



॥ तमसो मा ज्योतिर्गमय ॥

VISION

To provide equal opportunities for value based global education for creating an Enlightened Society

MISSION

To establish and facilitate educational institutions in the region for providing affordable value based global education to all who aspire to study and to create opportunities to educators, social workers and philanthropists to serve society



SARVAJANIK
UNIVERSITY

INCLUSIVE | INTEGRATED | INNOVATIVE

creating an enlightened society...

UNIVERSITY OFFICE

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CURRICULUM FOR

“MASTER OF SCIENCE (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)”

M.Sc. (Artificial
Intelligence and Data
Science)

SEM – 3

SEM – 4

w.e.f. Academic Year 2026-27

Constituent Institute:
**Shree Ramkrishna Institute of
Computer Education and Applied
Sciences (SRKI)**



Course Curriculum

MASTER OF SCIENCE (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)

Sem-3 and 4

The Course Curriculum of Master of Science (Artificial Intelligence and Data Science) was proposed and drafted by **Academic and Curriculum Committee of Computer Science** under the Faculty of Computer Science and Applications in the meeting held on **11-09-2026** and recommended to '**BOARD OF STUDIES**' for approval.

Mr. Jayesh Pushtiwala

Chairman, Academic

& Curriculum Committee

Science

Place of the meeting

Sarvajani University Office

Sign

The proposed Course Curriculum was approved by **Board of Studies; Computer Science** under the Faculty of Computer Science and Applications in the meeting held on **14-09-2026** and was recommended to the '**FACULTY**' for approval.

Dr. Shripal Shah

Chairman,

Board of Studies- Computer Science

Place of the meeting

Sarvajani University Office

Sign

The Course Curriculum approved by the **Faculty of Computer Science and Applications** in the meeting held on **14-09-2026** and was recommended to '**ACADEMIC COUNCIL**' for approval.

Dr. Shripal Shah

Chairman & Dean,

**Faculty of Computer Science and
Applications**

Place of the meeting

Sarvajani University Office

Sign

The Course Curriculum approved by the '**Academic Council of Sarvajani University**' in the meeting held on **16-09-2026**.

Mr. Ashish Desai

Member Secretary,

Academic Council

& I/c. Registrar,

Sarvajani University

Place of the meeting

Sarvajani University Office

Sign

The approved curriculum of Master of Science (Artificial Intelligence and Data Science) Sem-3 and 4 is with effect from the Academic year 2026-27

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FACULTY OF COMPUTER SCIENCE AND APPLICATIONS
M.Sc. (Artificial Intelligence and Data Science)
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Faculty of Computer Science and Applications

M.Sc.
(Artificial Intelligence and Data Science)

DETAILED CURRICULUM
(W.E.F. 2026-27)

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Master of Science (Artificial Intelligence and Data Science) 2026-27

Introduction:

The demands of our global, data-intensive, knowledge-based economy is creating a skills gap and making now the perfect time to gain the skills necessary to meet demand. This course is aimed at students who have a substantial background in computing and want to study advanced computing concepts and state of the art technologies in more depth.

This taught postgraduate course offers you the opportunity to study a wide variety of topics in depth in Artificial Intelligence, NLP, Data Science, BigData, Data Analytics etc. with dedicated experts.

The programme is suitable for students who are primarily interested in a career orientated towards development and applications in industry, as well as it is aimed at students interested in a research career either in the industrial or academic sector.

Objectives of the programme:

The Objective of the program is to impart knowledge of fundamentals and/or latest theories, concepts, methods, techniques and tools related to various areas of Advanced Computer Science. Applications and Information Technology and specifically in the area of Data Science, Cloud based, Web based Application Development, Machine Learning, Deep Learning and Intelligent Systems.

Programme Outcome:

At the successful completion of the program, students will be able to start their career in the field of Artificial Intelligence, Data Science and Research Domains of Computer Science.

Eligibility Criteria:

- A candidate Bachelor's degree in Computer Science / Computer Applications / Information Technology / Cyber Security/ Data Science / IoT / Bigdata / AI / Computer Engineering / Electronics Engineering / Electronics and Communication engineering or an equivalent examination.
- The candidate who has passed equivalent exam from other subjects or boards need to avail eligibility certificate for this programme from the Board of Equivalence (BoE) of the Sarvajanic University.

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Semester wise course group wise credit allocation for Post Graduate Programme (Annexure I)

Semester	DSC		SEC		DSE		Practical		Total
	No. of Courses	Credit Th.	No. of Courses	Credit Th.	No. of Course	Credit Th.	No. of Course	Credit	
1	2	8	1	4	1	4	1	8	24
2	2	8	1	4	1	4	1	8	24
3	2	8	1	4	1	4	1	8	24
4	1	20			1	4	1	-	24
Total	08	40	04	16	04	16	04	24	96

Evaluation Scheme:

Semester	Subject group	Internal					External	Grand Total
		CCE	Attend.	Assign.	Internal Exam/ Viva-Voce	Total Int.		
1	DSC-1	40	10	20		70	30	100
	DSC-2	40	10	20		70	30	100
	SEC-1	40	10	20		70	30	100
	DSE-1	40	10	20		70	30	100
	Practical	60	20	-	60	140	60	200
Total						420	180	600
2	DSC-3	40	10	20		70	30	100
	DSC-4	40	10	20		70	30	100
	SEC-2	40	10	20		70	30	100
	DSE-2	40	10	20		70	30	100
	Practical	60	20	-	60	140	60	200
Total						420	180	600
3	DSC-5	40	10	20		70	30	100
	DSC-6	40	10	20		70	30	100
	SEC-3	40	10	20		70	30	100
	DSE-3	40	10	20		70	30	100
	Practical	60	20	-	60	140	60	200
Total						420	180	600
4	DSC-7	150	50	-	150	350	150	500
	DSE-4	30	10	-	30	70	30	100
Total						420	180	600

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Faculty of Computer Science and Applications

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SEMESTER- 3

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Semester 3							
Course Code	Title	Teaching Hrs. per week		Course Credits	University Examination Marks	Internal Marks	Total Marks
		Theory	Practical				
MSCS21303	DSC-5: Agentic AI	4		4	30	70	100
MSCS21304	DSC-6: Artificial Neural Network and Deep Learning	4		4	30	70	100
MSCS22301/ MSCS22302/ MSCS22304	DSE-3 Elective-2	4		4	30	70	100
MSCS23301/ MSCS23302/ MSCS23304	SEC-3 Elective-1	4		4	30	70	100
MSCS26302	Practical and Project-3		8	8	140	60	200
	TOTAL	16		24			600

NOTE: Following subjects are listed as elective subjects of semester.

ELECTIVE SUBJECTS

SEC-3	1. Advanced JavaScript Framework 2. Blockchain Technology 3. Internet of Things
DSE -3	1. Cyber Law and Practices 2. Bigdata Analytics 3. Mobile Application Development - 2

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Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		2.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS21303	Course Name	Agentic AI			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
4	4	0	0	70	30	100

Purpose of Course	The purpose of the course is to equip learners with the knowledge and skills needed to understand, build, and apply agentic AI systems. Learners are expected to be capable of building agentic AI solutions, evaluating their performance, and applying them to solve practical problems creatively and responsibly.
Course Objective	1. To learn about agentic artificial intelligence 2. To learn and implement different types of AI Agents in the programming and content generation domain.
Prerequisite	Fundamental concepts of Programming, Computerized Tools and Software
Course Out come	After completion of this course, the student will be capable to develop agentic AI based solutions.
Course Content	Unit 1 Introduction to Agents 1. Defining AI Agents 2. Types of Agents 3. Traditional Software vs Agents 4. Practical Applications and Use Cases Unit 2 Agent Components 1. Synchronous to Asynchronous Operations 2. LLM Interactions and Agent Interactions 3. Workflows and Agents 4. Core Components of Agent Systems Unit 3 Designing Agent Systems 1. Models 2. Tools 3. Memory 4. Orchestration

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	5. Design Patterns Unit 4 Architecture Design Patterns 4.1 Single Agent Architecture 4.2 Multi Agent Architecture 4.3 Applications of LLMs 4.4 Introduction of lightweight LLMs and SLMs 4.4 Prompt Designing, Task Formulation using Prompts, Prompt Patterns 4.5 Prompt Tuning Techniques Unit 5 Tool and Orchestration 5.1 Local and API-Based 5.2 Plug-In Tools 5.3 Introduction to MCP Unit 6 Model Context Protocol 6.1 MCP Eco System 6.2 MCP Server Communication 6.3 Benefits of MCP 6.4 Applications with MCP Unit 7 Building Agents with AI Workflows 1. Introduction to Agent Platforms 2. N8n, make, Stackai 3. Publishing Agents 4. Managing Agents 5. Integration of RAG, MCP Unit 8 Code based agent development 8.1 Langgraph 8.2 CrewAI, Autogen 8.3 Agent on Github Co-pilot
Text and Reference books	1. A First Course in Artificial Intelligence by Deepak Khemani, McGrawHill, ISBN :978-1-25-902998-1 2. Generative AI for Everyone: Deep learning, NLP, and LLMs for creative and practical applications by Karthikeyan Sabesan, Sivagamisundari, et al 3. Generative AI for Begginers Playbook by Branson Adams 4. Genrative AI for Everyone by Altaf Rehmani 5. Generative AI for Software Developers: Future-Proof Your Career with AI- Powered Development and Practical Hands-On Skills by Saurabh Shrivastava , Kamal Arora

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Artificial Neural Network and Deep Learning

Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		1.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS21304	Course Name	Artificial Neural Network and Deep Learning			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
4	4	0	0	70	30	100

Purpose of Course	The purpose of the course is to make students capable of implementing concepts , methods and tool related to deep learning.
Course Objective	- To learn about fundamentals of deep learning. - To learn and implement different types of DL models. - To implement and evaluate various case studies of Deep Learning.
Pre-requisite	Only those Students who have completed any one of the following courses - Python Programming - Basics of Machine Learning
Course Out come	After completion of this course, the student will be capable to develop models and implement deep learning algorithms and models.
Course Content	Unit 1 Introduction to Deep Learning 1.1 A review of Machine Learning 1.2 Biological Inspiration 1.3 Artificial Neural Network 1.4 Concept of Deep Learning 1.5 Applications of areas Deep Learning Unit 2 Foundations of Maths and Technical Setup with Python 2.1 Scalars, Vectors, Matrices, Tensors Hyperplanes 2.2 Products, Feature, Solving Systems of Equations 2.3 Hyperparameters and Convergence 2.4 Gradient Descent 2.5 Evaluation Metrics 2.6 Python Libraries and Setup for DL - GPU, Keras , Tensorflow Unit 3 Foundations of Neural Networks 3.1 Anatomy of Neural Network : - Defining ANN in Python

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	- layers and Multilayer Perceptron, weights, bias, Activation Function, Loss function, Epochs 3.2 Linear threshold units. Perceptrons: representational limitation and gradient descent training. Unit 4 Artificial Neural Networks and its Types 4.1 Types of ANN, Feed Forward Neural Network, Backpropagation Neural Network, 4.2 Error calculation in ANN 4.3 Input Layer, Output Layer, Hidden Layers of Deep Neural Network 4.4 Classifying movie reviews using ANN Unit 5 Convolutional Neural Networks 5.1 Neurons in Human Vision 5.2 Filters and Feature Maps 5.3 Full Description of the Convolutional Layer Max Pooling 5.4 Full Architectural Description of Convolution Networks 5.5 MNIST with Convolutional Networks 5.6 Accelerating Training with Batch Normalization 5.7 Visualizing Learning in Convolutional Networks 5.8 Learning Convolutional Filters for Other Problem Domains Unit 6 Deep Learning for Text and Sequences 6.1 Working with text data - one hot encoding, word embedding 6.2 Understanding Recurrent and Recursive Neural Networks 6.3 Feature Reduction/Dimensionality Reduction 6.4 Recurrent Neural Networks and Implementation Unit 7 RNN For Language Models and Sequences 7.1 Language Models with RNN 7.2 NamedEntity Recognition, 7.3 Machine Translation, Parsing, Sentiment Analysis, Speech Recognition 7.4 Introduction to LSTM and GRU Unit 8 Advanced Topics in Deep Learning 8.1 Attention Mechanisms . 8.2 Recurrent Models of Visual Attention 8.3 Application to Image Captioning 8.4 Attention Mechanisms for Machine Translation 8.5 Generative Adversarial Networks (GANs) 8.6 Training a Generative Adversarial Network 8.7 Using GANs for Generating Image Data
Text and Reference Literature	1. Deep Learning with Python, Manning Francis Cohlet 2. Fundamentals of Deep Learning, O'Reilly, Nikhil Buduma 3. Deep Learning: A Practitioner's Approach, Josh Patterson , Adam Gibson O'Reilly Publications 4. Neural Networks and Deep Learning, A Textbook - Springer, Chru C Agrawal 5. Fundamentals of Deep Learning - Nikhil Buduma, O'Reilly Publications

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Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		1.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS23301	Course Name	Advance JavaScript Frameworks			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
4	4	0	0	70	30	100
Purpose of Course		The purpose of course is to make students capable of developing effective and interactive web client part of web applications.				
Course Objective		To provide Fundamental knowledge of Web client development technologies				
Prerequisite		Basic understanding of Web, HTTP, HTML, JavaScript and Object Oriented Concepts.				
Course Out come		After completion of this course, the student will be capable of developing effective and interactive web client part of web applications.				
Course Content		Unit 1: Introduction to Angular 1.1 Features and Advantages of Angular 1.2 Angular Architecture 1.3 Angular Components and Directives Unit 2: Angular Basics 2.1 Data Binding 2.1.1 One way Data Binding 2.1.2 Two way Data Binding 2.2 Routing Unit 3: Introduction to React 3.1 Basic concept of React 3.2 Difference between AngularJS and ReactJS 3.3 React features Unit 4: React Basics 4.1 ECMA Script 4.2 React with JSX				

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	4.2.1 React elements as JSX 4.3 Basic React Components 4.3.1 Stateless functional component 4.3.2 Stateful component 4.3.3 Higher order component 4.3.4 Nesting component 4.4 State and props in React Unit 5: React Routing 5.1 Life cycle of ReactJS 5.1.1 Mounting 5.1.2 Updating 5.1.3 Unmounting 5.2 React Routing 5.2.1 Router properties 5.2.2 Nesting Router Unit 6: React Forms and Introduction to Redux 6.1 React Forms 6.2 Introduction to Redux 6.3 Redux building parts – State, Actions, Reducers 6.4 Concept of the store, Action creators, middleware Unit 7: React – Redux and Hooks 7.1 Explicitly passing the store 7.2 Presentational Vs container component 7.3 The React Redux provider 7.4 React Redux Connect 7.5 Introduction to Hooks 7.6 Hooks -useState Hook, useEffect Hook, custom Hooks Unit 8: React Bootstrap Framework 8.1 Introduction to React Bootstrap Framework 8.2 Layout – Grid structure, Grid API 8.3 Media objects 8.4 Components – Accordion, Button, Dropdowns, Forms, Input group, Carousel, Images, Table 8.5 Utilities - Transitions
Reference Books	1. Pro Angular by Adam Freeman – Apress 2. Beginning Angular with Typescript by Greg Lim 3. Learning React: Learning React: Functional Web Development with React and Redux , O'Reilly 4. Learning React: Modern Patterns for Developing React Apps, O'Reilly 5. Fullstack React: The complete guide to ReactJS and Friends 6. Learning React by Kirupa Chinnathambi

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Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		1.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS23302	Course Name	Blockchain Technology			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
4	4	0	0	70	30	100

Purpose of Course	Conceptualize the students with the theoretical concepts of Blockchain and its associated areas.
Course Objective	Familiarization with different objectives of blockchain models of blockchain, mechanics of bitcoin, alternative coin and recent trends. Moreover, it can be more conceptualized using selected case studies.
Prerequisite	Fundamentals of Information Security concepts.
Course Out come	- Define and explain the fundamentals of Blockchain Illustrate the technologies of blockchain - Describe various models of block chain. - Case study of blockchain to analyze the different issues associated with various coins and crypto currencies. - Familiarize the functional/operational aspects of crypto currency. - Understand emerging abstract models for Block chain. - Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain.
Course Content	Introduction to Blockchain, Transactions and Blocks, Mining and Consensus, Connecting the Dots, Smart Contracts, Blockchain Development on Ethereum, Creating a Block, Adding the Hash Function to the Block, Creating Smart Contracts

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Unit 1 Blockchain Fundamentals

- 1.1. Definition
- 1.2. History of Blockchains
- 1.3. How the Blockchain Technology Works
- 1.4. Cryptographic Keys
- 1.5. Features of a Blockchain
- 1.6. Structure of a Blockchain

Unit 2 Picking a blockchain

- 2.1 Add substance
- 2.2 Determining the needs
- 2.3 Defining the goal
- 2.4 Drawing decision tree
- 2.5 Blockchain applications
- 2.6 Blockchain life cycle

Unit 3 Managing bitcoin blockchain

- 3.1 Creating first bitcoin wallet
- 3.2 Creating second bitcoin wallet
- 3.3 Generating bitcoin vanity address
- 3.4 Transferring vanity address
- 3.5 Reading blockchain entry in bitcoin
- 3.6 Using smart contract with bitcoin
- 3.7 Building smart bond Checking status of the contract
- 3.8 Mining for bitcoins

Unit 4 Ethereum Blockchain

- 4.1 History of Ethereum
- 4.2 Ether cryptocurrency
- 4.3 Mining for ether
- 4.4 Ethereum wallet
- 4.5 Building and managing decentralized autonomous organization – DAO
- 4.6 Managing smart contracts

Unit 5 Ripple and Factom Blockchain

- 5.1 Difference between ripple and other blockchains
- 5.2 Capacity of ripple
- 5.3 Caution with ripple
- 5.4 Factom blockchain
- 5.5 Authenticating documents and building identities using APIs
- 5.6 Publishing on Factom

Unit 6 DigiByte

- 6.1 Digging into digibyte
- 6.2 Fast blockchiang

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	6.3 Mining on Digibyte 6.4 Signing documents on digibyte's DiguSign Unit 7 Hyperledger 7.1 Fabric 7.2 Building system in Fabric 7.3 Chaincode development 7.4 Sumeragi 7.5 Sawtooth Unit 8 Industry Impacts 8.1 Financial technology 8.2 Real estate 8.3 Insurance 8.4 Government
Text and Reference books	1. Blockchain for dummies by Tiana Laurence –Wiley publication 2. Blockchain from concept to execution by Debajani Mohanty – BPB Publication 3. Blockchain by example by By Bellaj Badr , Richard Horrocks , Xun (Brian) Wu 4. Blockchain for beginners by Kurt Dugan 5. Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder Princeton University Press, 2016 6. Analysis of Blockchain protocol in Asynchronous networks by R.Pass et al EUROCRYPT 2017, (eprint.iacr.org/2016/454), A significant progress and consolidation of several principles 7. Blockchain Technology: Cryptocurrency and Applications S. Shukla, M., Dhawan, S. Sharma, S. Venkatesan Oxford University, Press 2019 8. Bitcoin and cryptocurrency technologies: a comprehensive introduction, Arvind Narayanan et. Al. Princeton University, Press 2016 9. Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming' Josh Thompson Create Space Independent Publishing Platform 2017

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Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		1.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS23304	Course Name	Internet of Things			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
4	4	0	0	70	30	100

Purpose of Course	The purpose of this course is to impart knowledge on Internet of Things (IoT), which relates to the study of sensors, actuators, and controllers, among other Things, IoT applications and examples overview (building automation, transportation, healthcare, industry, etc.)
Course Objective	This course is an introduction for students to IoT. The course also gives students an idea about various components of IoT and explains the working of them. The course also explains the role of embedded systems in IoT ecosystem.
Pre-requisite	Fundamental knowledge of Computer Organization, Computer Networks and Internet, Basic programming knowledge
Course Out come	Course Out come After having completed the course the student will gain: 1. Understanding about the architectural detail of IoT 2. Exposure to working with Arduino & Rasberry pi 3. Knowledge about domain specific applications of IoT
Course Content	Unit 1 Introduction to The Internet of Things 1.1 The Internet of Things overview - History of IoT, Components of IoT, Characteristics of IoT, About Objects/things in IoT 1.2 Enabling Technologies of IoT 1.2.1 Cloud Computing 1.2.2 Big Data Analytics 1.2.3 Wireless Sensor Networks 1.3 Near Field Communication & RFID Unit 2 IoT Architecture 2.1 M2M to IoT

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	2.1.1. Introduction of M2M - Components of M2M 2.1.2. Difference between IoT and M2M 2.2 IoT Reference Model or physical design and logical design of IoT 2.3 IoT Reference Architecture Unit 3 IoT Application Areas 3.1 IoT Application Areas 3.1.1. Home Automation 3.1.2. Smart Cities 3.1.3. Smart Energy & Smart Grid 3.1.4. Smart Health 3.1.5. Smart Manufacturing 3.1.6. Smart Agriculture Unit 4 Arduino 4.1 Introduction to Arduino 4.2 Flavors of Arduino 4.3 Architecture of Arduino board 4.4 Arduino Toolchain 4.4.1 Installing Arduino Desktop IDE 4.4.2 Installing Board drivers, Configuring board type, uploading the Program Unit 5 Raspberry Pi 5.1 About the board 5.2 Installation of Operating System on Raspberry Pi 5.3 Raspbian OS package Installation and updating process. 5.4 Raspberry pi interfaces of Data Transfer 5.5 Reading general purpose Input/Output pin Unit 6 Hardware interfacing & programming in Arduino 6.1 Controlling LED with Arduino 6.2 Interfacing sensors with Arduino 6.3 Working with switches 6.4 Serial data transfer Unit 7 Data Driven Application Using RaspberryPi 7.1 Selecting database for IoT applications 7.2 Capturing data from surrounding and storing on cloud Unit 8 IoT and Security Concerns 8.1 Types of security attacks 8.2 Security risk mitigation
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Reference Book	1. IoT & Applications I.A. Dhotre Technical Publication 2. Designing the Internet of Things Adrian McEwen and Cassimally Wiley 3. The Internet of Things Connection objects to web Edited by Hakima Chauchi Wiley 4. Introduction to Embedded System -By Shibu K V , McGrawHill 5. Getting Started with Internet of Things –By Cuno Pfister, O'Reilly 6. Learning Internet of Things-By Peter Waher , Packt Publication 7. Internet of Things : A Hands on Approach – By Arshdip Bahga and Vijay Madiseti 8. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press) 9. Raspberry Pi User Guide –By Eben Upton and Garath Halfacree, Wiley 10. Raspberry Pi for Dummies , Wiley 11. Raspberry Pi IoT in C -By Harry Fairhead, I/O Press
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Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		1.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS22301	Course Name	Cyber Law and Practices			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
4	4	0	0	70	30	100

Purpose of Course	To make students aware about provisions of various laws in IT ACT and its amendments.
Course Objective	Various frauds are taking place in different domains frequently. The course is specifically designed to provide knowledge of provisions of various laws and acts available in IT act 2000 and its amendments.
Pre-requisite	Basic knowledge of cyber security.
Course Out come	At the end of the course it will make student enable to have knowledge of provision and availability of various act and laws available to fight against frauds and crimes.
Course Content	Unit 1. Introduction to Cyber law 1.1. Introduction to cyber law 1.2. Challenges to laws 1.2.1. Technology-neutral and technology-based laws 1.2.2. Regulation versus freedom on the internet 1.2.3. Internet crime different from other technology crimes 1.3. Adjudication 1.3.1. Adjudicating officer 1.3.2. Cyber regulations appellate tribunal Unit 2 IT Act 2000 2.1 Overview of IT Act 2000 and its amendments 2.2 Critiques of the I.T. Act 2.3 Territorial effects of IT Act 2.4 Digital signatures 2.4.1 Controller of certifying authorities

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- 2.4.2 License to issue digital signature certificates
- 2.4.3 Legal recognition of digital signatures

Unit 3 Offences and investigation and penalties under the IT Act

- 3.1 Offences
- 3.2 Investigation
- 3.3 Penalties
- 3.4 Liability of network service provider
- 3.5 Amendments to certain statutes
 - 3.5.1 Amendments to the Indian penal code, 1860
 - 3.5.2 Amendments to the Indian evidence act, 1872

Unit 4 E-governance

- 4.1 Legal recognition and retention of electronic records
- 4.2 Use of electronic records and digital signatures in Government and its agencies
- 4.3 United nations commission on international trade development and law
- 4.4 World Trade and world intellectual property organization

Unit 5 Telecom and internet policy for data transmission and security

- 5.1 Broadband policy
- 5.2 Policy for .IN internet domain name
- 5.3 Guidelines for setting up of international gateways for internet
- 5.4 Policy guidelines on website development, hosting and Maintenance
- 5.5 Information technology Security Guidelines
- 5.6 SEBI guidelines on internet-based trading and services
- 5.7 Guidelines on internet-based e commerce and m commerce based services

Unit 6 Indian law

- 6.1 Law for cyber stalking
- 6.2 Law for digital forgery
- 6.3 Law for online gambling
- 6.4 Law for online sale of illegal articles
- 6.5 Law for cyber pornography

Unit 7 Jurisdiction in Cyberspace

- 7.1 Theories of jurisdiction in criminal cases
- 7.2 General jurisdiction in computer crimes
- 7.3 Application of 'Effects' doctrine in computer crimes
- 7.4 Convention on cyber crime – council of Europe

Unit 8 Online Dispute Resolution - ODR

- 8.1 Functioning of the Online Dispute Resolution (ODR) system
- 8.2 Kinds of disputes handled in an ODR environment
- 8.3 Communication modes in ODR
 - 8.3.1 E-mail
 - 8.3.2 Discussion boards

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	8.3.3 Instant messaging 8.3.4 Audio conferencing 8.3.5 Video conferencing 8.4 Types of ODR 8.4.1 Blind bidding or blind negotiation 8.4.2 Online negotiation 8.4.3 Online negotiation-cum-mediation 8.4.4 Document / E-mail arbitration for disputes arising from e-commerce transactions 8.4.5 Online arbitration through video-conferencing. 8.4.6 Peer jury and panel jury 8.5 Generating E-confidence – disclosure-based approach 8.6 Legal concerns in ODR
Reference Book	1. Investigating Cyber Law and Cyber Ethics: Issues, Impacts and Practices by Alfreda Dudley, James Braman, Giovanni Vincenti 2. Cyber Laws: A Guide to Cyber Laws, Information Technology, Computer Software, Intellectual Property Rights, E-commerce, Taxation, Privacy, Etc. Along with Policies, Guidelines and Agreements by Yatindra singh 3. Cyber Law in India by Talat Fatima 4. Regulation of Cyberspace – MIR-12 by IGNOU 5. Cyber Law 3.0: An Exhaustive Section Wise Commentary on The Information Technology Act Along with Rules, Regulations, Policies, Notifications Etc by Pawan Duggal

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Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		1.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS22302	Course Name	Big Data Analytics			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
4	4	0	0	70	30	100

Purpose of Course	The purpose of the course is to make students capable of understanding and implementation of big data technologies.
Course Objective	- To learn about fundamental of big data analytics. - To learn python programming with advanced libraries for implementing big data projects.
Pre-requisite	Fundamental of Data Science and Python Programming
Course Out come	After completion of this course, the student will be capable to understand big data platforms, architecture, concepts of map reduce and parallel programming with spark.
Course Content	Unit 1 Introduction to Big Data Platform and Frameworks 1.1 Challenges of Conventional Systems, 1.2 Intelligent Data Analysis, Nature of Data, 1.3 Analytic Processes and Tools, Analysis vs Reporting, 1.4 Modern Data Analytic Tools 1.5 Technology Stack of Big Data Unit 2 The Big Data Technology Landscape 2.1 Applications on Big Data Using Pig and Hive, 2.2 Data Processing Operators in Pig, Hive Services, HiveQL, 2.3 Querying Data in Hive, Fundamentals of HBase and ZooKeeper, 2.4 Visualizations, Visual Data Analysis Techniques 2.5 Interaction Techniques, Systems and Applications Unit 3 Map Reduce Fundamentals

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	3.1 The MapReduce Framework; 3.2 Uses of MapReduce; 3.3 Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFS Files, File system types, commands, 3.4 org.apache.hadoop.io package, HDFS High Availability 3.5 Techniques to Optimize MapReduce Jobs Unit 4 Hbase Fundamentals 4.1 Introducing HBase, Architecture, 4.2 Storing Big Data with HBase , Interacting with the Hadoop Ecosystem 4.3 HBase in Operations Programming with HBase 4.4 Installation, Combining HBase and HDFS Unit 5 Parallel Programming with Spark 5.1 Components of the Spark unified stack, 5.2 Resilient Distributed Dataset (RDD), 5.3 Scala and Python overview, Unit 6 Spark application programming 6.1 Initialize Spark with the various programming languages, 6.2 Create and run a Spark standalone application, 6.3 Introduction to Spark libraries -Understand and use the various Spark libraries, 6.4 Sliding Window Analytics, 6.5 Machine Learning with Spark Unit 7 Big Data Application Management 7.1 Design of zookeeper, 7.2 CQL cassandra query language, 7.3 Kafka for streaming and real time data management, 7.4 Parameter servers, Page Rank algorithm in Bigdata, Spark and GraphX 7.5 Query Engine for Managing BigData Unit 8 Bigdata Case Studies 8.1 Flight Data Analysis using Spark and GraphX 8.2 Twitter Sentiment Analysis using PYSPARK
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Text and Reference Literature	1. Learning Spark: Lightning-Fast Big Data Analysis - Holden Karau N Andy Kowinski O'relly Publication 2. Hadoop - The definitive Guide O'relly Publication 3. Spark- The definitive Guide O'relly Publication 4. Kafka The definitive Guide O'relly Publication 5. Big Data, Black Book: Covers Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization - Dreamtech Publications 6. Advanced Analytics with Spark: Patterns for Learning from Data at Scale, Sandy Ryza O'relly Publication 7. https://towardsdatascience.com/sentiment-analysis-on-streamingtwitter-data-using-spark-structured-streaming-python-fc873684bfe3
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Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		1.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS22304	Course Name	Mobile Application Development – 2			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
4	4	0	0	70	30	100

Purpose of Course	The purpose of this course is to give exposure of Flutter framework for mobile application development
Course Objective	This course introduces the foundation of mobile application development using flutter framework to the students. The course also gives students an idea about Google's own language, Dart.
Pre-requisite	Sound knowledge on Object Oriented Programming and basic knowledge on Android framework
Course Out come	Course Out come After having completed the course the student will gain: 1. Sound understanding of Dart programming 2. Proficiency in cross platform mobile application development 3. Knowledge about Flutter framework.
Course Content	Unit 1 Flutter Introduction 1.1 Features of Flutter 1.2 Advantages of Flutter 1.3 Disadvantage of Flutter 1.4 Flutter installation 1.5 Creating a basic flutter application in the Android Studio Unit 2 Foundation to Dart Programming – part 1 2.1 Important concepts 2.2 Keywords 2.3 Built-in types -Numbers, Strings, Booleans, Lists, Sets, Maps 2.4 Variables -Default value, Late variables, Final and const

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	2.5 Operators - arithmetic, relational, Type test operators, logical, bitwise Unit 3 Foundation to Dart Programming – part 2 3.1 Control flow statements 3.2 Exception handling 3.3 Functions - Parameters, The main() function, Functions as first-class objects, Anonymous functions Unit 4 Getting started with Flutter 4.1 Architecture of flutter framework - widgets, gestures, concepts of state, Layers 4.2 Widgets - 4.2.1 Platform specific widgets 4.2.2 Layout widgets 4.2.3 Platform independent / basic widgets 4.3 Layout - 4.3.1 Single child widgets 4.3.2 Multi child widgets 4.4 State management - 4.4.1 Application state scoped model 4.4.2 Navigation and Routing 4.5 Writing Android Specific Code Unit 5 Flutter Widgets 5.1 Flutter Scaffold 5.2 Flutter Container 5.3 Flutter Row & Column 5.4 Flutter Text 5.5 Flutter TextField 5.6 Flutter Buttons 5.7 Flutter Card 5.8 Flutter List 5.9 Flutter Images and Icon Unit 6 Shared Preferences in Flutter 6.1 Add the dependency. 6.2 Save data in Preferences. 6.3 Read data from Preferences. 6.4 Remove data from Preferences Unit 7 Persist data with SQLite 7.1 Add the dependency 7.2 Access and manipulate data from SQLite Unit 8 Advanced Programming 8.1 Flutter Google maps 8.2 Flutter Internationalization
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	8.3 Push Notifications
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Reference Book	1. Web URL: https://flutter.dev/docs/development 2. Beginning Flutter: A Hands-On Guide to App Development by Marco L. Napoli 3. Beginning App Development with Flutter: Create Cross-Platform Mobile Apps by Rap Payne 4. Flutter for Beginners by Alessandro Biessek 5. Learn Google Flutter Fast: 65 Example Apps by Mark Clow 6. Flutter in Action by Eric Windmill
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Name of College: Shree Ramkrishna Institute of Computer Education and Applied Sciences						
Faculty	Computer Science and Applications		Program		M.Sc. (Artificial Intelligence and Data Science)	
Year	2026-27		Version		1.0	
Semester	III		Effective From		June, 2026	
Course Code	MSCS26302	Course Name	Practical and Project-3			
Teaching Scheme				Examination Scheme		
Credits	Lecture (L)	Tutorial (T)	Practical (P)	Continuous and Comprehensive Evaluation (CCE)	Semester end examinations (SEE)	Total
8	0	0	16	70	30	100

Purpose of Course	The purpose of the course is to make students capable of implementing concepts, methods, tools and techniques learnt in courses of semester 3.
Course Objective	The objective of these course is to enable students to learn practical implementation of DSC-5, DSC-6, SEC-3 and DSE-3.
Pr-requisite	As per theory papers of semester -3.
Course Out come	After completion of this course, the student will be capable of performing practical application of subjects given in semester 3.
Course Content	The students will be required to carry out practical on DSC-5, DSC-6, SEC-3 and DSE-3 using the methods and tools discussed there in. A Journal must be prepared for the practical work done.
Reference Book	.As per paper DSC-5, DSC-6, SEC-3 and DSE-3