



PSGR Krishnammal College for Women



UGC Certified College of Excellence • Autonomous • Affiliated to Bharathiar University • ISO 9001:2015 Certified • Reaccredited with 'A' Grade by NAAC • Ranked 22nd in NIRF 2019 by MHRD

DEPARTMENT OF COMPUTER SCIENCE(PG)

CHOICE BASED CREDIT SYSTEM & OUTCOME BASED EDUCATION SYLLABUS

MASTER OF INFORMATION TECHNOLOGY (M.Sc IT)

2019-2021



PROGRAMME OUTCOMES

After completion of the programme, the student will be able to

PO1 : Broad knowledge in core areas and emerging technologies in IT

PO2 : Higher degree of technical skills in problem solving and application development

PO3 : Analytical and managerial skills to enhance employment potential

PO4 : Holistic development with strong emphasis on values and ethics

PROGRAMME SPECIFIC OUTCOMES

The students at the time of graduation will

PSO1: Identify and formulate complex problems to achieve solutions using concepts of Mobile computing, Information security, Cloud computing, Internet of things, Software Process Management and Big data Analytics

PSO2 : Design solutions for complex problems and design processes that meet the specific needs of the society

PSO3: Apply appropriate web technologies, resources and testing tools for developing applications in various domains.

PSO4: Apply programming and technical skills to solve real life complex problems and hence enhance employability

PSO5 : Analyse research methods including interpretation of data and synthesis of the information to provide valid conclusions.

PSO6 : Demonstrate skills as an individual and as a member or leader in diverse teams

PSO7 : Recognize the need for life-long learning for pursuing career in IT/ITES or entrepreneurship

PSO8 : Apply ethical principles and contribute effectively to the welfare of the society

Semeste	Part	Subje etCod	Title of Paper	Instru ctio ns/week	Contact hours	Tutoria lhours	Duratio nofExa mination	Examination Marks			Credits
								CA	ESE	Total	
III	III	MIT1909/ RB19E07	Paper 9: Big Data Analytics	4	56	4	3	40	60	100	4
III	III	MIT1910/ RC19E02	Paper10: Cloud Computing	4	56	4	3	40	60	100	4
III	III	RPY1911	Paper 11: Python Programming	4	56	4	3	40	60	100	4
			Elective – II	4	56	4	3	40	60	100	4
III	III	RRM19S1	Special Course: Research Methodology	4	60	-	3	-	100	100	4
III	III	MIT19P5	Lab 5: Big Data Analytics Lab	5	75	-	3	40	60	100	3
III	III	RPY19P6	Lab 6: Python Programming Lab	5	75	-	3	40	60	100	3
III	VI		Job Oriented Course	-	-	-	-	-	-	-	-
III	IV		Comprehensive Exam-Online	-	-	-	3	-	-	100	Grade
III			Summer internship	-	-	-	-	-	-	100	Grade
IV	III	MIT19PW	Project work and Viva – Voce	12	-	-	-	20	80	100	12
IV	III	RIT1912	Advanced Learner Course 1 – Cyber Security	-	-	-	3	25	75	100	5**
IV	III	RER1913	Advanced Learner Course 1 – Enterprise Resource Planning	-	-	-	3	25	75	100	5**

** Credits applicable to candidates who take up Advanced level course examination

List of Electives

S.No	Course Code	Course Title
1	RI19E01	Internet Protocols
2	RA19E02	Artificial Intelligence
3	RB19E03	Business intelligence
4	RD19E04	Data analytics
5	RS19E05	Software Architecture
6	RD19E06/ MCS1909	Data mining
7	RWI9E07/ MDA19E3	Web data analytics
8	RI19E08	Information Retrieval
9	RV19E09	Virtual Reality
10	RG19E10	Grid Computing

QUESTION PAPER PATTERN

CORE & ELECTIVE PAPERS

Continuous Internal Assessment : 50 Marks

SECTION	WORD LIMIT	MARKS	TOTAL
A – 5 X 2 Marks	One or two sentences	10	50
B – 4 X 5 Marks	250	20	
C - 2/3 X 10 Marks	500	20	

End Semester Examination : 100 Marks

SECTION	KNOWLEDGE LEVEL	WORD LIMIT	MARKS	TOTAL
A-11/13 X 2 Marks	K2,K3	One or two sentences	22	100
B - 5/7 X 6 Marks	K2, K3	250	30	
C - 4/6 X 12 Marks Last Question Compulsory	K4,K5,K6	500	48	

ADVANCED LEARNERS COURSE (ALC)

Continuous Internal Assessment : 25 Marks

SECTION	MARKS	TOTAL
A – 4 / 6 X 4 Marks	16	25
B – 1 / 2 X 9 Marks	9	

End Semester Examination : 75 Marks

SECTION	MARKS	TOTAL
A-5/8X5=25 Marks	25	75
B – 5/8X10=50 Marks	50	

SUMMER INTERNSHIP

Students will undergo summer internship during the second semester holidays from first week of May to second week of June for a period of 4 weeks in a related organization approved by the staff co - ordinator / HOD. It will be evaluated during III semester for 100 marks and converted to equivalent grades as given below.

MARKS

Report	: 50 Marks
Attendance	: 10 Marks
Work Diary	: 15 Marks
Viva Voce	: 25 Marks

	100 Marks

Mark Range	Grade	Description
90 – 100	O	Outstanding
80–89	D+	Excellent
75 -79	D	Distinction
70–74	A+	Very Good
60–69	A	Good
50–59	B	Average
0–49	U	Reappear

PROJECT WORK AND VIVA VOCE

Students will undergo project work in the final semester for a period of 4 months (December to March) at any industry / institution approved by the staff co-ordinator and HOD. It will be evaluated for 100 marks comprising internal marks for 20 and external evaluation for 80 marks.

EVALUATION

Internal evaluation of the project will be carried out in stages as described below

I Review - Selection of the field of study, Topic & Literature study	-	5 marks
II Review -Research design & data collection	-	10 marks
III Review- Analysis & conclusion, preparation of rough draft	-	5 marks
Total		- 20 marks

END SEMESTER EXAMINATION

Evaluation of the project	-	60 marks
Viva Voce	-	20 marks
Total		- 80 marks

Viva Voce will be conducted by a panel of external examiner and staff co-ordinator guiding the project.

Semester I

MIT1901	MOBILE COMPUTING	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course presents wireless transmission, telecommunication system, mobile adhoc network, mobile operating systems and current satellite network principles that support connectivity to Mobile devices. It also introduces some of mobility support languages, application and its security issues

Prerequisite

- Computer Networks
- Internet Protocol

Course Outcomes

On successful completion of the course, the students will be able to

CO number	CO statement	Knowledge Level
CO1	Understand the characteristics and limitations of mobile hardware devices including their user-interface modalities	K2
CO2	Apply security and privacy of user data and user behaviour	K3
CO3	Analyze mobile and wireless networks	K4
CO4	Evaluate the applications that are mobile-device specific	K5
CO5	Design and develop context aware solutions for mobile devices	K6

Mapping with Programme Outcomes

Cos	PO 1	PO 2	PO3	PO 4
CO1	S	S	M	M
CO2	S	S	M	M
CO3	S	S	S	S
CO4	S	S	S	S
CO5	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(12 Hrs)

Introduction: Mobile Computing - Mobile Computing Vs Wireless Networking - Applications - Characteristics of Mobile Computing - Structure of Mobile Computing - Structure of Mobile Computing Application - Wireless Transmission : frequencies for Radio Transmission- Signals – Antennas - Signal Propagation - Multiplexing - Modulations - Spread Spectrum. Medium Access Protocol: MAC – SDMA – FDMA – TDMA – CDMA.

UNIT II

(11 Hrs)

Telecommunication Networks: Telecommunication Systems- GSM – GPRS – DECT – UMTS- IMT 2000. Satellite Network: GEO - LEO- MEO – Routing - Localization - Handover.

UNIT III

(11 Hrs)

Wireless LAN: IEEE 802.11-Architecture- Services- MAC – Physical Layer – IEEE 802.11a- 802.11b – Standards – HIPERLAN – Bluetooth. Network Layer: Mobile IP Protocol overview Mobile -

Dynamic host Configuration protocol

UNIT IV

(11 Hrs)

Mobile Adhoc Network: Routing - Destination Sequence distance vector- Dynamic source routing-ad-hoc routing protocols - Operating systems for Mobile Computing: Mobile O/S Basics - Constraints and Requirements of O/S – Commercial Mobile O/S.

UNIT V

(11 Hrs)

Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP. Mobile Application Development and protocols: WAP – J2ME – Android. Applications: M-commerce - Mobile Payment System – Security Issues.

Text Book

1. Jochen Schiller (2012). Mobile Communication ; New Delhi : Pearson Education
2. Prasant Kumar Pattnaik, Rajib Mall (2012). Fundamentals of Mobile Computing ; New Delhi: PHI Learning Pvt. Ltd

Reference Books

1. Asoke K Talukder, Roopa R Yavagal (2010). Mobile Computing – Technology Applications and Service Creation; New Delhi: Tata McGraw-Hill
2. Martin Sauter (2010). Beyond 3G - Bringing Networks, Terminals and the Web LTE, WiMAX, IMS, 4G Devices and the Mobile Web 2.0; United States : Wiley Publishing Inc
3. Reza B' Far (2005). Mobile Computing Principles : Designing & Developing Mobile Application Using UML and XML; United Kingdom : Cambridge University Press.
4. Pei Zheng, Lionel M. Ni (2010). Smart Phone & Next-Generation Mobile Computing; Morgan Kaufmann Publishers

Pedagogy: Lectures, Demonstrations, Group Discussions

Course Designers:

1. Mrs. R.Kowsalya
2. Dr.N. Radha

MIT1902	INFORMATION SECURITY	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course covers the concepts of information security, ethical hacking, policies standards and security practices, risk management, implementation and maintenance processes. It also deals with managerial, technical aspects, physical security and cryptographic techniques of information security.

Prerequisite

- Security
- Cryptography
- Internet, firewalls, attacks, and threats

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the need of Information Security, polices, standards and security blue print of an organization	K2
CO2.	Apply cryptographic algorithms in real time applications	K3
CO3.	Analyse different types of physical security techniques	K4
CO4.	Assess the behavior of different threats and attacks	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	M	M
CO2.	S	M	M	M
CO3.	S	M	M	M
CO4.	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Introduction to Information Security: Introduction – Security - Critical Characteristics of Information - NSTISSC Security Model - Components of an Information System - Security Components - Approaches to Information Security Implementation - The Systems Development Life Cycle - The Security Systems Development Life Cycle

UNIT II

(12 Hrs)

The Need for Security: Business Needs First - Threats - Attacks - Secure Software Development. Risk management: Overview - Risk Identification - Risk Assessment- Risk Control Strategies - Selecting a Risk Control Strategy - Quantitative Versus Qualitative Risk Control Practices.Planning for Security: Information Security Policy, Standards and Practices - The Information Security Blue print

UNIT III**(11 Hrs)**

Security Technology: Firewalls and VPNS - Intrusion Detection, Access Control, and other Security Tools - Intrusion Detection and Prevention Systems - Honey Pots - Honey Nets, and Padded Cell Systems - Scanning and Analysis Tools - Access Control Devices

UNIT IV**(11 Hrs)**

Cryptography: Foundations of Cryptology- cipher methods- cryptographic algorithms – cryptographic tools - Physical Security: Physical access controls – fire security and safety – failure of supporting utilities and structural collapse – Interception of data – mobile and portable systems – special considerations for physical security threats

UNIT V**(11 Hrs)**

Implementation of Information Security : Information Security Project Management – Technical Topics of Implementation - Non Technical aspects of Implementation - Information Security Maintenance : Security Management Models - The Maintenance Model - Digital forensics

Text Book

1. Michael E. Whitman and Herbert J. Mattord (2014). Principles of Information Security, 5/e, Cengage Learning, Indian edition

Reference Books

1. Charles A. Sennewald(2011). Effective Security Management, 5/e, Elsevier
2. Dhiren R. Patel(2008). Information Security: Theory and Practice, Prentice Hall of India Pvt Ltd
3. S.M. Bhaskar, S.I. Ahson(2008). Information Security: A Practical Approach, Alpha Science
4. Gerald L. Kovacich(2003). Information System Security Officer's Guide, Butterworth Heinemann

Pedagogy:

Lectures, Case studies, Group Discussions, Demonstrations

Course Designers:

1. Dr. N. Radha
2. Mrs.R.Kowsalya

MIT1903	OBJECT ORIENTED SOFTWARE	Category	L	T	P	Credit
	ENGINEERING	III	56	4	-- --	

Preamble

This course provides methods and technologies involved in building complex software. It also introduces concepts that includes various steps involved in developing software including requirement elicitation, system design, object design and testing.

Prerequisite

- Software Engineering
- Object Oriented Concepts

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the steps involved in developing the software.	K2
CO2.	Understand the roles and responsibilities of various persons involved in the development cycle.	K2
CO3.	Implement the methods and techniques to develop a small project.	K3
CO4.	Analyze the problems that may occur in each and every phase of software development cycle.	K4
CO5.	Assess good standards to be followed to deliver successful software.	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	M	S
CO2.	S	M	S	S
CO3.	S	M	M	S
CO4.	M	S	M	S
CO5.	M	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Introduction to Software engineering –Software engineering Failures–Software Engineering Concepts - Software Engineering Development Activities - Modelling with UML: An Overview of UML - Modelling Concepts – A Deeper View into UML

UNIT II

(11 Hrs)

Project Organization and Communication: Introduction - An Overview of Projects–Project Organization Concepts - Project Communication Concepts - Organizational Activities Requirement Elicitation: Introduction - An Overview of Requirement Elicitation Requirement Concepts - Requirement Elicitation Activities - Managing Requirements Elicitation - **Analysis:**

Introduction - An Overview of Analysis - Analysis Concepts–Analysis Activities: From Use Cases to Objects - Managing Analysis

UNIT III

(12 Hrs)

System Design: Decomposing the System – Introduction - An Overview of System Design - System Design Concepts - System Design Activities: From Objects to Subsystems. System Design: Addressing Design Goals - Managing system Design. Object Design: Reusing Pattern Solutions – Introduction - An Overview of Object Design - Reuse Concepts-Reuse Activities. Testing: Introduction - An Overview of Testing - Testing Concepts - Testing Activities

UNIT IV

(11 Hrs)

Rationale Management: Introduction - An Overview of Rationale – Rationale Concepts - Rationale Activities: From Issues to Decisions - Managing Rationale. Configuration Management: An Overview of Configuration Management - Configuration Management Concepts - Configuration Management Activities - Managing Configuration Management

UNIT V

(11 Hrs)

Project Management: Introduction - An Overview of Project Management - Project Management Concepts – Classical Project Management Activities – Agile Project Management Activities. Software Life Cycle: Introduction- Life cycle processes-Characterizing Maturing of Software Life Cycle Models-Life Cycle Models

Text Book

1. Bernd Bruegge and Allen H. Dutoit (2013). Object-Oriented Software Engineering: Using UML, Patterns, and Java, Pearson Education, New Delhi.

Reference Books

1. David C. Kung (2013). Object-Oriented Software Engineering: An Agile Unified Methodology, McGraw Hill Higher Education.
2. Singh Yogesh (2012). Object Oriented Software Engineering, PHI Publication.
3. Timothy C. Lethbridge and Robert Laganier (2011). Object Oriented Software Engineering: Practical Software Development using UML and Java, Tata McGraw-Hill Edition.

Pedagogy: Lectures, Demonstrations, Group Discussions

Course Designers:

1. Mrs.V. Santhana Lakshmi
2. Mrs.R. Kowsalya

RWP1904	WEB PROGRAMMING	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course introduces the concepts of PHP, MySQL, HTML 5, CSS, JavaScript, Ajax and jQuery. It provides concepts of creating dynamic web application using client and server side scripting languages

Prerequisite

- Client/ Server Processing concepts, Fundamentals of Web applications
- Database Management System

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the concepts of dynamic web design	K2
CO2.	Apply the concepts of data driven web design using PHP with MySQL	K3
CO3.	Implement SQL language, JavaScript, Ajax, jQuery, PHP and CSS in the real time applications	K5
CO4.	Create dynamic web application both server and client side	K5
CO5.	Develop and Debug a PHP/JavaScript web application	K6

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	M	M
CO2.	S	M	M	M
CO3.	S	M	M	M
CO4.	S	S	S	M
CO5.	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Introduction to Dynamic Web Content: HTTP and HTML- The Request /Response Procedure – Benefits of PHP. My SQL, Javascript, CSS and HTML5- Introduction to PHP- Expressions and Control Flow in PHP – PHP Functions and Objects- Arrays – Date and Time Functions- File Handling - MySQL

UNIT II

(12 Hrs)

Accessing MySQL using PHP – Form Handling – Cookies, Sessions, and Authentication – Exploring JavaScript -Expressions and control flow in JavaScript – Functions – Objects – Arrays-JavaScript and PHP validation and Error Handling: Validating User Input with JavaScript – Regular Expression.

UNIT III**(11 Hrs)**

Ajax – Introduction to CSS: Importing style sheet- CSS Rules – Style Types – CSS Selectors – The CSS cascade – Fonts and Typography – Managing Text styles – color- positioning elements – Box model and Layout – Advanced CSS and CSS3: Attribute Selectors – Box -sizing Property – CSS3 Backgrounds – Borders- Box shadows - Multicolumn Layout – Text effects

UNIT IV**(11 Hrs)**

Accessing CSS from JavaScript - Revisiting the getElementById function – Accessing CSS properties from JavaScript – Inline Javascript – Adding NEW elements – Using Interrupts – Introduction to jQuery: selectors- Handling events – Event functions and Properties -Special effects – Manipulating the DOM – Dynamically Applying classes – Modifying Dimensions – DOM Traversal- - Using jQuery without selectors- Using Ajax

UNIT V**(11 Hrs)**

Introduction to HTML5 :The Canvas – Geolocation – Audio and Video – Forms – Web Application - The HTML5 Canvas: Creating and Accessing a Canvas – Writing Text to the Canvas - Drawing Lines – Filling Areas – Manipulating Images – Advanced Graphical Effects – Geolocation and HTML5-Geolocations and HTML5

Text Book

1. Robin Nixon (2017).LearningPHP, MySQL& JavaScript with jQuery, CSS &HTML5, (4/e) with jQuery, Thomson Press (India) Ltd., Delhi.

Reference Books

1. Ralph Moseley,M.T.Savaliya, (2013). Developing Web Applications,(2/e),Wiley India Pvt. Ltd., NewDelhi.
2. Nicholas C.Zakas(2012).Professional JavaScript for Web Developers(3/e),Wiley IndiaPvt. Ltd., New Delhi.

Pedagogy: Lectures, Demonstrations

Course Designers:

1. Dr. N. Radha
2. Mrs. M. Krithika Renuka

RAD1705	ADVANCED DATABASE MANAGEMENT SYSTEM	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course presents the advanced concepts of Database Management Systems and various databases like parallel, distributed and object oriented database management systems. The course also introduces various advanced databases like Spatial and NoSQL databases.

Prerequisite

- DBMS Concepts
- SQL

Course Outcomes

On successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the concepts of parallel database, distributed database and object oriented database	K2
CO2.	Understand the importance of data warehousing for decision support	K2
CO3.	Demonstrate various queries by applying RDBMS concepts	K3
CO4.	Analyze advanced databases like spatial and NoSQL databases for handling data	K4

Mapping with Programme Outcomes

Cos	PO 1	PO2	PO3	PO 4
CO1.	S	S	M	M
CO2.	S	S	M	M
CO3.	S	S	M	S
CO4.	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Parallel Database: Introduction - Architecture for Parallel Databases - Parallel Query Evaluation - Parallelizing Individual Operations - Parallel Query Optimization

UNIT II

(11 Hrs)

Distributed Database - Distributed DBMS Architectures - Storing Data in a Distributed DBMS -

Distributed Catalog Management - Distributed Query Processing - Updating Distributed Data - Distributed Transaction - Distributed Concurrency Control - Distributed Recovery

UNIT III (11 Hrs)

Object Database System : Motivating Example - Structured Data Types - Operations on Structured Data - Encapsulation and ADTs - Inheritance - Object, OIDs, and Reference Types – Database Design for ORDBMS - ORDBMS Implementation Challenges - OODBMS - Comparing RDBMS, OODBMS, and ORDBMS

UNIT IV (12 Hrs)

Data Warehousing And Decision Support: Introduction to Decision Support - OLAP: Multidimensional Data Model - Multidimensional Aggregation Queries - Implementation Techniques for OLAP - Data Warehousing - Data Warehouse Architecture - Data Warehouse Implementation - Views And Decision Support - View Materialization - Maintain Materialized Views - Data Mining: Introduction to Data Mining – Counting Co-occurrences – Mining for Rules - Clustering – Similarity Search over Sequences

UNIT V (11 Hrs)

Advanced Databases: Information retrieval: Introduction - Indexing for Text Search - Web Search Engines- Managing Text in a DBMS - Data Model for XML - XQuery. Spatial data management: Types of Spatial Data and Queries-Applications Involving Spatial Data. NoSQL databases: Introduction - Column oriented stores – Key - value stores - Document databases - Graph databases. Introduction to Mapreduce and Hadoop

Text Book

1. Raghuram Ramakrishnan and Johannes Gehrke (2007). Database Management System, 3/e, McGraw-Hill, Singapore.
2. G.K.Gupta (2011). Database Management systems, Tata McGraw Hill Private Limited.
3. Shashank Tiwari (2011). Professional NoSQL, John Wiley & Sons

Reference Books

1. Pranab Kumar Das Gupta, P. Radha Krishna (2013). Database Management System Oracle SQL and PL/SQL, PHI Learning Private Limited, New Delhi.
2. Rini Chakrabarti, Shilbhadra Dasgupta (2011). Advanced Database Management System, Wiley India, Private Ltd.
3. Abraham Silberschatz et.al (2011). Database System Concepts, 6/e, McGraw-Hill, Singapore.
4. Tom White (2012). Hadoop : The Definitive Guide, Third Edition, O'Reilly Media

Pedagogy: Lectures, Demonstrations, Group Discussions

Course Designer:

1. Mrs. S. Meera
2. Mrs. V. Pream Sudha

MIT19P1	MOBILE COMPUTING LAB	Category	L	T	P	Credit
		III	-	-	75	3

Preamble

This course provides exercises to know the components and structure of mobile application development frameworks for Android and windows OS based mobiles. This course includes various mobile application development frameworks, design concepts and issues of development of mobile applications and limitations of mobile devices.

Prerequisite

- Java

Course Outcomes

On successful completion of the course, the students will be able to

CO number	CO statement	Knowledge Level
CO1	Apply the key technological principles and methods for delivering and maintaining mobile applications	K3
CO2	Develop and apply current programming techniques for the successful deployment of mobile applications targeting a variety of platforms	K4
CO3	Evaluate and contrast requirements for mobile platforms to establish appropriate strategies for development and deployment	K5
CO4	Design and Implement various mobile applications using emulators	K6
CO5	Deploy applications to hand - held devices	K6

Mapping with Programme Outcomes

Cos	PO 1	PO 2	PO 3	PO 4
CO1	S	M	M	M
CO2	S	M	M	M
CO3	S	S	S	S
CO4	S	S	S	S
CO5	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

- Develop applications using GUI components, font, colours, layout managers, event listeners, GPS and alert
- Design of simple calculator
- Design of calendar for any given month and year
- Design of timer

- Design of simple game, animating an image
- Design a phone book containing the name, phone no, address, e-mail.

Pedagogy: Demonstrations

Course Designers:

1. Mrs.R.Kowsalya
2. Mrs.V.Santhanalakshmi

RWP19P2	WEB PROGRAMMING LAB	Category	L	T	P	Credit
		III	-	-	75	3

Preamble

This course provides exercises to create dynamic web application in both client and server side using HTML5, CSS3, AJAX, Javascript, jQuery, PHP and MySQL. It enables students to equip themselves as full stack developer.

Prerequisite

- Essentials of Web application
- PHP / MYSQL
- Ajax, jQuery, CSS3, HTML5, Javascript

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Implement the Client side /Server side web programming	K3
CO2.	Implement the form validation using jQuery	K3
CO3.	Implement the validation using JavaScript	K3
CO4.	Demonstrate the connectivity with MY SQL database	K4
CO5.	Develop dynamic web pages using PHP, HTML and MY SQL, CSS, jQuery, JavaScript	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	S	S	M
CO2.	M	S	S	M
CO3.	M	S	S	M
CO4.	M	S	S	M
CO5.	M	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

- Exercise to pass information between web pages using GET and POST methods.
- Exercise to apply string functions to manipulate strings.
- Exercise to implement file operations.
- Exercise to implement the date and time functions.
- Exercise to create menus, styles, Animation using CSS.
- Exercise to validate the HTML form fields using Javascript.
- Exercise to using JQuery and CSS.
- Exercise to handle events and special effects using jQuery
- Exercise to implement explode and implode functions

- Create data base connectivity-+using PHP and MYSQL.
- Create dynamic web pages using HTML5, CSS, JavaScript, Ajax, PHP and MYSQL database.

Pedagogy: Demonstrations.

Course Designers:

1. Dr. N. Radha
2. Mrs. M. Krithika Renuka

SEMESTER II

MIT1906	INTERNET OF THINGS	Category	L	T	P	Credits
		III	56	4	-	4

Preamble

This course covers the basic concepts of IoT, IoT Protocols and design methodology. This course also introduces building IoT with Arduino for various real time applications.

Prerequisite

- Programming
- Networks

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand basic concepts of IoT	K2
CO2.	Apply various sensors and protocols in real time applications	K3
CO3.	Implement data acquisition using Arduino	K5
CO4.	Create real time applications	K6
CO5.	Create web application for handling data communication using IOT devices	K6

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	S	M	M
CO2.	S	S	M	M
CO3.	S	S	S	M
CO4.	S	S	S	M
CO5.	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

Unit I

(11 Hrs)

Introduction to IoT : Internet of Things – Physical Design of IoT– Logical Design of IoT : Blocks, Models - IoT Enabling Technologies : Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems. IoT Levels and Deployment Templates – Domain Specific IoTs .

UNIT II

(12 Hrs)

Introduction to Arduino : Installing the Integrated Development Environment (IDE)- Setting up the Arduino Board- Structuring an Arduino Program- Simple Primitive Types- Floating-Point Numbers – Working with groups of values- Arduino String Functionality – C character Strings- Converting Number to String – Structuring the Code into Function Block.

UNIT III

(11 Hrs)

Serial Communication: Sending Debug Information From Arduino to your computer – Sending Formatted Text and Numeric data from arduino-Receiving Serial Data in Arduino – Sending and Receiving multiple text fields from arduino in a single message. Digital and Analog Input : Using

Switch-Without external resistors-detecting the closing of switch- How long a switch is pressed-reading a Keypad, Analog values- Changing range of values- Displaying Voltage up to 5V.

Unit IV

(11 Hrs)

Inputs from Sensors : Detecting Movements, Light, Motion – Measuring Distance , Temperature- Detecting Vibration, Sound – Reading RFID tags. Visual Output: Connecting and Using LEDs- Adjusting the Brightness of an LED- Driving High-power LEDs-Adjusting the color of an LED. Physical Output : Controlling the position of a servo- Controlling one or Two Servo with a Potentiometer or sensor-Controlling the speed of continuous Rotation Seros.

Unit V

(11 Hrs)

Audio Outputs: Playing Tones, Simple Melody- Generating more than one simultaneously Tone- Generating Audio Tones and Fading LED's, Playing WAV File, Controlling MIDI. Using Display : Connecting and Using a Text LCD Display- Formatting Text – Turning the cursor and display On or Off- Scrolling Text- Displaying Special Symbols- Creating Custom Characters- Displaying Symbols Larger than a single character- Displaying Text on TV. Using Time and Dates : Creating Delays- Using millis to determine duration- Measuring duration Pulse-Using Arduino as Clock- Creating an alarm to periodically call a function –Using a Real time clock.

Text Books

1. Arshdeep Bahaga, Vijay Madiseti (2014). “Internet of Things – A hands on approach”, Universities Press
2. Michael Margolis(2011), “Arduino Cookbook” 2nd Edition, O'Reilly Media

Reference Books

1. Honbo Zhou (2014). “The Internet of Things in the Cloud: A Middleware Perspective”,CRC Press.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds) (2011). “Architecting the Internet of Things”, Springer
3. Olivier Hersent, David Boswarthick, Omar Elloumi (2012). “ The Internet of Things – key applications and protocols”, Wiley

Pedagogy: Lectures, Demonstrations, Case studies

Course Designers:

1. Mrs. V. Pream Sudha
2. Ms. R. Kowsalya

MIT1907	SOFTWARE TESTING	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course provide the basic concepts of Software testing, types of software testing, testing in object oriented systems. This course also includes test planning, management, execution, software test automation and reporting.

Prerequisite

- Software engineering
- Object Oriented Programming

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the concepts of testing, types of testing and testing in object oriented system	K2
CO2.	Demonstrate the various types of testing using testing tools	K3
CO3.	Apply the concepts of testing in different applications	K3
CO4.	Analyze automated testing in development of high quality software	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	S	M	M
CO2.	S	S	S	M
CO3.	M	S	S	M
CO4.	S	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Introduction: Software Testing Fundamentals - Testing Principles - Test Organization. Process Models: V Model - Modified V Model - Levels of Testing

UNIT II

(12 Hrs)

Testing: White box testing- Static Testing - Structural Testing.Black Box Testing: Requirement Based Testing - Positive and Negative Testing - Boundary Value Analysis - Decision Tables - ECP - State Based Testing - Compatibility Testing - Cause- Effect Graphing. Integration Testing - Regression Testing - Acceptance Testing

UNIT III**(11 Hrs)**

Testing of Object-Oriented Systems: Introduction - Primer on Object-Oriented Software - Differences in OO Testing. Usability and Accessibility Testing- Introduction - Accessibility Testing - Tools for Usability

UNIT IV**(11 Hrs)**

Test Planning, Management, Execution and Reporting: Test Planning - Test Management – Test Process- Test Reports –Best Practices – Test Metrics and Measurements

UNIT V**(11 Hrs)**

Introduction to Selenium: Introduction to webdriver and webelements- locating webelements using weddriver- actions on webelements- exploring features of webdriver- different available webdrivers- understanding webdriver events.

Text Book

1. Srinivasan Desikan, Gopalaswamy, Ramesh (2012). Software Testing: Principles and Practices, Pearson Education
2. Satya Avasara (2014). Selenium WebDriver Practical Guide, Packt publishing

Reference Books

1. Hitesh Gupta (2012). Software Testing, 1/e; International Book House Pvt. Ltd.
2. William E. Lewis (2009). Software Testing and Continuous Quality Improvement, 3/e; Auerbach Publications
3. Nick Jenkins (2008). A Software Testing Primer; Creative Commons, USA
4. Cem Kaner, James Bach, Bret Pettichord (2001). Lessons Learned in Software Testing: A Context-Driven Approach; John Wiley & Sons
5. Elfriede Dustin, Thom Garrett, Bernie Gauf (2009). Implementing Automated Software Testing: How to Save Time and Lower Costs While Raising Quality, 1/e; Pearson Education
6. Navneesh Garg (2014). Test Automation using Selenium WebDriver using Java. AdactIn Group Pty Ltd.

Pedagogy

Lectures, Case studies, Group Discussions, Demonstrations

Course Designers:

1. Mrs. D. Kirthika Renuka
2. Ms. R. Yashaswini

RSP1908	SOFTWARE PROCESS MANAGEMENT	Category	L	T	P	Credits
		III	56	4	-	

Preamble

This course presents the concepts of software product life cycle models, Agile project management using Scrum and Lean. The course also introduces Devops tools and technologies.

Prerequisite

- Software Engineering

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand Agile Methodologies and Devops tools	K2
CO2.	Apply software process management concepts in real time applications	K3
CO3.	Differentiate various Agile Methodologies.	K4
CO4.	Compare the various software life cycle models	K5
CO5.	Devise a plan for delivering a quality product	K6

Mapping with Program Outcomes

Cos	PO1	PO2	PO3	PO4
CO1	S	S	S	M
CO2	S	S	S	M
CO3	S	S	S	M
CO4	S	S	S	M
CO5	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(12 Hrs)

Foundations : Background – The Software Process Ecosystem – Historical Overview – Terminology and Basic Concepts . Software Process in the Software Product Life Cycle: Introduction – Basic Software Development Life Cycle Models – Methodology – Driven Cycle and Process Models – Detailed combined Software Life Cycle and Process Models.

UNIT II

(11 Hrs)

Agile : Introduction – Core Attitudes of Agile – Learning through Example. The need for Agile Methodologies – Principles of Agile Project Management – Introduction to Scrum – Scrum Principles – Sprint Planning, Execution and Reviewing – Becoming a better Scrum Master - Introduction to kanban – The work in progress.

UNIT III

(11 Hrs)

Scrum: Agile Principles and Values- Scrum: Development Teams – Scrum Master – Planning – Sprint Review – Sprint Retrospective. Three Scrum Artifacts – Sprint Cycle – Scrum Estimation – Scrum Planning and Roadmaps – The daily Scrum –Scrum case studies and findings.

UNIT – IV**(11 Hrs)**

DevOps Concepts, Tools, and Technologies: Understanding the DevOps movement - The DevOps lifecycle - Tools and technologies: Code Repositories – GIT - Build Tools – Maven – Continuous Integration Tools – Jenkins – Configuration Management tools – Chef – Container Technology – Docker – Monitoring Tools. Installing and Configuring Docker.

UNIT –V**(11 Hrs)**

Introduction to Lean : Lean Thinking Tools. Design Thinking, Lean and Agile : Introduction – Actionable Strategy – Act to Learn – Leading teams to win- Delivery : Devops and Continuous Delivery – Evolutionary Architecture and Emergent Design.

Reference Books

1. Ralf Kneuper (2018), Software Processes and Life Cycle Models , Springer. (Unit – I)
2. James Edge, Agile(2018) – An Essential Guide to Agile Project Management, The Kanban Process and Lean Thinking, CreateSpace Independent Publishing. (Unit – II, III & V)
3. Jonny Schneider(2017), Understanding Design thinking, Lean and Agile, O’Reilly Publishing. (Unit – V)
4. Mitesh Soni(2016), Devops for Web Development, , Packt Publishing. (Unit – IV)

Pedagogy: Lectures, Demonstrations, Case studies

Course Designers:

1. Mrs.R.Vani
2. Mrs. V. Santhana Lakshmi

MIT19P3	IOT PROGRAMMING LAB	Category	L	T	P	Credits
			56	4	-	4

Preamble

This course introduces the concepts of programming in IoT. It also includes the practical exercises in building IoT using Simulators like NetSim, ANSYS, Matlab , eclipse, mbed and Cupcarbon

Prerequisite

- Java
- Python

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Apply the basic concepts of IoT	K3
CO2.	Develop the applications of IoT	K4
CO3.	Design a Portable IoT using Matlab	K6
CO4.	Design a Portable IoT using Raspberry Pi	K6
CO5.	Deploy simple application of IoT for Real time	K6

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4
CO1.	S	S	S	M
CO2.	S	S	S	M
CO3.	S	S	S	S
CO4.	S	S	S	S
CO5.	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

1. Exercises on domain specific applications of IoT,
2. Creating network based applications of IoT using Simulator
3. Exercises to implement the network communication aspects of IoT
4. Exercises on Sensor based application through embedded system platform.

Pedagogy: Demonstration

Course Designers

1. Mrs. V. Pream Sudha
2. Ms. R. Kowsalya

MIT19P4	SOFTWARE TESTING LAB	Category	L	T	P	Credit
		III	-	-	75	3

Preamble

This course provides the exercises for implementation of testing in various languages like C, C++, Visual Basic and VB.net. This course also presents different types of testing such as performance testing, security testing and boundary value analysis.

Prerequisite

Software Testing

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Implementation of testing methods in different applications	K3
CO2	Apply the concepts of object oriented system	K3
CO3	Develop the applications using different types of testing	K4
CO4.	Evaluate automated testing in different applications	K5

Mapping with Programme Outcomes

Cos	PO 1	PO2	PO3	PO4
CO1.	S	S	M	S
CO2.	S	S	S	M
CO3.	M	S	S	M
CO4.	S	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

- Exercises in testing different applications using various languages like C, C++, Visual Basic, VB.net and HTML.
- Exercises to implement the concepts of unit testing, performance testing, security testing and boundary value analysis.
- Exercises using Function Generator, Data Driven Wizard, Rapid Test Script Wizard, Bitmap Checkpoint and GUI Checkpoint.
- Exercises in Selenium Webdriver to implement navigation tools.
- Exercises in Selenium for developing webpages and its operations

Pedagogy : Demonstrations

Course Designers:

1. Mrs.D.Krithika renuka
2. Ms.R.Yashaswini

SEMESTER III

MIT1909 / RB19E07	BIG DATA ANALYTICS	Category	L	T	P	Credits
		III	56	4	-	4

Preamble

This course gives an introduction to big data tools, techniques, storage and Hadoop ecosystem. It also presents the concepts of MapReduce, data management in NoSQL and R programming.

Prerequisite

- Database Management systems
- Data mining

Course Outcomes

On the successful completion of the course, students will be able to

CO number	CO statement	Knowledge Level
CO1	Understand the characteristics of big data, tools, techniques, storage and Hadoop ecosystem	K2
CO2	Understand data management concepts in NoSQL databases and R Programming	K2
CO3	Apply Mapreduce concepts to process big data	K3
CO4	Analyze Hadoop components and their uses for big data processing	K4
CO5	Design programs for big data applications using Hadoop components and R programming	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1	S	M	M	M
CO2	S	M	M	M
CO3	S	S	M	M
CO4	S	M	S	M
CO5	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Introduction – Big Data- Characteristics of Big Data- Structure of Big Data - Risk of Big Data - Exploring Big Data-Big Data Business model- Big Data Technologies-**Web Data Overview** – Web Data in Action

UNIT II

(11 Hrs)

Hadoop: Introduction – Comparison with other systems- History of Hadoop-**Apache Hadoop**

and Hadoop Ecosystem-Mapreduce – introduction-Analyzing the data with Hadoop- Hadoop Distributed File System- Design – concepts-Anatomy of a MapReduce Job Run – Classic – Mapreduce features-counters-sorting

UNIT III

(11 Hrs)

Hadoop Components: Pig – Introduction – Comparison with databases - Pig Latin - Data processing operators – **Hive** – Comparison with traditional databases – HiveQL - tables- Hbase- introduction – concepts - Hbase versus RDBMS

UNIT IV

(12 Hrs)

NoSQL: Introduction to NoSQL - Key-value stores - **Document databases** - Graph databases
Storage architecture: Working with column oriented databases- Document store internals- Understanding key value stores-Indexing in MongoDB

UNIT V

(11 Hrs)

R Basics:- Introduction- Packages and Library – Data types – Basic operators – R objects- Vectors – Lists- Arrays – Matrix- Factors – Data frame- R file formats- Importing and exporting files – **Data Visualization in R**: Lattice package- Box plot- bar chart – scatter plot- GGplot2

Reference Books

1. Bill Franks (2012). Taming the Big Data Tidal wave, John Wiley & Sons
2. Tom White (2012). Hadoop : The Definitive Guide, Third Edition, O’Reilly Media
3. Shashank Tiwari (2011). Professional NoSQL, John Wiley & Sons
4. V. Bhuvanewari (2016). Data Analytics with R, Bharathiar University.

Pedagogy: Lectures, Demonstrations

Note: Flipped Mode Learning Topics are Highlighted

UNIT	TOPIC	ACTIVITY	WEB RESOURCES
UNIT I	Web data overview	Student generated content	https://www.springboard.com/big-data-university
UNIT II	Apache Hadoop and Hadoop Ecosystem	Quiz	https://www.edureka.co/blog/big-data-tutorial
UNIT III	Hive	Applications	https://data-flair.training/blogs/hadoop-tutorial/
UNIT IV	Document Databases	Small Group Problem solving	www.hive.org/resources
UNIT V	Data Visualization in R	Experiential Learning	www.nosql-database.org https://dzone.com/articles/best-of-dzone-python-and-r-for-big-data

Course Designers:

1. Mrs.V. Pream Sudha
2. Mrs.R.Kowsalya

MIT1910 / RC19E03	CLOUD COMPUTING	Category	L	T	P	Credits
		III	56	4	-	4

Preamble

This course covers various services of cloud computing. It also presents cloud computing collaborations and applications. It presents new concept of virtualization.

Prerequisite

- Computer Networks
- Web Technology

Course Outcomes

On successful completion of the course, students will be able to

CO Number	CO statement	Knowledge Level
CO1	Understand the concepts of cloud Architecture and its services.	K2
CO2	Classify different services providers, its services and tools.	K3
CO3	Demonstrate various web based applications for collaborating everyone in cloud computing	K3
CO4	Analyze the best service provider for cloud computing in terms of storage, services	K4
CO5	Assess various industrial platforms for the developments	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1	S	M	M	M
CO2	S	M	M	M
CO3	S	S	M	M
CO4	S	M	S	M
CO5	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Introduction: Benefits and Limitations-Cloud Architecture – Storage – Services –Service Providers - Types of Cloud Service Development – Services and Tools

UNIT II

(12 Hrs)

Collaborating on Contact Management - Collaborating on Project Management- Collaborating on Word Processing, Spreadsheet, Presentations, Databases - Sharing Files and Photographs

UNIT III**(11 Hrs)**

Cloud Virtualization Technology – Virtualization Defined – Virtualization Benefits – Server Virtualization – Virtualization for x86 Architecture – Hypervisor Management Software – Logical Partitioning – VIO Server – Virtual Infrastructure Requirements

UNIT IV (11 Hrs) Deep Dive: Cloud Virtualization – Introduction - Storage Virtualization – Storage Area Networks – Network Attached Storage – Cloud Server Virtualization – Virtualized Data Center

UNIT V**(11 Hrs)**

Industrial platforms and new developments - Amazon web services: Compute services - Storage services - Communication services - Additional services - Google AppEngine: Architecture and core concepts - Application life cycle - Cost model Microsoft Azure: Azure core concepts - SQL Azure - Windows Azure platform appliance

Reference Books

1. Michael Miller (2011). Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Pearson publication.
2. Dr. Kumar Saurabh (2011). Cloud Computing : Insights into New Era Infrastructure, Wiley India
3. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi (2013). Mastering Cloud Computing Foundations and Applications Programming, Morgan Kaufmann is an imprint of Elsevier
4. Rishabh Sharma (2014). Cloud Computing: Fundamentals, Industry Approach and Trends, wiley India edition.
5. Paul Mehner (2013). Cloud Computing with the windows Azure Platform, Microsoft Press US.

Pedagogy: Lecture, Guest Lecture, video Lecture, Case Study, Webinar, Discussion

Course Designers

1. Mrs. S. Meera
2. Mrs. V. Kalaimani

RPY1911	PYTHON PROGRAMMING	Category	L	T	P	Credits
		III	56	4	-	4

Preamble

This course introduces the concepts of programming in Python. It provides knowledge in core python, advanced concepts like regular expressions, exception handling, multithreading, web programming and data base programming

Prerequisite

- Basic understanding of Open source software
- Database concepts

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the programming constructs of Python	K2
CO2	Apply the concepts of Python in simple tasks	K3
CO3	Develop real time application using Python	K6
CO4	Create advanced applications using multithreading and exception Handling	K6
CO5	Develop GUI Programs for simple programs	K6

Mapping with Program Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	S	M	M
CO2	S	S	S	M
CO3	S	S	M	M
CO4	S	S	S	M
CO5	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(10Hrs)

Introduction: What is Python? - Origins - Features - Getting started-Python Basics - Python Objects - Numbers – Sequences - Strings, Lists and Tuples: - Strings - Strings and operators - String only operators - Built-in functions - String - Built-in methods - Special features of strings.

UNIT II

(12 Hrs)

Lists - Operators – Built in functions - List Type built-in methods - Special features of Lists, Tuples - Operators and Built-in functions - Special features of Tuples – Mapping and setting Dictionaries – Operators - Built-in and factory functions - Mapping types-built-in methods - Dictionary keys.

UNIT III**(11 Hrs)**

Set types- Operators - Built-in function - Set type built-in methods - Conditionals and loops. Functions and functional programming – Modules - Objected oriented programming - Execution environment

UNIT IV**(11 Hrs)**

Regular expressions - Multithreaded programming – Files & I/O: File objects – Built in Functions – Methods – Built in Attributes – Standard files – Command line arguments – File System – File Execution – Storage Modules – GUI Programming

UNIT V**(12 Hrs)**

Web programming- database programming - Exception Handling: Exception - Exception Handling - Except clause – Try- Finally clause - User Defined Exceptions

Text Book

1. Wesley J.Chun (2010). Core Python programming, 2/e, Pearson education.

Reference Books

1. Mark Lutz (2010). Programming Python, 4/e, O'Reilly Media.
2. Mark Summerfield (2009), Programming in Python 3, Pearson Education. **Pedagogy:** Lectures, Demonstrations, Case studies

Course Designers:

1. Mrs. T.Thendral
2. Mrs. V.Santanalakshmi

RRM19S1	RESEARCH METHODOLOGY	Category	L	T	P	Credits
		III	56	4	-	4

Preamble

This course presents the concepts of research, types of research, research design, literature review and writing reports. It also covers various areas of computer science.

Prerequisite

This course is most appropriate for post graduate students who are interested in research but do not have prior research experience.

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the concepts of research design, research process and various types of research	K2
CO2.	Understand the different steps in writing reports	K2
CO3.	Implement the methods and techniques for experimental study	K3
CO4.	Analyze the ethical issues in research	K4
CO5.	Develop solutions for research problems in a responsible and ethical manner	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	M	M
CO2.	S	M	M	M
CO3.	S	S	S	M
CO4.	S	S	S	M
CO5.	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(12Hrs)

Introduction: – Meaning of research – Objective of research – Motivation in research - Types of research – Research approaches – Significance of research – Research methods versus Methodology – Research and scientific method – Importance of knowing how research is done – Research process – Criteria of good research – Problems encountered by researchers in India. **Defining the research problem:** What is research problem? – Selecting the problem – Necessity of defining the problem.

UNIT II

(12 Hrs)

Reviewing the literature: Literature review in research – How to review the research? – Writing about the literature reviewed – Formulating a research problem

Research Design: Meaning of research design – Need for research design –Features of a good design – Important concepts relating to research design – Different research designs – Basic principles of experimental designs

UNIT III

(12 Hrs)

Data Collection: Introduction – Experiments and Surveys - Collection of primary data – Collection of secondary data – Selection of appropriate method for data collection – Case study method.

Data Preparation: Data Preparation Process – Some problems in preparation process – Missing values and outliers – Types of analysis – Statistics in research.

UNIT IV

(12 Hrs)

Processing and displaying Data: Data processing in quantitative studies – Data processing in qualitative studies – Displaying data.

Interpretation and report writing: Meaning of interpretation – Technique of interpretation – Precaution in interpretation – Significance of report writing – Different steps in writing report – Layout of the research report – Types of reports – Oral Presentation – Mechanics of writing a research report – Precautions for writing research reports.

UNIT V

(12 Hrs)

Research Ethics and Responsible Conduct in Research: Brief history and analytical basis of research ethics, responsible conduct in research (Honesty in Science: Integrity, Authorship, Conflicts of Interest, Privacy and Confidentiality, Informed Consent, Risk/Benefit Assessment), The legal regulation of research ethics in India (From UGC, MHRD and other governing agencies), Regulatory requirements relevant to international research.

Text Book

Kothari, C.R (2013), Research Methodology – Methods and Techniques, 3/e. Wiley Eastern Limited

Reference Books

1. Ranjit Kumar (2011), Research Methodology – A step- by-step guide for beginners, 3/e. Pearson Education.
2. R. Panneerselvam (2014), Research Methodology, 4/e. Prentice Hall India Learning Private Limited.
3. Deepak Chawla and Neena Sondh (2011), Research Methodology, Concepts and Cases, Vikas Publishing House Pvt. Ltd.
4. On Being a Scientist, A Guide to Responsible Conduct in Research: Third Edition (2009)
5. Role of the Ethics Committee: Helping To Address Value Conflicts or Uncertainties Author links open overlay panel Mark P.Aulisio, Robert M.Arnold
6. <https://www.glos.ac.uk/docs/download/Research/handbook-of-principles-and-procedures.pdf>
7. Research Regulatory Compliance 1st Edition (Mark Suckow, Bill Yates eBook ISBN: 9780124200654)
8. Recent research ethics policy from Government of India.

Pedagogy: Lectures, Demonstrations, Case Studies, Group Discussions

Course Designe

1. Mrs .S. Meera
2. Mrs. R.Vani

MIT19P5	BIG DATA ANALYTICS LAB	Category	L	T	P	Credits
		III	-	-	75	5

Preamble

This course provides exercises to implement data storage, retrieval, analysis and knowledge discovery using Big Data in Hadoop platform. This course includes application of distributed computing with NoSQL databases, scripting in Pig Latin, Hive and data analysis using R.

Prerequisite

- Database Management systems
- SQL

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1	Implement Hadoop components for big data processing	K3
CO2	Apply data management concepts in NoSQL databases	K3
CO3	Apply Mapreduce concepts to process big data	K3
CO4	Develop Pig Latin and scripts Hive scripts for big data Processing	K4
CO5	Develop R programs for data analysis using R	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	S	S	M
CO2.	S	S	S	M
CO3.	S	S	S	M
CO4.	S	S	S	M
CO5.	S	S	S	M

Syllabus

- Single-node Hadoop cluster creation
- Exercises to implement Hadoop file management tasks like adding files and directories, retrieving files, deleting files
- Exercises to implement the Pig Latin scripts to sort, group, join, project and filter data.
- Exercises to implement Hive Scripts to create, alter, drop databases, tables, views, functions and indexes
- Exercises to apply the concepts of MapReduce in NoSQL databases
- Exercises to perform statistical analysis and visualization using R
- Exercises to implement correlation and regression in the dataset using R

- Exercises to perform classification and clustering in R

Pedagogy: Demonstrations

Course Designers

1. Mrs.V.Pream Sudha
2. Dr.N.Radha

MPY19P6	PYTHON PROGRAMMING LAB	Category	L	T	P	Credits
		III	75	-	5	3

Preamble

This course introduces the concepts of programming in Python. It provides technical skill in core python, advanced concepts like regular expressions, exception handling, multithreading, web programming and data base programming.

Prerequisite

- C++
- Java
- SQL
- Oracle & MS-Access

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the basic concepts of python programming	K2
CO2.	Implementing the object oriented concepts to improve reusability.	K4
CO3.	Apply python concepts to develop applications that solves industrial problem.	K4
CO4.	Compare python programming language with other languages	K5
CO5.	Develop simple web application	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	S	S	M
CO2.	S	S	S	M
CO3.	S	S	S	M
CO4.	S	S	S	M
CO5.	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

1. Exercises to implement File handling concept
2. Exercises to implement list
3. Exercises using Dictionary.
4. Exercises to perform set operations.

5. Exercises using object oriented concepts.
6. Exercises to perform operations using Regular expression.
7. Exercises using exceptional handling technique.
8. Exercises using multithreading.
9. Exercises to perform operations on Byte objects.
10. Create an application using python with database connectivity.

Pedagogy : Demonstration

Course Designers

1. Mrs. V.Santhana Lakshmi
2. Mrs. V.Kalaimani

SEMESTER IV

RIT1912	ADVANCED LEARNER COURSE 1 - CYBER SECURITY	Category	L	T	P	Credits
		IV	-	-	-	5

Preamble

This course provides the classification of cyber crime, Botnets, attacks on the mobile devices, tools and methods used in cybercrime, laws of cybercrime and cyber forensic

Prerequisite

- Basic fundamental knowledge of Networking
- Web Application
- Mobile Application
- Relational Database Management System

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of cybercrime	K2
CO2	Understand the fundamental principles of cyber forensic	K2
CO3	Apply methods of the cyber crime	K3
CO4	Analyze the technique used for cyber crime and forensics	K4
CO5	Create methodology to secure their data in the real world	K6

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1	S	S	M	M
CO2	S	S	M	M
CO3	S	S	S	S
CO4	S	S	S	S
CO5	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

Introduction to Cybercrime: Introduction, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Newsgroup Spam/Crimes from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Pornographic Offenses, Software Piracy, Password Sniffing, Credit Card Frauds and Identity Theft. Cyber offenses: How Criminals Plan that attack, Categories of Cybercrime, How Criminals Plan the Attacks: Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector and Cloud Computing in Specific IoTs – IoT vs M2M.

UNIT II

Cybercrime- Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era and Laptops.

UNIT III

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft): Types of Identity Theft, Techniques of ID Theft, Identity Theft Countermeasures, How to Protect your Online Identity.

UNIT IV

Cybercrimes and Cybersecurity: The Legal Perspectives Introduction, Why Do We Need Cyberlaws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act., Amendments to the Indian IT Act, Cybercrime and Punishment, Cyberlaw, Technology and Students: Indian Scenario..

UNIT V

Understanding Computer Forensics: Introduction, Historical Background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail : RFC282, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Setting up a Computer Forensics Laboratory: Understanding the Requirements, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing and Anti forensics.

Text Books

1. Nina Godbole, Sunit Belapur, “Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Wiley India Publications, April, 2013

Reference Books

1. James Graham, Richar Howard,Ryan Olson, “Cyber Security Essentials”, CRC Press, Tailor and Francis Group, 2013
2. Robert Jones, “Internet Forensics: Using Digital Evidence to Solve Computer Crime”, O’Reilly Media, October, 2005.
3. Chad Steel, “Windows Forensics: The field guide for conducting corporate computer investigations”, Wiley India Publications, December, 2006.

Course Designers

1. Mrs. R.Kowsalya
2. Mrs.s.Meera

RER1913	ADVANCED LEARNER COURSE 2 - ENTERPRISE RESOURCE PLANNING	Category	L	T	P	Credits
		IV	-	-	-	5

Preamble

This course contains the Business process reengineering, ERP life cycle and ERP related technologies. This will also offer the technologies involved in business modules in ERP packages. It also covers the emerging trends in ERP case studies.

Prerequisite

- Data base concepts
- Software Project Management

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO statement	Knowledge Level
CO1	Understand the concepts of ERP Technologies, Business Process reengineering and Data Mining concepts	K2
CO2	Understand the concept of ERP Life cycle and Project Management	K2
CO3	Identify the various Business modules in ERP Packages	K3
CO4	Analyse the ERP market place of SAP, Oracle and SSA	K4
CO5	Analyse the ERP Packages in manufacturing, textile, and e-Commerce	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	S	M
CO2.	S	M	M	M
CO3.	S	M	S	M
CO4.	M	M	S	S
CO5.	S	M	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

ERP: An Overview, Enterprise – An Overview, Benefits of ERP - ERP and Related Technologies - Business Process Reengineering (BPR) - Data Warehousing - Data Mining - OLAP, SCM.

UNIT II

ERP Implementation Lifecycle - Implementation Methodology - Hidden Costs - Organizing the

Implementation – Vendors, Consultants and Users - Contracts with Vendors - Consultants and Employees - Project Management and Monitoring.

UNIT III

Business modules in an ERP Package – Finance – Manufacturing - Human Resources - Plant Maintenance - Materials Management - Quality Management - Sales and Distribution.

UNIT IV

ERP Market Place - SAP AG – PeopleSoft – Baan - JD Edwards – Oracle – QAD - SSA

UNIT V

ERP Case Studies: Post implementation review of ERP Packages in Manufacturing - Services and Textiles - Turbo Charge the ERP System - EIA, ERP and e-Commerce - ERP and Internet, Future Directions.

Text Book

1. Alexis Leon (2014). ERP Demystified, Tata McGraw-Hill, New Delhi.

Reference Books

1. K. Ganesh et al (2014). Enterprise Resource Planning: Fundamentals of Design and Implementation, Springer Publication
2. D P Goyal (2011). Enterprise Resource Planning A Managerial Perspective, McGraw Hill Education (India) Private Limited
3. Rajesh Ray. (2010). Enterprise Resource Planning, McGraw Hill Education (India) Private Limited

Course Designers

1. Mrs.V.Kalaimani
2. Mrs.S.Meera

MIT16PW	PROJECT WORK AND VIVA VOCE	Category	L	T	P	Credits
		III	-	-	-	12

Preamble

To build problem solving ability and technical skills through the application of theoretical concepts for modelling the real world problems using latest technologies

Pre requisites

- Software engineering
- Database management systems
- Programming languages
- Technologies

Outcomes

On successful completion of the project, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the problem identification, formulation and solution	K2
CO2.	Apply Software Tools and techniques to solve complex problems	K3
CO3.	Examine various technologies to implement the project solutions	K4
CO4.	Evaluate algorithms/techniques used for problem solving	K5
CO5.	Develop the knowledge, skills needed for professional software engineer	K6

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	S	M	M
CO2.	S	S	M	M
CO3.	S	S	M	S
CO4.	S	S	S	S
CO5.	S	S	S	S

S- Strong; M-Medium; L-Low

Methodology

- Identify the problem
- Decide the platform to carry out the work
- Design and develop the solution
- Test and implement the application
- Document the work

Electives

RI19E01	INTERNET PROTOCOLS	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course presents the concept of protocols in the TCP/IP suite, voice video over IP (RTP), Routing Architectures. It also includes Internet Application Services such as domain name system (DNS), Electronic Mail (SMTP,MIME), File Transfer and Access (FTP,TFTP, NFS), Remote login(TELNET, rlogin) and Network Management (SNMP), a description of private network interconnections such as NAT and VPN.

Prerequisite

- Computer Networks
- Basic Concept of Networking

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand concept of protocols in the TCP/IP suite, voice video over IP(RTP), Routing Architectures	K2
CO2.	Apply the routing concept in the given topologies	K3
CO3.	Analyze the relation between the various internet protocols	K4
CO4.	Evaluate The suitability of an internet protocol for supporting a given application type	K5
CO5.	Construct alternate protocol	K6

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	M	S
CO2.	S	M	M	S
CO3.	S	S	S	S
CO4.	S	S	S	S
CO5.	S	S	S	S

S-Strong; M-Medium; L-Low

Syllabus

UNIT I

(12 Hrs)

Introduction and Overview: The TCP/IP Internet - Internet Services - History and Scope Of The Internet - Two Approaches to Network Communication - Wide Area and LAN - Ethernet Technology - Switched Ethernet - Asynchronous Transfer Mode - Internetworking Concept and Architectural Model: Application-Level Interconnection - Network -Level Interconnection - Internet Architecture - Interconnection through IP Routers

UNIT II

(11 Hrs)

Classful Internet addresses - Mapping Internet Addresses of Physical Addresses (ARP) - User Datagram Protocol (UDP)

UNIT III**(11 Hrs)**

Internet Protocol: Connectionless Datagram Delivery (IPv4), Forwarding IP Datagram, Error and Control Messages (ICMP)

UNIT IV**(11 Hrs)**

Routing Between Peers (BGP), Routing Within an Autonomous System (RIP, OSPF), Mobile IP, Private Network Interconnection (NAT, VPN)

UNIT V**(11 Hrs)**

World Wide Web (HTTP), Voice and Video Over IP (RTP, RSVP, QOS), A Next Generation IP (IPv6).

Text Book

1. Douglas E. Comer (2006). Internetworking with TCP/IP Principles, Protocols and Architecture, 5/e, New Delhi, Prentice Hall India

Reference Books

1. Behrouz A. Forouzan (2006). TCP/IP Protocol Suite,1, Tata McGraw Hill, New Delhi
2. Richard Stevens (2003). TCP/IP Illustrated, Volume 2, Prentice Hall of India, New Delhi
3. Julie C. Gaffin (2007). Internet Protocol 6, Nova Science Publisher Inc., Newyork

Pedagogy: Lectures, Case Studies

Course Designers

1. Mrs. R. Kowsalya
2. Dr. N. Radha

RA19E02	ARTIFICIAL INTELLIGENCE	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course introduces the concepts of Artificial Intelligence and the various methods of solving problems using Artificial Intelligence. It also provides insights on machine learning techniques and its applications in Natural Language Processing.

Prerequisite

- Probability and Statistics
- Discrete Structures

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the techniques of knowledge representation and problem solving in the field of artificial intelligence and machine learning,	K2
CO2	Apply appropriate AI techniques for real time scenarios	K3
CO3	Analyze suitable Artificial Intelligence methods to solve a given problem	K4
CO4	Evaluate different machine learning algorithms for a given problem	K5
CO5	Design and develop models for predictive tasks	K6

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1.	S	M	M	M
CO2.	M	M	M	M
CO3.	M	M	M	M
CO4.	S	M	M	M
CO5.	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 hrs)

Artificial Intelligence – Foundations - The State of Art. Intelligent Agents: Nature of Environment - Structure. Solving Problems by searching: Uninformed Search strategies - Informed Search strategies - Planning and Acting in the real world: Time, Schedules and resources- Hierarchical planning - Planning and acting in nondeterministic domains

UNIT II**(12 hrs)**

Learning from examples: Forms of learning - Supervised Learning – Learning Decision trees - Evaluating and choosing the best hypothesis – The theory of learning – Regression and classification with linear models - Artificial Neural Networks - Non parametric models - Support vector machines - Ensemble learning. Reinforcement learning: Passive Reinforcement learning - Active Reinforcement learning - Generalization in Reinforcement learning - applications

UNIT III**(11 hrs)**

Deep learning: Learning algorithms – Capacity, Overfitting, Underfitting – Hyperparameters and validation sets - Estimators, Bias and variance - Deep Learning: Deep feed forward networks - Convolutional Networks - Sequence Modeling: Recurrent Neural Networks – Bidirectional RNNs – Long short term memory and Gated RNNs

UNIT IV**(11 hrs)**

Natural Language Processing: Language Models – Text classification – Information Retrieval - Information extraction. Natural Language for Communication: Phrase Structure - Syntactic Analysis - Machine translation - Speech Recognition

UNIT V**(11 hrs)**

Case Studies: AI in Retail (Alibaba, Walmart) - AI in Social Media Services (Facebook) - AI in Food industry (Coca -Cola, Dominos) - Home and workplace Automation with AI (Samsung) - AI in Entertainment (Netflix) – AI to detect Spambots (Twitter) - AI to build intelligent cars (BMW, Tesla) - AI in Healthcare (Infervision)

Reference Books

1. Stuart Russell, Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Publishing, 2016, Third edition.
2. Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, 2016.
3. Bernard Marr, Artificial Intelligence in Practice: How 50 Successful Companies Used AI and Machine Learning to Solve Problems, Wiley Publications, 2019.

Pedagogy:

Lectures, Group Discussions, Demonstrations

Course Designers:**Course Designers:**

1. Dr.N.Radha
2. Mrs.V.Pream Sudha

RB19E03	BUSINESS INTELLIGENCE	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course provides the basic concepts of business intelligence, data warehousing and online analytical processing. The course also contains data analysis, database design, extract, transformation and load (ETL) design, Business intelligence technologies and tools.

Prerequisite

- Database Management Systems
- Data Mining

Course Outcomes

On successful completion of the course, the students will be able to

CO number	CO statement	Knowledge Level
CO1	Understand the basic concepts of business intelligence and data warehousing	K2
CO2	Understand the concepts of data analysis, database design and ETL	K2
CO3	Apply the concepts of OLAP in business intelligence applications	K3
CO4	Demonstrate Business intelligence tasks using tools	K3
CO5	Analyse business processes to develop business intelligence applications	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	S	M	M
CO2	S	S	M	M
CO3	S	S	S	M
CO4	S	S	M	M
CO5	S	M	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Business intelligence: Effective and timely decisions - Data, information and knowledge - The role of mathematical models - Business intelligence architectures - Cycle of a business intelligence analysis - Enabling factors in business intelligence projects - Development of a business intelligence system - Ethics and business intelligence

UNIT II

(11 Hrs)

Data warehousing and Online Analytical Processing: Basic concepts of data warehouse - Multilayered data warehousing architecture – Data warehouse models – Data warehouse modeling – Data Cube and OLAP – Data warehouse design and usage – Data ware house implementation

UNIT III**(12Hrs)**

Data Analysis: Top - down logical data modeling – Bottom-up source data analysis - Data Cleaning – Data analysis activities. Database design: Operational databases – BI Target databases – Logical database design – Physical database design – Database design activities.

UNIT IV**(11 Hrs)**

Extract, Transformation and Load (ETL) design: ETL Process flow – ETL Activities – ETL development – ETL testing

UNIT V**(11 Hrs)**

BI Technology and Tools: OLAP Tools - ETL Tools–Querying and Reporting tools–Data mining techniques for Business Intelligence – Applications using XLMiner-BI Tools.

Text Book

1. Larissa T. Moss, ShakuAtre (2003). Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-Support Applications, Addison-Wesley Professional

Reference Books

1. Carlo Vercellis (2009). Business Intelligence:Data Mining and Optimization for Decision Making, Politecnico di Milano, Italy
2. Jaiwei Han, MichelineKamber (2012). Data Mining-concepts and techniques, 3/e, Elsevier, New Delhi
3. Ralph Kimball, MargyRass, Warren Thornthwaite, Joy Mundy, Bob Becker (2008). The Data Warehouse Lifecycle Toolkit: Practical Techniques for Building Data warehouse and Business Intelligence Systems, 2/e, Wiley Publications, India
4. GalitShmueli, Nitin R. Patel, Peter C. Bruce (2010). Data Mining for Business Intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XLMiner , 2/e, Wiley Publications, India

Pedagogy: Lectures, Demonstrations, Case studies

Course Designers

1. Dr. M. S. Vijaya
2. Mrs. V.Preamsudha

RD19E04	DATA ANALYTICS	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course presents the different methods for analysing data to enable decision making. It also introduces Macro programming and R tool for data analytics.

Prerequisite

- MS - Excel
- Statistics

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand various spreadsheet functions available for data analytics and management	K2
CO2.	Apply statistical and financial functions for decision making	K3
CO3.	Demonstrate data analysis and visualization using R tool	K3
CO4.	Analyse voluminous data and derive knowledge using appropriate functions	K4
CO5.	Develop Excel macros in Visual Basic Applications for analysing data	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1.	S	M	M	M
CO2.	S	M	M	M
CO3.	S	S	M	M
CO4.	S	S	S	M
CO5.	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I (11 hrs) Introduction to Spreadsheet -Basic Functions- Time and date functions - Sort - Filter - Conditional Formatting

UNIT II (11 hrs)

Analysis using Functions: Text Functions - look up function - match functions - index functions - Statistical and Financial Functions – What if analysis, Solver - Sum product

UNIT III (11 hrs)

Data Management and Modelling – Evaluating data- summarization – consolidating data – Correlation - Regression – Forecasting - Analysis of Variation with Moving average

UNIT IV**(12 hrs)**

Excel Macros (VBA) – Beginning Programming with VBA - Variables, data types, constants- Input and Output with VBA- String Manipulation – Event Procedures-Function Procedures- Looping-Arrays

UNIT V**(11 hrs)**

Analytics with R: Introduction-Data with R- Objects-Reading and saving files - data types –Working with objects - Statistical analysis with R : t-test - Correlation – Covariance - Simple linear regression - Graphics with R-Basic boxplots - scatterplots- Line charts- Piecharts

Reference Books

1. Wayne L Winston (2004). Microsoft Excel Data Analysis and Business Modelling, Microsoft Press
2. Duane Birnbaum, Michael Vine (2007). Microsoft Excel VBA Programming for the Absolute Beginner, 3/e, Thomson Press.
3. Mark Gardener (2012). Beginning R: The Statistical Programming Language, John Wiley India Publishing
4. Stephen L.Nelson, Elizabeth C.Nelson(2016). Excel Data analysis for Dummies, 3/e, John Wiley & Sons
5. John Walkenbach(2013). Excel VBA Programming for Dummies, 3/e, John Wiley & Sons
6. Michael J.Crawley(2005). Statistics: An Introduction using R, John Wiley & Sons

Pedagogy: Lectures, Demonstrations

Course Designers:

1. Mrs. V.Pream sudha
2. Dr. M. S. Vijaya

RS19E05	SOFTWARE ARCHITECTURE	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course provides the concepts of Software architecture, analysis method, architecture reviews and architecture based development. This course also introduces the design of software architecture in air traffic control and flight simulation.

Prerequisite

- Software engineering

Course Outcomes

On successful completion of the course, the students will be able to

CO number	CO statement	Knowledge Level
CO1	Understand the concepts of software architecture, business cycle and analysis method	K2
CO2	Understand the processes of system development from software architecture	K2
CO3	Apply software design to simple applications	K3
CO4	Analyse the software architectures in different domains	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	M	S	M
CO2	S	M	S	M
CO3	S	M	S	M
CO4	S	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Architecture Business Cycle: Introduction - Software processes and the architecture business cycle – Introduction: Software Architecture - Architectural styles, reference models and reference architectures - Importance of software architecture - Architectural structures and views

UNIT II

(11 Hrs)

Creating and Analyzing an Architecture: Quality Attributes: Architectures and Quality Attributes- Architectural Means for Achieving Qualities. Moving from Qualities to Architecture: Architecture Styles: Introducing Architectural Styles – Organizing Architectural Styles – Refinements of Styles – Using Styles in System Design – Achieving Quality Goals with Architectural Styles

UNIT III**(11Hrs)**

The Software Architecture Analysis Method: The How and Why of Analyzing Software architecture – Overview of Software Architecture Analysis Method – A Small Example of SAAM Application – SAAM Applied to a Financial Management System – SAAM Applied to a Revision – Control System – Observations on SAAM. Architecture Reviews: Costs and Benefits - Review Techniques – The Review Practice

UNIT IV**(12Hrs)**

Moving From Architectures to Systems: Architecture Description Languages Today – Capturing Architectural Information in an ADL – ADLs Help System Development – Choosing an ADL – An Example of an ADL

UNIT V**(11 Hrs)**

Air Traffic Control: A Case Study in Designing for High Availability: Relationship to the Architecture Business Cycle – Requirements and Qualities – Architectural Approach – Architectural Solution – Assessing the Architecture for Maintainability. Flight Simulation: A Case Study in Architecture for Integrability: Relationship to the Architecture Business Cycle – Requirements and Qualities – Architectural Approach – Architectural Solution

Text Book

1. Len Bass, Paul Clements, Rick Kazman (2013). Software Architecture in Practise, 3/e, Pearson Education.

Reference Books

1. Mary Shaw David Garlan (2007). Software Architectural Perspectives on an emerging discipline, Prentice Hall of India
2. Muhammad Ali Babar, Alan W. Brown, Ivan Mistrik (2014). Agile Software Architecture: Aligning Agile Processes and Software Architectures; Elsevier Inc.
3. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal (2001). Pattern-Oriented Software Architecture, A system Patterns, John Wiley and Sons.

Pedagogy : Lectures, Case studies, Group Discussions

Course Designers:

1. Ms. G.Gomathi
2. Mrs.V.Santhana Lakshmi

RD19E06 /MCS1909	DATA MINING	Category	L	T	P	Credits
		III	56	4	-	4

Preamble

This course presents the basic concepts of data mining various data mining techniques like classification, clustering, association rule mining. The course also introduces various applications of data mining such as text mining, web mining, multimedia mining, image mining, spatial mining and data visualization

Prerequisite

- Database Management Systems
- Probability and Statistics

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand basic concepts of data mining	K2
CO2.	Understand data mining techniques like classifications, clustering, association rule mining, prediction and related algorithm	K2
CO3.	Apply data mining techniques to carry out simple data mining tasks	K3
CO4.	Implementing data mining algorithms using Tools	K4
CO5.	Analyze data with data visualization using Tableau	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	S	M	M
CO2.	S	S	M	M
CO3.	S	S	S	M
CO4.	S	S	S	M
CO5.	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(10 Hrs)

Introduction to data mining: Mining from database - Data mining functionalities – Mining patterns - Classification of data mining systems - Major issues in Data mining.

UNIT II

(11 Hrs)

Data Preprocessing: Need for preprocessing – Data summarization – Data cleaning – Data integration - Data transformation – Data reduction – Data discretization

UNIT III

(12 Hrs)

Association Rule Mining: Apriori algorithm. Classification - Decision trees - Naïve Bayes - K Nearest Neighbour - Support Vector Machine - Neural Networks- Deep Neural Networks- Evaluation of classification algorithms. Prediction – Regression, Evaluation of Prediction methods.

UNIT IV

(11 Hrs)

Clustering: Cluster Analysis - Partitioning Methods - Hierarchical Methods - Density and Grid based methods - Evaluation of clustering algorithms.

Data Visualization: Foundations for building visualizations - Visualizing data -Working with Data in Tableau - Moving from Foundational to Advanced Visualizations.

UNIT V

(12 Hrs)

Advanced Data Mining Techniques: Mining Data Streams - Mining Time Series Data - Mining Sequence Patterns in Biological Data - Graph Mining - Social Network Analysis – Spatial Data Mining. Multimedia Data Mining - Text Mining - Mining the World Wide Web - Data Mining Applications and Tools.

Text Book

1. Jaiwei Han, Micheline Kamber (2006). Data Mining-concepts and techniques, 2/e, Morgan Kaufmann Publishers, San Francisco
2. Joshua N.Milligan (2015). Learning Tableau, PACKT publishing

Reference Books

- 2 David Hand, Heikki Mannila and Padhraic Smyth (2001). Principles of Data Mining, Prentice Hall of India, New Delhi
- 3 Mark A. Hall, Ian H. Witten, Eibe Frank (2011). Data Mining: Practical Machine Learning Tools and Techniques, 4/e,Morgan Kaufmann Publishers, San Francisco
- 4 Arun K. Pujari (2001). Data Mining Techniques; Universities Press, Hyderabad
- 5 Soman KP (2005). Data mining from theory to practice,2/e, PHI Learning Pvt. Ltd., New Delhi

Pedagogy: Lectures, Demonstrations, Case studies

Course Designers:

1. Dr. M. S. Vijaya
2. Mrs. V.Santhanalakshmi

RW19E07/ MDA19E3	WEB DATA ANALYTICS	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course gives insights about leveraging web data to achieve strategic business objectives. It deals with the various techniques for analysing web data like clickstream analysis. The course also provides ways to execute competitive intelligence analysis and to analyze emerging social, mobile and video data.

Prerequisite

- Foundations of Data Science
- Data Mining

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the techniques of web data analytics	K2
CO2.	Apply web data analytics on social, mobile and video data	K3
CO3.	Apply Competitive intelligence to analyse web traffic	K3
CO4.	Analyse techniques for measuring the success of a website	K4
CO5.	Assess the various cases to apply web data analytics	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	M	M
CO2.	S	S	M	M
CO3.	S	M	S	M
CO4.	S	S	S	M
CO5.	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hours)

Introduction : Web Analytics 2.0 - Clickstream- multiple outcome analysis- experimentation and testing- voice of customer – competitive intelligence- the tactical shift -Optimal strategy for choosing web analytics

UNIT II

(11 Hours)

Clickstream analysis: Metrics-Eight critical web metrics-web metrics demystified –strategically aligned tactics for impactful web –Web analytics report-Foundational analytical strategies-clickstream analysis made actionable-challenges

UNIT III

(12 Hours)

Measuring Success-Actionable Outcome KPIs- Moving beyond conversion rates- Micro and macro conversion-Measuring success for a non –ecommerce website- Leveraging qualitative data: Surveys- Web enabled emerging user research options

UNIT IV

(11 Hours)

A/B Testing - Multivariate testing-Actionable testing ideas-Controlled experiments-Competitive intelligence analysis-CI data source, types, secrets- website traffic analysis-Search and keyword analysis- audience identification and segmentation analysis

UNIT V

(11 Hours)

Emerging analytics: Social, Mobile, Video: Measuring social web - the data challenge- analyzing mobile customer experiences-measuring the success of blogs- quantifying the impact of Twitter – Analyzing the performance of videos

Reference Books

1. Avinash Kaushik (2010) , Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity, 1/e, Wiley Publishing.
2. Dietmar Jannach, Markus Zanker(2011), Recommender system-An introduction, Cambridge University Press
3. Bing Liu(2012), Sentiment Analysis and opinion mining, Morgan and claypool Publishing
4. Eric Enge, Stephan Spencer, Jessie Stricchiola, The Art of SEO: Mastering Search Engine Optimization, 3/e.
5. Kristina Halvors, Content Strategy for the Web, 1/e.

Pedagogy: Lectures, Demonstrations, Group Discussions

Course Designers

1. V. Pream Sudha
2. S. Meera

RI19E08	INFORMATION RETRIEVAL	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course presents the concepts of document representation, document indexing, digital information storage, retrieval and distribution. It also introduces effective search strategies for IR systems, vector space model, text classification and evaluation methods of IR systems.

Prerequisite

- Database Management systems
- Data mining

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of document representation, document indexing, digital information storage, retrieval and distribution	K2
CO2	Summarize the advantages and disadvantages of different information-retrieval models	K2
CO3	Demonstrate document classification applying the concepts of vector spaces and classifiers	K3
CO4	Analyze the effective search strategies for IR systems	K4
CO5	Assess the result of an information retrieval system	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1.	S	M	M	M
CO2.	S	M	M	M
CO3.	S	S	M	M
CO4.	S	M	S	M
CO5.	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I (11Hrs)

Boolean retrieval: Information retrieval problem - Processing Boolean queries - Boolean model versus ranked retrieval. The term vocabulary and postings lists: Document delineation and character sequence decoding - Determining the vocabulary of terms - Faster postings list intersection via skip pointers - Positional postings and phrase queries

UNIT II

(12Hrs)

Dictionaries and tolerant retrieval: Search structures for dictionaries - Wildcard queries - Spelling correction - Phonetic correction. Index construction: Hardware basics - Blocked sort-based indexing - Single-pass in-memory indexing - Distributed indexing - Dynamic indexing - Other types of indexes

UNIT III

(11Hrs)

Scoring, term weighting and the vector space model: Parametric and zone indexes - Term frequency and weighting - The vector space model for scoring. Evaluation in information retrieval: Information retrieval system evaluation - Standard test collections - Evaluation of unranked retrieval sets - Evaluation of ranked retrieval results – Assessing relevance

UNIT IV

(11Hrs)

XML retrieval: Basic XML concepts - A vector space model for XML retrieval - Evaluation of XML retrieval - Text-centric vs. data-centric XML retrieval. Text classification and Naive Bayes: The text classification problem - Naive Bayes text classification - Properties of Naive Bayes - Feature selection - Evaluation of text classification

UNIT V

(11Hrs)

Vector space classification: Document representations and measures of relatedness in vector spaces – Rocchio classification- k nearest neighbor - Flat clustering : Clustering in information retrieval - Evaluation of clustering - K-means – Web search basics - Web characteristics - Advertising as the economic model – Search user experience

Text Book

Christopher D. Manning, Prabhakar Raghavan, Henrich Schutze (2008). Introduction to Information Retrieval, 1/e; New York: Cambridge University Press

Reference Books

1. Stefan Buttcher et.al (2012). Information Retrieval - Implementing and Evaluating, MIT Press
2. Dr Ricardo Baeza-Yates et.al (2011). Modern Information Retrieval: The Concepts and Technology, Addison Wesley
3. David A. Grossman and Ophir Frieder (2010). Information Retrieval,2/e, Universities Press

Pedagogy: Lectures, Demonstrations, Guest Lecture, Video Lectures

Course Designers

1. Mrs. V. Pream Sudha
2. Dr. M. S. Vijaya

RV19E09	VIRTUAL REALITY	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course provides the technology behind virtual reality and introduces input, output devices used for virtual reality. It also presents the techniques and applications used for augmented reality.

Prerequisite

- Animation Techniques
- Image Processing

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the basic concepts of virtual reality	K2
CO2.	Understand the fundamental principles of augmented reality.	K2
CO3.	Apply appropriate techniques and design augmented reality applications	K3
CO4.	Analyze the techniques required for virtual reality environments	K4
CO5.	Assess the methods and techniques appropriate for virtual reality applications	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	M	M
CO2.	M	M	M	M
CO3.	M	M	M	M
CO4.	S	M	M	M
CO5.	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Introduction: The Three Fs of Virtual Reality - A Short History of Early Virtual Reality – Early Commercial VR Technology - VR Becomes an Industry - The Five Classic Components of a VR System

UNIT II

(12 Hrs)

Input Devices : Three – Dimensional Position trackers – Tracker Performance Parameters – Mechanical Trackers – Magnetic Trackers – Ultrasonic Trackers – Optical Trackers – Hybrid Inertial Trackers - Navigation and Manipulation Interfaces - Tracker-Based Navigation Manipulation Interfaces – Trackballs - Three-Dimensional Probes - Gesture Interfaces - The Pinch Glove - The 5DT Data Glove - The Didjiglove - The CyberGlove

UNIT III

(11 Hrs)

Output Devices: Graphics Displays: The Human Visual System - Personal Graphics Displays -Large-

Volume Displays - Sound Displays - The Human Auditory System - The Convolvotron – Speaker Based Three-Dimensional Sound - Haptic Feedback : The Human Haptic System - Tactile Feedback Interfaces - Force Feedback Interfaces

UNIT IV

(11 Hrs)

Introduction to Augmented Reality - Definition – Examples – Displays - Visual perception - Requirements and characteristics – Tracking - Characteristics of tracking technology - Stationary tracking systems - Mobile sensors

UNIT V

(11 Hrs)

Computer Vision for Augmented Reality - Natural feature tracking by detection – Simultaneous localization and mapping – Interaction - Output modalities – Input modalities – Tangible interfaces - Navigation

Text Book

1. Grigore C. Burdea, Philippe Coiffet (2010), Virtual Reality Technology, 2/e, Wiley Dream Tech India
2. Dieter Schmalstieg, Tobias Hollerer (2016), Augmented Reality : Principles and Practice, Pearson education Inc

Reference Books

1. Jonathan Linowes , Krystian Babilinski (2017), Augmented reality for developers, 1/ e, Packt Publishing
2. William R. Sherman, Alan B. Craig (2013), Understanding Virtual Reality: Interface, Application and Design, Morgan Kaufmann Publishers
3. Philippe Fuchs and Guillaume Moreau (2012), Virtual Reality: Concepts and Technologies, CRC Press
4. Ted Simpson (2011), Virtual Machines, Cengage Learning

Pedagogy: Lectures, Group Discussions, Demonstrations

Course Designers:

1. Mrs. V. Preamsudha
2. Mrs. R. Kowsalya

RG19E10	GRID COMPUTING	Category	L	T	P	Credit
		III	56	4	-	4

Preamble

This course contains the basics of Grid Computing introduction, initiatives and applications. This will also offer the technologies involved in grid computing. It also covers the concepts of grid computing toolkits.

Prerequisite

- Computer System Architecture
- Concepts of distributed computing

Course Outcomes

On successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the concepts of grid computing, grid computing Initiatives and applications	K2
CO2.	Understand the technologies like Open Grid Service Architecture and Open Grid Service Infrastructure	K2
CO3.	Apply grid computing in different applications	K3
CO4.	Analyse the architecture of OGSA and OGSI technology in grid computing	K4
CO5.	Analyse the standard projects in Grid Computing	K4

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1.	S	M	S	M
CO2.	S	S	S	M
CO3.	S	S	S	M
CO4.	M	M	S	M
CO5.	S	M	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(11 Hrs)

Grid Computing: Introduction-Early Grid Activities-Current Grid Activities-An Overview of Grid Business Areas-Grid Applications-Grid Infrastructure

UNIT II

(12 Hrs)

Grid Computing Initiatives: Grid Computing Organizations and their roles – Grid Computing analog – Grid Computing Road map

UNIT III**(11 Hrs)**

Grid Computing Applications: Merging the Grid Sources – Architecture with the Web Devices Architecture

UNIT IV**(11 Hrs)**

Technologies: OGSA – Sample use cases – OGSA platform components – OGSI – OGSA Basic services

UNIT V**(11 Hrs)**

Grid Computing Toolkits: GLOBUS GT3 Toolkit: Architecture – GT3 Software Architecture Model. GLOBUS GT3 Toolkit: Programming Model – Grid Service Behavior Implementation – Factory Callback Mechanism – Grid Service Lifecycle Callbacks and Lifecycle Management – Grid Service Lifecycle Model – GT3 Tools

Text Book

1. Joshy Joseph & Craig Fellenstein (2004). Grid Computing, Pearson Education

Reference Books

1. Ahmar Abbas (2003). Grid Computing: A Practical Guide to Technology and Applications, Charles River Media, New Delhi
2. Radu Prodan Thomas Fahringer (2007). Grid Computing: Experiment Management, Tool Integration, And Scientific Workflows, Prism Books Pvt Ltd
3. Prabhu C.S.R. (2008) . Grid And Cluster Computing, PHI Learning Pvt. Ltd
4. Fran Berman, Barry Wilkinson (2009). Grid Computing: Techniques and Applications, CRC Press

Pedagogy: Lectures, Discussions, Case Studies

Course Designers:

1. Mrs.S.Meera
2. Mrs.R.Kowsalya