Dr. J. J. Magdum Trust's
Dr. J. J. Magdum College of Engineering, Jaysingpur
(An Autonomous Institute)
Master of Computer Application
Curriculum Structure as per NEP 2020, Academic Year: 2024-25

Programme Outcomes (PO):

Graduates will be able to*:*

1. Apply knowledge and skills to solve information technology problems using advanced available tools.
2. Function effectively in multi-disciplinary teams and work as a team member and team leader to get technical solutions.
3. Understand, Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4. Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.
5. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
6. Communicate with customer, colleagues, and managers. Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
7. Maintain professional work ethic, appearance, and demonstration of personal responsibility.
8. Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.
9. Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
10. Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.
11. Implement cost effective and improved system.
12. Develop confidence for self-education and ability for lifelong learning.

Program Specific Outcomes (PSO):

PSO 1	Understand the structure, development methodologies of software systems, possess professional skills and obtain competency with a broad range of programming languages and platforms.
PSO 2	Apply analysis, design and development principles to provide user interactive solutions for various challenges.

Dr. J. J. Magdum Trust's
Dr. J. J. Magdum College of Engineering, Jaysingpur
(An Autonomous Institute)
Teaching and Evaluation Scheme
MCA (Master of Computer Application)
First Year MCA. (Semester- I)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	Evaluation Scheme						
								Theory				Practical		TOTAL
								CIE			ESE	CIE	ESE	
								T-I	T-II	ISE				
1	01MCL101	Operating System	3	-	--	3	3	20	20	10	50	--	--	100
2	01MCL102	Python Programming	3	-	--	3	3	20	20	10	50	--	--	100
3	01MCL103	Database Management System	3	-	--	3	3	20	20	10	50	--	--	100
4	01MCL104	Software Engineering	3	1	--	4	4	20	20	10	50	--	--	100
5		Program Elective-I	3	1	--	4	4	20	20	10	50	--	--	100
6	01MCP105	Python Programming	--	--	4	4	2	--	--	--	--	50	50	100
7	01MCP106	Database Management System	--	--	2	2	1	--	--	--	--	50	50	100
8	01MCP107	Communication Skills	1	--	2	2	2	--	--	--	--	50	50	100
9	01MCL108	Audit Course - I	2	--	--	2	Audit	--	--		50	--	--	50
		Total	**17**	**02**	**08**	**27**	**22**	**100**	**100**	**50**	**300**	**150**	**150**	**850**

L- Lecture , T- Tutorial , P- Practical , T-I-Test I, T-II- Test II,
ISE- In Semester Evaluation, CIE- Continuous Internal Evaluation, ESE- End Semester Examination,

Program Electives - I

Sr.No.	Course Code	Courses
01	01MCL109	Open-Source Technologies
02	01MCL110	Digital Marketing

Master of Computer Application (MCA)

Under Faculty of Science and Technology (Engineering and Technology)

01MCL101: Operating System

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCL101**:**Operating System**
Prerequisites	**Basics of Computer Hardware and software**
Teaching scheme: Lectures	**3 Hrs.**
Credits	**3**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Tutorial: - -NA	**TW: --NA**

Course Outcomes:

1. Student will able to understand the basic concepts of operating systems and processes.
2. Student will able to analyze Scheduling algorithms and concept of Deadlocks.
3. Student will able to apply various memory management schemes.
4. Student will able to understand the basics of Distributed Operating System

UNIT 1 : Introduction to Operating system (12 HOURS)

Introduction**:** Operating system definition, Functions of Operating System, Logical View, System View, Types **of** operating System, System Calls, System Programs.

Processes**:** Process Concept, Thread Concept, Difference between Process and Thread, Process Control Block, Process operations, Inter-process Communication, Communication in Client-Server.

UNIT 2 : CPU Scheduling & Process Synchronization (12 HOURS)

CPU Scheduling**:** Scheduling Concept, Scheduling Criteria, Scheduling algorithms, Scheduling Evaluation, Simulation Concept.

Process Synchronization**:** Synchronization concept, Need for Synchronization, Critical Section Problem, Semaphore, Monitor.

Deadlock: Deadlock concepts, Necessary Conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance, Bankers Algorithm, Deadlock Detection, Deadlock Detection Algorithm for Single and Multiple Instance of Resources, Deadlock Recovery.

UNIT 3 : Memory& File Management (12 HOURS)

Memory Management: Concept, Memory Management Techniques, Contiguous &Non Contiguous allocation, Relocation, Compaction, Logical & Physical Memory, Conversion of Logical to Physical address, Paging, Segmentation, Segment with paging, Virtual Memory Concept, Demand paging, Page fault.

File Management: File Structure, Protection, FILE system, Implementation, Directory structure, Free Space Management, File Access Methods, File Allocation Methods, Recovery.

UNIT 4 : Distributed Operating System (12 HOURS)

Disk Management: Disk Structure, Disk Scheduling algorithm, Disk management, Swap Space concept and Management, RAID structure, Disk performance issues.

Distributed Operating System: Difference between Distributed & Centralized OS, Advantagesof Distributed OS, Types of Distributed OS

Text Books:

1. Operating System Silberschatz, Galvin , Gagne, Wiley publication
2. Operating System Concepts and Design , Milan Milenkovic, MGH

References:

1. Distributed Operating System P.K. Sinha, PHI
2. Operating system Achyut Godbole
3. Operating System In Depth Doeppner Wiley India
4. Operating System Rohit KhuranaVikas pub.

01MCL102: Python Programming

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCL102: Python Programming**
Prerequisites	**Basics of Programming Languages C, C++**
Teaching scheme: Lectures + Practical	**3 Hrs. + 4 Hr.**
Credits	**3 + 2 = 5**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	Examination scheme
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Practical: 2 Hr./Week	**Practical:100 Marks POE: 50 Marks + TW(CIE): 50 Marks**

Course Outcomes:

1. Student will able to Learn Basic Syntax of Python Programming.
2. Student will able to understand and implement concepts of object oriented methodology using Python.
3. Student will able to learn collections in Python.
4. Student will able to develop problem solving skills and their implementation through Python.

UNIT 1 : Introduction to Python (12 HOURS)

Introduction to Python: an interpreted high level language, interactive mode and script mode. Variables, Expressions and Statements, Variables and Types-mutable and Immutable variable and Keywords. Operators and Operands in Python. (Arithmetic, relational and logical operators), Operator precedence .Expressions and Statements (Assignment statement); Taking input (using raw input) and input()) and displaying output - print statement, Comments in Python. Conditional and Looping Construct if - else statement and nested if – else while, for, use of rangefunction in for, Nested loops, break, continue.

UNIT 2 : Functions & Strings (12 HOURS)

Functions: Built-In Function, invoking built in functions, Functions from math, random, time & date,User Define Function. Strings: Creating, initializing and accessing the elements; String operators: +, *, in, not in, range, slice [n:m], String built in functions & methods,Strings constants defined in string module, Regular Expression and Pattern Matching.

UNIT 3 : Lists, tuples, sets & dictionaries (12 HOURS)

Lists: Concept of mutable lists, creating, initializing and accessing the elements of list, List operations. Tuples: Immutable concept, creating, initializing and accessing the elements in a tuple; Tuple functions: cmp(), len(), max(), min(), tuple(). Sets: Concept of Sets, creating, initializing and accessing the elements of Sets operation(Membership, union, intersection, difference, and symmetric difference. Dictionaries: Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, Traversing, Dictionary functions & Methods.

UNIT 4 (12 HOURS)

Modules: Executing modules as scripts, The Module Search Path, ―Compiled‖ Python files Standard Modules , The dir( ) Function ,Packages Importing * From a Package. I/O and File Handling:, Output Formatting ,Reading and Writing Files(text and binary mode).Errors and **Exceptions:** Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions. Introduction to Object Oriented concepts in Python.

This course should consist of 10 to 12 programming exercises with focus on covering the hands-on aspects.

Text Books

1. Learning Python By Mark Lutz,O'Reilly Publication
2. Programming with python, A users Book, Michael Dawson, Cengage Learning
3. Python Essential Reference, David Beazley, Third Edition 5. Python Bible

References:

1. Practical Programming: An introduction to Computer Science Using Python, second edition, Paul Gries, Jennifer Campbell, Jason Montojo, The Pragmatic Bookshelf.
2. Python for Informatics: Exploring Information, Charles Severance
3. John V Guttag. –Introduction to Computation and Programming Using Python‖, Prentice Hall of India
4. Nageswara Rao, –Core Python Programming‖, Dreamtech

01MCL103: Database Management System

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCL103: Database Management System**
Prerequisites	**Basics of Database**
Teaching scheme: Lectures + Practical	**3 Hrs. + 2 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Practical: 2 Hr./Week	**POE: 50 Marks , TW(CIE): 25 Marks**

Course Outcomes:

1. Student will able to understand basic concepts of DBMS and RDBMS.
2. Student will able to apply and practice data modeling using the entity-relationship and developing database designs.
3. Student will able to apply Structured Query Language (SQL) and learn SQL syntax.
4. Student will able to understand the needs of database processing and learn techniques for controlling theconsequences of concurrent data access.

UNIT 1 : Basics Of DBMS (12 HOURS)

Basics Of DBMS: Database Concept, Characteristics and architecture of DBMS, Database users, 3-tier architecture of DBMS-its advantages over 2-tier, Introduction of Parallel, Distributed Databases, Mobile databases and Cloud databases.

UNIT 2 : Introduction to RDBMS & Normalization (12 HOURS)

Introduction to RDBMS: Entity introduction, characteristics, Comparison between DBMS, RDBMS, Generalization and Aggregation
Normalization: Functional dependency, types of normalization (1NF, 2NF, 3NF, BCNF).
Data constraint: Primary key, Foreign key, Unique key, Null, Not Null, Default key.

UNIT 3 : SQL & NOSQL

SQL: Introduction to SQL, Features of SQL, Basic data types, SQL statements/commands, Set operations in SQL, order by and group by clause, between, in, like, create index, view and join command Nested queries, GRANT and REVOKE, Commit, Rollback, Save point. Join concept, Join Types, View.

NOSQL: Definition and Introduction**,** Features and Types of NOSQL databases, Sorted Ordered Column-Oriented Stores, Key/Value Stores, Document Databases, Graph Databases

Concurrency Control and Transaction Management: Transaction processing and

Unit 4: Concurrency control & transaction management (12 Hours)

Concurrency control & transaction management, Concept of transaction processing, ACID properties, Locking techniques, Timestamp based protocols, Granularity of data items, Deadlocks. Database Recovery & Backup.

This course should consist of 10 to 12 programming exercises with focus on covering the hands-on aspects.

Text Books:

1. Introduction to database systems C. J. Date Pearsons Education 8th
2. Database system concept Korth, Silberschatz and Sudarshan MGH 5th

References:

1. Fundamentals of Database Systems Elmasri Navathe PearsonEducation5th
2. SQL /PL SQL For Oracle 11G BlackBook Dr.Deshpande WileyDreamtech2012
3. ORACLE PL/SQL Programming Scott Ulman TMH 9th
4. SQL, PL/SQL the programming language of Oracle Ivan Bayross BPB 4th
5. Advance Database Management System hakrabharati/DasguptaWileyDreamtech2011
6. Database Management systems Ramakrishnan&Gehrke, McGraw-Hill,3rd Ed..

01MCL104: Software Engineering

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCL104: Software Engineering**
Prerequisites	**Basics of Computer Hardware and software**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1Hr**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Tutorial: 1 Hr./Week	**TW: NA**

Course Outcomes:

1. Students will get foundation of software engineering, various process models and can apply the new models in development process.
2. Students will have effective communication and interaction skills for requirement engineering tasks.
3. Students can implement good coding practices and testing strategies thoroughly using testing tools.
4. Students will understand the need of lifelong learning and adapt to new software engineering concepts.

Unit-1 Introduction to Software Engineering (9 HOURS)

Introduction to Software Engineering

Definition, need for Software Engineering, Software Engineering Problem, Software Engineering approach, Software Development Life Cycle

Process Models-Water fall model- Classical, Iterative, Prototyping Model, Spiral Model, Rapid Application Development (RAD)

Unit-2 Requirements Anticipation and Investigation

(12 HOURS)

Requirements Anticipation and Investigation

Fact finding methods, Software requirement Specification (SRS)-Concept, Need, Characteristics, Components, Structure of SRS. Decision Analysis Tools:-Decision Tree, Decision TableData Flow Diagrams, Entity Relationship Diagram

Unit-3 : Design of input & Control **(12 HOURS)**

Design of input & Control
Objectives of Input Design, Input Validations,
Design of output:- Objectives of Output, Design Types Of Output, Coupling & Cohesion
User Interface design: Elements of good design, design issues, features of modern GUI, error messages etc.,

Unit-4: Coding: Programming principles and guide lines, Coding process **(12 HOURS)**

Coding: Programming principles and guide lines, Coding process
Testing: Testing fundamentals and types of Testing, Unit Testing, Integration Testing, System Testing, Alpha testing & Beta testing, Black Box, White Box, Testing process
Case Studies: Airline reservation System, Tours & Travels management System, Sales & PurchaseManagement System, Library Management System, Hospital Management System

Text Book-

1. System Analysis and design and Introduction to Software Engineering by Parthsarathi, B.W. Khalkar, Everest Publishing House

Reference Books-

1. An Integrated Approach to Software Engineering by Pankaj Jalote, Tata McGraw-Hill
2. Fundamentals of Software Engineering by Rajib Mall, PHI Learning
3. Software Engineering by R.S. Pressman, Tata McGraw-Hill
4. Software Engineering by Martin Shooman, McGraw-Hill

01MCL109: Open Source Technology

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCL109: Open Source Technology**
Prerequisites	**Basic of Computer Technology**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks,** **50 (ESE) +50 (CIE)**
Tutorial: 1 Hr./Week	**TW: NA**

Course Outcomes:-

1. Student will able to understand the difference between open-source software and commercial software.
2. Student will able to understand the policies, licensing procedures and ethics of FOSS.
3. Student will able to understand open-source philosophy, methodology and ecosystem.
4. Student will able to awareness with Open-Source Technologies.

UNIT 1: Introduction to Open-Source (12 HOURS)

Introduction to Open-Source: Open Source, Need and Principles of OSS, Open-Source Standards, Requirements for Software, OSS success, Free Software, Examples, Licensing, Free Vs. Proprietary Software, Free Software Vs. Open-Source Software, Public Domain. History of free software, Proprietary Vs Open-Source Licensing Model, use of Open- Source Software, FOSS does not mean no cost. History: BSD, The Free Software Foundation and the GNU Project.

Open-Source Principles and Methodology Open-Source History, Open- Source Initiatives, Open Standards Principles, Methodologies, Philosophy, Software freedom, Open-Source Software Development, Licenses, Copyright vs. Copy left, Patents, Zero marginal cost, Income-generation Opportunities, Internationalization.

Licensing: What Is A License, How to create your own Licenses, Important FOSS Licenses (Apache, BSD, PL, LGPL), copyrights and copy lefts, Patent.

UNIT 2: Open-Source projects (12 HOURS)

Open-Source projects: Starting and maintaining own Open-Source Project, Open-Source Hardware, Open-Source Design, Open-source Teaching, Open-source media.

Collaboration: Community and Communication, Contributing to Open- Source Projects Introduction to GitHub, interacting with the community on GitHub, Communication and etiquette, testing open-source code, reporting 15
issues, contributing code. Introduction to Wikipedia, contributing to Wikipedia or contributing to any prominent open-source project of student‘s choice.

UNIT 3 : Open-Source Ethics and Social Impact (12 HOURS)

Open-Source Ethics and Social Impact: Open source vs. closed source, Open-source Government, Ethics of Open-source, Social and Financial impacts of open-source technology, Shared software, Shared source, Open Source as a Business Strategy

UNIT 4: Open-Source Ecosystem (12 HOURS)

Understanding Open-Source Ecosystem: Open-Source Operating Systems: GNU/Linux, Android, Free BSD, Open Solaris. Open-Source Hardware, Virtualization Technologies, Containerization Technologies: Docker, Development tools, IDEs, Debuggers, Programming languages, LAMP, Open-Source Database technologies.

Text Books:

1. Open Source Technology ― First Edition – 1 January 2009 – Kailash Vadhera
2. Open Source Technology ― First Edition – 1 January 2009 – Bhavesh Gandhi

References:

1.Open Source Way ― By Karsten Wade & Shawn Powers‖
2.Producing Open Source Software By Karl Fogel..

01MCL110: Digital Marketing

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCL110: Digital Marketing**
Prerequisites	**Basic of Computer Technology**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Tutorial: 1 Hr./Week	**TW: NA**

Course Outcomes:-

1. Student will able to understand concept and significance of Digital Marketing.
2. Student will able demonstrate the Technical Elements of Digital Marketing.
3. Student will able learn contemporary developments in Digital Marketing
4. Students will able use Google analytics tools for generating various reports.

UNIT 1: Basics of Digital Marketing (12 HOURS)

Principles of Digital Marketing, Basics of Marketing, What is Digital Marketing?, Comparison of Traditional and Digital Marketing, Statistics of Digital Marketing, Benefits of Digital marketing, Emerging trends in Digital marketing, Digital marketing platforms, Digital Marketing ,strategy for websites, Career opportunities in Digital Marketing

UNIT 2: Website Designing (12 HOURS)

Website Designing (Word Press), Types of Websites, Basics of HTML/CSS/JavaScript, Word Press Installation on Server, Understanding the Dashboard, Changing the Default Settings, Installing and customizing themes, Content management in WP, Creating categories, pages, and posts,Adding a menu, widgets to the website, Installing usefulplugins for site features, SEO specific plugins.

UNIT 3: SEO (Search Engine Optimization) and SEM (Search Engine Marketing)

I: SEO **(12 HOURS)**

Introduction to SEO, How Do Search engines work?, Search Engine Algorithms, Google Algorithm Updates, Google Search Console, Keyword Research Process, Keyword Research Tools, Competition Analysis, On page Optimization strategies, Content development strategy, Title & Meta Tags, Semantic SEO, Rich Snippets Integration, Speed Optimization, Off Page Optimization, Link Building Techniques as per latest standards, Local SEO Strategies, Penguin & Panda update recovery process, Reports and SERP Management, Click here for detailedSEO Curriculum

II. SEM

Introduction to Paid Marketing, Google Ads (Google AdWords) account and billing settings, Types of Campaigns PPC Campaign Setup, AdGroups and Keywords setup, idding strategies & Conversion Tracking, AdRank, Quality Score Optimization, Ad Formats & Ad Extensions, Shopping Campaigns, Dynamicsearch campaigns, Display Ads Campaigns, Remarketing campaigns, Mobile Apps Marketing, Video Marketing, Google Ads (Google AdWords) tools, MCC Account, AdWords Editor Tool

UNIT 4 : Google Analytics: **(12 HOURS)**

Google Analytics:

Purpose of website analytics, Tools for website analytics, Installing Google Analytics, Google Tag Manager, How to use Google Tag Manager, Implement Conversion Tracking, Basic terminology and KPI‘s, Audience Reports, Customer Acquisition Reports, Behavior Reports, Goals and Conversion Reports, Segmentation and Filters

Text Books:

1. Digital Markrting by Vibha mhatur, Saloni Arora.
2. Digital Marketing: Strategy, Implementation & Practice by Dave Chaffe,fiona ellis-chadwick

Reference Books:

1. MARKETING IN THE DIGITAL AGE Dinesh Kumar Professor of Marketing, JagranLakecity University, Bhopal Marketing faces a huge challenge in the digital era. T
2. Marketing 4.0: Moving from Traditional to Digital‖ by Philip Kotler
3. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns Hardcover –
4. Digital Marketing: Cases from India Paperback – 1 January 2018 by Edited by Rajendra Nargundkar and RomiSainy

01MCP107: Communication Skills

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCP107: Communication Skills**
Prerequisites	**Oral, Written Communication**
Teaching scheme: Practical	**2 Hr.**
Credits	**1**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: --	**Practical: 100 Marks,** **POE: 50 (CIE)** **POE:50 (ESE)**
Practical: 2 Hr./Week	**TW: NA**

Course Outcomes:

The objectives of this course are to introduce communication techniques, professional correspondence techniques and enhance writing skills of the students.

UNIT 1 (9 HOURS)

Communication: Nature and Importance of Communication, Objectives of Communication, Importance of Communication, Process and barriers to Communication, Elements of Communication, Forms of Communication.

Verbal Communication Techniques: Art of Speaking, Speech Styles. Oral Presentation, Preparation of Formal Speech, Meetings, Interviews, Group Discussion, Debate.

UNIT 2 (9 HOURS)

Non-verbal Communication: Meaning, Characteristics & classification of Non-verbal Communication, Body Language, Gestures, Postures, and Listening & observation skills.

Rapid review of Grammar: Corrections of common errors, Verb and its subject, forms of verb, Use of phrases and idioms, Use of infinitive Gerund and Participle, Errors & Use of Adjective and adverb , Punctuation and capitalization.

Text Books:

1. R.K. Chaddha Communication Techniques and skills – Dhanpal Rai Publication,New Delhi.
2. Pravil S. R. Bhatia, Professional Communication Skills- S. Chand and Co. New Delhi.
3. J.D.O'Connor, Better English pronunciation.

References:

1. Wren and Martin, Highschool English Grammar and Composition – Chand and Co.,New Delhi.
2. Sunita Mishra, C.Muralikrishna, Communication Skills for Engineers – Pearson Education.
3. Aspi Doctor, Principles and Practice of Business Communication Rhoda Doctor, Sheth Publication, Mumbai.
4. John Collin, –Perfect Presentation‖, Video Arts MARSHAL
5. Jenny Rogers ― Effective Interviews‖, Video Arts MARSHAL
6. Raman Sharma, ― Technical Communications‖, OXFORD

01MCL108: Audit Course -I

DISASTER MANAGEMENT

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCL108: Audit Course-I**
Prerequisites	**Disaster Management**
Teaching scheme: Lectures	**2 Hrs.**
Credits	**--**
Evaluation Scheme CIE for Theory	**50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 2 Hrs. /Week	**Theory: 50 Marks** (CIE)
Tutorial: NA	**TW: NA**

Course Outcomes:

1. Student will able to understand how to react effectively to natural, manmade, and planetary hazards
2. Student will able to explore the history of the field and comprehend how past events are earthquake,Landslides and volcanic hazards.
3. Student will able to describe the basic concepts of the emergency management cycle mitigation, preparedness,response, and recovery

UNIT 1. INTRODUCTION (4 HOURS)

Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.

UNIT 2. REPERCUSSIONS OF DISASTERS AND HAZARDS (4 HOURS)

Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.

UNIT 3. DISASTER PRONE AREAS IN INDIA (4 HOURS)

Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics

UNIT 4. DISASTER PREPAREDNESS AND MANAGEMENT (4 HOURS)

Preparedness: Monitoring of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

UNIT 5. RISK ASSESSMENT & DISASTER MITIGATION (4 HOURS)

Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People‘s Participation In Risk Assessment. Strategies for Survival.
Disaster Mitigation: Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.

Text Books:

1. R. Nishith, Singh AK, ―Disaster Management in India: Perspectives, issues and strategies‖, New Royal book Company.

References:

1. Sahni, PardeepEt.Al, ―Disaster Mitigation Experiences and Reflections‖, Prentice Hall Of India, New Delhi.
2. . Goel S. L. ―Disaster Administration and Management Text and Case Studies‖, Deep & Deep Publication Pvt. Ltd., New Delhi.

Dr. J. J. Magdum Trust's

Dr. J. J. Magdum College of Engineering, Jaysingpur

(An Autonomous Institute)

Teaching and Evaluation Scheme

MCA (Master of Computer Application)

First Year MCA. (Semester- II)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	Evaluation Scheme						
								Theory				Practical		TOTAL
								CIE			ESE	CIE	ESE	
								T-I	T-II	ISE				
1	01MCL111	Data Communication and Network	3	1	--	4	4	20	20	10	50	--	--	100
2	01MCL112	Web Technology	3		--	3	3	20	20	10	50	--	--	100
3	01MCL113	Java Programming	3		--	3	3	20	20	10	50	--	--	100
4		Program Elective-II	3	1	-	4	4	20	20	10	50	--	--	100
5	01MCP114	Mini Project	--	--	6	6	3	--	--	--		50	50	100
6	01MCP115	Web Technology	--	--	2	2	1	--	--	--	--	50	50	100
7	01MCP116	Java Programming	--	--	4	4	2					50	50	100
8	01MCP117	Professional Communication	1	--	2	2	2	--	--	--	--	50	50	100
9	01MCL118	Audit Course - II	2	--	--	2	Audit	--	--	--	50	--	--	50
		Total	**15**	**02**	**14**	**30**	**22**	**80**	**80**	**40**	**250**	**200**	**200**	**850**

L- Lecture , T- Tutorial , P- Practical , T-I-Test I, T-II- Test II,
ISE- In Semester Evaluation, CIE- Continuous Internal Evaluation, ESE- End Semester Examination,

Program Elective -II

Sr. No.	Course Code	Courses
01	01MCL119	Internet of Things
02	01MCL120	Cyber Security

01MCL111: Data communication and Network

Course Details:

Course Details Class	First Year M.C.A. Sem-II
Course Code and Course Title	01MCL111: Data communication and Network
Prerequisites	Basics of Computer Network
Teaching scheme: Lectures	3 Hrs. + 1Tut
Credits	3 + 1
Evaluation Scheme ESE + CIE for Theory	50 (ESE) + 50 (CIE)

Teaching scheme	Examination scheme
Lectures: 3 Hrs. /Week	Theory: 100 Marks, 50 (ESE) + 50 (CIE)
Tutorial: --NA	TW: NA

Course Outcomes:

1. Student will able to understand the basic concepts of data communication and Networking.
2. Student will able to evaluate the performance of various networking models.
3. Student will able to analyze the performance of network on the basis of different services provided by it.
4. Student will able to identify security threats to network and tools to control network security.

UNIT 1 : Introduction to Networking and Data communication (12 HOURS)

Introduction to Networking and Data communication: Need of Networking, Components of Data communication - sender, receiver, message, transmission media, Network Architecture-Client-Server and Peer to peer, Categories of Networks- LAN, WAN. MAN, Network topologies Bus, Ring, Star, Mesh, Transmission Media - Guided Media -Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable, Unguided Media: Radio Waves, Microwaves, Infrared, and satellite communication,

UNIT 2 : Network Models and Services (12 HOURS)

Network Models and Services: OSI reference model, TCP/IP reference model, Comparison of OSI and TCP/IP reference model, Protocol Standards, Introduction to Application Layer: Domain name system (DNS), Hypertext Transfer Protocol (HTTP), Simple Mail Transfer Protocol (SMTP), Telnet, File Transfer Protocol (FTP), Introduction to Presentation Layer, Services of Presentation Layer: Data encoding, Data encryption and data compression. Introduction to Session Layer, Services of session layer: Data Flow control, simplex, half-duplex, or full-duplex, Token Management, Synchronization.

UNIT 3 : Network Performance (12 HOURS)

Network Performance: Transport layer - Transport Layer Primitives: listen, connect, send, receive, disconnect, Protocols: TCP, UDP, Network layer- IP Protocol and IP addressing, Connection oriented and connectionless services, Routing algorithm: Shortest path, Flooding, distance vector, Congestion control, Data link Layer- Data Link Layer protocols: Stop and Wait protocol, Sliding window protocol, Services of Data Link Layer: Framing, Error detection and correction, Flow control.

UNIT 4 : Network Vulnerabilities (12 HOURS)

Network Vulnerabilities: Introduction to Vulnerabilities and Threats, Threats intransit, Protocol flaws, Impersonation, Active/Passive and Passive attacks: Virus, Worm. Malware, Hacking, Cracking, Sniffing, Spoofing, Dos, DDos, Masquerade, Trojan Horse. Ransomware, Logic bombs, Botnets, Key oggers, Rootkits, Identification of Network vulnerabilities. Network security controls: Authentication, Access Controls, Basic Cryptography terminologies.

Text Books:

1. Andrew S. Tanenbaum: Computer Networks, 4th Edition, PHI.
2. Computer Networks – Protocols, Standards, and Interfaces, 2nd Edition by Uyless Black.

Reference Books:

1. Computer Networking - A Top-Down Approach Featuring the Internet, 5th Edition, J. F. Kurose and K. W. Ross, Pearson Education, 2009.
2. Computer Networks: An Open Source Approach, 1st Edition, R2. Y. D Lin, R. H Hwang, and F.Baker, McGraw- Hill, 2011.
3. Bernard Menezes, _Network Security and Cryptography‘, Cengage Learning, ISBN: 978-81-315-1349—1.

01MCL112: Web Technology

Course Details:

Course Details Class	**First Year M.C.A. Sem-II**
Course Code and Course Title	**01MCL112: Web Technology**
Prerequisites	**Basics of HTML, CSS, Database**
Teaching scheme: Lectures + Practical	**3 Hrs. + 2 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	Examination scheme
Lectures: 3 Hrs. /Week	**Theory: 100 Marks,** 50 (ESE) +50 (CIE)
Practical: 2 Hr./Week	**POE: 50 Marks , (CIE): 50 Marks**

Course Outcomes:

1. Student will able to familiarize a student with Client-side and Server-side Programming.
2. Student will able to understand the website development using ASP.NET.
3. Student will able to inculcate skills pertaining to data access technology geared to facilitate thedevelopment of disconnected systems using .NET platform.
4. Student will able to familiarize the student with the development of N-tier web-based application.

UNIT 1 : Overview of HTML (12 HOURS)

Overview of HTML, Structure of HTML document. Formatting text with HTML, adding local and remote links, adding graphics, creating lists in HTML, creating tables in HTML, Dividing the window with frames, Building interactivity with forms, Formatting site with cascading style sheets. Image maps – creating client-side and server-side image maps, Various HTML Editors JavaScript Overview, Data types, variables, scope of variables, casting, data type conversion rules, Expressions and operators. Arrays. Built-in functions, and Built-in objects- String, Date, Math, Types of dialog boxes-alert, prompt, confirm. Custom Functions. Working with Frames, Forms, Form elements and Form validation

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UNIT 2 : ADO and ADO.NET (12 HOURS)

Comparison between ADO and ADO.NET and benefits offered by ADO.NET, ADO.NET managed providers, SQL managed providers, ADO.NET, OLEDB managed providers, creating, Data binding in ADO.NET. Introduction to SQL Server, Creating tables, Views and stored procedure.

UNIT 3 : Understanding ASP.NET (12 HOURS)

Architecture of ASP.NET web application. Understanding ASP.NET page structure. Page level events. Using standard controls, validation controls, Rich controls. Designing web sites with master pages and themes. ASP.NET folder structure, Validation process. Validation controls. Validation Groups and Custom Validation, Performing data access – Using Sql Data Sourcecontrol, using Grid View control, Form View, Repeater, Data List and ListView Developing 3-tier application using Object Data source.

UNIT 4 : Introduction to CSS (12 HOURS)

State management, Caching, AJAX, AJAX Extenders. Building and understanding web services, anatomy of a web service, overview of web service namespaces, building a simple web service, Introduction to CSS, Types of CSS, Applying CSS to Master pages in ASP.NET.

The laboratory course should consist of 10 to 12 programming exercises with focus on covering the hands-on aspects covered in theory course.

Books:

1. The Complete Reference HTML- Thomas A.Powell
2. The ABC‘s of JavaScript – Lee Purcell & May Jane Mara
3. ASP.NET Unleashed – Stephen Walther - Sams Publishing
4. The Complete Reference ASP.NET - Matthew Macdonald
5. Designing Microsoft ASP.Net Applications (Microsoft Press) – Jonathan Goodyear,Brian Peek, Brad Fox.
6. Microsoft ASP.NET – Step by Step (Microsoft Press) - G. Andrew Duthie
7. Programming ASP .NET - Jesse Liberty, Dan Hurwitz, Publisher: O'Reilly Media

01MCL113: Java Programming

Course Details:

Course Details Class	**First Year M.C.A. Sem-II**
Course Code and Course Title	**01MCL113: Java Programming**
Prerequisites	**Basic understanding of C++ and html.**
Teaching scheme: Lectures + Practical	**3Hrs. + 4 Hr.**
Credits	**3 + 2**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Practical: 2 Hr./Week	**POE: 50 Marks , (CIE): 50 Marks**

Course Outcomes :

1. Students will be able to articulate the principle of object-oriented problem solving &programming**.**
2. Students will be able to program using multithreading, networking concept & develop web applications using servlet and jsp.
3. Students will be able to applications using database concepts
4. Students will be able to understand Advanced Java Concepts like Spring Boot, Micro services, Web services

UNIT 1 **(12 HOURS)**

Introduction to Java Programming:

Java Features, JVM, JIT Compiler, Java Programing Basics, Data Types, Control Flow, Arrays, Jagged Array.

OOPS:

Introduction, Class, Object, Static Keywords, Constructors, this keyword, Inheritance, Inner class, Anonymous Inner class, super keyword, Polymorphism (overloading and overriding), Abstraction, Encapsulation, Abstract Classes, Interfaces, Packages.

UNIT 2 **(12 HOURS)**

Multithreading & Servlet, JSP:

Multithreading and Concurrency in Java Networking, Socket Programming, Exception Handling, Logging Generics and Collections Framework classes, Servlet Filters, JSP Syntax and Scripting Elements, Expression Language (EL) and JSP Standard Tag Library (JSTL), Model View Controller (MVC) architecture using Servlets and JSP

UNIT 3 **(12 HOURS)**

Java Database Connectivity (JDBC) & Hibernate:

JDBC overview, Architecture, Steps to create JDBC Application, Drivers, Database connection statements, Resultsets,

Hibernate framework application, Introduction Working on Hibernate framework and its advantage and disadvantage, Introduction to Using Hibernate framework in a live application.

UNIT 4 **(12 HOURS)**

Advanced Java Concepts

Types of software architectures, SOA and Monolith Architecture, Why Micro services. Detailed Micro Service Architecture, App Layer, Business Layer, Enteprise Layer, Infra Layer, Need of Spring Boot, Difference between Spring & Spring Boot, Advantages with Micro Services

Web Services: Introduction to REST ful Web Services Building and Consuming REST ful APIs using JAX-RS SOAP Web Services with JAX-WS

This course should consist of 10 to 12 programming exercises with focus on covering the hands-on aspects.

Text Books:

1. Cay Horstmann and Gary Cornell - Core Java- Volume I Fundamentals, Pearson, Eight edition
2 Cay Horstmann and Gary Cornell - Core Java- Volume II - Advanced Features, Pearson, Eight edition
3. Bryan Basham, Kathy Sierra Head First Servlets and JSP, O'Reilly

01MCL119: Internet of Things

Course Details:

Course Details Class	**First Year M.C.A. Sem-II**
Course Code and Course Title	**01MCL119: Internet of Things**
Prerequisites	**Computer Fundamentals.**
Teaching scheme: Lectures +Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks,** 50 (ESE) +50 (CIE)
Tutorial: 1 Hr./Week	**TW: NA**

Course Outcomes:

1. Understand the role of IoT in various application domains.
2. Illustrate different technologies of IoT.
3. Identify various communication protocols used for IoT.
4. Elaborate emerging trends in IoT.

Unit 1: Introduction to IoT (12 HOURS)

Fundamentals of IoT, IoT architecture: Design principals of IoT architecture, Outline of IoT architecture,IoT architectural Reference Model (ARM), Functional view, Information View, Deployment View and OperationalView, Various platforms of IoT, Real time examples of IoT, Challenges of IoT.

Unit 2: Arduino Environment (12 HOURS)

Introduction to Arduino Uno, Arduino IDE, Software and Libraries, Basics of Embedded C programming for Arduino, Interfacing basic hardware components with Arduino, Types of Sensors, Working of Sensors, Interfacing Sensors with Arduino.

Unit 3: RFID Technology and Communication Technologies: (12 HOURS)

RFID, IoT objects and services, principles of RFID, Components of an RFID system, RFID reader,Tags, middleware, Sensor nodes, connecting nodes, networking nodes. WPAN Technologies:Introduction to IEEE 802.15.4 standard, Bluetooth, Zigbee, IEEE 802.15.6; WBANS, NFC, IEEE 802.11 WLAN, Cellular and mobile technologies.

Unit 4: RaspberryPi and Emerging Trends in IoT (12 HOURS)

Introduction to RaspberryPi, Introduction to board of RaspberryPi, Operating systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi with Python, Accessing RaspberryPi, Other IoT devices, Role of Big data, Machine learning and Cloud computing in IoT.

Text Books:

1. Internet of Things, Srinivasa K. G., Cengage Learning India, 2017.
2. Internet of Things (A Hands on approach), Vijay Madisetti and Arshadeep Bagha, 1stedition,VPT, 2014

Reference Books:

1. Internet of Things: Architecture and Design principles, 1st edition, McGraw Hill, 2017
2. Arduino Programing in 24 hours, Richard Blum, Sams, 1st edition
3. RaspberryPi cookbook, Simon Mark, O'Reilly, 3rd edition.

01MCL120: Cyber Security

Course Details:

Course Details Class	**Second Year M.C.A. Semester II**
Course Code and Course Title	**01MCL120: Cyber Security**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Tutorial: 1 Hr./Week	**TW: NA**

Course Outcomes:

After completion of this course student should be able to

1. Understand the fundamentals of Cyber security vulnerabilities.
2. Demonstrate different Cyber Security techniques.
3. Apply different Internet and Cyber Security Controls.
4. Describe Information Technology Act 2000.

Unit 1: Introduction to Cyber Security Vulnerabilities (12 HOURS)

Introduction to Cyber space and security, Internet Security, Cloud Computing &Security, Social Network sites security, Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Authorization, Unprotected Broadband communications, Cyber Security Awareness.

Unit 2: Cyber Security Techniques (12 HOURS)

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography . Overview of Firewalls Types of Firewalls. Intrusion detection system: Types of Intrusion Detection System, Features and limitations. Intrusion prevention system: Honeypots, Types of Honeypots, Introduction to Honeynets.

Unit 3: Internet Security Controls (12 HOURS)

Internet Security: Secure Socket Layer (SSL), Secure Hypertext Transfer Protocol(S/HTTP), IPSec, and Secure Multipurpose Internet Mail 15Periods 6 Extensions (S/MIME). Web browser security: Filtering services in web browser. E-mail Security:, Encryption for Secure E-Mail, Secure E- Mail System: PGP (Pretty Good Privacy), S/MIME (Secure Multipurpose Internet Mail Extensions); Cyber Security Standards: ISO/IEC 27032, NIST- CSF

Unit 4: Cyber Law (12 **HOURS**)

Introduction to Cyber Laws, Why do we need Cyber law: The Indian Context, Three Bodies of Law, Types, Levels, Computers Related Laws, Cybercrime and the Indian ITA 2000 and amendments, Honeypots, The Indian Penal Code (IPC) 1860, Mapping of Cybercrime with IT Act, Technology and Students: Indian Scenario.

Reference Books:-

1. Charlie Kaufman and Radia Perlman, Mike Speciner, –Network Security, Second Edition,
2. Private Communication in Public World‖, PHI 2002.
3. Tony Bradley, –Essential Computer Security: Everyone‘s Guide to Email, Internet and
4. Wireless security‖, Syngress Publication 2006.
5. Behrouz A. Ferouzan, –Cryptography & Network Security‖, Tata McGraw Hill, 2007.
6. Information & Network Security for GTU, I. A. Dhotre V. S. Bagad, Technical publication,
7. Cyber frauds, cyber crimes and law in India, Pavan duggal.
8. Digital forensics, DSCI.Nasscom, 2012.
9. Cyber crime investigation, DSCI.Nasscom, 2013 Other resources.
10. Dr. Farooq Ahmad, Cyber Law in India, Allahbad Law Agency- Faridabad.

01MCP114: Mini Project

Course Details:

Course Details Class	**Second Year M.C.A. Semester II**
Course Code and Course Title	**01MCP114: Mini Project**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Practical	**6 Hrs.**
Credits	**3**
Evaluation Scheme ESE + CIE for Theory	**-**

Teaching scheme	**Examination scheme**
Lectures: NA	**NA**
Practical: 8 Hr./Week	**POE: 50 (ESE) +50 (CIE)**

Course Outcomes:

After completion of this course student should be able to

1. Identify the problem in existing system.
2. Develop SRS document for proposed system.
3. Develop application using appropriate technology platform.
4. Validate the developed application

A group of maximum two students prepare a mini project under the guidance of internal guide. Project report will be evaluated by the internal teacher out of 20 marks and there will be viva-voce examination for 80 marks. The student should prepare the project report based courses studied in Semester I, Semester II and Semester III. Guidelines of Major Projects should be followed except industry certificate, joining report and industry work progress report.

01MCP117: Professional Communication

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCP117: Professional Communication**
Prerequisites	**Business Management**
Teaching scheme: Practical + Theory	**1Hr. +1 Hr**
Credits	**1 + 1**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: --	**Practical:**
Practical: 2 Hr./Week	POE: **50 (ESE) +50 (CIE)**

Course Outcomes:

To empower the students towards general and technical writing, oral communications and listening skills: letter writing, technical report writing, and business communication.

UNIT 1 (9 HOURS)

Expression: Practical communication skill development, business presentation with multimedia, speaking skill, prepared speech, extempore speech.

UNIT 2 (9 HOURS)

Writing: Technical/business letter, Resume Preparation, organization of writing material, poster presentation, writing technical document, preparing software user manual, preparing project documentation.

Text Books:

1. Business Correspondence & Report Writing, Sharma, TMH
2. Business Communication Strategies, Monipally, TMH

References:

1. English for Technical communication,Laxminarayanan,Scitech
2. Business Communication, Kaul,PHI
3. Communication Skill for Effective Mgmt., Ghanekar,EPH

01MCL118 : Audit Course – II

VALUE EDUCATION

Course Details:

Course Details Class	**First Year M.C.A. Sem-I**
Course Code and Course Title	**01MCL118: Audit Course-II**
Prerequisites	**Value Education**
Teaching scheme: Lectures	**2 Hrs.**
Credits	**--**
Evaluation Scheme CIE for Theory	**50 (ESE)**

Teaching scheme	**Examination scheme**
Lectures: 2 Hrs. /Week	**Theory: 50 Marks** (ESE)
Tutorial: NA	**TW: NA**

Course Outcomes:

1. Understand the significance of ethical human conduct and self-development
2. Adopt value-based living and holistic technologies to save nature
3. Practice Self-control. Honesty through Studying effectively all religious messages

UNIT 1. VALUES AND SELF-DEVELOPMENT (4 HOURS)

Values and self-development. Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgments.

UNIT 2. CULTIVATION OF VALUES (4 HOURS)

Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism. Love for nature, Discipline.

UNIT 3. PERSONALITY AND BEHAVIOR DEVELOPMENT (4 HOURS)

Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labor. Universal brotherhood and religious tolerance. True friendship. Happiness vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature.

UNIT 4. CHARACTER AND COMPETENC (4 HOURS)

Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science of reincarnation. Equality, Nonviolence, Humility, Role of Women.

UNIT 5. SELF CONTROL (4 HOURS)

All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively.

Text Books:

1. Chakroborty, S.K. ‒Values and Ethics for organizations Theory and practice‖, Oxford University Press, New Delhi.

References:

1. R.P. Shukla, ‒Value education and human rights‖.

Dr. J. J. Magdum Trust's

Dr. J. J. Magdum College of Engineering, Jaysingpur

(An Autonomous Institute)

Teaching and Evaluation Scheme

MCA (Master of Computer Application)

Second Year MCA. (Semester- III)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	Evaluation Scheme						
								Theory				Practical		TOTAL
								CIE			ESE	CIE	ESE	
								T-I	T-II	ISE				
1	01MCL201	Cloud Computing	3		--	3	3	20	20	10	50	--	--	100
2	01MCL202	Data Science	3		--	3	3	20	20	10	50	--	--	100
3	01MCL203	Mobile Technologies	3		--	3	3	20	20	10	50	--	--	100
4		Program Elective-III	3	1	-	4	4	20	20	10	50	--	--	100
5	01MCP204	Major Project		--	8	8	4					50	50	100
6	01MCP205	Data Science Lab	--	--	2	2	1	--	--	--	--	50	50	100
7	01MCP206	Mobile Technologies Lab	--	--	2	2	1					50	50	100
8	01MCP207	SWAYAM.MOOC Course	--	--	2	2	1	--	--	--	--	--	50	50
9	01MCL208	Audit Course - III	2	--	--	2	Audit	--	--	--	50	--	--	50
		Total	**14**	**01**	**14**	**29**	**20**	**80**	**80**	**40**	**250**	**150**	**200**	**800**

L- Lecture , T- Tutorial , P- Practical , T-I-Test I, T-II- Test II,
ISE- In Semester Evaluation, CIE- Continuous Internal Evaluation, ESE- End Semester Examination,

Open Elective -III

Sr.No.	Course Code	Courses
01	01MCL209	Artificial Intelligence
02	01MCL210	Machine Learning

Note for Open Elective

An Open Elective course is included in the curriculum of S. Y. MCA (Semester-III), under which students need to learn either MOOC course or courses offered by department.

Guidelines for MOOC course under Open Elective

1. If students opt for MOOC course as an Open Elective, he/she should select this course from NPTEL platform only.
2. As three credits are allotted to open elective, selected MOOC course must be of minimum 6 weeks or 30 hours.
3. Students need to solve assignments given by platform and also, give the final certification exam at allotted NPTEL exam center.
4. Student must secure certification of NPTEL platform , otherwise he/she will not be eligible for

final evaluation.

5. Final evaluation of the MOOC course will be based on oral examination conducted by department and marks secured in the exam conducted by NPTEL

6. If student fails in NPTHL certification course, he or she should reregister for the course in the next semester.

01MCL201: Cloud Computing

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**01MCL201: Cloud Computing**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures	**3 Hrs.**
Credits	**3**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Tutorial: NA	**TW: NA**

Course Outcomes:

After completion of this course student should be able to

1. Differentiate between different types and services of cloud computing.
2. Assess the role of virtualization in cloud computing.
3. Identify security issues in cloud computing.
4. Describe risk assessment and management in cloud.

Unit 1: Introduction to Cloud Computing: (12 HOURS)

Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Cloud Architecture, Services and Applications: Infrastructure as a Service, Platform as a Service, Using Paas Application Frameworks, Software as a Service, Identity as a Service, and Compliance as a Service.Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Benefits and Disadvantages of Cloud Computing, Challenges and Risks of Cloud computing.

Unit 2: Abstraction and Virtualization: (12 HOURS)

Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context

Unit 3: Securing the Cloud: (12 HOURS)

Administrating the Clouds, Cloud Management Products, 15 Periods 9 Emerging Cloud Management Standards, Securing the Cloud, Securing Data, Establishing Identity and Presence, Storage Area Networks, Disaster Recovery in Clouds

Unit 4: Managing Risks in Cloud: (12 HOURS)

Risk of Cloud computing and Related Cost :Risk Assessment and Management , Risk of Vendor Lock- in, Risk of Loss of control over IT services Risk of Poor Provisioning, Risk of Multi, tenant environment , Risk failure of cloud provider, SLA risk, security, malware and Internet Attacks, Risk with Application Licensing

Reference Books:-

1. Cloud Computing, U S Pandey & Kavita Choudhary, S.Chand, 1st edition, 2014
2. Sosinsky B., ―Cloud Computing Bible‖, Wiley India ISBN 13: 9788126529803.
3. Buyya R., Broberg J., Goscinski A., ―Cloud Computing: Principles and Paradigm‖, John Wiley & Sons ISBN NO: 81–7758– 575-4
4. Velte T., Velte A., Elsenpeter R., ―Cloud Computing – A practical Approach‖, Tata McGrawHill.
5. Cloud Computing with Security, Naresh Kumar Sehgal, Springer, 2019

01MCL202: Data Science

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**01MCL202: Data Science**
Prerequisites	Statistics and Probability , Programming and Data Manipulation
Teaching scheme: Lectures + Practical	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Practical: 2 Hr./Week	**POE:50 (ESE) +50 (CIE)**

Course Outcomes:

At the end of this course, the students will be able to:

CO1 : Apply thy knowledge of Data Science and the skill set needed to be a Data Scientist
CO2: Use different tools for Data Science.
CO3: To create effective visualization of given data (to communicate or persuade).
CO4: Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbours (k-NN), k-means, Naive Bayes) for predictive modelling

Unit 1: Introduction: **(12 HOURS)**

What is Data Science? - Big Data and Data Science hype – and getting past the hype - Why now? – Datafication - Current landscape of perspectives - Skill sets needed, Statistical Inference - Populations and samples - Statistical modelling, probability distributions, fitting a model - Intro to R

Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary statistics) of EDA - Philosophy of EDA - The Data Science Process

Unit 2: Basic Machine Learning Algorithms (12 **HOURS**)

Linear Regression - k-Nearest Neighbours (k-NN) - k-means, One More Machine Learning Algorithm and Usage in Applications - Motivating application: Filtering Spam - Why Linear Regression and k-NN are poor choices for Filtering Spam - Naive Bayes and why it works for Filtering Spam Data Wrangling: APIs and other tools for scrapping the Web

Unit 3: Feature Generation and Feature Selection - **(12 HOURS)**

Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests

Mining Social-Network Graphs - Social networks as graphs - Clustering of graphs - Direct discovery of communities in graphs - Partitioning of graphs - Neighbourhood properties in graphs

Unit 4: Data Visualization – (**12 HOURS)**

Basic principles, ideas and tools for data visualization - Examples of inspiring (industry) projects - Exercise: create your own visualization of a complex dataset Data Science and Ethical Issues - Discussions on privacy, security, ethics - A look back at Data Science - Nextgeneration data scientists

Text Books:

Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014, ISBN: 9781449358655.

Reference Books:

1. Jure Leskovec, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press. 2014 (free online),ISBN -978-1107077232.

2. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2013

3. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013.

4. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition. ISBN 0387952845. 2009. (free online)

5. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science, ISBN: 9781108485067.

6. Mohammed J. Zakiand, Wagner Miera Jr. Data Mining and Analysis: Fundamental Concepts and Algorithms. Cambridge University Press. 2014,ISBN:0521766338

7. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, Third Edition. ISBN 0123814790. 2011

01MCL203: Mobile Technologies

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**01MCL203:Mobile Technologies**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Practical	**3 Hrs. + 1Hrs.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**-**
Practical: 2 Hr./Week	**POE: 50 (ESE) + 50 (CIE)**

Prerequisite: Programming Languages, Mobile Development Frameworks, User Interface (UI) Design

Course Outcomes:

After completion of this course student will be able to

CO1: Learn Mobile Technology Fundamentals

CO2: Develop proficiency in Android Application Development

CO3: Improve proficiency in iOS Application Development

CO4: Perform Application of Mobile Development Skills

Unit 1: Introduction to Mobile Technology (12 HOURS)

Introduction to Mobile operating System, Evolution of mobile technology, Characteristics of Mobile Applications. Comparison between Android, Windows and IoS. Architecture & Environment: SDK, Android Development Tools, Android Virtual Devices, Emulators, Dalvik Virtual Machine, Android Directory Structure.

Unit 2: Android Application Development (12 HOURS)

UI components Design: TextView, Buttons, Check Boxes and Radio Groups, Spinner, DatePicker, TimePicker. Android Menu: Option Menu, Context Menu, Popup Menu. Activity: Activity Lifecycle, Activity Example, Views, Layout Manager and types, Intent, Storing data with SQLite databases, Handling permissions and security in Android apps.

Unit 3: IOS Development (12 HOURS)

Introduction to iOS platform, Setting up the iOS development environment (Xcode),Basic iOS application structure,User interface design with Interface Builder, Handling user input and events in iOS apps, Working with table views and collection views, Storing data with Core Data, Networking and data communication in iOS apps, Deploying iOS apps to the App Store.

Unit 4: Cross-Platform Development:

Introduction to cross-platform development frameworks (e.g., React Native, Flutter), Pros and cons of cross-platform development, Building a simple cross- platform app, Strategies for code sharing and platform-specific optimizations.

Reference Books:-

1. Android, P.K. Dixit, Vikas Publication

2. Android Application Development – Black Book Pradip Kotari, Dreamtech

3. Composing Mobile Apps Learn, Explorer, Apply using Android Anubhav Pradhan, Anil Deshpande, Wiley Publications

4. "Android Programming: The Big Nerd Ranch Guide" by Bill Phillips and Chris Stewart by Bill Phillips, Chris Stewart, Kristin Marsicano Released January 2017 ISBN: 9780134706061

5. "iOS Programming: The Big Nerd Ranch Guide" by Christian Keur and Aaron Hillegass ISBN-13: 9780137570386 Published 2022

6. "Head First Android Development: A Brain-Friendly Guide" by Dawn Griffiths and David Griffiths ISBN 10: 1491974052 ISBN 13: 9781491974056Publisher: O'Reilly Media, 2017

7. "Cross-Platform Development with Xamarin.Forms" by Paul Johnson ISBN-10 : 1784391190 ISBN-13 : 978-1784391195

01**MCL209: Artificial Intelligence**

Course Details:

Course Details Class	**First Year M.C.A. Sem-II**
Course Code and Course Title	**01MCL209: Artificial Intelligence**
Prerequisites	**Basic Programming in Python.**
Teaching scheme: Lectures +Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks,** 50 (ESE) +50 (CIE)
Tutorial: 1 Hr./Week	**TW: NA**

Course Outcomes:

1. Evaluate Artificial Intelligence (AI) methods and describe their foundations.
2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.
3. Demonstrate knowledge of reasoning and knowledge representation for solving real world problems.
4. Analyze and illustrate how search algorithms play vital role in problem solving.

UNIT 1: Artificial Intelligence and Its Issues: (12 HOURS)

Definitions - Importance of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment, Knowledge Inferring systems and Planning, Uncertainty and towards Learning Systems. Problem solving by Search, Problem space - State space, Blind Search - Types, Performance measurement. Types, Game playing mini-max algorithm, Alpha-Beta Pruning

UNIT 2 (12 HOURS)

Probabilistic Reasoning & Markov Decision process:

Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model.

MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

UNIT 3 (12 HOURS)

Learning Systems & Expert Systems:

Forms of Learning Types - Supervised, Unsupervised, Reinforcement Learning, Learning Decision Trees. Expert Systems - Stages in the development of an Expert System - Probability based Expert Systems - Expert System Tools - Difficulties in Developing Expert Systems - Applications of Expert Systems.

UNIT 4 **(12 HOURS)**

AI with Python:

Study of important inbuilt libraries of Python like NumPy, SciPy, matplotlib, nltk, Simple AI. Installing Python. Setting up PATH. Running Python. Study of real time applications of AI with Python, Case Studies: AI Platforms-Azure ML, Google AI, Swift AI, Tensorflow.

Textbook:

1. Artificial Intelligence - A Modern Approach Russell, S. and Norvig, P. 3rd edition, Prentice Hall.2015
2. Artificial Intelligence: Foundations of Computational Agents Poole, D. and Mackworth, A. Cambridge University Press.2010

Reference Books:

1. Artificial Intelligence, 3rd edition Ric, E., Knight, K and Shankar, B. Tata McGraw Hill.2009
2. Artificial Intelligence -Structures and Strategies for Complex Problem Solving, Luger, G.F. 6th edition, Pearson.2008
3. Artificial Intelligence and Intelligent Systems. Padhy, N.P. Oxford University Press. 2009

MC1204: Machine Learning

Course Details:

Course Details Class	First Year M.C.A. Sem-II
Course Code and Course Title	MC1204: Machine Learning
Prerequisites	Basic Programming in Python.
Teaching scheme: Lectures +Tutorial	3 Hrs. + 1 Hr.
Credits	3 + 1
Evaluation Scheme ESE + CIE for Theory	50 (ESE) + 50 (CIE)

Teaching scheme	Examination scheme
Lectures: 3 Hrs. /Week	Theory: 100 Marks, 50 (ESE) +50 (CIE)
Tutorial: 1 Hr./Week	TW: NA

Course Outcomes:

After completion of this course student should be able to

1. Introduce machine learning techniques.
2. Become aware of various parametric and non-parametric methods in machine learning.
3. Understand a wide variety of learning algorithms.
4. Design and implement various machine learning algorithms in a range of real-world applications

Unit 1: (12 HOURS)

Introduction to Machine Learning: Different types of Learning: Supervised, Unsupervised, Semi Supervised, Hypothesis space. Machine Learning Models: Geometric, Logical and probabilistic. Features: Types and Selection Methods.

Unit 2: (12 HOURS)

Regression and Classification: Regression: Simple Linear Regression, Multiple Linear Regression, Other Considerations in the Regression Model. Classification: Logistic Regression: The Logistic Model, Estimating the Regression Coefficients, Making Predictions, Multiple Logistic Regression. Performance Evaluation: Error, Accuracy, Precision, Recall. Sampling Methods: Train/Test Sets, Cross Validation, Difficulties in evaluating hypothesis, Sample Error, True Error. What to measure: Precision and Recall, accuracy, AUC, ROC, How to measure: Cross Validation, how to interpret.

Unit 3: (12 HOURS)

Linear and Probabilistic Models: Linear Model: Least Square Method, Multivariate Linear regression, least square regression for classification, Support Vector Machine. Probabilistic Model:

Normal Distribution and its geometric interpretation, Naïve Bayes model for classification.

Model Ensembles: Bagging and Random Forest, Boosting: Boosted Rule Learning, Mapping the ensemble landscape: Bias, Variance and Margins.

Unit 4: (12 HOURS)

Introduction to Deep Learning: The Neural Network: The Neuron, Feed-forward neural networks, Linear neurons and their limitations, Sigmoid, Activation Functions: Tanh and ReLU Networks, Softmax output layers. Training Feed-forward neural networks: Gradient Descent, Learning Rates, Gradient Descent with Sigmoid neurons, The Back Propagation algorithm, Test sets, Validation Sets and over fitting, preventing over fitting in Deep Neural Networks. Convolutional Neural Networks: Architectural Description of Convolution Networks, Filters and Feature Maps, Back propagation in CNN

Reference Books:-

Nikhil Buduma, “Fundamentals of Deep Learning, O‟Reilly”, 1st Edition, ISBN NO. 978-14-919-2561-4.

EthemAlpaydin, “Introduction to Machine Learning”, PHI, 2nd Edition, 2013.

C.M. Bishop, “Pattern Recognition and Machine Learning”, Springer 1stEdition, 2013.

Tom Mitchell, “Machine Learning, Mcgraw-Hill”, 1

01MCP204: Major Project

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**01MCP204: Major Project**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Practical	**8 Hrs.**
Credits	**4**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: NA	**NA**
Practical: 8 Hr./Week	**POE: 50 (ESE) +50 (CIE)**

Course Outcomes:

After completion of this course student should be able to

1. Identify the problem in existing system and develop SRS.
2. Understand the industrial line of work and corporate work culture.
3. Select appropriate technology platform for problem solving
4. Develop application using appropriate technology platform.
5. Test developed application for user acceptance.
6. Write project report in professional format.

Guide Lines for Projects:

A student has to take project work at the end of third semester of MCA

1. For major project student should go for in-plant training of 90 days after completion of semester III.
2. Project report will be submitted to institute/department before university examination of 4th Semester.
3. Project work will be done individually and students should take guidance from assigned guide and prepare a Project Report on ―Project Work" to be submitted to the Head of the Department.
4. Acceptance/Rejection of Project Report:
    a. The student should submit progress report with draft project report to the guide.
    b. Respective guide has right to suggest modifications for resubmission or accept the project.
    c. Only on acceptance of draft project report, the student should make the final copy.

Following format for the submission of the Project Report.

a. Paper:
The Report shall be typed on white paper, A4 size, for the final submission. The report to be submitted must be original and subsequent copies may be photocopied on any paper.

b. Typing:
The typing shall be of standard letter size, 1.5 spaced and on both side of the paper. (Normal text should have Times New Roman, Font size 12. Headings can have bigger size)

c. Margins: The typing must be done in the following margins: Left -----1.5 inch, Right -------1 inch Top ------ 1 inch, Bottom - 1 inch

d. Front Cover: The front cover should contain the following details:
TOP: The title in block capitals of 6mm to 15mm letters.
CENTRE: Full name in block capitals of 6mm to 10mm letters.

BOTTOM: Name of the University, Course, Year of submission -all in block capitals of 6mm to 10mm letters on separate lines with proper spacing with center alignment.

e. Blank Sheets: At the beginning and end of the report, two white black papers should be provided, one for the purpose of binding and other to be left blank.

Documentation Format

a) Cover Page
b) Institute/College Recommendation
c) Organization Certificate
d) Guide Certificate
e) Declaration
f) Acknowledgement
g) Index

Chapter Scheme

1) Introduction to Project

- Introduction
- Existing System
- Need and scope of Computer System
- Organization Profile (Optional & applicable for live project only)

2) Proposed System

- Objectives
- Requirement Engineering.
    - Requirement Gathering
    - Software Requirements

3) System Analysis

- System Diagram
    - DFD
    - ERD

Note: Use advanced tools and techniques as per requirement.

4) System Design

- Database Design
- Input Design & its samples
- Output Design (on screen)

5) Implementation

- System Requirement
- Hardware
- Software
- Installation process
- User Guideline

6) Reports (with valid Data)

(Minimum 6-10 reports)

7) Conclusion and Suggestions

- Conclusion
- Limitations
- Suggestion

Annexure

- Source code (Include Main Logic source code)
- Questioner/Schedule (if used)
- Joining Report, Progress Reports, Student Guide Meet Record

01MCL208: Audit Course -III
CONSTITUTION OF INDIA

Course Details:

Course Details Class	**First Year M.C.A. Sem-III**
Course Code and Course Title	**01MCL208: Audit Course-III**
Prerequisites	**Constitution of India**
Teaching scheme: Lectures	**2 Hrs.**
Credits	**--**
Evaluation Scheme CIE for Theory	**50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 2 Hrs. /Week	**Theory: 50 Marks** (CIE)
Tutorial: NA	**TW: NA**

Course Outcomes:

1. Describe historical background of the constitution making and its importance forbuilding a democratic India.
2. Understand the Constitutional Rights and and duties
3. Analyse the decentralization of power between central, state and local self-government

UNIT 1. HISTORY OF MAKING OF THE INDIAN CONSTITUTION &PHILOSOPHY OF THE INDIAN CONSTITUTION (4 HOURS)

History of Making of the Indian Constitution: History, Drafting Committee, (Composition & Working) Philosophy of the Indian Constitution: Preamble, Salient Features

UNIT 2. CONTOURS OF CONSTITUTIONAL RIGHTS & DUTIES (4 HOURS)

Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom ofReligion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of StatePolicy, Fundamental Duties.

UNIT 3. ORGANS OF GOVERNANCE (4 HOURS)

Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, ExecutivePresident, Governor,Council of Minister.
Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions.

UNIT 4. LOCAL ADMINISTRATION (4 HOURS)

District‘s Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy(Different departments),Village level: Role of Elected and Appointed officials, Importance of grass root democracy

UNIT 5. ELECTION COMMISSION (4 HOURS)

Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC andwomen.

Text Books:

1.Dr. S. N. Busi, ―Dr. B. R. Ambedkar framing of Indian Constitution‖, 1st Edition, 2015.

2.M. P. Jain, ―Indian Constitution Law‖, Lexis Nexis, 7th Edition,2014..

References:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. D.D. Basu, ―Introduction to the Constitution of India‖, Lexis Nexis, 2015.

Dr. J. J. Magdum Trust's

Dr. J. J. Magdum College of Engineering, Jaysingpur

(An Autonomous Institute)

Teaching and Evaluation Scheme

MCA (Master of Computer Application)

Second Year MCA. (Semester- IV)

Sr. No.	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	Evaluation Scheme						
								Theory				Practical		TOTAL
								CIE			ESE	CIE	ESE	
								T-I	T-II	ISE				
1	01MCL211	Agile Software Development	3		--	3	3	20	20	10	50	--	--	100
2	01MCL212	Block chain Technologies	3		--	3	3	20	20	10	50	--	--	100
3		Program Elective -IV	3	1	--	4	4	20	20	10	50	--	--	100
4	01MCP213	Internship(Seminar)	--	--	6	6	3	--	--	--	--	50	100	150
5	01MCP214	Industrial Project		--	12	12	6	--	--	--	--	100	100	200
6	01MCP215	SWAYAM.MOOC Course	--	--	--	--	1	--	--	--	--	50	--	50
7	01MCL216	Audit Course – IV	2	--	--	2	--	--	--	--	50	--	--	50
		Total	**11**	**01**	**18**	**30**	**20**	**60**	**60**	**30**	**200**	**200**	**200**	**750**

L- Lecture , T- Tutorial , P- Practical , T-I-Test I, T-II- Test II,
ISE- In Semester Evaluation, CIE- Continuous Internal Evaluation, ESE- End Semester Examination,

Open Elective -IV

Sr.No.	Course Code	Courses
01	01MCL217	Robotics and Automation
02	01MCL218	Digital Forensics

Master of Computer Application (MCA)

Under Faculty of Science and Technology (Engineering and Technology)

01MCL211: Agile Software Development

Part II Semester IV

CourseDetails:

Course Details Class	Second Year M.C.A. Sem-II
Course Code and Course Title	01MCL211: Agile Software Development
Prerequisites	Software Engineering
Teaching scheme: Lectures+ Tutorials	3 Hrs.
Credits	3
Evaluation Scheme ESE + CIE for Theory	50 (ESE) + 50 (CIE)

Teaching scheme	Examination scheme
Lectures: 3 Hrs. /Week	Theory: 100 Marks, 50 (ESE) +50 (CIE)
Tutorial: -	TW: --NA

Course Outcomes:

After completing the course student should be able to:

1. Describe the fundamental principles and practices associated with each of the agile development methods.
2. Compare agile software development model with traditional development models and identify the benefits and pitfalls.
3. Use techniques and skills to establish and mentor Agile Teams for effective software development.
4. Apply core values and principles of Agile Methods in software development.

Unit-I: Fundamentals of Agile Process: (12 HOURS)

Introduction and background, Agile Manifesto and Principles, Stakeholders and Challenges, Overview of Agile Development Models: Scrum, Extreme Programming, Feature Driven Development, Crystal, Kanban, and Lean Software Development.

Unit-II: Introduction to Scrum: (12 HOURS) Agile Scrum Framework, Scrum Artifacts, Meetings, Activities and Roles, Scrum Team Simulation, Scrum Planning Principles, Product and Release Planning, Sprinting: Planning,

Execution, Review and Retrospective; User story definition and Characteristics, Acceptancetestsand Verifying stories, Burn down chart, Daily scrum, Scrum Case Study.

Unit-III: Introduction to Extreme Programming (XP): (12 HOURS)

XP Lifecycle, The XP Team, XP Concepts: Refactoring, Technical Debt, Timeboxing, Stories, Velocity; Adopting XP: Pre-requisites, Challenges; Applying XP: Thinking- Pair Programming, Collaborating, Release, Planning, Development; XP Case Study.

Unit-IV: Agile Software Design and Development: (12 HOURS)

Agile design practices, Role of design Principles, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control; Agility
and Quality Assurance: Agile Interaction Design, Agile approach to Quality Assurance, Test Driven Development, Pair programming: Issues and Challenges.

Text Books:

1. Clinton Keith Agile Game Development
2. Agile Software Development: Principles, Patterns, and Practices Author: Robert C. Martin

Reference Books:

1. Craig Larman, ―Agile and Iterative Development: A manager‘s Guide, Addison-Wesley, 2004.
2. Ken Schawber, Mike Beedle, Agile Software Development with Scrum, Pearson, 2001.
3. Cohn, Mike, Agile Estimating and Planning, Pearson Education, 2006.
4. Cohn, Mike, User Stories Applied: For Agile Software Development Addison Wisley, 2004.

01MCL212: Block Chain Technology

Course Details:

Course Details Class	**Second Year M.C.A. Sem-IV**
Course Code and Course Title	**01MCL212:** Block Chain Technology
Prerequisites	**Basics of Languages:** Programming Skills, Cryptography Basics
Teaching scheme: Lectures	**3 Hrs**
Credits	**3**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Tutorial: NA	**TW: NA**

Course Outcomes:

1. To understand the concepts of block chain technology
2. State the basic concepts of block chain
3. Paraphrase the list of consensus and Demonstrate and Interpret working of Hyper ledger Fabric
4. Implement SDK composer tool and explain the Digital identity for government

UNIT – 1 **(12 HOURS)**

History: Digital Money to Distributed Ledgers -Design Primitives: Protocols, Security, Consensus, Permissions, Privacy- : Block chain Architecture and Design-Basic crypto primitives: Hash, Signature-Hash chain to Block chain-Basic consensus mechanisms.

Requirements for the consensus protocols-Proof of Work (PoW)-Scalability aspects of Block chain consensus protocols**:** Permissioned Block chains-Design goals-Consensus protocols for Permissioned Block chains.

UNIT – 2 **(12 HOURS)**

Decomposing the consensus process-Hyper ledger fabric components-Chain code Design and Implementation: Hyper ledger Fabric II:-Beyond Chain code: fabric SDK and Front End-Hyper ledger composer tool.

UNIT – 3 **(12 HOURS)**

Block chain in Financial Software and Systems (FSS): -Settlements, -KYC, -Capital markets-Insurance-Block chain in trade/supply chain: Provenance of goods, visibility, trade/supply chain finance, invoice management/discounting.

UNIT - IV **(12 HOURS)**

Block chain for Government: Digital identity, land records and other kinds of record keeping between government entities, public distribution system / social welfare systems: Block chain Cryptography: Privacy and Security on Block chain.

TEXT BOOKS:

1. Mark Gates, ―Block chain: Ultimate guide to understanding block chain, bit coin, crypto currencies, smart contracts and the future of money‖, Wise Fox Publishing and Mark Gates 2017.
2. Salman Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O'Dowd, Venkatraman Ramakrishna, ―Hands-On Block chain with Hyper ledger: Building decentralized applications with Hyperledger Fabric and Composer‖, 2018.
3. Bahga, Vijay Madisetti, ―Block chain Applications: A Hands-On Approach‖, Arshdeep Bahga, Vijay Madisetti publishers 2017.

References:

1. Andreas Antonopoulos, ―*Mastering Bitcoin: Unlocking Digital Crypto currencies*‖, O'Reilly Media, Inc. 2014.
2. Melanie Swa, ―*Block chain* ‖,O'Reilly Media 2014.

01MCL217: Robotics and Automation

Course Details:

Course Details Class	**Second Year M.C.A. Sem-II**
Course Code and Course Title	**01MCL217**: **Robotics and Automation Course**
Prerequisites	**Knowledge of basic electronics and electrical engineering.**
Teaching scheme: Lectures+ Tutorials	**3 Hrs. + 1Hr**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks,** 50 (ESE) +50 (CIE)
Tutorial: 1 Hrs. /Week	**TW: --NA**

Course Outcome:

After successful completion of the course, students will able to:

1. Apply automation principles and strategies
2. Identify the automation need, type and method
3. Outline the fundamentals of robotics and its components
4. Design appropriate end effectors for various applications

UNIT-I: FUNDAMENTALS OF AUTOMATION (12 HOURS)

Definition, Types of Automation, Advantages, Goals and Issues in Automation, Industry 4.0, Components of an automatic system, Trends in Automation – PLC, DCS, SCADA, AI based Automation. Case Studies in Industrial Automation, Home Automation, Building Automation, Agricultural Automation, Medical Automation, Smart Cities and other applications, Future of Robotics and Automation

UNIT-II: APPLICATIONS OF ROBOTICS (12 HOURS)

Historical development of Robotics, Definitions of Industrial Robot, Type and Classification of Robots, Asimov_s laws of robotics, Robot configurations, Robot Components, Robot Degrees of Freedom, Work volume and work envelope, Robot Joints and symbols, Robot Coordinates, Robot Reference Frames, Resolution, accuracy and precision of Robot, Work cell control

UNIT-III: ROBOT DRIVE SYSTEMS AND END EFFECTORS (12 HOURS)

Pneumatic Drives, Hydraulic Drives, Mechanical Drives, Electrical Drives-D.C. Servo Motors, Stepper Motors, A.C. Servo Motors, BLDC-Salient Features, Applications and Comparison of all these Drives, Micro actuators, selection of drive, Grippers, Mechanical Grippers, Pneumatic and Hydraulic- Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Advance Grippers- Adaptive grippers, Soft Robotics Grippers, Tactile Sensor Grippers; Various process tools as end effectors; Robot end effectors interface, Active and passive compliance, Selection and Design Considerations

UNIT-IV: ROBOT SENSORS (12 HOURS)

Transducers and sensors, Sensors in robotics, Principles and applications of the following types of sensors- Proximity Sensors, Photo Electric Sensors, Position sensors – Piezo Electric Sensor, LVDT, Resolvers, Encoders – Absolute and Incremental: - Optical, Magnetic, Capacitive, pneumaticPosition Sensors, Range Sensors- Range Finders, Laser Range Meters, Touch Sensors, Force and torque sensors, Safety Sensor: Light Curtain, Laser Area Scanner, Safety Switches, Machine vision

Text Books:

1. Groover, M.P. Weiss, M. Nagel, R.N. &Odrey, N.G., Ashish Dutta, Industrial Robotics,
2. Technology, Programming & Applications, Tata McGraw Hill Education Pvt. Ltd. New Delhi
3. S. R. Deb, Robotics Technology and Flexible Automation, Tata McGraw Hill.
4. Groover M.P.-Automation, production systems and computer integrated manufacturing-
5. Prentice Hall of India.

Reference Books:

1. S B Niku, Introduction to Robotics, Analysis, Control, Applications, 2nd Edition, Wiley Publication, 2015.
2. Mikell P. Groover, Automation, Production Systems & Computer Integrated Manufacturing, PHI Learning Pvt. Ltd., New Delhi, ISBN: 987-81-203-3418-2, 2012
3. John Craig, Introduction to Robotics, Mechanics and Control, 3rd Edition, Pearson Education, 2009
4. R K Mittal & I. J. Nagrath, Robotics and Control, McGraw Hill Publication, 2015.
5. Mike Wilson, Implementation of Robotic Systems, ISBN: 978-0-124-04733-4
6. www.roboanalyzer.com

01MCL218: Digital Forensics

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**01MCL218: Digital Forensics**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**50 (ESE) + 50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 50 (ESE) +50 (CIE)**
Tutorial: 1 Hr./Week	**TW: NA**

Course Outcomes:

After completion of this course student should be able to

1. Understand concepts and comprehension of digital forensic as a profession.
2. Apply the technical tools and techniques used in the field of digital forensics to evaluate an emerging issue in computer and cyber forensics.
3. Analyze the position or arguments around the issue, and present his/her knowledge in a written logical professional manner.

Unit 1: Introduction of Cyber Crime and Digital Evidences (12 HOURS)

Types, The Internet spawns crime, Computers' roles in crimes, Prevention of Cybercrimes, A global Perspective on cybercrimes, Digital Forensics: Historical Background of Digital Forensics, Importance ofDigital Forensics, Digital Forensics Rules, Digital Forensics Investigation, DF Investigation Processes/Models/Framework. Digital Evidences and its rules, Digital Evidence Characteristics, Types, Challenges in Evidence Handling, Volatile Evidences, Evidence Handling Procedures. Incident Response:Overview of Incident Response, People involved in Incident Response Process, Incident Response Methodology, Activities in Initial Response, Phase after detection of an incident.

Unit 2: Data Collection:

Introduction to Data Collection, People Involved in Data Collection Techniques, Live Data Collection, Data Collection from Windows, Unix. Forensic Duplication: Forensic Duplication Rules, Need of ForensicDuplication, Forensic Duplicates as Admissible Evidence, Important Terms, Forensic Duplication Tools, Creating a Forensic Duplicate of a Hard Drive.

Unit 3: Network Forensics and Data Analysis. (12 HOURS)

Introduction to Intrusion Detection System, Types of Intrusion Detection System, Advantages and Disadvantages of IDS, Understanding Network Intrusions and Attacks, Recognizing Pre-Intrusion/Attack Activities, Port Scans, Address Spoofing, Attacking with Trojans, Viruses and Worms, Kerberos, CollectingNetwork-Based Evidence. Email Forensics, Mobile Phone Forensics, Cloud Forensics Digital Forensics Tools. Data Analysis: Data Analysis Techniques, Forensic Analysis of File Systems Report Writing: Goals ofReport, Investigative Report Layout, Guidelines for Report Writing.

Unit 4: Cyber Law **(12 HOURS)**

Introduction to Cyber Laws, Why do we need Cyber law: The Indian Context, Three Bodies of Law, Types,Levels, Computers Related Laws, Cybercrime and the Indian ITA 2000 and amendments, Honeypots, The Indian Penal Code (IPC) 1860, Mapping of Cybercrime with IT Act, Technology and Students: Indian Scenario.

Reference Books:-

1. Indian Computer Emergency Response Team https://www.cert-in.org.in/
2. CDAC, Cyber Security and Cyber Forensics, https://www.cdac.in/index.aspx?id=cyber_security
3. Maharashtra Judicial Academy and Indian Mediation Centre and Training Institute http://mja.gov.in/Site/Home/Index.aspx
4. Secure India- A Group of Cyber Security Specialists http://www.secureindia.in/
5. Resource Centre for Cyber Forensics – India http://www.cyberforensics.in
6. Cyber Law of India http://www.cyberlawsindia.net
7. International Forensic Sciences Education Dept. (Forensic Sciences and Investigation Courses)http://www.ifs.edu.inhttp://www.forensic.co.in/
8. Computer Forensic Training Centre Online http://www.cftco.com/
9. Digital Forensic Magazine http://www.digitalforensicsmagazine.com/
10. The Journal of Digital Forensics, Security and Law https://commons.erau.edu/jdfsl/

01MCP213: Internship (Seminar)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**01MCP213:Interenship(Seminar)**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Practical	**6 Hrs.**
Credits	**3**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: NA	**NA**
Practical: 6 Hr./Week	**POE: 100 Marks CIE: 50 Marks**

Course Outcomes:

After completion of this course student should be able to

1. to 1. To develop and support a relevant and informed thesis, or point of view, that is appropriate forits audience, purpose, discipline, and theme.
2. To demonstrate effective writing skills and processes by employing the rhetorical techniques of academic writing, including invention, research, critical analysis and evaluation, and revision.
3. To incorporate and document appropriate sources in accordance with the formatting style proper forthe discipline and effectively utilize the conventions of standard written English.

Nature of Internship (Seminar)

The aim of this Internship (Seminar)is to make the students to study regarding industrial project. They are expected to go through the latest trend pertaining to computer and allied fields, to do the literature survey and deliver the seminar on their work done in an industrial project. The other important aim of the Internship (Seminar) is to encourage and develop the personality, aptitude and knowledge of the students

1. Internship **(**Seminar**)** work should be continually evaluated based on the contributions of an individual student, originality of the work, innovations brought in, research and developmental efforts,depth and applicability, etc.
2. Three mid-term evaluations should be done, which includes presentations and demos of the work done.

Project Report Format:

1. Page Size: Trimmed A4
2. Top Margin: 1.00 Inch
3. Bottom Margin: 1.32 Inches
4. Left Margin: 1.5 Inches
5. Right Margin: 1.0 Inch
6. Para Text: Times New Roman 12 Point Font
7. Line Spacing: 1.5 Lines
8. Page Numbers: Right Aligned at Footer. Font 12 Point. Times New Roman
9. Headings: Times New Roman, 14 Point Bold Face
10. Certificate: All students should attach standard format of Certificate as described by the department. Certificate should be awarded to batch and not to individual student. Certificate should have signatures of Guide, Head of Department and Principal/ Director.

11. Index of Report:

a. Title Sheet
b. Certificate
c. Acknowledgement
d. Table of Contents
e. List of Figures
f. List of Tables

12. References: References should have the following format
For Books: ―Title of Book‖, Authors, Publisher, Edition
For Papers: ―Title of Paper‖, Authors, Journal/Conference Details, Year

Useful Links:

- **http://www.geeksforgeeks.org/**
- **https://in.udacity.com/**
- **https://graphics.stanford.edu/~seander/bithacks.html**
- **https://www.youtube.com/results?search_query=mycodeschool**
- **https://www.hackerrank.com/**

JOINING REPORT FORMAT

Date:

To,

The Director/Principal,

……..

……..

…….

Sub: Joining Report

Respected Sir,

I, Shri/Ms. ……have joined ……. for the summer in-plant training from ..... for the Project Work to be carried out.

I would be carrying out project work under the guidance and supervision of Shri. /Ms. …… (Designation) ……in ……area. The title of my project work is……

I shall join the college immediately after completion of my training i.e. on ……..… without fail.

(Name & signature of the Student) (Name & Signature of Industry Guide)

Seal of Organization

WEEKLY PROGRESS REPORT

Weekly Progress Report No.

Name of Student	
Title of the Project	
Name of Guide	
Organization	
Date of Joining Organization	
Date of Progress Report	
Period Of Progress Report	
Progress:	

Signature of Student

Signature of Industry Guide

01MCP214: Industrial Project

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**01MCP214:Industrial Project**
Prerequisites	**Project Management, Industrial Processes and Operations &Problem Solving and Innovation**
Teaching scheme: Practical	**12 Hrs.**
Credits	**6**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: NA	**NA**
Practical: 12 Hr./Week	**POE: 100 Marks CIE: 100 Marks**

Course Outcomes (CO): Students will be able to

1. Apply knowledge of the distinction between critical and non-critical systems.
2. Attain an exposure to real life organizational and environmental situations & technical skills as per the requirements of the domain
3. Articulate SDLC phases in developing software project and Identify specific components of software design that can be targeted for reuse.

Nature Of Project:

The project batches of 2-3 students should be formed, which will work on the project allocated by the department. The batch must complete it during first semester only. Term work submission should be done in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the University.

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.

3. **Project Report Format**: Project report should be of 15 to 20 pages (typed on A4 size sheets). For standardization of the project reports the following format should be strictly followed.

1. Page Size: Trimmed A4
2. Top Margin: 1.00 Inch
3. Bottom Margin: 1.32 Inches
4. Left Margin: 1.5 Inches
5. Right Margin: 1.0 Inch
6. Para Text: Times New Roman 12 Point Font
7. Line Spacing: 1.5 Lines
8. Page Numbers: Right Aligned at Footer. Font 12 Point. Times New Roman
9. Headings: Times New Roman, 14 Point Bold Face
10. Certificate: All students should attach standard format of Certificate as described by the department. Certificate should be awarded to batch and not to individual student. Certificate should have signatures of Guide, Head of Department and Principal/ Director.
11. Index of Report: a. Title Sheet b. Certificate c. Acknowledgement d. Table of Contents e. List of Figures f. List of Tables
12. References: References should have the following format For Books: ―Title of Book‖, Authors, Publisher, Edition For Papers: ―Title of Paper‖, Authors, Journal/Conference Details, Year

01MCL216: Audit Course IV

STRESS MANAGEMENT BY YOGA

Course Details:

Course Details Class	**First Year M.C.A. Sem-III**
Course Code and Course Title	**01MCL216: Audit Course-IV**
Prerequisites	**Stress management by yoga**
Teaching scheme: Lectures	**2 Hrs.**
Credits	**--**
Evaluation Scheme CIE for Theory	**50 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 2 Hrs. /Week	**Theory: 50 Marks** (CIE)
Tutorial: NA	**TW: NA**

Course Outcomes:

1. Understand Ashtanga yog and its importance
2. Identify the Dos and Do nots of Life by practicing the Yam and Niyam
3. Make use of breathing techniques and Asan and Pranayam
4. Develop healthy mind in a healthy body thus improving social health also

UNIT 1. INTRODUCTION **(4 HOURS)**

Definitions of Eight parts of yog. (Ashtanga)

UNIT 2. YAM AND NIYAM **(4 HOURS)**

Yam and Niyam. Do`s and Don‘t‘s in life. Ahinsa, satya, astheya, bramhacharya and aparigraha

UNIT 3. SHAUCHA **(4 HOURS)**

Shaucha, santosh, tapa, swadhyay, ishwarpranidhan

UNIT 4. ASAN AND PRANAYAM **(4 HOURS)**

Asan and Pranayam. Various Yog poses and their benefits for mind & body

UNIT 5. BREATHING TECHNIQUES **(4 HOURS)**

Regularization of breathing techniques and its effects-Types of pranayam

Text Books:

1. Swami Vivekananda, ―Rajayoga or conquering the Internal Nature‖, Advaita Ashrama (Publication Department), Kolkata

References:

1. Janardan Swami, ―Yogic Asanas for Group Training-Part-I‖, Yogabhyasi Mandal, Nagpur