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

Affiliated to

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

Evaluation Scheme & Syllabus

For

Master of Computer Applications (Integrated)

Fourth Year

(Effective from the Session: 2025-26)

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

MCA-Integrated
Evaluation Scheme
Semester-VII

Sl. No.	Subject Codes	Subject Name	Type of Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	AMICA0701	Business Intelligence and Data Visualization	Mandatory	3	1	0	30	20	50		100		150	4
2	AMICA0702	Cryptography and Network Security	Mandatory	3	1	0	30	20	50		100		150	4
3	AMICA0703	Internet of Things	Mandatory	3	1	0	30	20	50		100		150	4
4		Departmental Elective-III	Dept. Elective	3	0	0	30	20	50		100		150	3
5		Departmental Elective-IV	Dept. Elective	3	0	0	30	20	50		100		150	3
6	AMICA0751	Business Intelligence and Data Visualization Lab	Mandatory	0	0	4				50		50	100	2
7	AMICA0752	Cryptography and Network Security Lab	Mandatory	0	0	4				50		50	100	2
8	AMICA0753	Internet of Things Lab	Mandatory	0	0	4				50		50	100	2
9	AMICA0754	Personality development & Skill Enhancement	Mandatory	0	0	4				50		50	100	2
10	AMICA0759	Internship Assessment-III	Compulsory Audit	0	0	2				50		50	100	1
11		*Massive Open Online Courses (For MCA-Int Degree)	*MOOCs											
		GRAND TOTAL							**250**	**250**	**500**	**250**	**1250**	**27**

*** List of MOOCs Based Recommended Courses for Fourth year (Semester-VII) MCA-Integrated Students**

Sr. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	AMC0267	Internet of Things 201	Infosys Wingspan (Infosys Springboard)	15h 59m	
2	AMC0311	Network Management Systems Fundamentals	Infosys Wingspan (Infosys Springboard)	23h 50m	

Abbreviation Used:

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit, MOOCs: Massive Open Online Courses.

LISTOF DEPARTMENTAL ELECTIVES

Sr. No.	Subject Codes	Subject Name	Types of Subjects	Bucket Name	Branch	Semester
1	AMICA0711	Deep Learning	Departmental Elective-III	Emerging Technologies	MCA-Int	VII
2	AMICA0712	Advance concepts of Analytics	Departmental Elective-III	Digital Marketing	MCA-Int	VII
3	AMICA0713	CRM Advance Administration	Departmental Elective-III	CRM Using Salesforce	MCA-Int	VII
4	AMICA0715	Big Data Analytics	Departmental Elective-IV	Emerging Technologies	MCA-Int	VII
5	AMICA0714	Advance Concepts of Optimization	Departmental Elective-IV	Digital Marketing	MCA-Int	VII
6	AMICA0716	CRM Development	Departmental Elective-IV	CRM Using Salesforce	MCA-Int	VII

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
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MCA-Integrated
Evaluation Scheme
SEMESTER-VIII

Sr. No	Subject Codes	Subject	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	AMICA0801	Augmented & Virtual Reality -3D	Mandatory	3	1	0	30	20	50		100		150	4
2	AMICA0802	Block Chain Technology	Mandatory	3	1	0	30	20	50		100		150	4
3	AMICA0803	Mobile Application Development	Mandatory	3	1	0	30	20	50		100		150	4
4	AMICA0804	Cognitive Ability	Mandatory	3	0	0	30	20	50		100		150	3
5	AMICA0805	Software Project Management	Mandatory	3	0	0	30	20	50		100		150	3
6		Departmental Elective-V	Departmental Elective	3	0	0	30	20	50		100		150	3
7	AMICA0851	Project Based on Augmented & Virtual Reality -3D Lab	Mandatory	0	0	4				50		50	100	2
8	AMICA0852	Block Chain Technology Lab	Mandatory	0	0	4				50		50	100	2
9	AMICA0853	Mobile Application Development Lab	Mandatory	0	0	4				50		50	100	2
10		*Massive Open Online Courses (For MCA-Int Degree)	*MOOCs											
		Total							**300**	**150**	**600**	**150**	**1200**	**27**

*** List of MOOCs Based Recommended Courses for Fourth year (Semester-VIII) MCA-Integrated Students**

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	AMC0334	Blockchain Basics	Coursera	15h 30m	
2	AMC0343	Software Project Management Training	Infosys Wingspan (Infosys Springboard)	6h 54m	

Abbreviation Used:

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

CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit, MOOCs: Massive Open Online Courses.

LISTOF DEPARTMENTAL ELECTIVES

Subject Codes	Subject Name	Types of Subjects	Bucket Name	Branch	Semester
AMICA0811	Programming for Data Analytics	Departmental Elective-V	Emerging Technologies	MCA-Int	VIII
AMICA0812	Search Engine Optimization	Departmental Elective-V	Digital Marketing	MCA-Int	VIII
AMICA0813	Administering cloud and App Using Sales force	Departmental Elective-V	CRM Using Salesforce	MCA-Int	VIII

NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR
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Master of Computer Applications (Integrated)

AICTE Guidelines in Model Curriculum:

A student will be eligible to get Under Graduate degree with Honours only, if he/she completes the additional MOOCs courses such as Coursera certifications, or any other online courses recommended by the Institute (Equivalent to 20 credits). During Complete B.Tech. Program Guidelines for credit calculations are as follows.

1. For 6 to 12 Hours =0.5 Credit
2. For 13 to18 =1 Credit
3. For 19 to 24 =1.5 Credit
4. For 25 to 30 =2 Credit
5. For 31 to 35 =2.5 Credit
6. For 36 to 41 =3 Credit
7. For 42 to 47 =3.5 Credit
8. For 48 and above =4 Credit

For registration to MOOCs Courses, the students shall follow Coursera registration details as per the assigned login and password by the Institute these courses may be cleared during the B. Tech degree program (as per the list provided). After successful completion of these MOOCs courses, the students shall provide their successful completion status/certificates to the Controller of Examination (COE) of the Institute through their coordinators/Mentors only.

The students shall be awarded Honours Degree as per following criterion.

i. If he / she secures 7.50 as above CGPA.
ii. Passed each subject of that degree program in the single attempt without any grace.
iii. Successful completion of MOOCs based 20 credits.

Master of Computer Applications (Integrated) Fourth Year			
Course Code	**AMICA0701**	**L T P**	**Credits**
Course Title	Business Intelligence & Data Visualization	**3 1 0**	**4**

Course Objectives: This course covers fundamental concepts of Business Intelligence tools, techniques, components and its future. As well as a bit more formal understanding of data visualization concepts and techniques. The underlying theme in the course is feature of Tableau and its capabilities.

Pre-requisites: Basic knowledge of data analytics and Python.

Course Contents / Syllabus

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

Business Intelligence (BI), Scope of BI solutions and their fitting into existing infrastructure, BI Components and architecture, BI Components, Future of Business Intelligence, Functional areas of BI tools, End user assumptions, setting up data for BI, Data warehouse, OLAP and advanced analytics, Supporting the requirements of senior executives including performance management, Glossary of terms and their definitions specific to the field of BI and BI systems.

UNIT-II	**Elements of Business Intelligence Solutions**	**8 hours**

. Business Query and Reporting, Reporting, Dashboards and Scorecards Development, Development, Scorecards, Metadata models, Automated Tasks and Events, Mobile Business Intelligence, Software development kit (SDK). Stages of Business Intelligence Projects, Project Tasks, Risk Management and Mitigation, Cost justifying BI solutions and measuring success, BI Design and Development, Building Reports, Building a Report, Drill-up, Drill-down Capabilities.

UNIT-III	**Tableau**	**8 hours**

Introductions and overview: What Tableau can and cannot do well, Debug and troubleshoot installation and configuration of the software.

Creating Your First visualization: Getting started with Tableau Software, Using Data file formats, connecting your Data to Tableau, creating basic charts (line, bar charts, Tree maps), Using the Show me panel

Tableau Calculations: Overview of SUM, AVR, and Aggregate features Creating custom calculations and fields, Applying new data calculations to your visualization.

Formatting Visualizations: Formatting Tools and Menus, formatting specific parts of the view, Editing and Formatting Axes.

UNIT-IV	**Data Visualization**	**8 hours**

Manipulating Data in Tableau: Cleaning-up the data with the Data Interpreter, structuring your data, Sorting, and filtering Tableau data, Pivoting Tableau data.

Advanced Visualization Tools: Using Filters, Using the Detail Panel Using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colours.
Creating Dashboards & Stories: Using Storytelling, creating your first dashboard and Story, Design for different displays, Adding interactivity to your Dashboard
Distributing & Publishing Your Visualization: Tableau file types, publishing to Tableau Online, sharing your visualization, Printing, and exporting.

UNIT-V	**Introduction to Power BI**	**8 hours**

Describe the Power BI ecosystem, Define Power BI and its relationship with Excel, Discuss the Power BI suite of products, Describe how the Power BI products integrate, Explain the typical analytics process flow, Differentiate between the various data sources, Connect Power BI to a data source, Clean and transform data to ensure data quality, Load the data to the Power BI Data Model, Describe the Power BI ecosystem, Define Power BI and its relationship with Excel, Discuss the Power BI suite of products, Describe how the Power BI products integrate, Explain the typical analytics process flow.

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

CO 1	Apply quantitative modelling and data analysis techniques to the solution of real-world business problems.	**K3**
CO 2	Discuss the importance of data visualization, design and use of many visual components in business.	**K2**
CO 3	Describe as products integrate defining various analytical process flow.	**K2**
CO 4	Evaluate the basics of troubleshooting and creating charts using various formatting tools.	**K5**
CO 5	Discuss basics of structuring data and creating dashboard stories adding interactivity dashboard stories.	**K5**

Text books:

1. "Decision Support and Business Intelligence Systems", by Efraim Turban, Ramesh Sharda, Dursun Delen ,9th Edition, 2011
2. "Learning Tableau : Business Intelligence and data visualization that brings your business into focus", by Joshua N. Milligan 2nd ed. Edition, 2016
3. "Tableau Your Data!", by Daniel G. Murray November 2013

Reference Books:

1. "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", by Larissa T. Moss, S. Atre Addison Wesley, 2022.

NPTEL/ YouTube/ Faculty Video Link:

UNIT 1	https://www.youtube.com/watch?v=dRG5JP6zxck
UNIT 2	https://www.youtube.com/watch?v=jkCCnwvO_fg
UNIT 3	https://www.youtube.com/watch?v=KPc6950u0TE
UNIT 4	https://www.tableau.com/academic/students
UNIT 5	https://www.youtube.com/watch?v=cHSR_1U0ki8

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0702	L T P	Credits
Course Title	Cryptography and Network Security	3 1 0	4

Course Objectives: The aim of this course is to provide students with a strong foundation in cryptographic techniques and network security principles, and preparing students to tackle real-world cybersecurity challenges and industry applications.

Pre-requisites: Basic knowledge of computer networks, discrete mathematics, and programming

Course Contents / Syllabus

UNIT-I	Introduction	8 hours

Definition, Security goals: Confidentiality, Integrity, and Availability, Security Attacks, Security Services, and Mechanisms, Classical encryption techniques: substitution techniques, transposition techniques, Block ciphers: Characteristics of Block Ciphers, Shannon's theory of confusion and diffusion, Feistel structure, Stream Ciphers: Concept and Applications.

UNIT-II	Symmetric and Asymmetric Cryptography	8 hours

Block Ciphers: Data Encryption Standard (DES), Triple DES, Block Cipher Modes of Operation. Mathematical Foundations for Cryptography: Linear Feedback Shift Register (LFSR) based Stream Ciphers, Abstract Algebra: Groups, Rings, and Fields. Number Theory: Prime Numbers, GCD, Modular Arithmetic. Advanced Encryption Standard (AES), Public Key Cryptography: Principles and Applications, Diffie-Hellman Key Exchange, RSA Algorithm and its Security Considerations

UNIT-III	Public Key Cryptosystems and Cryptographic Hash	8 hours

Public Key Cryptosystems: Primality Testing, ElGamal Cryptosystem, Elliptic Curve Cryptography (ECC), Elliptic Curve over the Reals, Elliptic Curve Modulo a Prime, Rabin Cryptosystem. Cryptographic Hash Functions: Properties of Cryptographic Hash Functions, Secure Hash Algorithm (SHA-1, SHA-2, SHA-3), Digital Signature Standard (DSS)

UNIT-IV	Authentication, Cryptanalysis, and Modern Ciphers	8 hours

Authentication and Key Management: Message Authentication Techniques, Digital Signatures, Key Management and Key Exchange Mechanisms, Hash Functions and Their Role in Security. Introduction to Cryptanalysis: Time-Memory Trade-off Attack, Differential and Linear Cryptanalysis, Differential and Linear Cryptanalysis, Advanced Encryption Techniques: Shamir's Secret Sharing Scheme, Identity-Based Encryption (IBE), Attribute-Based Encryption (ABE)

UNIT-V	Emerging Security Concepts & Network Security	8 hours

Side-Channel Attacks and Countermeasures, Network Security Protocols: Secure Sockets Layer (SSL) and Transport Layer Security (TLS), Pretty Good Privacy (PGP) for Email Security, Block chain Security: Cryptography in Bitcoin & Cryptocurrency, Zero Trust Security Model

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

CO1	Describe cryptographic techniques and algorithms.	**K2**
CO2	Analyze cryptographic security mechanisms and vulnerabilities.	**K3**
CO3	Implement and evaluate encryption algorithms.	**K3**
CO4	Develop secure communication protocols.	**K5**
CO5	Discuss advancements in quantum cryptography and blockchain security.	**K2**
Text books:		
1. "Cryptography and Network Security: Principles and Practice", by William Stallings, Seventh Edition, By Pearson, 2017		
2. "Cryptography and Network Security", by Behrouz A. Forouzan and Debdeep Mukhopadhyay ,July 2010		
Reference Books:		
1. "Handbook of Applied Cryptography",by Alfred J. Menezes, Oorschot, Vanstone 2018		
NPTEL/ Youtube/ Faculty Video Link:		
UNIT 1	https://surl.li/qntktj =Collection	
UNIT 2	https://surl.li/qntktj =Collection	
UNIT 3	https://onlinecourses.nptel.ac.in/noc22_cs90/preview	
UNIT 4	https://onlinecourses.nptel.ac.in/noc22_cs90/preview	
UNIT 5	https://onlinecourses.nptel.ac.in/noc22_cs90/preview	

Master of Computer Applications (Integrated) Fourth Year			
Course Code	**AMICA0703**	**L T P**	**Credits**
Course Title	**Internet of Things**	**3 1 0**	**4**

Course Objectives: This course emphasizes the study of the introduction of IoT technology, Components, architecture, network communications and applications protocols. The course also aims at understanding various hardware for IoT, programming concepts using Arduino and Raspberry Pi, and studying about applications of IoT.

Pre-requisites: Basic knowledge of electronics, computer networks, and programming

Course Contents / Syllabus

UNIT-I	**An Architectural Overview:**	**8 hours**

Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

UNIT-II	**Hardware Components:**	**8 hours**

Sensors, different types of Sensors, Transducer, Actuators, Radio Frequency Identification (RFID) Technology. Overview of IOT supported Hardware Computational platforms such as Arduino, NetArduino, Raspberry Pi, Node MCU, and ARM cortex and its Architecture

UNIT-III	**Programming Arduino and Raspberry Pi:**	**8 hours**

Arduino platform boards anatomy, Arduino IDE coding, using emulator, using libraries, arithmetic addition in Arduino IDE, programming the Arduino for IoT. Programming with Node MCU, Introduction to Raspberry Pi Board. Interfacing and programming the various sensors, IOs, etc. with different platforms

UNIT-IV	**Transport & Session Layer Protocols:**	**8 hours**

PHY/MAC Layer ,Bluetooth Low Energy, Zigbee Smart Energy, Network Layer- IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP ,CoAP, XMPP, AMQP, MQTT

UNIT-V	**IoT Applications:**	**8 hours**

Smart metering, e-health, Smart city automation, Automotive applications, home automation, communicating data with H/W units, mobiles, and tablets, Designing smart streetlights in smart cities, and Ideation of Mini Project

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

CO1	Describe the Architectural Overview of IoT	**K_2**
CO2	Apply Sensors, actuators, and microcontrollers used in IoT implementation.	**K_3**

CO3	Execute and verify programs with the help of Arduino, Node MCU, and Raspberry Pi.	**K_3**
CO4	Illustrate various applications of IoT protocols .	**K_2,**
CO5	Analyze applications like Smart metering systems, Smart streetlights, home automation, and smart city applications	**K_4**
Text books:		
"The Internet of Things", by Michael Miller, 1st Edition March 2015		
"INTERNET OF THINGS", McGraw-Hill, 2nd Edition, May 2022		
Reference Books:		
"Programming arduino next steps" by Mc Graw-Hill Education ,2nd Edition, 2018		
"Internet of Things (A Hands-on-Approach)" by Vijay Madisetti and Arshdeep Bahga, 1stEdition VPT, 2015.		
NPTEL/ Youtube/ Faculty Video Link:		
UNIT 1	https://www.youtube.com/watch?v=7iWriXyI2cE&t=2s	
UNIT 2	https://www.youtube.com/watch?v=FRxRT0DjE7A	
UNIT 3	https://www.youtube.com/watch?v=qtkKa0Dsv30	
UNIT 4	https://www.youtube.com/watch?v=bIbfkOPhJL4	

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0711	L T P	Credits
Course Title	Deep Learning	**3 0 0**	**3**

Course Objectives: To be able to learn unsupervised techniques and provide continuous improvement in accuracy and outcomes of various datasets with more reliable and concise analysis results.

Pre-requisites: Python, Basic Modeling Concepts.

Course Contents / Syllabus

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

Model Improvement and Performance: Curse of Dimensionality, Bias and Variance Trade off, Overfitting and underfitting, Regression - MAE, MSE, RMSE, R Squared, Adjusted R Squared, p-Value, Classification - Precision, Recall, F1, Other topics, K-Fold Cross validation, RoC curve, Hyper-Parameter Tuning Introduction – Grid search, random search, Introduction to Deep Learning.

Artificial Neural Network: Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: Single layer and Multilayer feed forward networks, recurrent networks. Various learning techniques; Perception and Convergence rule, Hebb Learning. Perceptron's, Multilayer perceptron, Gradient descent and the Delta rule, Multilayer networks, Derivation of Backpropagation Algorithm.

UNIT-II	**Convolutional Neural Network**	**8 hours**

Computer vision, Convolutions (CNN), Introduction to CNN, Train a simple convolutional neural net, Explore the design space for convolutional nets, Pooling layer motivation in CNN, Design a convolutional layered application, Understanding and visualizing a CNN, Transfer learning and fine-tuning CNN, Image classification, Text classification, Image classification and hyper-parameter tuning, Emerging NN architectures.

UNIT-III	**Detection & Recognition**	**8 hours**

Padding & Edge Detection, Stride Convolutions, Networks in Networks and 1x1Convolutions, Inception Network Motivation, Object Detection, YOLO Algorithm

UNIT-IV	**Recurrent Neural Networks**	**8 hours**

Sequence models, Recurrent Neural Network Model, Notation, Back-propagation through time (BTT), Different types of RNNs, Language model and sequence generation, Sampling novel sequences, Vanishing gradients with RNNs, Gated Recurrent Unit (GRU), Long Short-Term Memory (LSTM), Bidirectional RNN, Deep RNNs.

UNIT-V	**Auto Encoders In Deep Learning**	**8 hours**

Auto-encoders and unsupervised learning, Stacked auto-encoders and semi-supervised learning, Regularization - Dropout and Batch normalization.

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

CO1	Analyze ANN model and understand the ways of accuracy measurement.	**K4**
CO2	Develop a convolutional neural network for multi-class classification in images	**K5**

CO3	Apply Deep Learning algorithm to detect and recognize an object.	**K3**
CO4	Apply RNNs to Time Series Forecasting, NLP, Text and Image Classification;	**K4**
CO5	Apply Lower-dimensional representation over higher-dimensional data for dimensionality reduction and capture the important features of an object	**K3**
Text books:		
1. Fundamental Of Neural Network And Deep Learning, by Dr. Sushma Jaiswal and Dr. A. Kumar, 1st edition (25 September 2022)		
2. Neural Networks and Learning Machines 3e, Simon Haykin, 3rd Edition, 2016		
3. Deep Learning with Python, by François Chollet, First Edition, December 2017		
Reference Books:		
1. Dive into Deep Learning, by Aston Zhang, Zachary C. Lipton, Mu Li, and Alexander J. Smola, 7 December 2023		
2. Artificial Intelligence: A Modern Approach, by Russell, S. and Norvig ,3rd edition, December 2009		
NPTEL/ Youtube/ Faculty Video Link:		
UNIT 1	(371) Lec-1 Introduction to Artificial Neural Networks - YouTube (3) Deep Learning(CS7015): Lec 8.1 Bias and Variance - YouTube (3) Mod-10 Lec-39 Assessing Learnt classifiers; Cross Validation; - YouTube (3) Lec-1 Introduction to Artificial Neural Networks - YouTube (3) Lec-2 Artificial Neuron Model and Linear Regression - YouTube(3) Evaluation and Cross-Validation - YouTube	
UNIT 2	(3) Lecture 1 | Introduction to Convolutional Neural Networks for Visual Recognition - YouTube (3) Lecture 2 | Image Classification - YouTube (3) Lecture 3 | Loss Functions and Optimization - YouTube (3) Hyperparameter optimization - YouTube(3) Deep Learning(CS7015): Lec 11.3 Convolutional Neural Networks - YouTube	
UNIT 3	(3) C4W3L09 YOLO Algorithm - YouTube (3) Edge Detection - YouTube(3) Neural Networks - Networks in Networks and 1x1 Convolutions - YouTube	
UNIT 4	(3) Backpropagation in CNNs - YouTube (3) Deep RNNs and Bi- RNNs - YouTube (3) Deep Learning(CS7015): Lec 13.4 The problem of Exploding and Vanishing Gradients - YouTube(3) Deep Learning(CS7015): Lec 14.2 Long Short Term Memory(LSTM) and Gated Recurrent Units(GRUs) - YouTube	
UNIT 5	(3) Deep Learning(CS7015): Lec 7.1 Introduction to Autoncoders - YouTube (3) Deep Learning(CS7015): Lec 9.5 Batch Normalization - YouTube	

	(3) Deep Learning(CS7015): Lec 7.3 Regularization in autoencoders (Motivation) - YouTube

Master of Computer Applications (Integrated) Fourth Year			
Course Code	**AMICA0712**	**L T P**	**Credits**
Course Title	Advance concepts of Analytics	**3 0 0**	**3**
Course Objectives: To help students understand digital marketing practices, inclination of digital consumers and role of content marketing. To provide understanding of the concept of E-commerce and developing marketing strategies in the virtual world to impart learning on various digital channels and how to acquire and engage consumers online. To provide insights on building organizational competency by way of digital marketing practices and cost considerations. To develop understanding of the latest digital practices for marketing and promotion.			
Pre-requisites: Creative thinking which is being used in your business areas.			
Course Contents / Syllabus			
UNIT-I	**Process Data from Dirty to Clean**		**8 hours**
Introduction to focus on integrity, why data integrity is important, balancing objectives with data integrity, dealing with insufficient data, the importance of sample size, using statistical power, Determine the best sample size Clean it up! Why data cleaning is important Recognize and remedy dirty data, Data-cleaning tools and techniques, cleaning data from multiple sources, Data cleaning features in spreadsheets, Optimize the data-cleaning process.			
UNIT-II	**Advance Data Cleaning**		**8 hours**
Data Cleaning and Pre-Processing, Exploring raw data, Missing values, Noisy Data, Data Integration-The Entity Identification Problem, Redundancy and Correlation Analysis, Tuple Duplication, Detection and Resolution of Data Value Conflicts.			
UNIT-III	**Share Data through the Art of Visualization**		**8 hours**
Communicating your data insights, Introduction to communicating your data insights, understand data visualization: Why data visualization matters, Connecting images with data, A recipe for a powerful visualization, Dynamic visualizations, Design data visualizations: Elements of art, Data visualization impact, Design thinking and visualizations			
UNIT-IV	**Introduction to PowerBI**		**8 hours**
Working with data – Importing from flat files, excel files, other Sources, Data Sources in Power BI Desktop, Loading Data in Power BI Desktop, Views in Power BI Desktop, Query Editor in Power BI, Transform, Clean, Shape, and Model Data Manage Data Relationship, editing a Relationship, Cross Filter Direction, Saving Work file Measures. Data Analysis Expressions – Introduction to Power Query – Introduction to Power View – Power View visualizations – Power View filtering options –Introduction to Power Map – Preparing geospatial data – Publish from Power BI desktop – Publish Dashboard to Web.			
UNIT-V	**Introduction to Big Data**		**8 hours**
Evolution – Data as Economy - What is Big Data – Sources of Big Data. – Big Data Myths - Characteristics of Big Data 6Vs – Big Data Use cases - Big data- Challenges of Conventional			

Systems- -– Data Processing Models – Limitation of Conventional Data Processing Approaches - Data Discovery-Traditional Approach, Big Data Technology: Big Data Exploration - Data Augmentation – Operational Analysis – 360 View of Customers – Security and Intelligence – Data Analytics – Classification - Descriptive – Diagnostic -Predictive – Prescriptive – Augmented – Pervasive Analytics

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

CO1	Discuss how to check for data integrity. Discover data cleaning techniques using spreadsheets.	**K2**
CO2	Develop basic SQL queries for use on databases. Apply basic SQL functions for cleaning and transforming data.	**K3**
CO3	Examine the importance of data visualization. Learn how to form a compelling narrative through data stories.	**K1**
CO4	Explain an understanding of how to use Tableau to create dashboards and dashboard filters, discover how to use Tableau to create effective visualizations. Explore the principles and practices involved with effective presentations.	**K2**
CO5	Discuss Big Data Characteristics What, why, When, Limitation of traditional approaches and models.	**K2**

Text books:

1. "Digital Marketing", Oxford University Press India, by Vandana, Ahuja November 2015
2. "Strategic Digital Marketing: Top Digital Experts", by Eric Greenberg, and Kates, Alexander ,1st Edition 2013

Reference Books:

1. "E, Commerce: Strategy, Technologies and Applications", by David Whitely ,McGraw Hill Education.1st July 2017

NPTEL/ Youtube/ Faculty Video Link:

UNIT 1	https://www.youtube.com/watch?v=9gfER4p1jXM&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=3
UNIT 2	https://www.youtube.com/watch?v=8LgR42WCRl0&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=5
UNIT 3	https://www.youtube.com/watch?v=SUXOFrhWsAQ&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=6
UNIT 4	https://www.youtube.com/watch?v=AZlpYHup1Cw&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=11
UNIT 5	https://www.youtube.com/watch?v=XaHFNhHfXwQ&list=PLLqEsfz6HOalezPFBfibMfoewWICkigHk&index=12

Master of Computer Applications (Integrated)
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Course Code	AMICA0713	L T P	Credits
Course Title	CRM Advance Administration	**3 0 0**	**3**

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

Pre-requisite: Fundamental Knowledge of CRM and Problem-Solving Skills.

Course Contents / Syllabus

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

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

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

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

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

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

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

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

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

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

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

CO 1	Describe the importance of Security in Database.	**K1**
CO 2	Apply the concepts of Objects and Applications.	**K3**
CO 3	Describe the concepts of Auditing.	**K1**
CO 4	Explain the concepts of maintaining data in cloud.	**K2**
CO 5	Discuss the knowledge of Data Analytics & Management.	**K2**

Text books:

1. "Salesforce: A quick Study laminated Reference Guide", by Christopher Mathew Spencer, eBook by Amazon (Online)
2. "Salesforce Platform Developer", by Vandevelde Jain ,Edition Ist 2018

Reference Books:

1. "Learning Salesforce Development", by Paul Battisson , E-book (Online)

NPTEL/ YouTube/ Faculty Video Link:	
UNIT 1	https://www.youtube.com/watch?v=Kn192OdHGKg
UNIT 2	https://www.youtube.com/watch?v=al60A0C2nAg
UNIT 3	https://www.youtube.com/watch?v=g1R_QJSoq-Q
UNIT 4	https://www.youtube.com/watch?v=1oPiBgMcwZw
UNIT 5	https://www.youtube.com/watch?v=bllHYNGiJC4

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0715	L T P	Credits
Course Title	Big Data Analytics	**3 0 0**	**3**

Course Objectives: Understand Big Data concepts, tools, processing, analytics, visualization, machine learning, storage, scalability, ethical issues, and real-world applications.

Pre-requisite: Basic Knowledge of Linux & programming language.

Course Contents / Syllabus

UNIT-I	**Fundamental of Big Data**	**8 hours**

Introduction to Big Data: History of Big Data, Types of digital data, introduction to Big Data platform, importance & applications of Big Data, drivers for Big Data, Big Data architecture and characteristics, 5 Vs of Big Data, , Big Data technology components, Features of Big Data– security, compliance, auditing and protection, Big Data privacy and ethics, Big Data Analytics, Challenges of conventional systems, intelligent data analysis, nature of data, analytic processes and tools, analysis vs reporting, modern data analytic tools.

UNIT-II	**Hadoop**	**8 hours**

Hadoop: Introduction & history of Hadoop, Apache Hadoop, components of Hadoop, Hadoop Distributed File System, data format, analyze data with Hadoop, scaling out, Hadoop streaming, Hadoop pipes, Hadoop Echo System.

UNIT-III	**Map-Reduce**	**8 hours**

Map-Reduce: Basics of Map-Reduce , Map-Reduce framework , working of Map Reduce, Map Reduce features, developing a Map Reduce application, unit tests with MR unit, test data and local tests, anatomy of a Map Reduce job run, failures, job scheduling, shuffle and sort, task execution, types of Map Reduce, input & output formats, Real-world Map Reduce.

UNIT-IV	**Hadoop Distributed File System(HDFS)**	**8 hours**

Hadoop Distributed File System (HDFS): HDFS concepts, HDFS concepts, Design of HDFS, benefits and challenges of HDFS, file sizes, block sizes and block abstraction in HDFS, how does HDFS store, read, and write files, data replication, Java interfaces to HDFS, command line interface, Hadoop file system interfaces, data flow, data ingest with Flume and Scoop, Hadoop archives, Hadoop I/O: Compression, serialization, Avro and file-based data structures.

Hadoop Environment: Setting up a Hadoop cluster, Hadoop configuration, cluster specification, cluster setup and installation, security in Hadoop, administering Hadoop, HDFS monitoring & maintenance, Hadoop benchmarks, Hadoop in the cloud.

UNIT-V	**Hadoop and its Components**	**8 hours**

Hadoop Eco System and YARN: Hadoop ecosystem components, schedulers, fair and capacity, Hadoop 2.0 New Features – Name Node high availability, HDFS federation, MRv2, YARN, Running MRv1 in YARN.

Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators,

Hive - Apache Hive architecture and installation, Hive shell, Hive services, Hive.
metastore, comparison with traditional databases, HiveQL, tables, querying data and user defined functions, sorting and aggregating, Map Reduce scripts, joins & subqueries.

HBase – Hbase concepts, clients, example, Hbase vs RDBMS, advanced usage, schema design, advance indexing, Zookeeper – how it helps in monitoring a cluster. IBM Big Data strategy.

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

CO1	Illustrate knowledge of Big Data Analytics and its applications in business.	**K2**
CO2	Apply the functions and components of Hadoop.	**K3**
CO3	Apply process of developing Map Reduce based distributed processing applications.	**K3**
CO4	Describe the process of developing Map Reduce based distributed processing applications. Access and Process Data on Distributed File System	**K2**
CO5	Analyze the process of developing applications using HBASE, Hive, Pig etc.	**K4**

Text books:

1. "Hadoop: The Definitive Guide", by Tom White ,3rd edition, May 2012
2. "Learning Spark: Lightning-Fast Big Data Analysis", by Holden Karau, Andy Konwinski, Patrick Wendell, and Matei Zaharia ,February 2015
3. "Data Science for Business", by Foster Provost and Tom Fawcett , 1st edition, July 2013

Reference Books:

1. "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", by Michael Minelli, Michelle Chambers, and Ambiga Dhiraj Wiley, January 2013
2. "Big Data Analytics with Spark", by Mohammed Guller, 1st ed. edition,25 December 2015
3. "Spark: The Definitive Guide", by Bill Chambers, Matei Zaharia , January 2017
4. "Data Mining: Concepts and Techniques", by Jiawei Han, Micheline Kamber ,3rd edition, June 2011

NPTEL/ YouTube/ Faculty Video Link:

UNIT 1	https://www.youtube.com/watch?v=rvJgArru8dI
UNIT 2	https://www.youtube.com/watch?v=mNP44rZYiAU
UNIT 3	https://www.youtube.com/watch?v=GJYEsEEfjvk
UNIT 4	https://www.youtube.com/watch?v=S0i4NX1vlCU
UNIT 5	https://www.youtube.com/watch?v=_Mh1yBJ8l88

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0714	L T P	Credits
Course Title	Advance Concepts of Optimization	**3 0 0**	**3**

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

Pre-requisite: Basic Marketing Concepts and Knowledge of Computer.

Course Contents / Syllabus

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

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

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

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

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

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

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

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

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

Media Marketing: Social Media Marketing, Social Media Links & SEO, Influence Marketing: Influence Marketing, Building the Relationship, Advanced: Targeted Advertising Creating World Class Content: Creating World Class Content, Market Data on Content Marketing.		
Course outcome: After completion of this course students will be able to		
CO1	Discuss the important concepts of search engine optimization.	**K2**
CO2	Describe to Recognize how marketers use Google SEO to influence purchase and sell decisions on digital platforms using SEO content and tools	**K1**
CO3	Identify the benefits of Google SEO Fundamentals with the advantages of sell and purchase marketing strategies.	**K1**
CO4	Discuss the benefits of Optimize a website for Google search to a business of using social media to engage an audience.	**K2**
CO5	Implement the use of an Advance Content and social tactics to optimize SEO.	**K3**
Text books:		
"Digital Marketing for Dummies", Publisher: John Wiley & Sons, Inc, March 2017		
"Youtility: Why Smart Marketing Is About Help Not Hype ",Jay Baer, Publisher: Gildan Media, LLC 2013		
Reference Books:		
"Epic Content Marketing", by Joe Pulizzi ,Publication: McGraw Hill Education,2013		
NPTEL/ YouTube/ Faculty Video Link:		
UNIT 1	https://www.youtube.com/watch?v=L_11kpq82bM&list=PLNfnAKZ4Zsar3Jwb59D0dJeQ-RnsaqpoT&index=2	
UNIT 2	https://www.youtube.com/watch?v=eJ53AuVRMXc&list=PLNfnAKZ4Zsar3Jwb59D0dJeQ-RnsaqpoT&index=8	
UNIT 3	https://www.youtube.com/watch?v=wbWOmTUeyJc&list=PLNfnAKZ4Zsar3Jwb59D0dJeQ-RnsaqpoT&index=9	
UNIT 4	https://www.youtube.com/watch?v=zlVDys3GtMw&list=PLNfnAKZ4Zsar3Jwb59D0dJeQ-RnsaqpoT&index=18	
UNIT 5	https://www.youtube.com/watch?v=jkIvYoHCs80&list=PLNfnAKZ4Zsar3Jwb59D0dJeQ-RnsaqpoT&index=32	

Master of Computer Applications (Integrated) Fourth Year			
Course Code	**AMICA0716**	**L T P**	**Credits**
Course Title	CRM Development	**3 0 0**	**3**
Course Objectives: Understanding CRM concepts and strategies, mastering CRM technologies, and enhancing business processes to improve customer interactions and achieve business goals.			
Pre-requisite: Creative thinking and which is being used by the creative talent in your business areas.			
Course Contents / Syllabus			
UNIT-I	**Salesforce Fundamentals**		**8 hours**
Building blocks of Salesforce, Data model & Security model, Business process automation options, Master Sales Cloud and Service Cloud , Salesforce platform, Salesforce terminology, force platform, Multi-tenancy and cloud, Salesforce metadata and APIs, Salesforce architecture.			
UNIT-II	**Salesforce Data Modeling**		**8 hours**
Salesforce Data model, IDIC model QIC model, CRM value chain model, Payne & Frow's five forces and CRM objects, Relationship types, Formula fields and roll-up summary fields, Importing and exporting data			
UNIT-III	**Logic and Process Automation**		**8 hours**
Formulas and Validations, Formula Operators and Functions, Screen Flow Distribution, Salesforce Flow, Apex Basics, Apex Triggers, Database & .NET Basics, Search Solution Basics, Triggers and Order of Execution, Platform Events Basics, Process Automation Specialist, Apex Specialist, Apex integration Services, Apex Metadata API.			
UNIT-IV	**User Interface**		**8 hours**
General development, Apex code development Visualforce development, Sales dashboard, Visualforce performance, Technique for optimizing performance Lightning Web Components Basics Lightning App Builders Development.			
UNIT-V	**Testing, Debugging, and Deployment**		**8 hours**
Apex Testing, Apex code Test Method, Custom controller and Controller Extension, Test Data Developer Console Basics, Asynchronous Apex, Debugging Tool and Techniques, Debug logs, Application lifecycle and development model, Change Set Development model.			
Course outcome: After completion of this course students will be able to			
CO1	Implement the working concept of variables.		**K2**
CO2	Apply the concepts of Data Management.		**K2**
CO3	Apply the concepts of APEX.		**K3**
CO4	Demonstrate the concepts of APEX Code development		**K2**

CO5	Implement concepts of APEX Integration.	**K2**
Text books:		
1. "Customer Relationship Management: Concepts and Cases (Second Edition)", by Alok Kumar Rai, PHI Learning, 2018		
2. "Customer Relationship Management (Wiley Dreamtech)", by Bhasin ,2019		
Reference Books:		
1. "Salesforce : A quick Study" Christopher Mathew Spencer , eBook by Amazon(Online)		
2. "Salesforce Platform Developer, by Vandevelde Jain Edition Ist 2018		
NPTEL/ Youtube/ Faculty Video Link:		
UNIT 1	www. Trailhead.salesforce.com	
UNIT 2	www.mindmajix.com/salesforce-tutorial	
UNIT 3	www.youtube.com/watch?v=7K42geizQCI	
UNIT 4	https://onlinecourses.nptel.ac.in/noc22_mg93/preview	
UNIT 5	https://onlinecourses.nptel.ac.in/noc22_cs61/preview	

Master of Computer Applications (Integrated)
Fourth Year

Course Code	BMICA0751	L T P	Credit
Course Title	Business Intelligence & Data Visualization – Lab	0 0 4	2

List of Experiments

Sr. No.	Name of Experiment	CO
1	Introduction to various Data Visualization tools	CO1
2	Basic Visualization in Python	CO1
3	Data visualization plots- Line, Area & Histogram	CO2
4	Data visualization plots- Bar & Pie charts	CO2
5	Data visualization plots- Box & Scatter plots	CO3
6	Introduction to Tableau and Installation	CO3
7	Connecting to Data and preparing data for visualization in Tableau	CO4
8	Data Aggregation and Statistical functions in Tableau	CO4
9	Basic Dashboards in Tableau	CO4
10	Data Visualizations in Tableau	CO5
11	Components and the flow of work in Power BI	CO5
12	Power BI Desktop Interface , Filters in Power BI, Formatting dashboards	CO5

Lab Course Outcome: After the completions of this course students will be able to

CO1	Describe the main concepts of data visualization for business intelligence and decision making.	**K2**
CO2	Analyze reports, charts, graphs, figures, maps and derive meaning from them	**K4**
CO3	Asses and work with different plotting libraries	**K4**
CO4	Apply data visuals to convey trends in data over time using tableau	**K3**
CO5	Design effective data visuals to solve workplace problems	**K6**

Master of Computer Applications (Integrated)
Fourth Year

Course Code	BMICA0752	L T P	Credit
Course Title	Cryptography and Network Security Lab	0 0 4	2

List of Experiments

Sr. No.	Name of Experiments	CO
1	Write a program to encrypt and decrypt text using the Caesar cipher.	CO1
2	Implement Vigenère cipher for encryption and decryption.	CO1
3	Implement columnar transposition cipher.	CO1
4	Write a program to perform frequency analysis on a cipher text.	CO1
5	Implement Data Encryption Standard (DES) for encryption and decryption.	CO2
6	Implement AES algorithm for encrypting and decrypting messages.	CO2
7	Implement Triple Data Encryption Standard (DES 3) for encryption and decryption.	CO2
8	Implement Diffie-Hellman Key Exchange between two users.	CO2
9	Write a program for ECC key generation and encryption.	CO3
10	Implement SHA-256 Hash Function to compute the hash of a given message.	CO3
11	Implement signing and verification of messages by using Digital Signature using RSA	CO3
12	Implement Hash-based Message Authentication Code	CO4
13	Write a program to perform linear cryptanalysis on DES.	CO4
14	Implement a program to split and reconstruct a secret using Shamir's scheme.	CO4
15	Write a program to encrypt and decrypt using ChaCha20.	CO5
16	Simulate a TLS handshake using Python's SSL library.	CO5
17	Implement a simple blockchain hash function using SHA-256.	CO5
18	Write a program to generate Bitcoin addresses from private keys.	CO5

Lab Course Outcome: After the completions of this course students will be able to

CO 1	Implement classical and modern cryptographic algorithms for secure communication.	**K3**
CO 2	Analyze symmetric and asymmetric encryption techniques for data security.	**K4**
CO 3	Implement secure key exchange protocols	**K3**
CO 4	Develop cryptographic hash functions and digital signatures for authentication.	**K5**
CO5	Experiment modern security mechanisms like blockchain	**K4**

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0753	L T P	Credit
Course Title	Internet of Things Lab	0 0 4	2

List of Experiments

Sr. No.	Name of Experiment	CO
1	Installation of Arduino IDE and introduction to tools, assembly, and libraries.	CO2
2	Getting Programming board Info and configuring boot loader settings using Arduino IDE	CO2
3	Study and design IoT reference architecture for IoT-based applications like Smart home	CO2
4	Study Hardware Architecture and Pin Out of Arduino UNO Board. Compare Arduino Uno Arduino Nano and Arduino Mega. Identification of their use case according to a given scenario	CO3
5	Study Hardware Architecture and Pin Out of Node MCU and ESP8266. Identification of their use case according to the given snapshot.	CO3
6	a. Study Pin out Architecture of Sensors and actuators b. DHT 11 Sensor c. MQ 135 Sensor d. MQ 7 Sensor e. MQ 3 Sensor f. Ultrasonic Sensor HC-04 g. Rain Sensor h. Soil moisture Sensor i. PIR Sensor j. LDR Sensor k. Line Sensor l. Colour Sensor m. Servo Motor n. Relay	CO3
7	a. Working with structures using Arduino IDE b. Working with Variables using Arduino IDE c. Working with Flow control using Arduino IDE d. Working with Digital i/o using Arduino IDE e. Working with Analog i/o using Arduino IDE f. Working with the Time function using Arduino IDE g. Working with Math functions using Arduino IDE h. Working with Random functions using Arduino IDE i. Working with Serial communication using Arduino IDE	CO3

	j. Working with loops and control statements using Arduino IDE k. Working with PinMode function using Arduino IDE l. Working with analog Read, analog Write, digital Read, digital Write using Arduino IDE, Blinking LED Program using Arduino Uno	
8	Write a program using Arduino Uno to generate a random number between 0 to 25. Use 4 LEDs (Red, Green, Blue, and Yellow) and design LED patterns as (i) if the random number is less than 5 then only the Red LED should glow. (ii) if the random number is between 5-10 then only Blue LED should glow. (iii)if the random number is between 11-20 then only Yellow LED should glow. (iv) if the random number is greater than 20 then only Green LED should glow. " Write a program using Arduino uno for addition of digits of a user-defined number. Example: number is 257 then output should be 14." Write a program to take LED color as input from the user and glow that LED using Arduino Uno.	CO3
9	a. Interfacing of DHT 11 Sensor with Arduino Uno. Implement an LED mechanism for notifying rise in temperature. b. Interfacing of MQ 135/MQ7 Sensor with Arduino Uno. Implement alarm mechanism for notifying rise in amount of hazardous gases in the air. c. Interfacing of MQ 3 Sensor with Arduino Uno. Implement alarm mechanism for checking amount of alcohol in the air	CO3
10	a. Interfacing of Ultrasonic Sensor HC-04 with Arduino Uno. b. Interfacing of Rain Sensor with Arduino Uno. Implement a buzzer mechanism as the sensor identifies rain. c. Interfacing of Soil Moisture Sensor with Arduino Uno. d. Interfacing of PIR Sensor with Arduino Uno. e. Interfacing of LDR Sensor with Arduino Uno. f. Interfacing of LCD with Arduino Uno g. Interfacing of I2C LCD with Arduino Uno	
11	a. Interfacing Bluetooth Module with Arduino Uno b. Connecting Node MCU with Wi-Fi hotspots using Arduino IDE c. Interfacing of DHT 11 Sensor with Node MCU d. Interfacing of MQ 135 Sensor with Node MCU e. Interfacing of MQ 7 Sensor with Node MCU f. Interfacing of MQ 3 Sensor with Node MCU	CO3
12	a. Interfacing of Ultrasonic Sensor HC-04 with Node MCU b. Interfacing of Rain Sensor with Node MCU	CO3

	c. Interfacing of Soil moisture Sensor with Node MCU d. Interfacing of PIR Sensor with Node MCU e. Interfacing of LDR Sensor with Node MCU	
13	a. Sending Data to Thingspeak Cloud Server using Node MCU b. Detection of LPG Gas using MQ6 and Node MCU. Notify Thingspeak server that "LPG gas Leakage has been detected".	CO4
14	Controlling LED with Node MCU using Blynk cloud App.	
15	Development of Mini Project Sample Projects: Introduction to IoT Projects.xlsx	CO5
Lab Course Outcome: After the completions of this course students will be able to		
CO 1	Describe the functionality of computing, sensing, and actuating components of the Internet of Things.	K2
CO 2	Develop IoT applications using Arduino IDE.	K4
CO 3	Design, develop, and deploy real-time mini projects of IoT Applications.	K4
CO 4	Describe the importance of Technology in the life of common men.	K2
CO5	Design and develop real-time IoT-based solutions for societal needs using appropriate hardware and communication protocols.	K5

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0754	L T P	Credits
Course Title	Personality Development and Professional Skills	**0 0 4**	**2**

Course Objectives: The primary objective of this course is to equip students with the essential personal and professional skills required to excel in the modern workplace

Pre-requisite: Basic understanding and foundational knowledge of general communication skills

Course Contents / Syllabus

UNIT-I	Foundations of Personal Development	8 hours

Self-Awareness and Self-Improvement Self-Assessment Tools: Myers-Briggs Type Indicator (MBTI), StrengthsFinder. Goal Setting: SMART Goals, Personal Development Plans. **Time Management:** Prioritization, Scheduling, Avoiding Procrastination. Stress Management: Techniques for Managing Stress, Mindfulness, and Relaxation Exercises.
Communication Skills Verbal Communication: Public Speaking, Group Discussions, Debating. **Non -Verbal Communication:** Body Language, Eye Contact, Gestures. **Listening Skills:** Active Listening, Feedback Techniques. **Presentation Skills:** Creating Effective Presentations, Using Visual Aids, Storytelling

UNIT-II	Interpersonal and Professional Skills	8 hours

Interpersonal Skills, Teamwork: Role of a Team Player, Group Dynamics, Conflict Resolution, **Leadership Skills:** Leadership Styles, Motivating Team Members, Decision Making. **Networking Skills:** Building Professional Relationships, Networking Strategies, Use of Social Media, Professional Etiquette, Corporate Etiquette: Professional, Behavior, Office Etiquette, Business Meetings. **Email Etiquette:** Professional Email Writing, Common Mistakes to Avoid. **Telephone Etiquette:** Handling Professional Calls, Voicemail Etiquette. **Dining Etiquette:** Business Dining Rules, Table Manners.

UNIT-III	Aptitude and Logical Reasoning	8 hours

Aptitude Skills, Quantitative Aptitude: Basic Mathematics, Data Interpretation. **Logical Reasoning:** Analytical Puzzles, Logical Deductions. **Verbal Ability:** Grammar, Vocabulary, Reading Comprehension

UNIT-IV	Career Readiness and Interview Preparation	8 hours

Interview Preparation, Resume Writing: Crafting an Effective Resume, Cover Letter Writing. Mock Interviews: HR Round, Technical Round, Stress Interviews. **Group Discussions:** Techniques to Excel, Common Topics, Role of a Moderator**, Personal Interview Tips:** Dressing for Success, Answering Common Questions, Handling Unexpected Questions, Soft Skills Development**, Creativity and Innovation:** Brainstorming Techniques, Creative Problem Solving. **Emotional Intelligence:** Understanding Emotions, Empathy, **Handling Relationships. Adaptability and Flexibility:** Coping with Change, Learning Agility. **Critical Thinking:** Evaluating Information, Problem -Solving Strategies.

UNIT-V	Practical Workplace Skills and Ethics	8 hours
Digital Literacy and Online Presence, Professional Use of Social Media: LinkedIn Profile Optimization, Building an Online Portfolio. **Cyber Etiquette:** Safe Online Practices, Digital Footprint Management. **Blogging and Content Creation:** Writing for the Web, Creating Engaging Content, Workplace Skills, **Project Management:** Basics of Project Management, Tools like MS Project, Agile Methodology. **Time and Task Management Tools:** Using Tools like Trello, Asana, and Calendar Apps. **Financial Literacy:** Basic Financial Planning, Understanding Salaries, Taxes, Ethics and Values, **Workplace Ethics:** Integrity, Accountability, Professional Conduct. **Diversity and Inclusion:** Understanding Diversity, Promoting Inclusivity, Corporate Social Responsibility (CSR): Understanding CSR, Participating in CSR Activities		
Course outcome: After completion of this course students will be able to		
CO 1	Develop self-awareness, set personal goals, and manage time and stress effectively.	**K1, K2**
CO 2	Communicate effectively, work well in teams, and practice professional etiquette in various settings.	**K3, K4**
CO 3	Enhance quantitative, logical, and verbal reasoning skills for effective problem-solving and decision-making	**K3, K4**
CO 4	Create impactful resumes, perform confidently in interviews and group discussions, and develop critical soft skills	**K6**
CO 5	Apply project management principles, understand financial literacy, and demonstrate ethical behavior and digital professionalism	**K3**
Text books:		
1. The 7 Habits of Highly Effective People, by Stephen R. Covey		
2. A Modern Approach to Verbal & Non-Verbal Reasoning, by Dr. R.S. Aggarwal		
NPTEL/ Youtube/ Faculty Video Link:		
UNIT 1	https://www.youtube.com/watch?v=sO8eGL6SFsA&pp=ygUoU29mdHdhcmUgVGVzdGluZyBhbmQgQXBwbGljYXRpb25zIGNvdXJzZQ%3D%3D	
UNIT 2	https://www.youtube.com/watch?v=sbW4RThXNL8&pp=ygUoU29mdHdhcmUgVGVzdGluZyBhbmQgQXBwbGljYXRpb25zIGNvdXJzZQ%3D%3D	
UNIT 3	https://www.youtube.com/watch?v=xOB5ftSEv0c&list=PLrpK1inhO61VDiW_RBhkizmTYyUE0eoAF&pp=iAQB	
UNIT 4	https://youtu.be/zEgVjx85lWs	

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0801	L T P	Credits
Course Title	Augmented & Virtual Reality -3D	**3 1 0**	**4**

Course Objectives: The objective of this course is to explain how Unity supports the many components of a VR app, including tracking, teleporting, interacting with virtual objects. At the same time to see how Unity's AR Foundation supports building AR apps.

Pre-requisite: A strong foundation in mathematics, programming, and content creation

Course Contents / Syllabus

UNIT-I	**Introduction to Augmented Reality**	**8 hours**

Introduction to Augmented Reality, Technology and features of augmented reality, difference between AR and VR, Challenges with Augmented Reality, Augmented Reality systems and functionality, Augmented reality methods.

UNIT-II	**Introduction to Virtual Reality**	**8 hours**

Introduction to Virtual Reality, Technology and features of Virtual reality, difference between AR and VR, Challenges with Virtual Reality, Virtual Reality systems and functionality, Virtual reality methods.

UNIT-III	**Fundamentals of Unity Game Engine**	**8 hours**

Exploring Unity's interface and tools: Scene view, Game view, Hierarchy, Project, and Inspector windows, various tools Transform, Creating and organizing scenes and objects in Unity from scratch, importing 3D models, textures, audio files, and other resources into Unity, and optimizing them for use in the project.

UNIT-IV	**Introduction to Vuforia**	**8 hours**

Importance of Vuforia in AR development, Basic features of Vuforia, Components of Vuforia, Challenges of Vuforia, how to create a Vuforia developer account, Setting up Vuforia Engine, application development used Image Target.

UNIT-V	**Augmented Reality & Virtual Reality Application**	**8 hours**

Marker-based approach- Introduction to marker-based tracking, types of markers, marker camera pose and identification, visual tracking, **Marker-less approach**- Localization based augmentation, real world examples. Advantages and Disadvantages of AR and VR technologies, Healthcare and Industry application VR.

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

CO1	Compare AR and VR experiences	**K4**
CO2	Contrast VR applications and their effects	**K3**
CO3	Demonstrate and develop AR and VR apps in Unity.	**K2**
CO4	Evaluate different Vuforia experiences	**K3**

CO5	Analyzing real-world examples of marker-based and marker less augmented reality applications	**K4**
Text books:		
1. "Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR", by Steve Aukstakalnis , Addison-Wesley Professional, September 2016		
2. "Designing Virtual Systems: The Structured Approach", by Gerard Jounghyun Kim, 2005		
3. "Human-Centered Design for Virtual Reality", by Jason Jerald ,September 2015		
Reference Books:		
1. "Fundamentals of Computers", by E. Balagurusamy, 8th Edition, McGraw-Hill Inc, 2021		
2. Augmented Reality for Developers: Build practical augmented reality applications with Unity, by Jonathan Linowes, Krystian Babilinski, 9th October 2017.		
NPTEL/ YouTube/ Faculty Video Link:		
UNIT 1	https://youtu.be/Phdlo2Hmkqk?si=kv42bMNK0T0-VCeO	
UNIT 2	https://youtu.be/FyHrIW2FdTg?si=V9364YfLU94WPcG3	
UNIT 3	https://youtu.be/gVDdOucyZrk?si=hgTUp1F-OOLfLXAG	
UNIT 4	https://youtu.be/eBG3WsfHjRk?si=0dFlEElUmfk7yTwp	
UNIT 5	https://youtu.be/qAaUSmVfpaU?si=rCGjKnCQZA0THq6S	

Master of Computer Applications (Integrated) Fourth Year			
Course Code	**AMICA0802**	**L T P**	**Credits**
Course Title	Blockchain Technology	**3 1 0**	**4**
Course Objectives: This course emphasizes the study about introduction of IoT technology, Components, architecture, network communications and applications protocols of IoT. Course also aims at understanding various hardware for IoT, programming concepts using Arduino and Raspberry Pi and study about applications of IoT.			
Pre-requisite: Basic Electronics and C programming			
Course Contents / Syllabus			
UNIT-I	**Introduction to Blockchain**		**8 hours**
History and evolution of blockchain, How Blockchain works Basic concepts -decentralization, consensus mechanisms, cryptography, Key components-blocks, chains, nodes, miners, Types of block chains: public, private, consortium, Practical applications, public and private key basics, pros and cons of Blockchain, Myths about Bitcoin.			
UNIT-II	**Blockchain vs shared Database**		**8 hours**
Blockchain- Public Ledgers, Blockchain as Public Ledgers Block in a Blockchain, Transactions- The Chain and the Longest Chain - Permissioned Model of Blockchain, Cryptographic -Hash Function, Properties of a hash function-Hash pointer and merkle tree.			
UNIT-III	**Blockchain Platforms and Ecosystems**		**8 hours**
Hyperledger - Architecture of Hyperledger fabric v1.1- chain code- Ethereum: Ethereum network, Ethereum Virtual Machine (EVM). Ethereum vs Bitcoin. Introduction to Smart Contracts, usage and applications, Working Principle, Law and regulations. Block Chain tools and Development - Development environments: Truffle, Remix, Blockchain APIs and libraries.			
UNIT-IV	**Decentralization using blockchain**		**8 hours**
Blockchain and full ecosystem decentralization: Smart contract, Decentralized autonomous organization (DAO), Decentralized applications - Platforms for decentralization.			
UNIT-V	**Use Cases and Applications - Financial services**		**8 hours**
cryptocurrencies, cross-border payments, DeFi, Supply chain management, Healthcare, Government and public services, Emerging applications: NFTs, IoT integration. Futuristic Trends and Challenges- Scalability and interoperability, Quantum computing and blockchain, Advances in consensus algorithms, The future of blockchain regulation and governance.			
Course outcome: After completion of this course students will be able to			
CO 1	Recognize the historical development and evolution of blockchain technology.		**K1**
CO 2	Discuss the permissioned model of blockchain and its features & cryptographic hash functions within the context of blockchain.		**K3**

CO 3	Develop and deploy blockchain applications using smart contracts, Ethereum, Hyperledger Fabric, and related development tools.	**K4**
CO 4	Analyse the blockchain ecosystem with a focus on smart contracts, decentralizeed autonomous organization (DAOs), decentralized applications, and supporting platforms.	**K4**
CO 5	Evaluate current and emerging blockchain applications across sectors and assess future trends and challenges in the technology's evolution.	**K4**
Text books:		
1. "Block Chain for dummies", by Manav Gupta, Second IBM Limited Edition, 2018, John Wiley & Sons.		
2. "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction", by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder Princeton University Press, 2016.		
Reference Books:		
1. "Blockchain: Blueprint for a New Economy", by Melanie Swan, First edition, 2015, O'Reilly Media.		
2. "Bitcoin: Programming the Open Blockchain", by Andreas M. Antonopoulos, Mastering, Second edition, 2017, O'Reilly Media.		
NPTEL/ Youtube/ Faculty Video Link:		
UNIT 1	https://nptel.ac.in/courses/106/104/106104220/	
UNIT 2	https://nptel.ac.in/courses/106/105/106105184/	
UNIT 3	https://archive.nptel.ac.in/courses/106/105/106105235/	
UNIT 4	https://archive.nptel.ac.in/courses/106/105/106105235/	
UNIT 5	http://digimat.in/nptel/courses/video/110105121/L01.html	

Master of Computer Applications (Integrated) Fourth Year			
Course Code	**AMICA0803**	**L T P**	**Credits**
Course Title	Mobile Applications Development	**3 1 0**	**4**
Course Objectives: The objective of this course is to provide the basic understanding of the fundamentals of Android operating systems & Android software development tools.			
Pre-requisites: Basic Knowledge of Object Oriented Programming Concepts through Java & XML.			
Course Contents / Syllabus			
UNIT-I	**Introduction to Android Operating System**		**8 hours**
Android OS and Features — Android development framework, Installing and running applications on Android Studio, Creating AVDs, Types of Android application, Creating Activities, Activity Life Cycle, Activity states, monitoring state changes.			
UNIT-II	**Android application components**		**8 hours**
Android Manifest file, Externalizing recourses like Simple Values, Drawables, Layouts, Menus, etc. Building User Interfaces: Fundamental Android UI design, Layouts — Linear, Relative, Grid and Table Layouts. User Interface (UI) Components.			
UNIT-III	**Fragments**		**8 hours**
Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities.			
UNIT-IV	**Intents and Broadcasts**		**8 hours**
Using intents to launch Activities, Types of Intents, Passing data to Intents, Getting results from Activities, Broadcast Receivers — Using Intent filters to service implicit Intents, Resolving Intent filters.			
UNIT-V	**Database connectivity using SQLite**		**8 hours**
Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data			
Course outcome: After completion of this course students will be able to			
CO1	Analyze architecture of android and current trends in mobile operating systems.		**K4**
CO2	Apply suitable software tools and APIs for the development User Interface of a particular mobile application.		**K3**
CO3	Discuss the lifecycle of fragments.		**K2**
CO4	Synthesis intents and broadcast receivers in android application.		**K6**
CO5	Develop apps for mobile devices using SQLite Database.		**K5**
Text books:			
1. Professional Android 4 Application Development, by Reto Meier, May 2012			

2. Android Application Development for Java Programmers, by James C Sheusi, 1st edition, February 2013	
Reference Books:	
1. Beginning Android 4 Application Development, by Wei-Meng Lee,1st edition, March 2012	
2. Android Application Development (with Kitkat Support), by Black Book, May 2014	
3. Android Programming: Pushing the Limits, by Erik Hellman, Illustrated edition, November 2013	
NPTEL/ Youtube/ Faculty Video Link:	
UNIT 1	https://www.youtube.com/watch?v=fzQcQV0UCUM&t=9s
UNIT 2	https://www.youtube.com/watch?v=W2Xn42Id2V4
UNIT 3	https://www.youtube.com/watch?v=DmemBQNfqGM&t=9s
UNIT 4	https://www.youtube.com/watch?app=desktop&v=dYt763QgaTg&t=13m38s

Master of Computer Applications (Integrated) Fourth Year			
Course Code	**AMICA0804**	**L T P**	**Credits**
Course Title	Cognitive Ability	**3 0 0**	**3**
Course Objectives: The objective of this course is to develop students' quantitative aptitude and logical reasoning skills through number theory, analytical puzzles, and business mathematics, enabling them to solve real-world and competitive exam problems with speed, accuracy, and logical thinking.			
Pre-requisite: Basic understanding of elementary mathematics			
Course Contents / Syllabus			
UNIT-I	**Speed Math and Basic Number System**		**8 hours**
Classification of number, Divisibility Rule, Factors, Factorization, HCF & LCM, It's Application, Direction and Sense			
UNIT-II	**Advance Number System and Logical Reasoning**		**8 hours**
Unit digits, Last two digits, Remainder Theorem, Trailing zero's, Highest power, Blood Relation, Number Series and Letter Series			
UNIT-III	**Business Math and Logical Reasoning-I**		**8 hours**
Alpha numeric series, Coding Decoding, Percentage, Ratio and Proportion, Partnership, Problem of ages			
UNIT-IV	**Business Math and Logical Reasoning - II**		**8 hours**
Profit and Loss, Discount, Simple Interest and Compound Interest, Clock and Calendar			
UNIT-V	**Arithmetic**		**8 hours**
Average , Mixture & Allegation, Time and Work, Pipe and Cistern, Time speed and distance, Boat and Stream			
Course outcome: After completion of this course students will be able to			
CO1	Apply fundamental number theory concepts such as divisibility, HCF & LCM, remainder theorem, and cyclicity to solve quantitative problems efficiently.		**K3**
CO2	Solve problems involving logical reasoning and analytical thinking, including direction sense, blood relations, series patterns, and time-based puzzles like clocks and calendars.		**K3**
CO3	Solve the problems involving percentage, ratio, proportion, partnership, problem of ages and coding decoding.		**K3**
CO4	Solve real-life business math problems involving percentages, profit and loss, discounts, interest calculations, averages, mixtures, and ratios using appropriate mathematical methods		**K3**

CO5	Solve quantitative aptitude problems involving time and work, wages, pipes and cisterns, speed-distance-time, and race-related scenarios, using mathematical formulas and real-world applications.	**K3**
Reference Books:		
Quicker math, by M. Tyra (BSC publication co. Pvt. Ltd)		
Quantitative Aptitude, by RS Aggarwal		
Verbal & Non-Verbal Reasoning, by RS Aggarwal		
Quantitative Aptitude - Quantum CAT, by Sarvesh K Verma		

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMCA0805	L T P	Credits
Course Title	Software Project Management	**3 0 0**	**3**

Course Objectives: This course aims to provide students with the skills and knowledge to effectively manage all phases of a software project, focusing on planning, estimation, risk management, quality assurance, and post-project evaluation. By the end, students will be equipped to handle resources, mitigate risks, and ensure project success.

Pre-requisites: Basic understanding of software development methodologies, project management principles, fundamental mathematics and statistics, and strong problem-solving skills before enrolling in this course. This foundation will help them apply project management techniques effectively.

Course Contents / Syllabus

UNIT-I	**Introduction to Software Project Management**	**8 hours**

Introduction to Software Project Management (SPM) - The Software Development Life Cycle (SDLC) - Project Management Process Groups: Initiation, Planning, Execution, Monitoring, and Closing - Role of Project Manager - Project Life Cycle and Product Life Cycle - Project Scope and Planning - Risk Management in Software Projects

UNIT-II	**Software Project Estimation**	**8 hours**

Software Project Estimation Techniques - Function Point Analysis - Use Case Points - COCOMO Model - Estimation Process and Methods (Top-down and Bottom-up) - Resource Allocation and Scheduling

UNIT-III	**Project Scheduling and Tracking**	**8 hours**

Scheduling in Software Projects - Gantt Charts and PERT Charts - Critical Path Method (CPM) and Project Evaluation and Review Technique (PERT) - Earned Value Management (EVM) - Resource Leveling and Allocation - Progress Monitoring and Reporting - Metrics and KPIs for Tracking Project Health

UNIT-IV	**Quality Assurance and Risk Management**	**8 hours**

Software Quality Assurance (SQA) - Types of Testing: Unit Testing, Integration Testing, System Testing - Risk Management in Software Projects - Risk Identification, Assessment, and Mitigation Strategies - Software Metrics and Measurement - Configuration Management - Change Management Process

UNIT-V	**Software Project Closure and Post-Project Activities**	**8 hours**

Software Project Closure Process - Post-mortem Analysis and Documentation - Client Handover and Support - Team Evaluation and Knowledge Transfer Project Success and Failure Factors - Lessons Learned and Process Improvement

Course outcome: After completion of this course students will be able to		
CO1	Discuss the principles of Software Project Management	**K2**
CO2	Apply project estimation techniques to software development projects	**K3**
CO3	Develop skills in scheduling, tracking, and monitoring the progress of software projects	**K4**
CO4	Implement quality assurance and manage risks in software projects	**K4**
CO5	Analyzing software project closure and post-project activities, ensuring continuous improvement	**K4**
Text books:		
1. "Software Project Management" by Bob Hughes and Mike Cotterell, Ingram short title, 2009.		
2. "Software Engineering: A Practitioner's Approach", by Roger S. Pressman, McGraw-Hill 2023		
3. "Software Engineering: Theory and Practice", by Shari Lawrence Pfleeger and Joanne M. Atlee Pearson, 2009		
Reference Books:		
1. The Art of Project Management", by Scott Berkun, Shroff, 2005.		
2. Project Management for Software Engineers", by Steve McConnell , Microsoft Press US, 1997		
NPTEL/ Youtube/ Faculty Video Link:		
UNIT 1	https://archive.nptel.ac.in/courses/106/105/106105218/	
UNIT 2	https://archive.nptel.ac.in/courses/106/105/106105218/	
UNIT 3	https://www.youtube.com/watch?v=CEBO4k6Tnqg	
UNIT 4	https://www.youtube.com/watch?v=xLAcx4-9Bmg	
UNIT 5	https://www.youtube.com/channel/UCRV5IZl5OD7y3z5rExHTsgg	

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0811	L T P	Credits
Course Title	Programming for Data Analytics	**3 0 0**	**3**

Course Objectives: Demonstrate knowledge of statistical data analysis techniques utilized in business decision making. Apply principles of Data Science to the analysis of business problems. Use data mining software to solve real-world problems. Employ cutting-edge tools and technologies to analyse Big Data.

Pre-requisite: Basic Knowledge of Python

Course Contents / Syllabus

UNIT-I	Introduction to Data Analytics	8 hours

Introduction to Data Analytics: Sources and nature of data, classification of data (structured, semi-structured, unstructured), characteristics of data, introduction to Big Data platform, need of data analytics, evolution of analytic scalability, analytic process and tools, analysis vs reporting, modern data analytic tools, applications of data analytics. Data Analytics Lifecycle: Need, key roles for successful analytic projects, various phases of data analytics lifecycle – discovery, data preparation, model planning, model building, communicating results, operationalization.

UNIT-II	Data Visualization using Python	8 hours

Python Packages for Data Analysis: Numpy, Scipy, Matplotlib, Plotly, NLTK. Data Frames, Usage of frames, analytical roles, File handling and reading data for processing, Pre-processing data using multiple Python frameworks, Data Formatting, Data Manipulation, Data normalization, Data Merging, Data reshaping, Data Wrangling, Aggregation functions.

UNIT-III	Data Engineering Foundation	8 hours

Connecting to a database (SQLite) using Python, Sending DML and DDL queries, and processing the result from a Python Program, Handling errors, NOSQL query using MongoDB, and MongoDB Compass.

UNIT-IV	Introduction To TensorFlow And AI	8 hours

Introduction, Using TensorFlow for AI Systems, Up and Running with TensorFlow, Understanding TensorFlow Basics, Convolutional Neural Networks, Working with Text and Sequences, and TensorBoard Visualization, Word Vectors, Advanced RNN, and Embedding Visualization. TensorFlow Abstractions and Simplifications, Queues, Threads, and Reading Data, Distributed TensorFlow, Exporting and Serving Models with TensorFlow.

UNIT-V	Deep Learning With Keras	8 hours

Introducing Advanced Deep Learning with Keras, Deep Neural Networks, Autoencoders, Generative Adversarial Networks (GANs), Improved GANs, Disentangled Representation GANs, Cross-Domain GANs, Variational Autoencoders (VAEs), Deep Reinforcement Learning, Policy Gradient Methods.

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

CO1	Discuss various concepts of data analytics pipeline	K2

CO2	Install, Code, and Use Python & R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices, and Data frames.	**K1**
CO3	Understand the basic concept of MongoDB.	**K2**
CO4	Understand and apply the concept of the RNN and TensorFlow.	**K2**
CO5	Understand and evaluate the concept of Keras in deep learning.	**K4**

Text books:

1. "Python Data Science Handbook: Essential Tools for Working with Data", by Jake VanderPlas.
2. Intelligent Data Analysis, Springer by Michael Berthold, David J.

Reference Books:

1. "Python for Data Analysis" by Wes McKinney
2. Intelligent Data Analysis", Springer by Michael Berthold, David J. Hand

NPTEL/ Youtube/ Faculty Video Link:

UNIT 1	https://www.youtube.com/watch?v=jPAqc9QNTLE
UNIT 2	https://www.youtube.com/watch?v=mjmSaQfCmR0
UNIT 3	https://hevodata.com/learn/data-engineering-and-data-engineers/
UNIT 4	https://www.youtube.com/watch?v=IjEZmH7byZQ
UNIT 5	https://www.youtube.com/watch?v=pWp3PhYI-OU

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0812	L T P	Credits
Course Title	Search Engine Optimization	**3 0 0**	**3**

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

Pre-requisites: Basic Marketing Concepts and Knowledge of Computers.

Course Contents / Syllabus

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

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

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

Gauging a Site's Opportunity for Improvement, identifying a Potential Client, Create an SEO Pitch, Resources, Develop Kickoff Questions

Initial Research Phase, developing a Persona – User/Buyer Persona Template, Performing Keyword Research, Keyword Research Example & Template

Conducting a Competitive Analysis – Keyword Competitive Analysis Template

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

Conducting a Content Audit and Technical Review, Competitive Content Analysis, Competitive Analysis Template, Internal Content Audit, Internal Content Audit Template, Keyword Mapping, Keyword Mapping Template, Technical SEO, Error Tracking Template, Technical Audit Template.

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

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

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

Case Study: City Shopping Center, Objectives, PPC Hero, Pros and Cons of Top Social Media Advertising Platforms Facebook: Payment Models and Ad Elements, Introduction to Facebook Ads Manager. Instagram: Who Advertises on Instagram, Instagram Ad Features

Twitter: Ad Types, Campaign Types, Creative Best Practices, Ads Manager, Tweet Analytics and Customer Insights.

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

CO1	Describe importance of digital marketing.	**K2**
CO2	Reorganize how marketers use Google SEO projects to influence purchasing and selling decisions on digital platforms using digital content and tools.	**K2**
CO3	Analyze the benefits of integrating traditional and digital marketing with Google SEO for sells and purchasing marketing strategies.	**K3**
CO4	Evaluate the benefits of search advertising for a business that uses social media to target an audience.	**K2**
CO5	Implement an active social media community by using social media advertising.	**K3**

Text books:

1. "Digital Marketing for Dummies", by Ryan Deiss& Russ Henneberry John Wiley & Sons, Inc.
2. "Youtility", Gildan Media, by Jay Baer LLC.
3. "Epic Content Marketing", by Joe Pulizzi McGraw Hill Education.

Reference Books:

1. "The Art of SEO: Mastering Search Engine Optimization", by Eric Enge , Stephan Spencer , Jessie Stricchiola Fourth Edition (Grayscale Indian Edition) Paperback – 30 September 2023
2. "Product-Led SEO: The Why Behind Building Your Organic Growth Strategy", by Eli Schwartz Paperback – 27 April 2021

NPTEL/ Youtube/ Faculty Video Link:

UNIT 1	https://www.youtube.com/watch?v=XO6MSb9-s1k
UNIT 2	https://www.youtube.com/watch?v=FGF8RusTIQ0
UNIT 3	https://www.youtube.com/watch?v=R8tator_HI0
UNIT 4	https://www.youtube.com/watch?v=8jeOKv5UOa0
UNIT 5	https://www.youtube.com/watch?v=EmQf1J29Z58

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0813	L T P	Credits
Course Title	Administering cloud and App Using Sales force	**3 0 0**	**3**

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

Pre-requisites: Creative thinking which is being used in your business areas.

Course Contents / Syllabus

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

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

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

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

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

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

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

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

UNIT-V	**Learn Admin Essential s in Lightning Experience**	**8 hours**

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

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

CO1	Discuss basic working environment of Salesforce.	**K2**
CO2	Describe the concepts of Lightning & Salesforce App Experience Customization.	**K2**
CO3	Recognize with concepts reports chatter administration.	**K1**
CO4	Discuss the concepts of Lightning Experience.	**K2**
CO5	Implement Admin Essentials in Lightning Experience.	**K3**

Text books:

1. "Customer Relationship Management: Concepts and Cases", by Alok Kumar Rai (Second Edition), PHI Learning, 2018.
2. " Customer Relationship Management", by Bhasin (Wiley Dreamtech) ,2019.

Reference Books:

1. "Salesforce for beginners", by Shaarif Sahaalane Amazon (Online edition).	
2. "Learning Salesforce Development with Apex: Write, Run and Deploy Apex Code with Ease", by Paul Battisson 10 August 2020	
NPTEL/ Youtube/ Faculty Video Link:	
UNIT 1	https://www.youtube.com/watch?v=bxtqhfyoTjY&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=1
UNIT 2	https://www.youtube.com/watch?v=ZkQwm-6lsIw&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=3
UNIT 3	https://www.youtube.com/watch?v=65QivvdfjGs&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=5
UNIT 4	https://www.youtube.com/watch?v=65QivvdfjGs&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=6
UNIT 5	https://www.youtube.com/watch?v=65QivvdfjGs&list=PLaGX-30v1lh1BaUKgXa05gqrOP0vUg_6i&index=8

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0851	L T P	Credit
Course Title	Project Based on Augmented & Virtual Reality -3D Lab	0 0 4	2

List of Experiments

Sr. No.	Name of Experiment	CO
1	Installation of Unity and Visual Studio, setting up Unity for AR development.	CO1
2	Develop a scene in Unity that includes: **i.** a cube, plane and sphere, apply transformations on the 3 game objects. **ii.** add a video and audio source.	CO1
3	Develop a scene in Unity that includes a cube, plane and sphere. Create a new material and texture separately for three Game objects. Change the colour, material and texture of each Game object separately in the scene..	CO2
4	Develop a scene in Unity that includes a sphere and plane. Apply Rigid body component, material and Box collider to the game Objects	CO2
5	Develop a simple UI(User interface) menu with images, canvas, sprites and button.	CO3
6	Study of different Game engines	CO3
7	Explore projects in Unity 2D and 3D	CO3
8	Create a real-world app using AR	CO4
9	Develop a VR game where users can interact with objects.	CO5
10	Project on Augmented Reality and Virtual Reality	CO5

Lab Course Outcome: After the completions of this course students will be able to

CO 1	Discuss the fundamental concepts of AR and VR, including their history, applications, and hardware/software requirements.	**K2**
CO 2	Develop simple AR/VR applications using Unity and relevant SDKs.	**K4**
CO 3	Draw a class diagram after identifying classes and association among them	**K3**
CO 4	Draw various UML diagrams, and associations among them and identify the logical sequence of activities undergoing in a system, and represent them pictorially	**K3**
CO5	Apply modern engineering tools for specification, design, implementation and testing	**K3**

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0852	L T P	Credit
Course Title	Blockchain Technology Lab	0 0 4	2

List of Experiments

Sr. No.	Name of Experiment	CO
1	Create a simple storage contract with set() and get() functions.	CO1
2	Store and retrieve a string variable in a smart contract.	CO1
3	Implement a counter with increment and decrement functions.	CO1
4	Deploy a contract using MetaMask on a public Ethereum testnet (e.g., Goerli).	CO2
5	Write a contract that accepts Ether with a deposit() and shows balance.	CO2
6	Implement a function to withdraw Ether to a user-specified address.	CO2
7	Create a basic voting contract with vote counting logic.	CO3
8	Apply access control by restricting a function to only the contract owner.	CO3
9	Add a function to change the contract owner securely.	CO3
10	Store and retrieve user-submitted messages in an array.	CO4
11	Build a basic To-Do List contract with task completion functionality.	CO4
12	Use mappings to associate user addresses with values (e.g., balances).	CO4
13	Define and use a struct (e.g., Student with name, age, grade) in a contract.	CO5
14	Emit and log events for user actions like payments or submissions.	CO5
15	Implement a function with time-based access control using block timestamp.	CO5
16	Create a donation contract that records donor addresses and amounts using mappings	CO5
17	Build a simple lottery contract where users enter by paying ETH, and a winner is selected randomly.	CO5

Lab Course Outcome: After the completions of this course students will be able to

CO1	Apply the basic concepts of blockchain, Ethereum, and smart contracts to practical scenarios.	K3
CO2	Demonstrate the ability to write and deploy basic smart contracts using Solidity on Remix IDE.	K3
CO3	Develop smart contracts with state variables, functions, modifiers, and event logging to interact with users and handle transactions.	K4

CO4	Analyze and implement secure access controls, ownership logic, and Ether transfer mechanisms in smart contracts.	K4
CO5	Design smart contracts that interact with other contracts and use complex data structures (e.g., arrays, mappings, structs).	K4

Master of Computer Applications (Integrated)
Fourth Year

Course Code	AMICA0853	L T P	Credit
Course Title	Mobile Applications Development Lab	0 0 4	2

List of Experiments

Sr. No.	Name of Experiment	CO
1	Installation of Android Studio.	CO1
2	Development of basic Android Application.	CO1
3	Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user Click the OK button.	CO2
4	Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On Clicking the submit button, print all the data below the submit button (use any layout).	CO2
5	Create an android application Using Fragments.	CO3
6	Design an android application to create page using Intent and one Button and Pass the Value from one Activity to second Activity.	CO4
7	Design an android application send SMS using Intent.	CO4
8	Design an android application using Radio buttons.	
9	Design an android application for menu.	CO4
10	Create a registration application that store the user details in a database table.	CO5

Lab Course Outcome: After the completions of this course students will be able to

CO1	Describe the working of Android OS Practical	**K2**
CO2	Develop User Interfaces.	**K6**
CO3	Deploy and maintain the Android Application.	**K6**
CO4	Create URL related applications	**K4**
CO5	Implement SQLite is embedded in Android, making it an essential skill for mobile developers.	**K3**