NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)

Affiliated to

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY UTTAR PRADESH, LUCKNOW

Evaluation Scheme & Syllabus

For

Master of Computer Applications

MCA

Second Year

(Effective from the Session: 2022-23)

NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
(AN AUTONOMOUS INSTITUTE)

Master of Computer Applications

MCA

EVALUATION SCHEME

SEMESTER-III

S. No.	Subject Codes	Subject Name	Periods			Evaluation Schemes				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	AMCA0301Z	Software Engineering	3	0	0	30	20	50		100		150	3
2	AMCA0302Z	Web Technology	3	0	0	30	20	50		100		150	3
3	AMCA0304	Computer Networks	3	0	0	30	20	50		100		150	3
4	AMCA0305	Problem Solving using Python	3	0	0	30	20	50		100		150	3
5		Departmental Elective-II	2	0	0	30	20	50		50		100	2
6	AMCA0351	Software Engineering Lab	0	0	4				50		50	100	2
7	AMCA0352	Web Technology Lab	0	0	4				50		50	100	2
8	AMCA0355	Problem Solving using Python Lab	0	0	4				50		50	100	2
9		Departmental Elective-II Lab	0	0	2				50			50	1
10	AMCA0359	Mini Project	0	0	4				50		50	100	2
	GRAND TOTAL							**250**	**250**	**450**	**200**	**1150**	**23**

****List of MOOCs (Coursera) Based Recommended Courses for Second Year (Semester-III) MCA Students**

S. No.	Subject Code	Course Name	University/Industry Partner Name	No of Hours
1	AMC0057	Process Data from Dirty to clean	Offered by Google	22
2	AMC0132	Analyze Data to Answer Questions	Offered by Google	24
3	AMC0058	Share Data through Art of Visualization	Offered by Google	23
4	AMC0059	Introduction to Google SEO	USDAVIS University of California	14
5	AMC0060	Google SEO Fundamentals	USDAVIS University of California	29
6	AMC0061	Optimizing a website for Google Search	USDAVIS University of California	14

Abbreviation Used: -

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

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ELECTIVE

List of Departmental Electives (Semester- III)

ELECTIVES-II		
S. No	**Subject Code**	**Subject Name**
1	AMCA0321	CRM Advance Administration
2	AMCA0322	Advance Concepts of Optimization
3	AMCA0323	Advance concepts of Analytics
4	AMCA0324	Advance Software Testing

ELECTIVES-II LAB		
S. No	**Subject Code**	**Subject Name**
1	AMCA0321P	CRM Advance Administration Lab
2	AMCA0322P	Advance Concepts of Optimization Lab
3	AMCA0323P	Advance concepts of Analytics Lab
4	AMCA0324P	Advance Software Testing Lab

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Master of Computer Applications

MCA

EVALUATION SCHEME

SEMESTER -IV

S. No.	Subject Codes	Subjects Name	Periods			Evaluation Schemes				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	AMCA0401	Artificial Intelligence	3	0	0	30	20	50		100		150	3
2	AMCA0402	Cloud Computing	3	0	0	30	20	50		100		150	3
3		Departmental Elective- III	2	0	0	30	20	50		50		100	2
4		Departmental Elective – III Lab	0	0	2				50			50	1
5	AMCA0458	Colloquium	0	0	4				100			100	2
6	AMCA0459	Industrial Project/ Dissertation	0	0	12				250		350	600	12
	GRAND TOTAL							**150**	**400**	**250**	**350**	**1150**	**23**

List of MOOCs (Coursera) Based Recommended Courses for Second Year (Semester-IV) MCA Students

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours
IV	AMC0056	Data Analytics with R Programming	Offered by Google	37 hrs.
IV	AMC0062	Advance Content and social tactics to optimize SEO	USDAVIS University of California	18 hrs.

Abbreviation Used: -

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Master of Computer Applications
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List of Departmental Electives (Semester- IV)

ELECTIVES –III		
S. No.	**Subject Code**	**Subject Name**
1	AMCA0415	Administering cloud and App using Sales force
2	AMCA0416	Search Engine Optimization
3	AMCA0417	Business Data Analytics
4	AMCA0418	Software Quality and Testing

ELECTIVES -III LAB		
S. No.	**Subject Code**	**Subject Name**
1	AMCA0415P	Administering cloud and App using Sales force Lab
2	AMCA0416P	Search Engine Optimization Lab
3	AMCA0417P	Business Data Analytics Lab
4	AMCA0418P	Software Quality and Testing Lab

MCA SECOND YEAR THIRD SEMESTER					
Course Code	AMCA0301Z	**L**	**T**	**P**	**Credit**
Course Title	Software Engineering	3	0	0	**3**

Course objective: To enable students to develop methods and procedures for software development that can scale up for large systems and that can be used consistently to produce high-quality software at low cost and with a small cycle of time. Students will be able to understand the concepts of requirement engineering, designing and its principles, testing techniques and maintenance methods for effective software development.

Pre-requisites: Basic knowledge about software and its types, Basic knowledge of any programming language.

Course Contents / Syllabus

UNIT-I **Introduction** **8 hours**

Introduction: Evolving role of Software, Software Characteristics, Software Crisis, Silver Bullet, Software Myths, Software Process, Software Engineering Phases, Team Software Process (TSP), Emergence of Software Engineering, Software process, Project and Product.

Software Process Models: SDLC, Waterfall Model, Prototype Model, Spiral, Model, Iterative Model, Incremental Model, V Process Model, Agile Methodology.

UNIT-II **Software Requirement** **8 hours**

Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Decision Tables, SRS Document, IEEE Standards for SRS.

UNIT-III **Software Design** **8 hours**

Software Design: Design principles, the design process; Design concepts: Abstraction, Refinement, Modularity (Cohesion and coupling), Software Architecture (Function Oriented Design, Object Oriented Design), Control Hierarchy (Top-Down and Bottom-Up Design), Structural partitioning, Data structure, Software procedure, Information hiding.

Software Measurement and Metrics: Various Size Oriented Measures, Function Point, Design Heuristics for effective modularity, Cyclomatic Complexity Measures: Control Flow Graphs.

UNIT-IV **Software Testing** **8 hours**

Software Testing: Testing Objectives, Unit Testing, Integration Testing, User Acceptance Testing, Regression Testing, testing for Functionality and Testing for Performance, Top Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Test Beds and Test Oracle, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products.

Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

Software Quality Assurance (SQA): Quality concepts, Software quality assurance, SQA activities, Formal approaches to SQA; Statistical software quality assurance; CMM, The ISO standard

UNIT-V **Project Maintenance and Management Concepts** **8 hours**

Software Maintenance: Preventive, Corrective and Perfective Maintenance, Project Management concepts, Planning the Software Project, Cost of Maintenance, Estimation—Empirical Estimation COCOMO- A Heuristic Estimation Techniques, Staffing Level Estimation, Team structures, Risk analysis and management, Configuration Management, Software reengineering, Reverse Engineering, restructuring, Forward engineering, Clean Room software engineering, CASE Tools.

Course outcome: After completion of this course students will be able to

CO 1	Explain various software characteristics and analyze different software Development Models	K1, K2
CO 2	Demonstrate the contents of a SRS and apply basic software quality assurance practices to ensure that design, development meet or exceed applicable standards	K1, K2
CO 3	Compare and contrast various methods for software design.	K2, K3
CO 4	Formulate testing strategy for software systems, employ techniques such as unit testing, Test driven development and functional testing	K3
CO 5	Manage software development process independently as well as in teams and make use of Various software management tools for development, maintenance and analysis.	K5

Text books :

(1) KK Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.

(2) RS Pressman, Software Engineering: A Practitioners Approach, McGraw Hill

(3) Rajib Mall, Fundamentals of Software Engineering, PHI Publication.

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://youtu.be/x-jqSXYE4S4
Unit 2	https://youtu.be/mGkkZoFc-4I
Unit 3	https://youtu.be/sGxgZxwuHzc
Unit 4	https://youtu.be/BNk7vni-1Bo
Unit 5	https://youtu.be/8swQr0kckZI

MCA SECOND YEAR THIRD SEMESTER					
Course Code	AMCA0302Z	**L**	**T**	**P**	**Credit**
Course Title	Web Technology	3	0	0	**3**

Course objective: Understanding the concepts of web technology, internet and Web Designing, Design static and dynamic web pages using HTML and CSS ,understanding and implementing client side script programming using JavaScript , understand how server-side programming works on the web using PHP , apply tools to retrieve the information from the database using PHP.

Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.

Course Contents / Syllabus

UNIT-I	**INTRODUCTION & WEB DESIGN**	**8 hours**

Introduction: Web Technology, Web and web Protocols Governing Web, HTTP Protocol: Request and Response, Web browser and Web servers, Features of Web 2.0

Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation

UNIT-II	**HTML & CSS**	**8 hours**

HTML: Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, Character entities, frames and frame sets. HTML forms.

Style sheets: Introduction to CSS, need for CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS. Overview of some front end web development tools.

UNIT-III	**JAVASCRIPT & XML**	**8 hours**

JavaScript: Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes.

Advance Java Script: Java Script and objects, Java Script oward objects- the DOM and web browser environments, Manipulation using DOM, forms and validations.

DHTML: Combining HTML, CSS and JavaScript, Events and buttons.
XML: Introduction XML

UNIT-IV	**PHP**	**8 hours**

PHP: Downloading, installing, configuring PHP, basic syntax of PHP program, Variables and data types, operators, expressions and statements, decision and looping, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files.

Advance PHP: Cookies and Sessions.

UNIT-V	**PHP AND DATABASE ACCESS in MySQL**	**8 hours**

PHP and MySQL: Basic database concepts, Overview of PHP myadmin for handling MySQL,
Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables.

Course outcome: After completion of this course students will be able to

CO 1	Understanding the concepts of Web Designing.	K1, K2
CO 2	Design a responsive web site using HTML and CSS.	K1, K4
CO 3	Implement interactive web pages using HTML, CSS, and JavaScript.	K3
CO 4	Understanding and implementing PHP programming.	K2
CO 5	Build Dynamic web site using server side PHP Programming and Database connectivity.	K2, K4

Text books :

(1) Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India, 2nd Edition January 2013

(2) Xavier, C, " Web Technology and Design", New Age International, First edition (Reprint- August 2018)

(3) Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson, 5th edition (2012)

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	http://www.nptelvideos.in/2012/11/internet-technologies.html
Unit 2	https://www.youtube.com/watch?v=JsbxB2l7QGY
Unit 3	https://www.youtube.com/playlist?list=PL-JvKqQx2Atf5w_httliQrmqPpL7oLc-W
Unit 4	https://www.youtube.com/playlist?list=PLERZXVMwiajr9lYUA1RVq4_D0VxLuTUHh
Unit 5	https://www.youtube.com/watch?v=uDwSnnhl1Ng&list=PLsyeobzWxl7qtP8Lo9TReqUMkiOp446cV

MCA SECOND YEAR THIRD SEMESTER					
Course Code	AMCA0304	**L**	**T**	**P**	**Credit**
Course Title	Computer Networks	3	0	0	**3**

Course objective: Describe communication models TCP/IP, ISO-OSI model, network topologies along with communicating devices and connecting media. Apply knowledge of error detection, correction and learn concepts of flow control along with error control. Classify various IP addressing techniques, sub netting along with network routing protocols and algorithms. Understand various transport layer protocols and their design considerations along with congestion control to maintain Quality of Service. Understand applications-layer protocols and elementary standards of cryptography and network security.

Pre-requisites: Basic computer concepts and terminology.

Course Contents / Syllabus

UNIT-I	**Data Communications**	**8 hours**

Introduction: Data communication Components and characteristics, Data representation and Data flow. Networks: LAN, WAN, MAN, Topologies. Protocols and Standards: ISO-OSI model and TCP-IP Model. Network Connecting Devices: HUB, Bridge, Switch, Router and Gateways. Transmission Media: Guided and unguided Media Classification and Arrangement: Wired LANs and Wireless LANs

UNIT-II	**Data Link Layer**	**8 hours**

Error Detection and Error Correction: Types of errors, LRC, VRC, Checksum, CRC, and Hamming Code. Flow Control and Error Control: Stop and Wait Protocol, Sliding Window, Go-Back-N-ARQ Protocol and Selective-Repeat ARQ Protocol. Channel Allocation Protocols: Random Access, Controlled and Channelization techniques such as ALOHA, CSMA, CSMA/CD, CDMA/CA, TDMA, FDMA, Token Passing, etc.

UNIT-III	**Network Layer**	**8 hours**

Switching Techniques: Circuit Switching, Packet Switching, and Message Switching. Logical addressing: IPv4 and IPv6 Address schemes, Classes and sub netting Network Layer Protocols: ARP, RARP, BOOTP and DHCP Routing Techniques: Inter domain and Intra domain routing with examples.

UNIT-IV	**Transport Layer**	**8 hours**

Introduction to Transport Layer, Process-to-Process Delivery: Reliable and unreliable Connection, Port and Socket Addressing Transport Layer Protocols with packet formats: User Datagram Protocol(UDP),TransmissionControlProtocol(TCP),StreamControlTransmissionProtocol(SCTP). Congestion Control: Techniques for handling the Congestion Control. Quality of Service (QoS) : Flow Characteristics and techniques to improve QoS.

UNIT-V	**Application Layer**	**8 hours**

Basic Concept of Application Layer: Domain Name System, World Wide Web, Hyper Text Transfer Protocol, Electronic mail, File Transfer Protocol , Remote login. Introduction to Cryptography:Definition,Goal,Applications,Attacks,Encryption,decryption,public-keyandprivatekeycryptography

Course outcome: After completion of this course students will be able to

CO 1	Understanding the concepts of Communication Models.	K1, K2
CO 2	Describe Data link layer, error detection, correction and learn concepts of flow	K1, K4

	control	
CO 3	Classify various IP addressing techniques.	K3
CO 4	Understand various transport layer protocols and their design considerations	K2
CO 5	Understand applications-layer protocols and elementary standards of security	K2, K4

Text books :

(1) BehrouzForouzan,"DataCommunicationandNetworking",McGrawHill

(2) AndrewTanenbaum"ComputerNetworks",PrenticeHall.

(3) WilliamStallings,"DataandComputerCommunication",Pearson

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=lnU-Zw3NEEQ&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=2
Unit 2	https://www.youtube.com/watch?v=29Qdz0FmvmQ&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=3
Unit 3	https://www.youtube.com/watch?v=b6f9vh3cd6w&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=4
Unit 4	https://www.youtube.com/watch?v=8BK70UDgyrc&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=5
Unit 5	https://www.youtube.com/watch?v=bKHRbqwkMkg&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=10

MCA SECOND YEAR THIRD SEMESTER					
Course Code	AMCA0305	**L**	**T**	**P**	**Credit**
Course Title	Problem Solving using Python	3	0	0	**3**

Course objective: In this course, the students will learn basic building blocks of python programming, gain the knowledge of implementation and debugging of basic programs in Python having decision control statements, function and modules, study basic data structure, file and exception handling.

Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.

Course Contents / Syllabus

UNIT-I **Basics of python programming** **8 hours**

Introduction: A Brief History of Python, Applications areas of python, The Programming Cycle for Python, Python IDE.

Elements of Python: keywords and identifiers, variables, data types and type conversion, Indexing and Slicing, operators in python, Operator precedence and associativity, expressions in python.

Conditional Statements: if statement, if-else statement, Nested-if statement and el-if statements.

Loops: Purpose and working of loops, while loop, for loop, else with loop statement, Nested Loops, break, continue and pass statement.

UNIT-II **Function and Modules** **8 hours**

Introduction of Function, built in function, user defined function, Function arguments, Mutability and Immutability, scope rules, Namespaces, Garbage Collection, recursion.

Functional Programming: Lambda functions, higher order functions, Map, filter, Reduce. Closures and its characteristics, Decorators, decorating function with argument, iterable and iterator, Building custom iterator , generator and generator expression, Co-routines.

Modules and Packages: Importing Modules, writing own modules, Standard library modules, Packages in Python.

UNIT-III **Object Oriented Concepts** **8 hours**

Object-oriented programming: User-defined classes, Object as an argument, Class variables and Instance variables, Constructor, Parameterized constructor, Encapsulation, Data hiding, Instance methods, Class method, Static methods, property method, Magic Methods in python, Instances as Return Values.

Inheritance: Introduction to inheritance, Types of inheritance, MRO and super (), Abstract class, Containership.

Polymorphism: Polymorphism in operators, Polymorphism in built-in function, Duck Typing, Polymorphism in inheritance (method overriding), Method Overloading, Operator overloading (defining new behavior of operators).

UNIT-IV **Basic Data structures , Exception and File Handling** **8 hours**

Python Basic Data Structures: Sequence, Packing and Unpacking Sequences, Mutable Sequences, Strings, Basic operations, comparing strings, string formatting, Built-in string methods and function, Lists, Tuples, Sets and Dictionaries with built-in methods, List Comprehension, Looping in basic data structures.

Exception Handling, Errors, Run Time Errors, Handling I/O Exception, Try-except statement, Raise, Assert.

Files and Directories: Introduction to File Handling, Reading and Writing files, Additional file methods, Working with Directories.

UNIT-V	**GUI Programming and Libraries in Python**	**8 hours**

Tkinter: Introduction to GUI programming, Widgets: Frame, Label, Button, Entry, Radio button, Check button, Canvas, and Menu. Creating a GUI Application.

Libraries in Python: Intro to *NumPy:* Basic Operation, Indexing, slicing and Iterating, multidimensional arrays, NumPy, Data types, Reading and writing data on Files.

Intro to Pandas: Series and Data Frames, Grouping, aggregation, Merge Data Frames, Generate summary tables, Group data into logical pieces, Manipulation of data.

Intro to Matplotlib: Scatter plot, Bar charts, histogram, Stack charts, Legend title Style, Figures and subplots, plotting function in pandas, Labelling and arranging figures, Save plots.

Course outcome: After completion of this course students will be able to

CO 1	Write simple python programs and will make use of decision making and loop constructs	K_2,K_3
CO 2	Explain user defined functions and modules in python	K_3,K_6
CO 3	Implement OOPS concepts in Python	K_2
CO 4	Implement python data structures–lists, tuples, set, dictionaries and will be able to perform file handling	K_3
CO 5	Performinput/outputoperationswithfilesinpythonandimplementsearching, Sorting and merging algorithms	K_3,K_4

Text books :

(1) Magnus LieHetland, "Beginning Python-From Noviceto Professional"—ThirdEdition,Apress

(2) Python Programming using Problem solving approach by ReemaThareja OXFORD Higher education

(3) KennethA. Lambert,—Fundamentals ofPython:FirstPrograms,CENGAGE Learning,2012.

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://nptel.ac.in/courses/106/106/106106182/
Unit 2	https://nptel.ac.in/courses/106/106/106106212/
Unit 3	https://nptel.ac.in/courses/106/106/106106145/
Unit 4	https://www.youtube.com/watch?v=ixEeeNjjOJ0&t=4s
Unit 5	https://www.youtube.com/watch?v=NMTEjQ8-AJM

MCA SECOND YEAR THIRD SEMESTER					
Course Code	AMCA0321	**L**	**T**	**P**	**Credit**
Course Title	CRM Advance Administration	2	0	0	**2**

Course objective: Understand the importance of Security in Database Learn the concepts of Objects and Applications Familiarize with concepts of Auditing Learn the concepts of maintaining data in cloud Get knowledge of Data Analytics & Management

Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.

Course Contents / Syllabus

UNIT-I	**Security and Access**	**8 hours**

Enhanced Transaction Security, Session-Bases Permission Sets and Security, Company-wide org Setting, Custom objects: quick look.

UNIT-II	**Objects and Applications**	**8 hours**

Lightning Experience Rollout, Lightning Experience Features Lightning Knowledge setup and customization.

UNIT-III	**Auditing and Monitoring**	**8 hours**

Event monitoring, Event Monitoring Analytics App, Leads & opportunities for lightning experience, Product, quotes & Contracts, Territory management basics.

UNIT-IV	**Cloud Applications**	**8 hours**

Advanced Territory Management, Path & workspaces, , Web chat basics, Omni channel for lightning experience identity for customers, External services Big object Basics

UNIT-V	**Data and Analytics Management**	**8 hours**

Application Lifecycle and Development Models, Change set Development Model, Change set development model, Advance Formula, Apex Triggers, Process Automation Specialist

Course outcome: After completion of this course students will be able to

CO 1	Understand the importance of Security in Database	K1,K2
CO 2	Apply the concepts of Objects and Applications	K1,K2
CO 3	Describe the concepts of Auditing	K3
CO 4	Learn the concepts of maintaining data in cloud	K1,K2
CO 5	Get knowledge of Data Analytics & Management	K1,K3

Text books :

(1) Alok Kumar Rai : Customer Relationship Management : Concepts and Cases(Second Edition), PHI Learning, 2018

(2) Bhasin- Customer Relationship Management (Wiley Dreamtech) ,2019

(3) Salesforce for beginners by Sharif Sahaalane book by Amazon (Online edition)

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=DgurCZsmMvc&list=PLWgzSrReOBh4JSM4CC5OGt1O8q26QCpz7&index=2

Unit 2	https://www.youtube.com/watch?v=IFX_lZhbP6A&list=PLWgzSrReOBh4JSM4CC5OGt1O8q26QCpz7&index=6
Unit 3	https://www.youtube.com/watch?v=wYULDOJ7U0A&list=PLWgzSrReOBh4JSM4CC5OGt1O8q26QCpz7&index=10
Unit 4	https://www.youtube.com/watch?v=jM5IC1N29nU&list=PLWgzSrReOBh4JSM4CC5OGt1O8q26QCpz7&index=16
Unit 5	https://www.youtube.com/watch?v=IrObPmUeVGg&list=PLWgzSrReOBh4JSM4CC5OGt1O8q26QCpz7&index=25

MCA SECOND YEAR THIRD SEMESTER					
Course Code	AMCA0322	**L**	**T**	**P**	**Credit**
Course Title	Advance Concepts of Optimization	2	0	0	**2**

Course objective: To introduce students to Understand how search engine optimization and social media have used the way businesses sell to consumers. To help students to Recognize how marketers use the Google SEO to influence purchase and sell decisions on digital platforms using SEO content and tools. To help students to Appreciate the benefits of integrating Google SEO Fundamentals with the advantages of sell and purchase marketing strategies. To Identify the benefits of Optimize a website for Google search to a business of using social media to engage an audience. To Build, manage, and sustain an active Advance Content and social tactics to optimize SEO

Pre-requisites: Basic Marketing Concepts, Basic Knowledge of Computers

Course Contents / Syllabus

UNIT-I	**Introduction to Search Engine Optimization**	**8 hours**

Introduction To SEO, Technical SEO, Keyword Research Process, Content Planning and Creation, On-Page SEO, Off-page SEO, Avoid Negative SEO, Local SEO

UNIT-II	**Introduction to Google SEO**	**8 hours**

Introduction to Google SEO: Introduction to Google SEO, SEO as a Career, How Search Engines Work, Evolution of SEO , Current SEO Best Practices: Current SEO Best Practices, Introduction to Search Engine Algorithms, SEO of Today, Tomorrow and Beyond: Featured Snippets and Rich Snippets, BERT, Evolution of Keyword Optimization, Your Audience and Building Personas: Your Audience and Building Personas, Persona Development

UNIT-III	**Google SEO Fundamentals**	**8 hours**

Getting Started and Introduction to On-page SEO: Introduction to On-page SEO, Key Areas of SEO Analyzing a Website Using a Web Crawler, Introduction to Off-page SEO: Introduction to Off-page SEO, Off-site SEO Elements, Introduction to Technical SEO: Introduction to Technical SEO, Laying the Structural Foundation With Technical SEO, Keyword Theory & Research: Keyword Theory & Research Introduction, Choosing the Right Keywords

UNIT-IV	**Optimizing a website for Google Search**	**8 hours**

Introduction to Optimizing a Website for Google Search: Applying Keyword Research Introduction, How to Perform a Competitive Keyword Analysis, Analyzing Your Competition, Advanced SEO Strategies: Advanced On-Page SEO, Benefits of a Competitive Content Analysis, Dissecting the Competitive Content Analysis, Mobile/App SEO and Metrics & KPIs:Mobile/App SEO, External App Optimization, App Store Optimization, Creating an SEO Campaign: Creating an SEO Campaign, Scoping an SEO Project, Importance of Achieving Quick Wins, Developing SMART Project Goals.

UNIT-V	**Advance Content and social tactics to optimize SEO**	**8 hours**

Introduction to Advanced Content and Social Tactics to Optimize SEO: Content Marketing Ecosystem, Basics of SEO Recap, Social Media Marketing: Social Media Marketing, Social Media Links & SEO, Influence Marketing: Influence Marketing, Building the Relationship, Advanced: Targeted Advertising Creating World Class Content: Creating World Class Content, Market Data on Content Marketing.

Course outcome: After completion of this course students will be able to

CO 1	Learn important concepts of search engine optimization..	K1

CO 2	Understand to Recognize how marketers use Google SEO to influence purchase and sell decisions on digital platforms using SEO content and tools.	K1
CO 3	Understand the benefits of Google SEO Fundamentals with the advantages of sell and purchase marketing strategies.	K1,K2
CO 4	Understand the benefits of Optimize a website for Google search to a business of using social media to engage an audience.	K2
CO 5	Implement the use of an Advance Content and social tactics to optimize SEO.	K2

Text books :

(1) Digital Marketing for Dummies, Author: Ryan Deiss& Russ Henneberry, Publisher: John Wiley & Sons, Inc

(2) Youtility, Author: Jay Baer, Publisher: Gildan Media, LLC

(3) Epic Content Marketing, Author: Joe Pulizzi, Publication: McGraw Hill Education

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=gw_ZEUjI9KM&list=PLYihddLF-CgZGDFVwB1v699kvl4FMeAr-&index=1
Unit 2	https://www.youtube.com/watch?v=nWh7JrnL2IA&list=PLYihddLF-CgZGDFVwB1v699kvl4FMeAr-&index=2
Unit 3	https://www.youtube.com/watch?v=e2zuivQ1wWU&list=PLYihddLF-CgZGDFVwB1v699kvl4FMeAr-&index=3
Unit 4	https://www.youtube.com/watch?v=egL2EflYt94&list=PLYihddLF-CgZGDFVwB1v699kvl4FMeAr-&index=6
Unit 5	https://www.youtube.com/watch?v=kEj9nw-3-54&list=PLYihddLF-CgZGDFVwB1v699kvl4FMeAr-&index=7

MCA SECOND YEAR THIRD SEMESTER					
Course Code	AMCA0323	**L**	**T**	**P**	**Credit**
Course Title	Advance concepts of Analytics	2	0	0	**2**

Course objective: To help students understand digital marketing practices, inclination of digital consumers and role of content marketing. To provide understanding of the concept of E-commerce and developing marketing strategies in the virtual world to impart learning on various digital channels and how to acquire and engage consumers online. To provide insights on building organizational competency by way of digital marketing practices and cost considerations. To develop understanding of the latest digital practices for marketing and promotion.

Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.

Course Contents / Syllabus

UNIT-I	**Process Data from Dirty to Clean**	**8 hours**

Introduction to focus on integrity, why data integrity is important, balancing objectives with data integrity, dealing with insufficient data, the importance of sample size, using statistical power, Determine the best sample size Clean it up! Why data cleaning is important Recognize and remedy dirty data, Data-cleaning tools and techniques, Cleaning data from multiple sources, Data-cleaning features in spreadsheets, Optimize the data-cleaning process.

UNIT-II	**Advance Data Cleaning**	**8 hours**

Different data perspectives, Using SQL to clean data, Understanding SQL capabilities, Spreadsheets versus SQL, Widely used SQL queries, Advanced data cleaning functions Manually cleaning data: Verifying and reporting results Cleaning and your data expectations The final step in data cleaning Documenting results and the cleaning process: Capturing cleaning changes, Why documentation is important, Feedback and cleaning.

UNIT-III	**Analyze Data to Answer Questions**	**8 hours**

Data analysis basics: The analysis process, organize data for analysis: Always a need to organize, more on sorting and filtering, Sort data in spreadsheets: Sorting datasets, The SORT function, Sort data using SQL: Sorting queries in SQL, Convert and format data: Getting started with data formatting, from one type to another, Data validation, Conditional formatting Combine multiple datasets: Merging and multiple sources, Strings in spreadsheets. VLOOKUP for data aggregation, Aggregate data for analysis, preparing for VLOOKUP, VLOOKUP in action, Identifying common VLOOKUP errors.

UNIT-IV	**Share Data through the Art of Visualization**	**8 hours**

Communicating your data insights, Introduction to communicating your data insights, Understand data visualization: Why data visualization matters, Connecting images with data, A recipe for a powerful visualization, Dynamic visualizations, Design data visualizations: Elements of art, Data visualization impact, Design thinking and visualizations.

UNIT-V	**Sharing data with Tableau**	**8 hours**

Get started with Tableau: Data visualizations with Tableau, Tableau Public and other online tools Meet Tableau, create a data visualization in Tableau, create visualizations in Tableau: The good, the bad, and the ugly, Use data to develop stories: Storytelling with data, bringing ideas to life Use Tableau dashboards: Tableau dashboard basics, from filters to charts. Creating your first Tableau dashboard. Compelling presentation tips, sharing a narrative. The art and science of an effective presentation. Presenting with a framework Weaving data into your presentation, Brittany: Presentation skills for new data analysts, Proven presentation tips, Present like a pro, Anticipate the question, Handling objections, Q&A best practice, Connor:

Becoming an expert data translator		
Course outcome: After completion of this course students will be able to		
CO 1	Learn how to check for data integrity. Discover data cleaning techniques using spreadsheets.	K_2
CO 2	Develop basic SQL queries for use on databases. - Apply basic SQL functions for cleaning and transforming data.	K_1,K_2,K_4
CO 3	Gain an understanding of how to aggregate data in spreadsheets and by using SQL. - Use formulas and functions in spreadsheets for data calculations.	K_3
CO 4	Examine the importance of data visualization. - Learn how to form a compelling narrative through data stories.	K_2,K_6
CO 5	Gain an understanding of how to use Tableau to create dashboards and dashboard filters. - Discover how to use Tableau to create effective visualizations. - Explore the principles and practices involved with effective presentations.	K_2,K_4
Text books :		
(1) Vandana, Ahuja; Digital Marketing, Oxford University Press India (November, 2015).		
(2) Eric Greenberg, and Kates, Alexander; Strategic Digital Marketing: Top Digital Experts.		
(3) David Whitely; E-Commerce: Strategy, Technologies and Applications, McGraw Hill Education.		
Link: NPTEL/ YouTube/ Faculty Video Link:		
Unit 1	https://www.youtube.com/watch?v=9gfER4p1jXM&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=3	
Unit 2	https://www.youtube.com/watch?v=8LgR42WCRl0&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=5	
Unit 3	https://www.youtube.com/watch?v=SUXOFrhWsAQ&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=6	
Unit 4	https://www.youtube.com/watch?v=AZlpYHup1Cw&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=11	
Unit 5	https://www.youtube.com/watch?v=XaHFNhHfXwQ&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=12	

MCA SECOND YEAR THIRD SEMESTER					
Course Code	AMCA0324	**L**	**T**	**P**	**Credit**
Course Title	Advance Software Testing	2	0	0	**2**

Course objective: Explain how and why the timing and level of involvement for the Test Analyst varies when working with different software development lifecycle models Summarize the appropriate tasks for the Test Analyst when conducting analysis activities For a given project scenario, select the appropriate design level for test cases (high level or low-level) Explain the issues to be considered in test case design Summarize the appropriate tasks for the Test Analyst when conducting test execution activities

Pre-requisites: Basic knowledge about software and its types. Basic knowledge of any programming language.

Course Contents / Syllabus

UNIT-I	**Introduction**	**8 hours**

Testing in the Software Development Lifecycle, Test Analysis, Test Design, Low-level and High-level Test Cases, Design of Test Cases, Test Implementation, Test Execution

UNIT-II	**The Test Analyst's Tasks in Risk-Based Testing**	**8 hours**

Introduction, Risk identification, Risk Assessment, Risk Mitigation, Prioritizing the Tests, Adjusting Testing for Future Test Cycles

UNIT-III	**Test Techniques**	**8 hours**

Introduction, Black-Box Test Techniques, Equivalence Partitioning, Boundary Value Analysis, Decision Table Testing, State Transition Testing, Classification Tree Technique, Pair wise Testing, Use Case Testing, Combining Techniques, Experience-Based Test Techniques-Error Guessing, Checklist-Based Testing, Exploratory Testing, Defect-Based Test Techniques.

UNIT-IV	**Testing Software Quality Characteristics**	**8 hours**

Introduction, Quality Characteristics for Business Domain Testing, Functional Correctness Testing, Functional Appropriateness Testing, Functional Completeness Testing, Interoperability Testing, Usability Evaluation, Portability Testing

UNIT-V	**Reviews**	**8 hours**

Introduction, Using Checklists in Reviews, Requirements Reviews, User Story Reviews, Test Tools and Automation, Types of Test Tools, Test Design Tools, Test Data Preparation Tools, Automated Test Execution Tools.

Course outcome: After completion of this course students will be able to

CO 1	Perform the appropriate testing activities based on the software development life cycle being used	K1, K2
CO 2	Determine the proper prioritization of the testing activities based on the information provided by the risk analysis	K1, K2
CO 3	Select and apply appropriate test techniques to ensure that tests provide an adequate level of confidence, based on defined coverage criteria	K2, K3
CO 4	Determine the appropriate types of functional testing to be performed	K3
CO 5	Improve the efficiency of the test process with the use of tools	K5

Text books :

(1) BorisBezier,"Black-boxTesting", JohnWiley&Sons,1995, ISBN0-471-12094-4	
(2) RexBlack,"Managingthe TestingProcess(2ndedition)", JohnWiley&Sons: NewYork,2002, ISBN0-471-22398-0	
(3) RexBlack, "AdvancedSoftwareTesting,Volume1", RockyNook,2009, ISBN978-1-933-952-19-2	
Link: NPTEL/ YouTube/ Faculty Video Link:	
Unit 1	https://www.youtube.com/watch?v=jyzBKgXxHww&list=PLJ5C_6qdAvBHiqw9Yc7-_vyfbBG1Bmfg_&index=3
Unit 2	https://www.youtube.com/watch?v=EjE6gv4SFo0&list=PLJ5C_6qdAvBHiqw9Yc7-_vyfbBG1Bmfg_&index=5
Unit 3	https://www.youtube.com/watch?v=7Pafz_FLX4Q&list=PLJ5C_6qdAvBHiqw9Yc7-_vyfbBG1Bmfg_&index=7
Unit 4	https://www.youtube.com/watch?v=zCCHgZzxLag&list=PLJ5C_6qdAvBHiqw9Yc7-_vyfbBG1Bmfg_&index=14
Unit 5	https://www.youtube.com/watch?v=PoGMx5CAA84&list=PLJ5C_6qdAvBHiqw9Yc7-_vyfbBG1Bmfg_&index=21

MCA SECOND YEAR THIRD SEMESTER			
Course Code	AMCA0351	**L T P**	**Credit**
Course Title	Software Engineering Lab	**0 0 4**	**2**

Suggested list of Experiment

Sr. No.	Name of Experiment	CO
1	Prepare a SRS document in line with the IEEE recommended standards on any one of the following mini project: • Covid Vaccination System • Online Exam Management • Academic performance Evaluation System • Online Grocery Store • College Admission System	CO1
2	Design the mini project.	CO3
3	Create a technical document on mini project.	CO2
4	Draw the architectural diagram of mini project.	CO4
5	Perform forward engineering in java. (Model to code conversion)	CO5
6	Perform reverse engineering in java. (Code to Model conversion)	CO5
7	Demo of JIRA software (Test case management & Agile software development).	CO1

Note: The instructor may add/delete/modify/tune mini project, wherever he/she feels in a justified manner.

Lab Course Outcome:

CO 1	Identify ambiguities, inconsistencies and incompleteness from a requirements specification and state functional and non-functional requirement	K2,K4
CO 2	Identify different actors and use cases from a given problem statement and draw use case diagram to associate use cases with different types of relationship	K3, K5
CO 3	Draw a class diagram after identifying classes and association among them	K4, K5
CO 4	Graphically represent various UML diagrams, and associations among them and identify the logical sequence of activities undergoing in a system, and represent them pictorially	K4, K5
CO5	Able to use modern engineering tools for specification, design, implementation and testing	K3, K4

MCA SECOND YEAR THIRD SEMESTER			
Course Code	AMCA0352	**L T P**	**Credits**
Course Title	Web Technology Lab	**0 0 4**	**2**

Course objectives: The course enable the students to :

1	Design static and dynamic web pages using HTML, CSS and Java Script.	K6
2	Apply server-side programming on the web using PHP	K3
3	Design retrieves the information from the database using PHP.	K6

Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.

The programs in Web Technology lab will cover the following concepts :

1. Basic HTML Tags, Table Tags, List Tags, Image Tags, Hyperlink, Forms.
2. Implement forms using HTML Frames, CSS.
3. Basic Java script syntax, operators, conditional statements, loop control statements.
4. Java scripts pre-defined and user defined functions, arrays.
5. Java Script objects, DOM.
6. Basic PHP syntax, operators, conditional statements, loop control statements.
7. PHP pre-defined and user defined functions, arrays.
8. Form handling using PHP.
9. File inclusion using PHP.
10. PHP cookies and sessions.
11. MySQL database handling using PHP, creation, updation, deletion of database.
12. MySQL table creation, updation, and deletion using PHP.
13. Data insertion, updation, deletion from My SQL database table using PHP.

Course outcomes: After completing this course student will be able to :

CO 1	Design a responsive web site using HTML, CSS, Java Script	K6
CO 2	Understanding and implementing PHP programming.	K2, K6
CO 3	Build Dynamic web site using server side PHP Programming and Database connectivity.	K6

Text books:

1. Web Technologies, Black Book, Dreamtech Press
2. Internet and World Wide Web How to program, P.J. Deitel& H.M. Deitel, Pearson
3. Xavier, C, " Web Technology and Design", New Age International
Reference
1. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication
2. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
1. Developing Web Applications in PHP and AJAX, Harwani, McGraw Hill
Video Links :
https://nptel.ac.in/courses/106105084/
http://www.nptelvideos.in/2012/11/internet-technologies.html
http://www.nitttrchd.ac.in/sitenew1/nctel/comp_sc.php
https://spoken-tutorial.org/tutorial-search/?search_foss=HTML&search_language=English
https://www.youtube.com/watch?v=JsbxB2l7QGY
https://www.youtube.com/playlist?list=PL-JvKqQx2Atf5w_httliQrmqPpL7oLc-W

MCA SECOND YEAR THIRD SEMESTER			
Course Code	AMCA0355	**LTP**	**Credits**
Course Title	Problem Solving using Python Lab	**0 04**	**2**

Course objectives:

To understand why Python is a useful scripting language for developers. To learn how to design and program Python applications.To learn how to use lists, tuples, and dictionaries in Python programs.
To learn how to identify Python object types.To learn how to use indexing and slicing to access data in Python programs.

EXPERIMENT LIST

Name of Experiment

S.N.	ProgramTitle	Category
1	PythonProgram toprint “HelloPython”	Basic
2	PythonProgram toreadandprint valuesofvariablesofdifferentdatatypes.	Basic
3	PythonProgram toperformarithmeticoperationsontwointegernumbers	Basic
4	PythonProgram toSwap twonumbers	Basic
5	PythonProgramtoconvertdegreeFahrenheitintodegreeCelsius	Operators
6	PythonProgram todemonstratetheuse ofrelationaloperators.	Operators
7	PythonProgramtounderstandtheworkingofbitwiseandlogicaloperators.	Operators
8	PythonProgram tocalculaterootsofaquadratic equation.	Conditional
9	PythonProgram tocheckwhetherayearisleapyearornot.	Conditional
10	PythonProgramtofindsmallestnumberamongthreenumbers.	Conditional
11	PythonProgram tomakeasimplecalculator.	Conditional
12	PythonProgramtofindthefactorialofanintegernumber.	Loop
13	PythonProgramtofindthereverseofanintegernumber.	Loop
14	PythonProgramtofindandprintallprimenumbersinalist.	Loop
15	PythonProgramtoFindtheSumof‘n’NaturalNumbers	Loop
16	PythonProgramtoprintsumofseries:-1/2+2/3+3/4+ .....+n/(n+1)	Loop
17	PythonProgramtoprintpatternusingnestedloop	Loop
18	PythonProgramtoDisplaythemultiplicationTableofan Integer	Loop
19	PythonProgram toPrinttheFibonaccisequence	Loop
20	PythonProgramtoCheckArmstrongNumber	Loop
21	PythonProgram toFind ArmstrongNumberin an Interval	Loop
22	PythonProgramtocheckUsingfunctionwhether apassedstringis Palindromeornot	Function
23	PythonProgram usingfunctionthattakesanumberasaparameter,check Whetherthenumberisprimeornot.	Function
24	PythonProgram usingfunctionthatcomputesGCD oftwogivennumbers.	Function

25	PythonProgram toFind LCM oftwoormoregivennumbers.	Function
26	PythonProgram toConvertDecimalto Binary,OctalandHexadecimal	Function
27	PythonProgram To FindASCIIvalueofa character	Basic
28	PythonProgram toDisplayCalendar	Loop
29	PythonProgramtoAddTwoMatrices	Loop
30	PythonProgramtoMultiplyTwoMatrices	Loop
31	PythonProgramto Transpose aMatrix	Loop
32	PythonProgramtoSortWordsinAlphabeticOrder	Sorting
33	PythonProgramtoDisplayFibonacciSequenceUsingRecursion	Recursion
34	PythonProgramtoFindFactorialofNumberUsingRecursion	Recursion
35	PythonProgramthatimplements differentstringmethods.	String
36	PythonProgramtoswaptwovaluesusingtupleassignment.	Tuple
37	PythonProgramtounderstandtheconceptofExceptionHandling	Exception Handling
Courseoutcome: At the endofcourse,thestudentwillbeableto		
CO1	Writesimplepythonprograms.	K_2,K_3
CO2	Implementpythonprogramsusingdecisioncontrolstatements	K_3,K_6
CO3	Writingpythonprograms usinguserdefinedfunctions andmodules	K_2
CO4	Implementprogramsusingpythondatastructures–lists,tuples,set, Dictionaries	K_3
CO5	Writeprogramstoperforminput/outputoperationsonfiles	K_3,K_4

MCA SECOND YEAR THIRD SEMESTER			
Course Code	AMCA0321P	**L T P**	**Credits**
Course Title	CRM Advanced Administration Lab	**002**	**1**

Course objectives:

Student will be able to learn the fundamentals of CloudGet the knowledge of Database Management Familiarize with concepts of reports design

Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.

The programs in CRM Advanced Administration Lab will cover the following concepts :

- Cloud Applications
- Set Up Salesforce Knowledge
- Set Up Case Escalation and Entitlements
- Import and Export with Data Management Tools
- Setup Case Escalation and EntitlementsImprove Data Quality for a Recruiting App
- Improve Data Quality for Your Sales and Support Teams
- Evaluate Report Data with Formulas
- Embed Dashboards and Report Charts on Lightning Pages
- Prepare for your Advanced Administrator Certification Exam (CRT211)

Course outcomes: After completing this course student will be able to :

CO 1	Student will learn about cloud functionality	K6
CO 2	Able to handle and manage Data	K2, K6
CO 3	Familiarize with concepts of reports design	K6

Text Books:

1. Alok Kumar Rai : Customer Relationship Management : Concepts and Cases(Second Edition), PHI Learning, 2018
2. Bhasin- Customer Relationship Management (Wiley Dreamtech) ,2019
3. Salesforce for beginners by ShaarifSahaalane book by Amazon (Online edition)

Reference Book:

4. Salesforce Essentials for Administrators , By ShrivasthavaMohith, Edition Ist ,2018

5. Salesforce : A quick Study laminated Reference Guide by Christopher Mathew Spencer eBook by Amazon (Online)
6. Mastering Salesforce CRM Administration By Gupta Rakesh Edition IInd 2018
ReferenceLinks:
www. Trailhead.salesforce.com
www.mindmajix.com/salesforce-tutorial
www,youtube.com/watch?v=7K42geizQCI

MCA SECOND YEAR THIRD SEMESTER			
Course Code	**AMCA0322P**	**L T P**	**Credits**
Course Title	**Advanced Concept of Optimization Lab**	**0 0 2**	**1**

Course objectives:

To introduce students to Understand how search engine optimization and social media have used the way businesses sell to consumers. To help students to Recognize how marketers use the Google SEO to influence purchase and sell decisions on digital platforms using SEO content and tools. To help students to Appreciate the benefits of integrating Google SEO Fundamentals with the advantages of sell and purchase marketing strategies.

Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.

The programs in Advanced concept of Optimization Lab will cover the following concepts :

1. Off Page Part 1
   a. Backlinks Explanation and Creation
   b. Link Quality, Link Juice
   c. Do follow & No follow
   d. Anchor Text and its types
2. Off Page Part –II
   a. Earning Backlinks
   b. Creating Backlinks
   c. Buying Backlinks
   d. Making Backlinks
3. Local SEO
   a. Local SEO Explanation
   b. Ranking Factor
   c. Google My Business
   d. Citation
4. YouTube SEO
   a. YouTube Ranking factor
   b. YouTube Keyword Research
   c. How to Upload videos on YouTube?
   d. How to optimized videos on YouTube
5. Audit & Strategy
   a. Key Elements in SEO Audit Report
   b. Auditing Software's
   c. Audit Report Presentation
   d. Phase- 1 and Phase -2 SEO Auditing Strategy

Course outcomes: After completing this course student will be able to :

CO 1	Understand important concepts of search engine optimization..	K6

CO 2	Understand to Recognize how marketers use Google SEO to influence purchase and sell decisions on digital platforms using SEO content and tools.	K2, K6
CO 3	Understand the benefits of Google SEO Fundamentals with the advantages of sell and purchase marketing strategies.	K6

Text books:

- Digital Marketing for Dummies, Author: Ryan Deiss& Russ Henneberry, Publisher: John Wiley & Sons, Inc.
- Youtility, Author: Jay Baer, Publisher: Gildan Media, LLC
- Epic Content Marketing, Author: Joe Pulizzi, Publication: McGraw Hill Education

Reference book:

- New Rules of Marketing and PR, Author: David Meerman Scott, Latest Edition: 6th Edition, Publication: John Wiley & Sons
- Social Media Marketing All-in-one Dummies, Author: Jan Zimmerman, Deborah Ng, and Latest Edition: 4th Edition, Publication: John Wiley & Sons Inc.,

MCA SECOND YEAR THIRD SEMESTER			
Course Code	AMCA0323P	**L T P**	**Credits**
Course Title	Advanced concept of Analytics Lab	**00 2**	**1**

Course objectives:

Student will be able to learn the fundamentals of Data Management. Get the knowledge of Query Handling. Familiarize with concepts of Spreadsheet

Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.

The programs in Advanced concept of Analytics Lab will cover the following concepts :

1. Select and remove blank cells, Filter by condition, Transpose data, Change Uppercase to Lowercase, Remove Duplicates
2. Query the Database with CSV File
3. Using Concat function in spreadsheet
4. Using VLOOKUp in spreadsheet
5. Using Join in BigQuery
6. Using Subquery in SQL
7. Use SUMIF, AVERAGEIF Function
8. Use PIVOT Table
9. Add Calculations in Query
10. Import File in Spreadsheet

Course outcomes: After completing this course student will be able to :

CO 1	learn the fundamentals of Data Management	K6
CO 2	Get the knowledge of Query Handling	K2, K6
CO 3	Familiarize with concepts of Spreadsheet	K6

Text books:

• Digital Marketing for Dummies, Author: Ryan Deiss& Russ Henneberry, Publisher: John Wiley & Sons, Inc
• Youtility, Author: Jay Baer, Publisher: Gildan Media, LLC
• Epic Content Marketing, Author: Joe Pulizzi, Publication: McGraw Hill Education
Reference book:
• New Rules of Marketing and PR, Author: David Meerman Scott, Latest Edition: 6th Edition, Publication: John Wiley & Sons
• Social Media Marketing All-in-one Dummies, Author: Jan Zimmerman, Deborah Ng, and Latest Edition: 4th Edition, Publication: John Wiley & Sons Inc.,

MCA SECOND YEAR THIRD SEMESTER			
Course Code	AMCA0324P	**L T P**	**Credits**
Course Title	Advanced Software Testing Lab	**0 02**	**1**

Course objectives:

Learn test plan documentation.Understanding web testing tool, Implement bug tracking tool, test management tool

Pre-requisites: Basic knowledge about software and its types. Basic knowledge of C programming language.

The programs in Software Testing lab will cover the following concepts:

1. Write programs in „C" Language to demonstrate the working of the following a. constructs: i) do...while ii) while….do iii) if…else iv) switch v)for
2. A program written in „C" language for Matrix Multiplication fails to Introspect the causes for its failure and write down the possible reasons for itsfailure.
3. Take any system (e.g., ATM system) and study its system specifications and report the variousbugs.
4. Write the test cases for any known application (e.g., Bankingapplication)
5. Create a test plan document for any application (e.g., Library ManagementSystem)
6. Study of any testing tool (e.g., Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g., Bugzilla,bug bit)
9. Study of any test management tool (e.g., Test Director)
10. Study of any open source-testing tool (e.g., Test Link)

Course outcomes: After completing this course student will be able to:

CO 1	Understand test plan documentation	K6
CO 2	Learn web testing tool	K2, K6
CO 3	Implement bug tracking tool, test management tool	K6

Text books:

1. Lessons Learned in Software Testing, by Bret Pettichord, CemKaner, and James Marcus Bach1
2. Foundations of Software Testing: ISTQB Certification, by Dorothy Graham and Erik P.W.M. Veenendaa2

3. Software Testing: A Craftsman's Approach, Fourth Edition, by Paul C. Jorgensen	
Reference book:	
1. The Art of Software Testing, by Glenford Myers	
2. Software Test Automation, by Dorothy Graham and Mark Fewster	
3. Software Testing and Quality Assurance: Theory and Practice, by Kshirasagar Naik and Priyadarshi Tripathy	
ReferenceLinks:	
1.	https://www.youtube.com/watch?v=OGImfxO2TEU
2.	https://www.youtube.com/watch?v=g0PrXoWKM2Y

MCA SECOND YEAR FOURTH SEMESTER					
Course Code	AMCA0401	**L**	**T**	**P**	**Credit**
Course Title	Artificial Intelligence	3	0	0	**3**

Course objective: Describe the key components of the artificial intelligence (AI) field and its relation and role in Computer Science, automated planning and agent systems, Identify and describe artificial intelligence techniques, including search, heuristics and knowledge representation , Identify and apply AI techniques to a wide range of problems, including complex problem solving via search, probabilistic models and probabilistic reasoning , Discussion of different machine learning techniques including decision tree , Discuss different AI techniques and models for pattern recognition and classification.

Pre-requisites: Students know about any computer programming language and probability theory.

Course Contents / Syllabus

UNIT-I	**Introduction to Artificial Intelligence**	**8 hours**

INTRODUCTION:-Fundamentals of AI. Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Related fields, Intelligent Agents, Structure of Intelligent Agents, Classification of Intelligent Agents.

UNIT-II	**Introduction To Search**	**8 hours**

INTRODUCTION TO SEARCH:-Searching for solutions, Uninformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.

UNIT-III	**Knowledge Representation & Reasoning**	**8 hours**

KNOWLEDGE REPRESENTATION &REASONING:-Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

UNIT-IV	**Machine Learning**	**8 hours**

MACHINE LEARNING:-Supervised and unsupervised learning, Reinforcement learning, Decision trees, Classification Techniques: Nearest Neighbor (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), and K – means clustering.

UNIT-V	**Pattern Recognition**	**8 hours**

PATTERN RECOGNITION:- Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Computer vision, Natural Language Possessing.

Course outcome: After completion of this course students will be able to

CO 1	To explain the history and basics of Artificial Intelligence, Intelligent Agents.	K1, K2
CO 2	To illustrate the various searching techniques including Informed search, Uninformed search, Game playing strategies and Alpha-Beta pruning.	K1, K4
CO 3	To demonstrate different knowledge representation scheme including Hidden Markov model and Bayesian networks.	K3
CO 4	To explain the Machine learning concepts including statistical learning models.	K2

CO 5	To explain the pattern recognition and classification algorithms, computer vision and natural language processing.	K2, K4

Text books :

(1) Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India, 1st Edition, 2015.

(2) Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill, 3rd Edition, 2017 .

(3) Ela Kumar, "Artificial Intelligence", Wiley publications, 1st Edition 2020.

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=4JNApj1wjsw
Unit 2	https://www.youtube.com/watch?v=SWxpkZ_SzaA
Unit 3	https://www.youtube.com/watch?v=MBVXsQKxYQk
Unit 4	https://in.video.search.yahoo.com/yhs/search?fr=yhs-itm-001&hsimp=yhs-01&hspart=itm&p=nptel+video+lecture+on+introduction+to+artificial+intelligence#id=1&vid=cf3755807ebe306b71ea26b0aee82b6f&action=click
Unit 5	https://in.video.search.yahoo.com/yhs/search?fr=yhs-itm-001&hsimp=yhs-001&hspart=itm&p=video+lecture+on+introduction+to+artificial+intelligence#id=1&vid=6c252f3e69977c7859d3e67f7aeca15d&action=click

MCA SECOND YEAR FOURTH SEMESTER					
Course Code	AMCA0402	**L**	**T**	**P**	**Credit**
Course Title	Cloud Computing	3	0	0	**3**

Course objective: Basics and deployment models of cloud computing , Service models of cloud computing , Major service providers of cloud computing , Online communication methods by using cloud computing , Concept of Virtualization and Virtual Machines.

Pre-requisites: Students know about any computer programming language and probability theory up to a satisfactory level.

Course Contents / Syllabus

UNIT-I	**INTRODUCTION**	**8 hours**

Cloud- Definition, benefits, usage scenarios, History of Cloud Computing, Cloud Architecture, Types of Clouds, Business models around Clouds, Issues in Clouds.

UNIT-II	**CLOUD SERVICES**	**8 hours**

Types of Cloud services: Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), Database as a Service, Monitoring as a Service, Communication as services.

UNIT-III	**CLOUD SERVICE PROVIDERS**	**8 hours**

Major Players in Cloud Computing: Eucalyptus, Nimbus, Open Nebula, Cloud Sim

Service providers: Google, Amazon, Microsoft Azure, IBM, Sales force.

UNIT-IV	**COLLABORATING USING CLOUD SERVICES**	**8 hours**

Email Communication over the Cloud - CRM Management - Project Management-Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation – Spreadsheet - Databases – Desktop - Social Networks and Groupware.

UNIT-V	**VIRTUALIZATION FOR CLOUD**	**8 hours**

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System VM, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - supervisors – Xen, KVM, VMware, Virtual Box, Hyper-V.

Course outcome: After completion of this course students will be able to

CO 1	To explain the basic concepts and major players of cloud computing.	K1, K2
CO 2	To explain the types of cloud services.	K1, K4
CO 3	To discuss about different cloud service provider software and organizations.	K3
CO 4	To illustrate about collaboration using cloud services.	K4
CO 5	To explain about Virtualization techniques and tools available.	K2, K4

Text books :

(1) David E.Y. Sarna Implementing and Developing Cloud Application, CRC press 2011.

(2) Anthony T Velte, Toby J Velte, Robert Elsenpeter, Cloud Computing: A Practical Approach, Tata McGraw-Hill 2010.	
(3) Haley Beard, Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.	
Link: NPTEL/ YouTube/ Faculty Video Link:	
Unit 1	https://www.digimat.in/nptel/courses/video/106105167/L01.html
Unit 2	http://www.infocobuild.com/education/audio-video-courses/computer-science/CloudComputing-VT-Kharagpur/lecture-40.html
Unit 3	https://www.youtube.com/watch?v=RmuVkB3siYY
Unit 4	http://www.infocobuild.com/education/audio-video-courses/computer-science/CloudComputing-IIT-Kharagpur/lecture-40.html
Unit 5	https://www.youtube.com/playlist?list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J

MCA SECOND YEAR FOURTH SEMESTER					
Course Code	AMCA0415	**L**	**T**	**P**	**Credit**
Course Title	Administering Cloud and App using Sales force	2	0	0	**2**

Course objective: Understand the concepts of cloud and will be able to learn the concepts of administration. They will also be able to understand and implement the concepts of lightning experience in context to Sales force.

Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.

Course Contents / Syllabus

UNIT-I	**Introduction to Cloud**	**8 hours**

Marketing Cloud Admin Certification Prep: Setup and Data, Marketing Cloud Admin Certification Prep: Marketing, Channels, and Maintenance.

UNIT-II	**Lightning & Sales force App Experience Customization**	**8 hours**

Lightning Experience Customization, Service Cloud for Lightning Experience, App Exchange Solutions, Data Security, Identity Basics, Security Specialist.

UNIT-III	**Sales force Administration**	**8 hours**

Reports & Dashboards for Lightning Experience, Create Reports and Dashboards for Sales and Marketing Managers, Lightning Experience Reports & Dashboards Specialist

UNIT-IV	**Lightning Experience**	**8 hours**

Sales force Mobile App Customization, Chatter Administration for Lightning Experience, Leads & Opportunities for Lightning Experience, Pick list Administration, Duplicate Management, Formula Operators and Functions, Sales force Flow, Screen Flow Distribution, Lightning Experience Productivity.

UNIT-V	**Learn Admin Essentials in Lightning Experience**	**8 hours**

Application Lifecycle and Development Models, Change Set Development Model, Org Development Model, Package Development Model.

Course outcome: After completion of this course students will be able to

CO 1	Understand the basic working environment of Salesforce	K1, K2
CO 2	Know the concepts of Lightning & Salesforce App Experience Customization	K1, K2
CO 3	Familiarize with concepts reports chatter administration	K3
CO 4	Learn the concepts of Lightning Experience	K1, K2
CO 5	Implement Admin Essentials in Lightning Experience	K1,K3

Text books :

(1) Alok Kumar Rai : Customer Relationship Management : Concepts and Cases(Second Edition), PHI Learning, 2018.

(2) Bhasin- Customer Relationship Management (Wiley Dreamtech) ,2019.

(3) Salesforce for beginners by ShaarifSahaalane book by Amazon (Online edition).

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=bxtqhfyoTjY&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=1
Unit 2	https://www.youtube.com/watch?v=ZkQwm-6lsIw&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=3
Unit 3	https://www.youtube.com/watch?v=65QivvdfjGs&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=5
Unit 4	https://www.youtube.com/watch?v=65QivvdfjGs&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=6
Unit 5	https://www.youtube.com/watch?v=65QivvdfjGs&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=8

MCA SECOND YEAR FOURTH SEMESTER					
Course Code	AMCA0416	**L**	**T**	**P**	**Credit**
Course Title	Search Engine Optimization	2	0	0	**2**

Course objective: To introduce students to Understand how digital marketing have disrupted the way businesses sell and purchase to consumers. To help students to Recognize how marketers use the Google SEO Projects to influence purchase decisions on digital platforms using digital content and tools. To help students to Appreciate the benefits of integrating traditional and digital marketing with the Google SEO of selling and purchasing marketing strategies. To Identify the benefits of search advertising to a business of using social media to engage an audience

Pre-requisites: Basic Marketing Concepts, Basic Knowledge of Computers

Course Contents / Syllabus

UNIT-I	**Introduction to Digital Marketing**	**8 hours**

Fundamentals of Marketing: Journey from Traditional Marketing to Digital Marketing, Digital Marketing Metrics and Channels, Customer Centricity, Designing a Web Presence, Social Media Marketing, Search Engine Optimization (SEO), Search Engine Marketing (SEM), Content Marketing, User Nurturing.

UNIT-II	**Google Capstone SEO Project-I**	**8 hours**

Getting Started and Milestone 1: Gauging a Site's Opportunity for Improvement, identifying a Potential Client - Resources, Create an SEO Pitch - Resources, Develop Kickoff Questions - Resources Milestone 2: Initial Research Phase, developing a Persona – Resources, User/Buyer Persona Template, Performing Keyword Research - Resources, Keyword Research Example & Template, Conducting a Competitive Analysis – Resources, Keyword Competitive Analysis Template.

UNIT-III	**Google Capstone SEO Project-II**	**8 hours**

Milestone 3: Conducting a Content Audit and Technical Review, Competitive Content Analysis, Competitive Analysis Template, Internal Content Audit - Resources, Internal Content Audit Template, Keyword Mapping - Resources, Keyword Mapping Template, Technical SEO - Resources, Error Tracking Template, Technical Audit Template.

UNIT-IV	**Search Advertising**	**8 hours**

Search Basics: Search, Intent, Market, the Bidding Process ,Google Adwards: Pros and Cons, Google's Take on Auction Ads: Payment Models, Pre-campaign Budgeting, Google's Take on Bidding, Audiences, and Tools: Basic Campaign Setup, Targeting, Budgeting, Timing, and Rotation, Google Ads Campaigns: Keyword Optimization, Optimizing Ad Copy, Negative Keywords.

UNIT-V	**Social Media Advertising**	**8 hours**

Case Study: City Shopping Center, Objectives, PPC Hero - Pros and Cons of Top Social Media Advertising Platforms, Facebook: Payment Models and Ad Elements, Introduction to Facebook Ads Manager. Instagram: Who Advertises on Instagram, Instagram Ad Features, Twitter: Ad Types, Campaign Types, Creative Best Practices, Ads Manager, Tweet Analytics and Customer Insights.

Course outcome: After completion of this course students will be able to

CO 1	Understand important concepts of digital marketing.	K1
CO 2	Understand to Recognize how marketers use Google SEO Projects to influence purchase decisions on digital platforms using digital content and tools.	K1

CO 3	Understand the benefits of the integrating traditional and digital marketing with the Google SEO of selling and purchasing marketing strategies.	K1, K2
CO 4	Understand the benefits of search advertising to a business of using social media to engage an audience.	K2
CO 5	Understand the use an active social media community by using Social Media Advertising.	K2

Text books :

(1) Digital Marketing for Dummies, Author: Ryan Deiss& Russ Henneberry, Publisher: John Wiley & Sons, Inc.

(2) Youtility, Author: Jay Baer, Publisher: Gildan Media, LLC.

(3) Epic Content Marketing, Author: Joe Pulizzi, Publication: McGraw Hill Education.

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=4bD0FXF_WAI
Unit 2	https://www.youtube.com/watch?v=spf_AhwMT_k
Unit 3	https://www.youtube.com/watch?v=nb6FI9dCJr4
Unit 4	https://www.youtube.com/watch?v=_-QgRw6XuNU
Unit 5	https://www.youtube.com/watch?v=HuKWKuQYBnQ

MCA SECOND YEAR FOURTH SEMESTER					
Course Code	AMCA0417	**L**	**T**	**P**	**Credit**
Course Title	Business Data Analytics	2	0	0	**2**

Course objective: Students will be able to perform data analysis using R programming. They will also be able to generate and analysis the reports using R programming.

Pre-requisites: Basic knowledge about software and its types. Basic knowledge of C programming language.

Course Contents / Syllabus

UNIT-I	**The Exciting World of Programming**	**8 hours**

Introduction to the exciting world of programming, Fun with R Programming languages, Introduction to R, Introduction to R Studio.

UNIT-II	**Understand basic programming concepts**	**8 hours**

Programming using R Studio, Programming fundamentals, Vectors and lists in R, Dates and times in R, Other common data structures, Operators and calculations. Logical operators and conditional statements, The gift that keeps on giving, Available R packages, tidy verse, Working with pipes

UNIT-III	**Explore Data and R**	**8 hours**

Data in R, R data frames. Working with data frames. More about tibbles. Data-import basics. Cleaning up with the basics. File-naming conventions. More on R operators. Organize your data. Transforming data. Clean, organize, and transform data with R. Same data, different outcome. The bias function working with based data.

UNIT-IV	**Data Analysis with R Programming**	**8 hours**

Visualizations in R. Visualization basics in R and tidyverse. Getting started with ggplot(). Common problems when visualizing in R. Enhancing visualizations in R. Aesthetic attributes. Doing more with ggplot. Smoothing. Filtering and plots. Annotation layer. Adding annotations in R. Saving your visualizations. Saving images without ggsave()

UNIT-V	**Data Analysis with R Programming**	**8 hours**

Documentation and reports. Overview of R Markdown. R Markdown resources. Using R Markdown in RStudio, Structure of markdown documents, Even more document elements, Code chunks, Exporting documentation, Output formats in R Markdown.

Course outcome: After completion of this course students will be able to

CO 1	Understand R programming concepts	K_2
CO 2	Implement the use of data structure and loop functions	K_1,K_2, K_4
CO 3	Apply transform, cleaning concepts in R programming	K_3
CO 4	Implement visualization concepts to write programs in R	K_2,K_6
CO 5	Able to do documentation concepts and generate reports in R	K_2,K_4

Text books :

(1) R for beginners, Emmanuel Paradis

(2) The Art of R programming, Norman Matloff	
(3) R in action , Rob Kabacoff	
Link: NPTEL/ YouTube/ Faculty Video Link:	
Unit 1	https://www.youtube.com/watch?v=YZf5q-ICf8Y&list=PLLy_2iUCG87CNafffzNZPVa9rW-QmOmEv&index=2
Unit 2	https://www.youtube.com/watch?v=YZf5q-ICf8Y&list=PLLy_2iUCG87CNafffzNZPVa9rW-QmOmEv&index=4
Unit 3	https://www.youtube.com/watch?v=YZf5q-ICf8Y&list=PLLy_2iUCG87CNafffzNZPVa9rW-QmOmEv&index=7
Unit 4	https://www.youtube.com/watch?v=YZf5q-ICf8Y&list=PLLy_2iUCG87CNafffzNZPVa9rW-QmOmEv&index=10
Unit 5	https://www.youtube.com/watch?v=YZf5q-ICf8Y&list=PLLy_2iUCG87CNafffzNZPVa9rW-QmOmEv&index=14

MCA SECOND YEAR FOURTH SEMESTER					
Course Code	AMCA0418	**L**	**T**	**P**	**Credit**
Course Title	Software Quality and Testing	2	0	0	**2**

Course objective: Student will be able to analyze the test needs for a system in order to plan test activities and work products that will achieve the test objectives. Use traceability to check completeness and consistency of defined test conditions with respect to the test objectives, test strategy, and test plan Explain the importance of accurate and timely information collection during the test process to support accurate reporting and evaluation against exit criteria.

Pre-requisites: Basic knowledge about software and its types. Basic knowledge of C programming language.

Course Contents / Syllabus

UNIT-I	**Testing Process**	**8 hours**

Introduction, Test Planning, Monitoring and Control, Test Planning, Test Monitoring and Control, Test Analysis, Test Design, Test Implementation, Test Execution, Evaluating Exit Criteria and Reporting, Test Closure Activities.

UNIT-II	**Test Management**	**8 hours**

Introduction, Test Management in Context, Understanding Testing Stakeholders, Managing Non-Functional Testing, Managing Experience-Based Testing, Risk-Based Testing, Risk-Based Testing Techniques, Other Techniques for Test Selection, Test Prioritization and Effort Allocation in the Test Process, Test Policy, Test Strategy, Master Test Plan, Project Risk Management, Test Estimation, Defining and Using Test Metrics.

UNIT-III	**Reviews**	**8 hours**

Introduction, Management Reviews and Audits, Managing Reviews, Metrics for Reviews, Managing Formal Reviews.

UNIT-IV	**Defect Management**	**8 hours**

Introduction, The Defect Lifecycle and the Software Development Lifecycle, Defect Workflow and States, Managing Invalid and Duplicate Defect Reports, Cross-Functional Defect Management, Defect Report Information, Assessing Process Capability with Defect Report Information.

UNIT-V	**Test Tools and Automation**	**8 hours**

Introduction, Tool Selection, Open-Source Tools, Custom Tools, Selection Process, Tool Lifecycle, Tool Metrics.

Course outcome: After completion of this course students will be able to

CO 1	Explain various software characteristics and analyze different software Development Models	K1, K2
CO 2	Demonstrate the contents of a SRS and apply basic software quality assurance practices to ensure that design, development meet or exceed applicable standards	K1, K2
CO 3	Compare and contrast various methods for software design.	K2, K3
CO 4	Formulate testing strategy for software systems, employ techniques such as unit testing, Test driven development and functional testing	K3

CO 5	Manage software development process independently as well as in teams and make use of Various software management tools for development, maintenance and analysis.	K5

Text books :

(1) Rex Black, "Critical Testing Processes," Addison-Wesley, 2003, ISBN 0-201-74868-1

(2) RexBlack,"ManagingtheTestingProcess,thirdedition,"JohnWiley&Sons,2009,ISBN 0-471-22398-0

(3) Rick Craig, Stefan Jaskiel, "Systematic Software Testing," Artech House, 2002, ISBN 1-580-53508-9

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=Ln_LP7c23WM&list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&index=1
Unit 2	https://www.youtube.com/watch?v=PM73z4SwvIQ&list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&index=2
Unit 3	https://www.youtube.com/watch?v=nM4O7S_ASSw&list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&index=3
Unit 4	https://www.youtube.com/watch?v=nM4O7S_ASSw&list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&index=4
Unit 5	https://www.youtube.com/watch?v=nM4O7S_ASSw&list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&index=5

MCA SECOND YEAR FOURTH SEMESTER			
Course Code	AMCA0415P	**L T P**	**Credits**
Course Title	Administering cloud and App using Salesforce Lab	**0 0 2**	**1**

Course objectives:

Student will be able to understand the cloud architecture and working. He will be able to learn the working process of salesforce app.

Pre-requisites: Creative thinking and which is being used by the creative talent in your business areas.

List of Programs will cover Administering cloud and App using Salesforce

1. Process Automation Specialist,
2. Build a Battle Station App
3. App Customization Specialist
4. Quick start process builder
5. Build a simple salesforce flow
6. Create a report with help of tools
7. Customize a Salesforce Mobile App

Course outcomes: After completing this course student will be able to:

CO 1	Understand the basic working environment of Salesforce	K6
CO 2	Learn the concepts of Lightning & Salesforce App Experience Customization	K2, K6
CO 3	Familiarize with concepts reports chatter administration	K6

Text books:

1. Alok Kumar Rai : Customer Relationship Management : Concepts and Cases(Second Edition), PHI Learning, 2018
2. Bhasin- Customer Relationship Management (Wiley Dreamtech) ,2019
3. Salesforce for beginners by ShaarifSahaalane book by Amazon (Online edition)

Reference book:

1. Salesforce Essentials for Administrators, By ShrivastavaMohith, Edition Ist ,2018
2. Salesforce: A quick Study laminated Reference Guide by Christopher Mathew Spencer eBook

by Amazon (Online)	
3. Mastering Salesforce CRM Administration By Gupta Rakesh Edition IInd 2018	
ReferenceLinks:	
1.	www. Trailhead.salesforce.com
2.	www.mindmajix.com/salesforce-tutorial
3.	www.youtube.com/watch?v=7K42geizQCI

MCA SECOND YEAR FOURTH SEMESTER			
Course Code	AMCA0416P	**L TP**	**Credits**
Course Title	Search Engine Optimization Lab	**0 0 2**	**1**

Course objectives:

Students will be able to understand how search engine optimization and social media have used the way businesses sell to consumers It will help students to Recognize how marketers use the Advanced Content and Tactics to influence purchase and sell decisions on digital platforms using SEO content and tools.

Pre-requisites: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.

The programs in Introduction to Advanced Content and Tactics Lab will cover the following concepts:

1	Develop a Persona for a Digital Marketing agency
2	Perform Keyword Research for a new fresh website of Digital Marketing according to Persona you developed previously?
3	Make a Detailed audit Report for any website in the Digital Marketing industry and List out Problems in the Website?
4	Write Content on "Why Keyword research is Important" and Create Keyword Mapping in this.
5	Take any Two Websites (the top one and the lower one) of the same industry and perform a Competitor Analysis between them.
6	List out all types of Search Intent and Perform Keyword Research in each search Intent Segment? Remember all the search Intent should belong to the same Industry.
7	Perform Keyword Research for Running a Google Ad campaign for a "Web development service" website.
8	Differentiate Search Ads and Display ads with an Example for Web development services.

Course outcomes: After completing this course student will be able to :

CO 1	Understand important concepts of Advanced Content and Tactics.	K6
CO 2	Recognize how marketers use Advanced Content and Tactics to influence purchase and sell decisions on digital platforms using SEO content and tools.	K2, K6
CO 3	Learn the benefits of Advanced Content and Tactics with the advantages of sell and purchase marketing strategies.	K6

Text books:

1. Digital Marketing for Dummies, Author: Ryan Deiss& Russ Henneberry, Publisher: John Wiley & Sons, Inc
2. Youtility, Author: Jay Baer, Publisher: Gildan Media, LLC
3. Epic Content Marketing, Author: Joe Pulizzi, Publication: McGraw Hill Education
Reference book:
4. New Rules of Marketing and PR, Author: David Meerman Scott, Latest Edition: 6th Edition, Publication: John Wiley & Sons
5. Social Media Marketing All-in-one Dummies, Author: Jan Zimmerman, Deborah Ng, and Latest Edition: 4th Edition, Publication: John Wiley & Sons Inc.,

MCA SECOND YEAR FOURTH SEMESTER			
Course Code	AMCA0417P	**L TP**	**Credits**
Course Title	Business Data Analytics Lab	**0 0 2**	**1**

Course objectives:

Students will be able to understand the use of functions and formulas and will be able to apply SQL to generate queries. They will also learn to create BigQuery

Pre-requisites: Basic knowledge about software and its types. Basic knowledge of C programming language.

The programs in Data Analytics lab will cover the following concepts:

1.	Create a Chart with a spreadsheet
2.	Create and edit a Google Sheet
3.	Share the Google Sheet
4.	Create Custom Data Table and Sort It.
5.	Use COUNTIF, MIN, MAX, AVERAGE, SUM functions
6.	Handling FORMULAS in Spreadsheet
7.	Find Errors in functions
8.	Clean data by Sorting and Filtering
9.	Create your custom table with Big Query
10.	Query Your Dataset using Big Query

Course outcomes: After completing this course student will be able to:

CO 1	Understand spreadsheet to use functions and formulas	K6
CO 2	Implement SQL to generate Queries	K2, K6
CO 3	Learn how to create Big Query	K6

Text books:

1. Microsoft Excel Data Analysis and Business Modeling (Office 2021 and Microsoft 365) 7th EditionWayne Winston
2. SQL for Data Analytics: Perform Fast and Efficient Data Analysis with the Power of SQL Book by Benjamin Johnston, Matt Goldwasser, and Upom Malik
3. Learning Google BigQuery: A beginner's guide to mining massive datasets through interactive analysis 1st Edition, Kindle Edition by ThirukkumaranHaridass (Author), Eric Brown (Author) Format: Kindle Edition

MCA SECOND YEAR FOURTH SEMESTER			
Course Code	AMCA0418P	**L T P**	**Credits**
Course Title	Software Testing Lab	**0 0 2**	**1**

Course objectives:

Students will be able to Design, develop and code a program and then derive test cases, Execute the test cases and draw out the result. They will be able to understand decision table approach, boundary value analysis and equivalence class partitioning.

Pre-requisites: Basic knowledge about software and its types. Basic knowledge of C programming language.

The programs in Software Testing lab will cover the following concepts :

Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Derive test cases for your program based on decision-table approach, execute the test cases and discuss the results.

Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on boundary-value analysis, execute the test cases and discuss the results.

Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on equivalence class partitioning, execute the test cases and discuss the results.

Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of dataflow testing, derive different test cases, execute these test cases and discuss the test results.

Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of boundary value testing, derive different test cases,

execute these test cases and discuss the test results		
Design, develop, code and run the program in any suitable language to implement the binary search algorithm. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results.		
Design, develop, code and run the program in any suitable language to implement the quick sort algorithm. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results.		
Course outcomes: After completing this course student will be able to :		
CO 1	Design, develop and code a program and then derive test cases	K6
CO 2	Execute the test cases and draw out the result	K2, K6
CO 3	Understand decision table approach, boundary value analysis and equivalence class partitioning	K6
Text books:		
1. Lessons Learned in Software Testing, by Bret Pettichord, CemKaner, and James Marcus Bach1		
2. Foundations of Software Testing: ISTQB Certification, by Dorothy Graham and Erik P.W.M. Veenendaa2		
3. Software Testing: A Craftsman's Approach, Fourth Edition, by Paul C. Jorgensen		
Reference book:		
1. The Art of Software Testing, by Glenford Myers		
2. Software Test Automation, by Dorothy Graham and Mark Fewste		
3. Software Testing and Quality Assurance: Theory and Practice, by Kshirasagar Naik and Priyadarshi Tripathy		
ReferenceLinks:		
1.	https://www.youtube.com/watch?v=T0TynxN77oY	
2.	https://www.youtube.com/watch?v=T3q6QcCQZQg	
3.	https://www.youtube.com/watch?v=QJqNYhiHysM	