processing, Time sharing, online processing, real time system	
UNIT-2:	**7**
Classification of Computer Language Machine, assembly and high level languages .Brief idea of operating system. Assembler, compiler and interpreter. Number Systems: Binary, octal, decimal and hexadecimal representation of numbers. Integers and floating point numbers. Representation of characters, ASCII and EBCDIC codes. Binary Arithmetic: addition, subtraction, complements	
UNIT-3:	**7**
An overview of information technology, difference between data and information, quality, of information, Information system. Introduction to internet: www, web browser, search engine, email, open source software's, Search Engine optimization.	
UNIT-4:	**7**
Introduction to e-commerce and its advantage, security threats to e-commerce, Electronic payment system, E-governance, EDI and its benefits. Introduction to cryptography, digital signature and smart card technology, Steganography & Watermarking	
UNIT-5:	**7**
Introduction to LAN, WAN, MAN: Transmission media Data transmission type: Introduction to OSI reference model, TCP/IP Model. Analog and digital signals, modulation, Network topologies, client-server architecture, ISDN, Broadband, Firewalls, Virus & Worms	
TOTAL	**35**

Reference:

1. "Computer Fundamentals" by P K Sinha
2. "FUNDAMENTALS OF COMPUTERS" by E Balagurusamy
3. "Fundamentals of Computers" by Rajaraman V and Adabala N
4. "Computer Fundamentals and Programming in C" by Reema Thareja

Course Title: **Operating System**	Course Code: **CA 517**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Basic understanding about operating system and knowledge about subject

Course Objectives:

To learn the fundamentals of Operating Systems - To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols - To gain insight on the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols - To know the components and management aspects of Real time, Mobile operating Systems.

Course Content:

Topics and Contents	Hours
UNIT-1	**7**
Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structure. System calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/0 devices organization, I/0 devices organization, I/0 devices organization, I/0 buffering	
UNIT-2	**7**
Process concept, process scheduling, operations on processes Threads, inter-process communication, precedence graphs Critical section problem, semaphores, an classical problems of synchronization. Deadlock problem, deadlock characterization deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.	
UNIT-3	**7**
Concepts of memory management, logical and physical address space swapping, contiguous and non-contiguous allocation paging, segmentation, and paging combined with segmentation	
UNIT-4	**7**
Concepts of virtual memory, demand paging, page replacement algorithms Allocation of frames, thrashing, and demand segmentation. Security threads protection intruders-Viruses-trusted system	
UNIT-5	**7**
Disk scheduling, file concepts, file access methods, allocation methods, directory systems, file protection, Introduction to distributed systems and parallel processing case study.	
TOTAL	**35**

Reference:

- A.S.Tanenbaum-Modern Operating Systems, Pearson Education Asia.
- D.M.Dhamdhere-Operating Systems-A Concept based approach, Tata Mc-Graw Hills.
- Achyut godble -Operating Systems, Tata Mc-Graw Hills.
- Stallings-Operating System, Pearson.

Course Title: **Operating System Lab**	Course Code: **CA 559**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **0:0:2:2**	Credits : **2 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **20**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Basic understanding about operating system and programming.

Course Objectives:

To learn the fundamentals of Operating Systems - To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols - To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols - To know the components and management aspects of Real time, Mobile operating Systems.

Course Content:

S.NO.	NAME OF EXPERIMENTS	HOURS
1	Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir	2
2	Write programs using the I/O system calls of UNIX operating system (open, read, write, etc.)	2
3	Write C programs to simulate UNIX commands like ls, grep, etc.	2
4	Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling	2
5	Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.	2
6	Developing Application using Inter Process communication (using shared memory, pipes or message queues)	2
7	Implement the Producer – Consumer problem using semaphores (using UNIX system calls).	2
8	Implement some memory management schemes-I	2
9	Implement some memory management scheme-II	2
10	Implement any file allocation technique (Linked, Indexed or Contiguous)	2

Course Title: **Web Development**	Course Code: **CA 620**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Knowledge of HTML Course Objectives: This course enables students to understand web page site planning, management and maintenance. The course explains the concepts of developing advanced HTML pages with the help of frames, scripting languages, and evolving technologies like DHTML, and XML.

Course Content:

Topics and Contents	Hours
UNIT-1	**7**
PHP Introduction: - Introduction PHP and MySQL, Benefits of using PHP MySQL, Setup of PHP Environment, Testing the Page, Troubleshooting Installation Errors.	
UNIT-2	**7**
PHP Programming Concepts: - Write your First PHP Program, Embed PHP in HTML / HTML in PHP, PHP Data Types, Variables in PHP, Super Global Variables, Operators in PHP, Conditional Statements, Loops (For A while, Do While, For each).	
UNIT-3	**7**
PHP Functions: - Using Functions in PHP, User defined Functions, Predefined Functions, Common Functions, String Functions, File Functions, Date Functions, Hash Functions, Mail Function.	
UNIT-4	**7**
Arrays and Array Functions: - Why use Arrays, Types of Arrays, Creation Arrays, Accessing Arrays, Array Functions, Using Array Functions	
UNIT-5	**7**
MySQL Database Training: - What is Database, understanding an RDBMS, Understanding Tables, Records, and Fields, SQL Language, working with PHP My Admin, Creating and Types	
TOTAL	**35**

Reference:

- Complete reference HTML.
- JavaScript Bible
- HTML, DHTML, JavaScript, Perl & CGI Ivan Bayross W. Sebesta

Course Title: **Web Development Lab**	Course Code: **CA 507**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **0:0:2:2**	Credits : **2 Credit**
Type of course : **Lecture**	Total Contact Hours : **2 Hours weekly**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Basic knowledge of computer system and networking.

Course Objectives:

Units	Course Contents	Total Contact Hrs.
1	**Introduction of PHP MySQL and setup Xampp.**	2 hours
2	**Testing Page , troubleshooting installation errors.**	2 hours
3	**Embed php in html and print value in next page.**	2 hours
4	**Using data type & variable in php.**	2 hours
5	**Conditional statement and array.**	2 hours
6	**Making and using function string function etc.**	2 hours
7	**Using array and types of array.**	2 hours
8	**Accessing array and array function.**	2 hours
9	**Basics of database and Query.**	2 hours
10	**Table Records, RDBMS, working PHP My Admin.**	2 hours

Course Title: **System Analysis and Designing Fundamentals**	Course Code: **CA 513**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : 4**0 Marks**	ESE : 6**0 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-Requisites:

Basics in software and its various merits and demerits.

Course Objective:

1. Apply the concept of software development life cycle.
2. Apply the software testing

Course Contents:

Topics and Contents	Hours
UNIT-1: INTRODUCTION	**7**
Introduction to System Analysis and Designing Fundamentals: Introduction, Definitions of System Analysis and Designing Fundamentals, Program V/s. Software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software Processes, Software Quality Attributes, Key challenges faced by the System Analysis and Designing Fundamentals, Software Engineer, SDLC, Software System Development Methodologies, CASE tools	
UNIT-2: SOFTWARE PROJECT MANAGEMENT	**7**
Software Project Management: Project Management Process, Feasibility Study, Software Project Planning, Project Execution, Monitoring and Control, Project Termination Analysis, SCM, Process Management Process, CMM, Risk Management Process, Software Project Planning, Scheduling a Software Project.	
UNIT-3: REQUIREMENT ENGINEERING	**7**
Requirement Engineering: Introduction to Requirement Engineering, Functional Requirements, Non-Functional Requirements, Domain Requirements, Requirement Engineering Process, Software Requirements Specification (SRS)	
UNIT-4: STRUCTURED ANALYSIS & DESIGN	**7**
Data Modeling,Data Objects, Attributes And Relationships, Cardinality And Modality, Entity-Relationship Diagram, Functional Modelling, Data Flow Diagram, Logical And Physical DFDs, Levelling Of DFDs, Control Flow Diagram, Behavioural Modelling, Data Dictionary, Structured English, Decision Trees, Decision Table, Software Design Model, Conceptual and Technical Designs, Characteristics of a Good Design, Design Principles, Design Guidelines, Decomposition and Modularity.	
UNIT-5: QUALITY ASSURANCE ACTIVITIES	**7**
Types of Quality Assurance Activities , Verification and Validation, Testing, Testing Fundamentals, Strategic Issues in Testing, Test Plan, Testing Principles General Testing Strategies, Code Testing, Specification Testing, Black Box Testing, White Box Testing, Testing Process.	
TOTAL	**35**

Reference:

- Sabharwal S., System Analysis and Designing Fundamentals: Principles, Tools and Techniques, Second Ed., Umesh Publications, Delhi, 2005
- Gill N.S., System Analysis and Designing Fundamentals: Software Reliability, Testing and Quality Assurance, Khanna Book Publishing Co (P) Ltd, New Delhi, 2002
- Keswani & Banerjee, System Analysis and Designing Fundamentals, Genius Publications, 2009

Course Title: **Discrete Mathematics Structure**	Course Code: **CA 503**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Should have basic knowledge and interest about mathematics.

Course Objectives:

1. Understand mathematics fundamentals.
2. Ways of implementing concepts into formula.

Course Content:

Topic and Content	Hours
UNIT-1	**7**
Sets & Relations- Sets, Types of Sets, MultiSets, Operations on Sets, Relations and Properties of Relations, Representation of Relations, Equivalence Relation, Closures of Relations, recurrence relation	
UNIT-2	**7**
Formal logic-statement, tautologies, quantifier, predicator and validity, normal form, propositional. Logic, predicate logic, Proposition Methods of Proof-Direct Proofs, Indirect Proofs, Mathematical Induction, Method of Contradiction., Permutations and Combinations, Lattices, Pigeon Hole Principle	
UNIT-3	**7**
definition of semi group, subsemigroup, cyclic semigroup, homomorphism and isomorphism, monoid, Group, abelian group, properties of group, subgroup, group homomorphism, kernel of homomorphism, permutation group, dihedral group, cyclic group, costs, normal subgroup	
UNIT-4	**7**
Basic Introduction of Graphs, Terminology, types of graph-simple graph,multigraph,pseudograph,,subgraph,isomorphism,path,circuits,cycles,connected, graph, cutest, Euler path ,circuit, Euler graph, Hamiltonian graph. weighted graph and shortest path algo, planar graph, graph colouring, polya's theory of enumeration	
UNIT-5	**7**
Grammar and Languages- Phrase structure Grammar, Types of Grammars and Languages, Finite State Machines and Languages, Minimization of Finite State Machines.	
Total	**35**

Reference:

- Lipschitz, Seymour, "Discrete Mathematics", McGraw Hill.
- Tremblay, J.P & R. Manohar, "Discrete Mathematical Structure with Application to Computer Science", McGraw Hill.
- Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
- Deo, Narsingh, "Graph Theory With application to Engineering and Computer Science.", PHI.
- Krishnamurthy, V., "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi.
- Kolman B., Busby R: Discrete Mathematical

Course Title: **Digital Electronics**	Course Code: **EC 220**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Should have basic knowledge and interest about the subject.

Course Objectives:

To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits. To prepare students to perform the analysis and design of various digital electronic circuits.

Course Content:

Topic and Contents	Hours
UNIT-1: Number System And Data Representation	**7**
Number System: Binary, Octal, Decimal And Hexadecimal Number System And Their Interconversion. Binary Codes: Bcd, Excess 3, Parity, Gray, Ascii And Ebcdic Codes, Their Advantages And Disadvantages Data Representation :(Related To 8 Bit Number), Real Number Representation, Underflow, Overflow, Range And Accuracy Of Numbers.	
UNIT-2: Binary Arithmetic	**7**
Binary Addition, Decimal Subtraction Using 9's And 10's Complement, Binary Subtraction Using 1's And 2'nd Compliment, Multiplication And Division .Logic Gates: Truth Table, Properties And Symbolic Representation Of NOT, AND ,OR,NOR,NAND ,EX-OR,EX – NOR GATES, NOR and NAND GATES As A Universal Gates.	
UNIT-3: Boolean Algebra	**7**
Laws And Identities Of Boolean Algebra, Demorgan's Theorem, Use Of Boolean Algebra For Simplification Of Logic Expression, Karnaugh Map For 2,3,4 Variable, Simplification Of Sop And Pos Logic Expression Using K-Map.	
UNIT-4 Combinational / Sequential Circuits	**7**
Half Adder , Full Adder, Parallel Adder, Half Subtractor, Full Subtractor, 4 Bit Binary Adder/ Subtractor, Multiplexer , demultiplexer, Decoder , Encoder ,Parity Detector, Construction And Working With Timing Diagram Of Bistable, Monostable And Astable Multivibrator Using Logic Gates. Sequential Circuits: Flip-Flop: Construction And Working Of RSFF, CKRSFF, DFF, TFF, JKFF AND JKM SFF, Counters: Construction And Working Of Asynchronous, Synchronous, Up-Down Counter, Shift Register And Their Types, Ring Counter And Johnson Counter With Their Timing Diagram.	
UNIT-5: Architecture of 8086	**7**
Block Diagram Of 8086, Pin Diagram 0f 8086, Minimum And Maximum Mode, Addressing Modes, Instruction Set: Data Transfer, Arithmetic, Logical, String Manipulation, Control Transfer, Unconditional Branch Conditional Branch, Flag, Processor Control.	
TOTAL	**35**

Reference:

M. Morris Mano, Michael D. Ciletti, "Digital Design", *Prentice Hall of India Pvt Ltd.*, 2008.

Course Title: **Human Values & Ethics**	Course Code: **HS 101**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:) : **1:0:0:1**	Credits : **1 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **12 Hours**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Student should have basic knowledge

Course Objectives:

1. Understand mathematics fundamentals.
2. Ways of implementing concepts into formula.

Course Content:

Topic and Contents	Hours
UNIT-1	**6**
Universal human aspirations: Happiness and prosperity; Human values and ethics: Concept definition, significance and sources; Fundamental values: Right conduct, peace, truth, love and nonviolence; Ethics: professional, environmental, ICT; Sensitization towards others particularly senior citizens, developmentally challenged and gender.	
UNIT-2	**6**
Spirituality, positive attitude and scientific temper; Team work and volunteering; Rights and responsibilities; Road safety; Human relations and family harmony; Modern challenges and value conflict: Sensitization against drug abuse and other social evils; developing personal code of conduct (SWOT Analysis); Management of anger and stress.	
TOTAL	**12**

Reference:

- Gaur RR, Sangal R & Bagaria GP. 2011. A Foundation Course in Human Values and Professional Ethics. Excel Books.
- Mathur SS. 2010. *Education for Values, Environment and Human Rights.* RSA International.
- Sharma RA. 2011. *Human Values and Education -Axiology, Inculcation and Research.* R. Lall Book Depot.
- Sharma RP & Sharma M. 2011. *Value Education and Professional Ethics.* Kanishka Publishers.
- Srivastava S. 2011. *Human Values and Professional Ethics.* S K Kataria & Sons.
- Srivastava S. 2011. *Environmental Science*. S K Kataria & Sons.
- Tripathi A.N. 2009. *Human Values.* New Age International (P) Ltd Publishers.

Course Title: **Data Structure & Algorithm**	Course Code: **CP 201**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P) : **3:0:0**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:- Have basic knowledge of computer with understanding of basic programming languages.

Course Objectives:

1. To impart logical understanding to solve given task
2. Understand algorithm and their types for said cause.

Course Content:

Topic and Contents	Hours
UNIT-: DATA STRUCTURE	**7**
Data Structure: Definition, Implementation, Operation, Application, Algorithm writing and convention. Analysis of algorithm, Complexity Measures and Notations ,Arrays: Representation of arrays (multidimensional), Address calculation using column and row major ordering. Linked Lists : Implementation, Doubly linked list, Circulr linked list, unrolled linked list, skip-lists, Splices, Sentinel nodes Application (Sparse Matrix, Associative Array, Functional Programming)	
UNIT-2: STACKS	**7**
Stacks : Definition, Implementation, Application (Tower of Hanoi, Function Call and return, Parentheses Matching, Back-tracking, Expression Evaluation), Queues : Definition, dequeue, enqueue, priority queue, bounded queue, Implementation, Application.	
UNIT-3: TREES	**7**
Tree: Definition of elements, Binary trees: Types (Full, Complete, Almost complete), Binary Search Tree, Traversal, (Pre, In, Post & Level order), Pruning, Grafting. Application: Arithmetic Expressions Evaluation Variations: Indexed Binary Tree, Threaded Binary Tree, AVL tree, Multi-way trees, B tree, B+ tree, Forest, Tree and Dictionary.	
UNIT-4: GRAPH	**7**
Graphs: Elementary definition, Representation (Adjacency Matrix, Adjacency Lists), Traversal (BFS, DFS)Application: Spanning Tree (Prim's and Kruskal's Algorithm), Dijkstra's algorithm, shortest path Algorithms.	
UNIT-5: SORTING	**7**
Sorting: Bubble, Selection, Insertion, Quick, Radix, Merge, Bucket, Heap, Searching: Hashing, Symbol Table, Binary Search, Simple String Searching.	
TOTAL	**35**

Reference:

- Aho A.V., J.E.Hopcroft. J.D.Ullman: Data Structures and Algorithms, Addison Wesley.
- Brastrad: Algorithms, PHI.
- Horowitz and Sahni: Algorithms Design and Analysis, CS Press.
- Kruse R.L.: Data structure and Program Design.PHI.
- Tenenbaum : Data structures in C,PHI
- Trembley & Sorenson :An Introduction to Data Structures, Mc-Graw Hill International

Course Title: Relational Database Management System	**Course Code: CA 506**
Semester : II	**Core / Elective : Core**
Teaching Scheme in Hrs. (L:T:P:C) : 3:0:0:3	**Credits : 3 Credit**
Type of course : Lecture + Assignments	**Total Contact Hours : 35**
Continuous Internal Evaluation : 40 Marks	**ESE : 60 Marks**
Programs: MASTER OF COMPUTER APPLICATIONS	

Pre-requisites:

Have basic knowledge of computer with back end features.

Course Objectives:

- Understand the concepts of database management system
- Types of data models
- Learn different diagrams for database design.

Course Content:

Topic and Contents	Hours
UNIT-1:	**7**
Overview of DBMS, Basic DBMS terminology, data base system v/s file system, data independence. Architecture of a DBMS.	
UNIT-2: INTRODUCTION TO DATA MODELS	**7**
Introduction to data models: entity relationship model, hierarchical model: from network to hierarchical, relational model, comparison of network, hierarchical and relational models.	
UNIT-3: DATA MODELLING USING ER DIAGRAM	**7**
Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.	
UNIT-4: RELATIONAL MODELS	**7**
Relational model: storage organizations for relations, relational algebra, relational calculus. Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.	
UNIT-5: Introduction to SQL	**7**
Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Transaction Manager, Recovery, Concurrency control.	
TOTAL	**35**

Reference:

1. Database Management Systems by Raghu Ramakrishnan
2. Fundamentals of Database Management Systems by Mark L. Gillen son
3. Database System Concepts by Abraham Silber Schatz, Henry F. Korth, and Sudarshan
4. Database Systems: Design, Implementation, and Management by Peter Rob and Carlos Coronel
5. Database Systems: The Complete Book (2nd Edition) by Hector Garcia-Molina, Jeffrey D. Ullman, and Jennifer Wisdom

Course Title: **Introduction to Android**	Course Code: **CA 307**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P) : **3:0:0**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Knowledge about JAVA and OOPS is required.

Course Objectives:

- The Android environment
- Tools for creating Android applications
- The Android approach to structuring applications
- Basic user interfaces
- Application life cycles

Course Content:

Topic and Content	Hours
UNIT-1	**7**
Hello Android Introduction to Android, Android Flavours Android OS Architecture Gradle Build System Setting up Android Development Environment System Requirements Android Studio Installation Create First Android Application Understand Project Hierarchy. User Interface & Event Handling Layouts & Views Resources User Input Control List view and Scrolling Views Recycler view & Card View Themes & Styles Material Design Providing Resources for adaptive layouts Dialogs – Alert, Progress and Custom Floating Action Button Localization.	
UNIT-2	**7**
Activities and Intents Activity Lifecycle Activity State Explicit Intent Implicit Intent Intent resolution. Exploring Action bar Getting Access of Action Bar Option Menus Context Menus Popup Menus Navigation Drawer Tab Navigation Swipe View with View Pager.	
UNIT-3	**7**
Broadcast Receivers & Notification: Broadcast receiver Sending a Broadcast Creating Receiver Registering broadcast receiver Notification Integrating notification with broadcast receiver. **Services** Service Types of Service, Service Declaration, creating a Service Extending Service Class Start a Service Stop a Service Creating a Bound Service Life cycle of Service.	
UNIT-4	**7**
Fragments What is Fragment? Creating a Fragment, Fragment Lifecycle Handling Fragment Events Fragment Communication.	
UNIT-5	**7**
Background Tasks & Networking Asynctask, Asynctask with Progress Bar Android Networking Connecting to Internet using Asynctask Downloading an Image using Asynctask Alarm Manager Job Scheduler Thread Handlers.	
TOTAL	**35**

Reference:

Programming Android: Java Programming by Zigurd Mennies, Laird Dornim.

Course Title: **Industrial oriented project DBMS lab**	Course Code: **CA 554**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P:C) : **0:0:2:2**	Credits : **2 Credit**
Type of course : **Practical Assignments**	Total Contact Hours : **2 Hours Weekly**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Students should have Basic knowledge of database is required.

Course Objectives:

- To learn concepts of Programming Language
- To learn how to write query in database

Course Content:

S. No.	Name of Experiments	Hours
1	To create a table and then perform Insertion, Deletion and Updating and then execute single line and group line functions.	2
2	To Create a table and execute the TCL and DCL commands.	2
3	To create a table and to manipulate various database objects.	2
4	To create a table and create locks, partitions for the particular database.	2
5	To write a PL/SQL procedure for an application using user- defined and predefined exceptions.	2
6	To write a PL/SQL program for an application using cursor.	2
7	To create a program to prepare reports for an application using functions.	2
8	To create a PL/SQL block for transaction applications of a typical application using triggers.	2
9	To create a PL/SQL block for transaction applications of a typical application using Packages.	2
10	To create an employee application using VB as front end and Oracle as backend.	2

Course Title: **Data Structure & Algorithm Lab**	Course Code: **CA 651**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:) : **0:0:2:2**	Credits : **2**
Type of course : **Practical Assignments**	Total Contact Hours : **2 Hours Weekly**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Must have knowledge about data structure.

Course Objectives:

The practical implementation of data structure will be done by students through this lab work, which will build efficient programming skills in students.

Course Content:

S. No.	Name of Experiments	Hours
1	Addition and Multiplication of Two Polynomials.	2
2	Addition and Transpose of Sparse Matrices.	2
3	Singly Linked List: Create, Display, Insertion, Deletion, Search, Reverse	2
4	Singly Circular Linked List: Create, Display, Insertion, Deletion, Search,	2
5	Doubly Linked List: Create, Display, Insertion, Deletion, Search, Reverse	2
6	Stack Application: Inter conversion of Infix, Prefix & Postfix	2
7	Stack Application: Palindrome & Matching Parenthesis.	2
8	Binary Search Tree Implementation: Creation, Insertion, Deletion, Copy, Mirror, Traversal (Pre-order, In-order).	2
9	Queue Application: Job Scheduling.	2
10	Graph Application: Depth First Search, Breadth First Search, and Shortest Path Algorithm.	2

Course Title: **Android Lab**	Course Code: **CA 655**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:2**	Credits : **2 Credit**
Type of course : **Practical Assignments**	Total Contact Hours : **2 Hours Weekly**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Knowledge about JAVA and OOPS is required.

Course Objectives:

The Android environment

- Tools for creating Android applications
- The Android approach to structuring application
- Basic user interfaces
- Application life cycles

Course Content:

S. No.	Name of Experiments	Hours
1	Create the simple calculator.	2
2	Create an app that explores the life-cycle of activity	2
3	Create an app of registration form	2
4	Create a simple game	2
5	Create a Music Player using Spiner.	2
6	Create a Chat application	2
7	Create an application using Navigation Drawer	2
8	Create an application of notification	2
9	Create an application of game	2
10	Create an application of android tutorial using SQLite	2

Course Title: **Employability Skills -V**	Course Code: **EM 102**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P:C) : 2**:0:0:2**	Credits : **2 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **24**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Course Objectives:

To have good overall development for placement

Course Content:

S. No.	Topic	Details	Contact
1	Communication	Role Play, Reading, Formal writing skills listening, Interaction Process, Interpersonal Relationship	3
2	Attitude & Manners	Motivation, Team Building, Winning Strategy, CAN DO.	3
3	Preparation, presentation	Presentation skills. Preparation Skills,	3
4	Industry	Concept & Importance of SIP, Industrial Mentoring & Networking	3
	TOTAL		**12**

References:

Brilliant employability skills by Trought, Frances

Course Title: **Software Engineering**	Course Code: **CP 202**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Should have basic idea about software development life cycle

Course Objectives:

- To learn about project management.
- Understand software development life cycle
- Understand system design and analysis of a program.

Course Content:

Topic and Contents	Hours
UNIT-1: INTRODUCTION TO SOFTWARE ENGINEERING	**7**
Introduction to Software Engineering: Introduction, Definitions of Software Engineering, Program V/s. Software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software Processes, Software Quality Attributes, Key challenges faced by the Software Engineering, Software Engineer, SDLC, Software System Development Methodologies, CASE tools.	
UNIT-2: SOFTWARE PROJECT MANAGEMENT	**7**
Software Project Management: Project Management Process, Feasibility Study, Software Project Planning, Project Execution, Monitoring and Control, Project Termination Analysis, SCM, Process Management Process, CMM, Risk Management Process, Software Project Planning, Scheduling a Software Project.	
UNIT-3: REQUIREMENT ENGINEERING	**7**
Requirement Engineering: Introduction to Requirement Engineering, Functional Requirements, Non-Functional Requirements, Domain Requirements, Requirement Engineering Process, Software Requirements Specification (SRS)	
UNIT-4: STRUCTURE ANALYSIS AND DESIGN	**7**
Structured Analysis & Design: Data Modelling, Data Objects, Attributes and Relationships, Cardinality And Modality, Entity – Relationship Diagram , Functional Modelling , Data Flow Diagram , Logical And Physical DFDs , Levelling Of DFDs, Control Flow Diagram, Behavioural Modelling, Data Dictionary, Structured English, Decision Trees, Decision Table, Software Design Model, Conceptual and Technical Designs, Characteristics of a Good Design, Design Principles, Design Guidelines, Decomposition and Modularity	
UNIT-5: QUALITY ASSURANCE ACTIVITY	**7**
Quality Assurance Activities: Types of Quality Assurance Activities, Verification and Validation, Testing, Testing Fundamentals, Strategic Issues in Testing, Test Plan, Testing Principles, General Testing Strategies, Code Testing, Specification Testing, Black Box Testing, White Box Testing, Testing Process.	
TOTAL	**35**

Reference:

1. C. Banerjee, “Software Engineering”, First Edition, Genius Publications
2. Roger, S. Pressman, “Software Engineering-A Practitioner’s Approach”, Third Edition, McGraw Hill
3. R.E. Fairley, “Software Engineering Concepts”, McGraw Hill
4. Jalote “An Integrated Approach to Software Engineering”, Narosa Publishing House.

Course Title: **Project Stage -I**	Course Code: **PE 652**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **0:0:2:2**	Credits : **2 Credit**
Type of course : **Practical Assignments**	Total Contact Hours: **2 Hours Weekly**
Continuous Internal Evaluation: **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Students have the knowledge of at least one programming language, database and software engineering concept.

Course Objectives:

Students are able to learn the development of software.

Course Content:

Topics and Contents	Hours
PROJECT STAGE- I	
Minor Project	2 Hours Weekly

Course Title: **Java Lab**	Course Code: **CA 615**
Semester : **II**	Core / Elective : **Elective**
Teaching Scheme in Hrs (L:T:P) : **0:0:2**	Credits : **2 Credit**
Type of course : **Practical Assignments**	Total Contact Hours : **2 Hours Weekly**
Continuous Internal Evaluation: **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-Requisites:

Knowledge of OOPs concepts

Course Objectives:

The major objective of this course that student should understand to learn the concept of Java technology.

Course Content:

S.no	Topic and Contents	Hours
1	WAP to swap two numbers without using third variable.	2 hours weekly
2	WAP to check whether a number is Armstrong or not.	2 hours weekly
3	WAP to implement the Concept of Function Overloading.	2 hours weekly
4	WAP to implement the Concept of Function Overriding.	2 hours weekly
5	WAP to implement the Exceptional Handling.	2 hours weekly
6	WAP of an applet that receives two numerical values as the input from user and displays the sum of these two numbers.	2 hours weekly
7	WAP for displaying product list along with their prices and then allow user to buy any1 item from them with required quantity.	2 hours weekly
8	WAP to implement multithreading (three threads using single run method).	2 hours weekly
9	WAP to implement the calculator.	2 hours weekly
10	WAP for Sending e-mail in Java	2 hours weekly

Course Title: **Programming in Java**	Course Code: **CA 661**
Semester : **II**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P) : **3:0:0**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-Requisites:

The major objective of this course that student should know the basic concepts of Object-Oriented Programming Language

Course Contents:

Topic and Contents	Hours
UNIT-1 Introduction to Java	**07**
Enterprise, J2EE Architecture, API JDBC, API J2EE Fundamentals, J2EE multi-tier architecture, Web Applications in J2EE, Apache Tomcat5.0 Server Configuration and important file. Http protocol with client and server model.	
UNITS-2: Servlets Fundamentals	**07**
architecture, life cycle of a servlet, method of Servlet life cycle, initialization, javax. servlet and javax. servlet. http package and method of this package, servlets and HTML, Handling HTTP requests and Responses, retrieving data in servlet using GET and POST methods.	
UNITS-3: JDBC	**07**
JDBC, JDBC servlet , inter servlet communication, different packages of JSP and servlets. Servlet sessions management technique using cookies, URL Rewriting, Hidden Form , HTTP Session methods, JDBC connection pool, servlet security	
UNIT-4 JSP Fundamentals	**07**
architecture , JSP Life Cycle, Difference between JSP and Servlet, JSP elements (JSP Expression , JSPScriptlet , JSP Directivies, JSP Declaration) standard actions, (setProperities, getProperties, getParameter, setParameter, useBean, param), Implicit objects, JSP errors, JSP with JDBC connection.	
UNIT 5: J2ME	**07**

introduction, building MID lets, creating a user interface, event handling with commands, tickers, screens, textbox, lists and forms.	
TOTAL	**35**

Reference:

Programming in java by E.Balagurusamy.

Course Title: **Computer Network with AWS**	Course Code: **CA 469**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Student should have basic knowledge of method of cloud computing using through AWS and Networking.

Course Objectives:

Course Objectives

1. To build an understanding of the fundamental concepts of computer networking and AWS Cloud.

2. To familiarize the student with the basic taxonomy and terminology of the computer networking area.

3. To introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking

4. To allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Content:

Unit	Content of the Course	Total Contact Hrs.
I	**UNIT-I Introduction:** Data communication Components: Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, Reference Models (OSI, TCP/IP), Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.	**7**
II	**UNIT-II** Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA	**8**
III	**UNIT-III** Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP,	**7**

	RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.	
IV	**UNIT-IV Transport Layer:** Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm. **Application Layer:** Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography	**7**
V	**UNIT-V** AWS Cloud Computing, Benefits of Cloud Computing, Types of Cloud Computing (Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud)Software as a Service Platform as a Service, Horizontal vs vertical scaling, Cloud Computing Issues, Security, Virtualization and cloud computing, Types of virtualization Introduction to AWS Elastic computing, Introduction to Scaling, ELB(Elastic Load Balancer),Components and types of load balancing	**7**
	Total	**36**

Text / References:

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice
3. Hall India.Computer Networks 4th Ed.: andrew S. Tanenbaum; Pearson Education
1. Computer Networking: J. F. Kurose and K. W .Ross; Pearson Education Asia.
2. Data Communications and Networking: B. a. Forouzan; Tata Mc-Graw Hill.
3. Communication Networks: Garcia and Widjaja; Tata Mc-Graw Hill.

Course Title: **Ecommerce and Digital Marketing**	Course Code: **CA 389**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P) : **3:0:0**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-Requisites:

Student should have knowledge about Amazon, Flipkart like Electronic commerce companies.

Course Objective:

Digital Marketing Course is an initiative designed to educate students and practitioners in the area of Digital Marketing analytics and make them ready for jobs or prepare them to launch campaign for their own organizations.

Course Contents:

Units	Course Contents	Hrs.
1	Introduction: Motivation, Forces behind E-Commerce Industry Framework, Brief history of E Commerce, Advantages and Disadvantages of E- Commerce, Inter Organizational E-Commerce Intra Organizational E- Commerce.	7
2	Architectural framework, Network Infrastructure for E-Commerce Network Infrastructure for E Commerce, Market forces behind I Way, Component of I way Access Equipment, Global Information Distribution Network, Broadband Telecommunication.	7
3	Electronic Payments and Encryption: Overview of Electronics payments, Digital Token based Electronics payment System, Smart Cards, Credit Card I Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking, World Wide Web & Security, Encryption, Transaction security, Secret Key Encryption, Public Key Encryption, Virtual Private Network (VPM), Implementation Management Issues.	7
4	Introduction of social media, Social Media Optimization, e-mail Marketing, Mobile Marketing, performance marketing, online public relations, content marketing, search engine optimization, search engine marketing.	7
5	Introduction to Digital Marketing Tools: Google Analytics, Google Adwords, Google Adsense, Hootsuit, Facebook Campaign Manager, Twitter Campaign Manager.	7
	Total	**35**

Reference:

Digital Marketing: Strategy, Implementation & Practice by Dave Chaffey & Fiona Ellis-Chadwick

Course Title: **Ecommerce and Digital Marketing Lab**	Course Code: **CA 392**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P:C) : **0:0:3:2**	Credits : **2 Credit**
Type of course : **Practical Assignments**	Total Contact Hours : **2 Hours Weekly**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-Requisites:

Basic knowledge of Ecommerce tools and Technologies and Digital Marketing

Course Objective:

- Understanding about the Digital Marketing, Basics of Website creation, SEO and SEM, etc.
- Understanding about new terms like Google Analytics and Social Media Traffic etc.

Course Contents:

Units.	List of Experiments	Total Contact Hrs
1	Marketing	**2 hours weekly**
2	Website Basic	**2 hours weekly**
3	SEO	**2 hours weekly**
4	SEM	**2 hours weekly**
5	Email Marketing	**2 hours weekly**
6	ORM	**2 hours weekly**
7	Google Analytics	**2 hours weekly**
8	Google AdSense	**2 hours weekly**
9	Facebook & twitter Traffic	**2 hours weekly**
10	Google web traffic	**2 hours weekly**

Course Title: **Advance Android II**	Course Code: **CP 312**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Student should have knowledge of java, advance java and basic android.

Course Objectives:

Student will be able to, Create location-aware applications, Create custom "services" that multi-task and run in the background, Monitor, manage and control Android's Wi-Fi networking capabilities, Monitor, manage and control Android's Bluetooth networking capabilities, Monitor, manage and control Android's telephony capabilities (abilities to place receive and manage calls).

Course Content:

Unit No.	Topic and Contents	Hours
1	**Concept of Adv. Android:** Introduction to adv. Android, activity and intents, testing and debugging backwards compatibility, support library.	7
2	**User Interface:** User interaction with intuitive navigation, delightful user experience, testing your UI.	7
3	**Background Task:** connection to the internet, notification and background tasks, triggering scheduling and optimizing background tasks.	7
4	**Data saving retrieving loading:** storing data in your APP, storing data using SQLite, sharing data: content resolvers and content provider, loading data using loaders.	7
5	**Polish & publish :** permission and libraries, security best practices, widgets, publishing your app.	7
	TOTAL	**35**

Reference:

Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides) By: Bill Philips & Brian Hardy.

Course Title: **Advance Web Development**	Course Code: **CA 384**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P:C) : **3:0:0:3**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-Requisites:

Knowledge about web technology.

Course Objectives:

Giving the students the insights of the Internet programming and how to design and implement complete applications over the web.

- It covers the notions of Web servers and Web Application Servers, Design Methodologies with concentration on Object-Oriented concepts, Client-Side Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to web applications, Programming Common Gateway Interfaces, Programming the User Interface for the web applications.

Course Assessment & Evaluation:

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

Course Contents:

Topic and Contents	Hours
UNIT-1:	07
Overview of PHP: Introduction to web & internet, Introduction to server, understanding local host server, Starting PHP, PHP syntax and variables, Operators and Expressions, Conditional Branching and Looping Statements, Learning Arrays in PHP.	
UNITS-2:	07
Advance PHP: String and Math functions in PHP, Introduction HTML Form Elements and Fields, Accessing PHP, Query Strings and Hyperlinks, Describing Pre-Defined Variables - Super Global Arrays, Understanding Functions, what are the Scope of variables, Usage of Include and require statements, Introduction to files Handling, Classes and Objects.	
UNITS-3:	07
Word Press: Overview, setting up and Installing Word Press, Introduction to Blogging, Designing, Theme Installation, Theme Customization, Working with Word Press Plugin, Working with Ecommerce plugin.	
UNIT-4:	07
Magento and Opencart: Installing and Working with Magento and Opencart, Installing Magento and Opencart Theme.	
Unit-5	07
MYSQL Database	
TOTAL	**35**

Reference:

1. Blanck, Peter. EQuality: The Struggle for Web Accessibility by Persons with Cognitive Disabilities, Cambridge Disability Law and Policy Series, 2015.
2. Burgstahler, Sheryl. Universal Design in Higher Education: From Principles to Practice, Harvard Education Press, 2008.

Course Title: **Employability Skills - VIII**	Course Code: **EM 303**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P) : **0:2:0**	Credits : **1 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **12**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Knowledge about grammar

Course Objectives:

1. Self-management
2. Interacting with other

Course Content:

Topic and Contents	Hours
UNIT 1- Quantitative	3
Permutation and combination, Clock and calendar, Data Interpretation and sufficiency, Inequalities	
UNIT-2	3
Puzzles, Statement & Assumptions, Strong & Weak Arguments, Verbal and non-verbal reasoning,	
UNIT – 3 Motivation	3
Practice Sessions on Leadership thru case method,	
UNIT- 4 Group Discussions & PI	3
Objective and Managing GD/PI, GD/PI-Technical /Mkt/HR/ IT/Gen round, Factual, Argumentative, Opinion, Abstract GDs, Practice, Mock, Recorded PI/GD.	

References:

Brilliant employability skills by Trought, Frances

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Course Title: **Project Stage – II**	Course Code: **PE 701**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P) : **0:0:3**	Credits : **2 Credit**
Type of course : **Practical Assignments**	Total Contact Hours : **2 Hours Weekly**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Students have the knowledge of at least one programming language, database and software engineering concept.

Course Objectives:

Students are able to learn the development of software.

Course Content:

Topic and Contents	Hours
PROJECT STAGE -II	
Major project	2 Hour weekly

Course Title: **Project Training Seminar -II**	Course Code: **SM 701**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P) : **0:0:3**	Credits : **2 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Basic knowledge of minimum one programming is required.

Course Objectives:

To learn concepts of Development of project.

Course Content:

Topic and Contents	Hours	Marks
a) Student presentations on various topics. b) At least one technical paper presentation in National/International Conference/Seminar by the Student. c) At least one technical paper publication by the student in Research journal/magazine of National/International repute.	2 hours weekly	60

Course Title: **ERP System**	Course Code: **CA 709**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs. (L:T:P) : **3:0:0**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Basic understanding about software engineering.

Course Objectives:

To make student able to build an understanding of the fundamental concepts of ERP systems, their architecture, and working of different modules in ERP. Students will also able to develop and design the modules used in ERP systems, and can customize the existing modules of ERP systems.

Course Content:

Topic and Contents	Hours	Marks
UNIT-1	7	20
Enterprise-wide information system, Custom built and packaged approaches, Needs and Evolution of ERP Systems, Common myths and evolving realities, ERP and Related Technologies, Business Process Reengineering.		
UNITS-2	7	20
ERP Benefits, classification, Present global and Indian market scenario, milestones and pitfalls, Forecast, Market players and profiles, Evaluation criterion for ERP product, ERP Life Cycle.		
UNITS-3	7	20
Analytical Hierarchy Processes (AHP), Various ERP modules and applications, Vendor selection criteria for successful ERP solution.		
UNIT 4	7	20
ERP implementation strategies, Success and failure factors for implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Useful guidelines for ERP Implementations.		
UNIT 5	07	20
Technologies in ERP Systems and Extended ERP, Case Studies Development and Analysis of ERP Implementations in focusing the various issues discussed in above units Learning and Emerging Issues. Concept of E-Governance: Concept, E-Governance frame work, area of application like public sector, service industry.		
TOTAL	**35**	**100**

Reference Books:

1. **"**Enterprise Resource Planning" by Bansal
2. "Enterprise Resource Planning" by Rajesh Ray
3. Enterprise Resource Planning: Concepts and Practice" by Garg
4. "Concepts in Enterprise Resource Planning" by Monk
5. "Enterprise Resource Planning" by R K Srivastava
6. "Concepts in Enterprise Resource Planning" by Bret Wagner

Course Title: **Colloquium Lab**	Course Code: **CA 261**
Semester : **III**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:3**	Credits : **2 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **20**
Continuous Internal Evaluation : **60 Marks**	ESE : **40 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-Requisites:

Confidence, knowledge, willing to learn.

Course Objectives:

3. Group discussion about various topics will make technical growth of student.
4. Group discussion will increase confidence level of student.

Course Contents:

List of Experiments	Total Contact Hrs.
Group Discussion among students on various topics related to the Recent technological issues or social issues as well.	2 hrs. Weekly

Course Title: **Artificial Intelligence**	Course Code: **CP 407**
Semester : **III**	Core / Elective : **Elective**
Teaching Scheme in Hrs. (L: T:P) : **3:0:0**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours: **35**
Continuous Internal Evaluation: **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Background in computer programming, undergraduate algorithms and data structures, and basic discrete mathematics and probability theory.

Course Objectives:

Various symbolic knowledge representations to specify domains and reasoning tasks of a situated software agents.
Use different logical systems for inference over formal domain representations, and trace how a particular inference algorithm works on a given problem specification.

Course Content:

Topic and Contents	Hours
UNIT-1	**07**
Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production Systems Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, best first Search. A* algorithm, AO* algorithms etc., and various types of control strategies.	
UNITS-2	**07**
Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic Resolution, refutation, deduction, theorem proving, inference, monotonic and no monotonic reasoning	
UNITS-3	**07**
Probabilistic reasoning, Bayes theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning.	
UNIT-4	**07**
Game playing techniques like minimax procedure, alpha-beta cut-offs etc., planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.	
UNIT 5	**07**
Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.	
TOTAL	**35**

Course Title: **Research Methodologies**	Course Code: **CA 723**
Semester : **III**	Core / Elective : **Elective**
Teaching Scheme in Hrs. (L:T:P) : **3:0:0**	Credits : **3 Credit**
Type of course : **Lecture + Assignments**	Total Contact Hours : **35**
Continuous Internal Evaluation : **40 Marks**	ESE : **60 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

References:

- Thomas Dean-Artificial Intelligence-Theory & Practice, Pearson Education, Asia.
- Alison Cawsey - The Essence of Artificial Intelligence, Pearson Education, Asia.

Pre-requisites:

Basic understanding about research.

Course Objectives:

- Learn about primary and secondary data collection methods
- Use of sampling
- Algorithm design and development

Course Content:

Topic and Contents	Hours
UNIT-1: Introduction to Research Methods	7
Philosophy of Science, Evolutionary Epistemology, Scientific Methods, Hypotheses Generation and Evaluation, Code of Research Ethics, Definition and Objectives of Research, Various Steps in Scientific Research, Types of Research; Research Purposes - Research Design - Survey Research - Case Study Research.	
UNITS-2: Data Collection and Sampling Design	7
Sources of Data: Primary Data, Secondary Data; Procedure Questionnaire- Survey and Experiments – Design of Survey and Experiments - Sampling Merits and Demerits - Control Observations - Procedures – Sampling Errors.	
UNITS-3: Statistical Modelling and Analysis	7
Statistical Modelling and Analysis, Time Series Analysis Probability Distributions, Fundamentals of Statistical Analysis and Inference, Multivariate methods, Concepts of Correlation and Regression, Fundamentals of Time Series Analysis and CSpectral Analysis, Error Analysis, Applications of Spectral Analysis.	
UNIT-4: Evolutionary Algorithms	7
Introduction to evolutionary algorithms - Fundamentals of Genetic algorithms, Simulated Annealing, Neural Network base optimization,	

Optimization of fuzzy systems.	
UNIT 5: Research Report	7
Structure and Components of Research Report, Types of Report, Layout of Research Report, Mechanism of writing a research report	
TOTAL	35

Reference Books:

1. C.R. Kothari, Research Methodology Methods and Techniques, 2/e, Vishwa Prakashan, 2006.
2. Bendat and Piersol, Random data: Analysis and Measurement Procedures, Wiley Interscience, 2001.
3. Shumway and Stoffer, Time Series Analysis and its Applications, Springer, 2000.
4. Jenkins, G.M., and Watts, D.G., Spectral Analysis and its Applications, Holden Day, 1986.
5. Donald R. Cooper, Pamela S. Schindler, Business Research Methods, 8/e, Tata McGraw-Hill Co. Ltd., 2006.

Course Title: **Industrial Training**	Course Code: **PT 702**
Semester : **IV**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P) : **0:0:0**	Credits : **18 Credit**
Type of course : **Practical**	Total Contact Hours :
Continuous Internal Evaluation : **120 Marks**	ESE : **80 Marks**
Programs: **MASTER OF COMPUTER APPLICATIONS**	

Pre-requisites:

Domain Specific Knowledge.

Course Objectives:

To provide industry exposure to the student, 6 months training in a repute software industry is mandatory for every student of Vth Semester.

Course Content:

Units	Course Contents	Total Contact Hrs.
1	Trainings as per the industrial requirements.	18 hrs week