

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	19PCS313	Title	Batch :	2019-2021
		Angular JS	Semester	III
Hrs/Week:	4		Credits:	4

Course Objective

On successful completion of this course, students will be able to create dynamic web applications that depend on the Model-View-Controller architecture, and also to minimize the dependence on JavaScript requirement for functionalizing the web applications.

Course Outcomes (CO)

K1	C01	To recollect the fundamental concepts of javascript
K2	C02	To get the idea about AngularJS framework and Model View Controller(MVC)
K3	C03	To deploy the programs using filters, modules, controllers and directives
K4	C04	To review the various services and server communications
K5	C05	To validate the forms by using model binding

CONTENTS	Hours
UNIT I JavaScript: Introduction- Including Scripts on a Page- Statements- Functions- Parameters and Return Values- Types and Variables- <i>Primitive Types</i> - JavaScript Operators- Equality vs. Identity- Pre- vs. Post-Increment- Working with Objects: Creating Objects- Reading and Modifying an Object's Properties- Adding Methods to Objects- Enumerating Properties- Control Flow- Working with Arrays- Callbacks- JSON.	10
UNIT II AngularJS: Basics of AngularJS-Framework- Downloading and Installing AngularJS- Browser Support- First AngularJS Application- Declarative vs. Procedural Programming- Directives and Expressions- Introduction to MVC: Design Patterns- Model View Controller- Why MVC- MVC the AngularJS Way- Filters and Modules: Introduction to Filters- Built-in Filters- The Number Filter- The Date Filter- The limitTo Filter- AngularJS Modules- Bootstrapping AngularJS- Creating a Custom Filter	10
UNIT III Controllers : Defining Controllers- Creating and Applying Controllers – Scopes: Setting up the scope- Modifying the Scope- Directives: Basics of Directives- Using Directives- Built-in Directives- Event-Handling Directives- Creating a Custom Directive- Working with Forms: <i>HTML Forms Overview</i> - Model Binding- AngularJS Forms- Validating Forms	10
UNIT IV Services and Server Communication: Using Services- The \$window Service- The \$location Service- The \$document Service- Creating Services- Server Communication- Handling Returned Data- Organizing Views: Installing the ngRoute Module- Using URL Routes-	10

Defining Routes- Route Parameters- Eager vs. Conservative Routes- Route Configuration Options- HTML5 Mode.	
UNIT V AngularJS Animation: Installing the ngAnimate Module- CSS Animation Overview- Applying Animations- Deployment Considerations: Configuration- Testing- Error Handling- Hide Unprocessed Templates- Minification and Bundling- Managing the Build Process- Deployment.	10
Total Hours	50
<i>*Italicized texts are for self study</i> Power point Presentations, Seminar , Assignment, Brain storming	
Text Books 1. Andrew Grant, “Beginning AngularJS”, 1st Edition, Apress, 2014 2. Adam Freeman, “Pro AngularJS”, 1st Edition, Apress, 2014	
Reference Books 1. Brad Green and Shyam Seshadri , “AngularJS – Up and Running”, 2 nd Edition, O’ Reilly, 2014	

M.Sc. Computer Science

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	20PCS101	Title	Batch :	2020-2022
		Design & Analysis of	Semester	I
Hrs/Week:	5	Computer Algorithms	Credits:	5

Course Objective

On successful completion of the course the students should understand the various design and analysis of various data structure algorithms.

Course Outcomes (CO)

K1	CO1	To remember worst case running times of algorithms using asymptotic analysis
K2	CO2	To understand divide-and-conquer paradigm, dynamic-programming paradigm, greedy paradigm and branch and bound strategies and apply them for the appropriate problems
K3	CO3	To deploy different data structures
K4	CO4	To analyze major graph algorithms and to employ graphs to model engineering problems
K5	CO5	To validate divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm

CONTENTS		Hours
UNIT I Introduction: algorithm definition and specification – performance analysis –Elementary Data structures:- <i>stacks and queues</i> – <i>trees</i> – dictionaries – priority queues – sets and disjoint set union – graphs – Basic traversal and search techniques – Techniques for Binary Tree – Techniques for Graphs: Breadth First Search and Traversal, Depth First Search and Traversal.		13
UNIT II Divide – and – conquer: - General method – binary search – merge sort – quick sort –The Greedy method: - General method – knapsack problem – minimum cost spanning tree – single source shortest path.		13
UNIT III Dynamic Programming: General method – multistage graphs – all pair shortest path – optimal binary search trees – 0/1 Knapsack – traveling salesman problem – flow shop scheduling.		13
UNIT IV Backtracking: General method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem .		13

UNIT V Branch and bound: The method – Least Cost (LC) Search – The 15 puzzle: An Example – Control abstractions for LC Search – Bounding – FIFO Branch and Bound – LC Branch and Bound – 0/1 Knapsack problem – LC Branch and Bound solution – FIFO Branch and Bound solution – Traveling salesperson.	13
Total Hours	65
<i>*Italicized texts are for self study</i> Power point Presentations, Seminar , Assignment, Brain storming	
Text Books 1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, “Computer Algorithms”, 2 nd Edition, Galgotia Publications, 2008.	
Reference Books 1. Ellis Horowitz, Sartaj Sahni, “Fundamentals of data structures”, Reprinted Edition, Galgotia Publications, 2015. 2. Alfred V.Aho, John E.Hopcroft & Jeffery D Ullman, “Data structures and Algorithms”, Reprinted, 2009 Edition, PHI learning pvt Ltd 3. Adam Drozdek, “Data Structures and Algorithms in C++”, 4 th Edition, Vikas publishing house, NewDelhi, 2012.	

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	20PCS102	Title	Batch :	2020-2022
		Internet of Things	Semester	I
Hrs/Week:	5		Credits:	5

Course Objective

On successful completion of this course, students will understand the fundamentals of Internet of Things, IoT Protocols, built a small low cost embedded system using Raspberry Pi and to apply the concept of Internet of Things in the real world scenario.

Course Outcomes (CO)

K1	CO1	To remember web services to access/control IoT devices
K2	CO2	To understand the portable IoT using Raspberry Pi
K3	CO3	To deploy use of IoT application and connect to the cloud
K4	CO4	To analyze various protocols for IoT
K5	CO5	To evaluate Real World IoT Design Constraints, Industrial Automation in IoT.

CONTENTS		Hours
UNIT I Introduction to IoT: Introduction – Physical Design – Logical Design – IoT Enabling Technologies – IoT Levels & Deployment Templates – Domain Specific IoTs. IoT and M2M: M2M – Difference between IoT and M2M – SDN and – NFV for IoT.		13
UNIT II IoT System Management with NETCONF – YANG: Need for IoT Systems Management - Simple Network Management Protocol – Network Operator Requirements – NETCONF – YANG. IoT Platforms Design Methodology: Introduction – Design Methodology. IoT Architecture: M2M high-level ETSI Architecture – IETF Architecture for IoT.		13
UNIT III IoT Reference model – Domain model - Information model - Functional model – Communication model - IoT Reference Architecture. IoT Protocols: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols - SCADA and RFID Protocols – Protocols – IEEE 802.15.4 – BACNet Protocol - Modbus – Zigbee Architecture - Network Layer – 6LowPAN – CoAP – Security.		13
UNIT IV Building IoT with RASPBERRY Pi and ARDUINO: Building IoT with RASPBERRY Pi – IoT Systems – Logical Design using Python – IoT Physical Devices and Endpoints – IoT Device – Building blocks – Raspberry Pi – Board – Linux on Raspberry Pi – Raspberry Pi Interfaces - Programming Raspberry Pi with Python – Other IoT Platforms - Arduino		13

UNIT V Case studies: Home Automation – Cities – Environment – Agriculture – Productivity Application. Tools for IoT: Chef – Chef Case Studies – Puppet – Puppet Case Study. <i>Amazon Web Services for IoT.</i>	13
Total Hours	65
<i>*Italicized texts are for self study</i> Power point Presentations, Seminar , Assignment	
Text Book 1. Arshdeep Bahga , Vijay Madisetti , “Internet of Things –A hands –on pproach”,Universities Press , 2015.	
Reference Books 1. Dieter Uckelmann , Mark Harrison, Michahelles,Florian(Eds), “Architecting the Internet of Things”, Springer, 2011. 2. Honbo Zhou, “The Internet of Things in the cloud: A Middleware Perspective”, CRC Press, 2012. 3. Jan Holler ,Vlasios Tsiatsis ,Catherine Mulligan , Stamatis , Karnouskos Stefan Avesand , David Boyle , “From Machine – to- Machine to the Internet of Things – Introduction to a New Age of Intelligence”, Elsevier 2014. 4. Olivier Hersent, David Boswarthick , Omar Elloumi – “The Internet of things – Key applications and Protocols”,Wiley 2012.	

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	20PCS207	Title	Batch :	2020-2022
		Advanced Java Programming	Semester	II
Hrs/Week:	5		Credits:	5

Course Objective

On successful completion of this course, the students will be able to understand the advanced Java concepts, to develop Java based applications and hands on practices by applying these advanced concepts to implement in web based applications.

Course Outcomes (CO)

K1	CO1	To recollect different classes, constructors and methods of Swing components
K2	CO2	To get an idea to construct an enterprise application using Java Beans
K3	CO3	To deploy RMI programs for real world applications
K4	CO4	To analyze session tracking using Session objects and Cookies
K5	CO5	To validate server side java programs using Servlets and JSP

CONTENTS		Hours
UNIT I Java Swings: JPanel-JFrame-JApplet-JSplitPane-JTabbedPane-JViewport-JMenu-Items and Labels - JTextField - JTextArea - JButtons - JButton Classes - JCheckBoxes - JRadioButton-JComboBoxes-JList.		13
UNIT II Advanced Components: JTree - JTable - JInternalFrame - JDesktopPane -JTextPane - JProgressbar.		13
UNIT III Java Beans: Introduction to Java Bean-Advantages of a Java Bean-Application Builder tools-The Bean Developer Kit (BDK)-Jar files-Introspection-Developing a Simple Bean-Using Bound Properties-Using Bean Info Interface-Constrained Properties-Persistence-Customizers-Java Bean API.		13
UNIT IV Servlet Overview and Architecture: Movement to Server Side Java-Practical Applications for Java Servlets-Java Servlet Alternatives-Reason to use Java Servlets-Java Server Architecture – Servlet Basics-The Lifecycle of Servlet-A Basic Servlet. Servlet Chaining: Definition for Servlet Chaining-Uses of Servlet Chains-A Practical example using Servlet Chaining-Servlets and JDBC-Two Tier and Three Tier Database access models-JDBC Servlet-Session Tracking-Using Cookies-Using Session Objects.		13
UNIT V Java Server Page (JSP): Introduction-Server-side programming-Life Cycle of JSP- To create and run JSP- Architecture of JSP-Scripting tag Elements- Implicit Object- Beans - Conditions - Directives - Declarations – Implicit Variables -Expressions. RMI (Remote Method Invocation): Introduction - RMI Architecture-Bootstrapping and RMI Registry - The RMI Compiler - Object Specialization and Parameter Passing - A Simple example.		13
Total Hours		65
<i>*Italicized texts are for self study</i>		

Power point Presentations, Seminar , Assignment, Brain storming

Text Books

1. Herbert Schildt, “ Java-2, The Complete Reference”, 11th Edition, Tata McGraw Hill, 2019.
2. Jim Keogh, “The Complete Reference J2EE”, Tata McGraw Hill, 2007.
3. KogentSolutionss, “Java Server Programming Java EE7 Black Book”,Dreamtech Press, 2014.
4. Sams Series,James GoodWill, “Developing Java Servlets”, 1st Edition, SAMS Techmedia, 2004.
5. Sam Series, “Java RMI”, Tata McGraw Hill, 2006.

Reference Books

1. Brian Cole, Robert Eckstein, James Elliott, Marc Loy, David Wood, “Java Swing”, 2nd Edition, O“Reilly Publishers, 2002.
2. Stephen Potts, Mike Kopack, “Web Services”, Kindle Edition, Pearson Education, 2004.

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	20PCS209	Title	Batch :	2020-2022
		Cloud and Big Data Analytics	Semester	II
Hrs/Week:	4		Credits:	4

Course Objective

On successful of this course, students will understand the concept of Virtualization and design of cloud Services and will be able to analyze the big data using intelligent techniques.

Course Outcomes (CO)

K1	C01	To remember the fundamental concepts of big data	
K2	C02	To understand the applications using Map Reduce Concepts	
K3	C03	To deploy the concept of Virtualization and design of cloud Services	
K4	C04	To analyze the big data using intelligent techniques	
K5	C05	To present the broad perceptive of cloud architecture and model	
CONTENTS			Hours
UNIT I Cloud Architecture and Mode: Technologies for Network-Based System – System Models for Distributed and Cloud Computing - NIST Cloud Computing Reference Architecture. Cloud Models:-Characteristics – Cloud Services – Cloud Models (IaaS,PaaS,SaaS) – Public vs Private Cloud – Cloud Solutions – Cloud ecosystem – Service Management – Computing on demand, Virtualization : Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures - Tools and Mechanism – Virtualization of CPU, Memory I/O Devices - Virtual Clusters and Resource Management – Virtualization for Data-Center Automation.			11
UNIT II Cloud Infrastructure: Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges – Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources. Programming Model: Parallel and Distributed Programming Paradigms – MapReduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications – Programming Support – Google App Engine, Amazon AWS – Cloud Software Environments – Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim.			11
UNIT III Getting Started with Big Data: Introduction – Grasping the Fundamentals of Big Data-Examining Big Data Types – Old Meets New - Technology Foundation for Big Data : Digging into Big Data Technology Components – Virtualization and How It Supports Distributed Computing – Examining the Cloud and Big Data – Big Data Management: Operational Databases - Map Reduce Fundamentals – Exploring the World of Hadoop – The			10

Hadoop Foundation and Ecosystem – Appliances and Big Data Warehouses.	
UNIT IV Analytics and Big Data: Defining Big Data Analytics – Understanding Text Analytics and Big Data – Customized Approaches for Analysis of Big Data. Big Data Implementation: Integrating Data Sources – Dealing with Real-Time Data Streams and Complex Event Processing – Operationalizing Big Data – Applying Big Data within Your Organization – Security and Governance for Big Data Environments.	10
UNIT V Big Data Solutions in the Real World: The Importance of Big Data to Business – Analyzing Data in Motion – Improving Business Process With Big Data Analytics. The Part of Tense: Ten Big Data Best Practices-Ten Great Big Data Resources – Ten Big Data Do’s and Don’ts.	10
Total Hours	52
*Italicized texts are for self study	
Power point Presentations, Seminar ,Assignment, Experience Discussion, Brain storming	
Text Books 1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012 from Parallel (Unit I – II). 2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, “Big Data for Dummies” A Wiley Brand Publications.2013. (Unit III–V). 3. Jeffrey Stanton, “An Introduction to Data Science” Syracuse University, 2012(Case Study).	
Reference Books 1. Michael Miller, ”Cloud Computing”, Que Publishing , 2008 2. Nick Antonopoulos, Cloud Computing, Springer Publications, 2010.	