

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for MCA IV Semester under Regulations 2015**  
**Branch: Master of Computer Applications**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
<b>Theory</b>						
1	P15MCA401	Open Technologies	3	0	0	3
2	P15MCA402	Mobile Application Development	3	0	0	3
3	P15MCA403	Service Oriented Architecture	3	0	0	3
4	Elective -I P15MCA711	User Interface Design	3	0	0	3
	Elective- I P15MCA729	Advanced Java Programming				
5	Elective - II P15MCA716	Social Networks	3	0	0	3
	Elective - II P15MCA728	Internet of Things				
<b>Practical</b>						
6	P15MCA404	Open Technologies Laboratory	0	0	4	2
7	P15MCA405	Mobile Application Development Laboratory	0	0	4	2
8	P15MCA406	XML and Web Services Laboratory	0	0	4	2
9	P15MCA407	Soft Skill Development Laboratory - IV	0	0	2	1
<b>Total Credits</b>						<b>22</b>

Approved by

**Chairman, MCA BOS**  
**Dr.G.M.Kadhar Nawaz**

**Member Secretary, Academic Council**  
**Dr.R.Shivakumar**

**Chairperson, Academic Council & Principal**  
**Dr.S.R.R.Senthil Kumar**

Copy to:-  
 Director, Fourth Semester MCA Students and Staff, COE

## P15MCA401 - OPEN TECHNOLOGIES

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Introduce Open Source technologies
- Develop web applications using PHP and Python
- Understand the use of open source database management system
- Run web application in various environments.
- Develop websites using PHP and MySQL

### UNIT I - INTRODUCTION TO OPEN SOURCE TECHNOLOGY 9

Overview of Open Source/Commercial Software - Open Source Licenses - Applications - Open Source movement - Apache Web server - XAMPP/WAMP Web Server Platform - Configuring Apache and PHP on Linux/Windows

### UNIT II - PHP BASICS 9

PHP: Introduction - Programming in Web Environment - Data Types - Variables - Constants - Control Structures - Operators - Functions - Arrays - String Manipulation and Regular Expressions

### UNIT III - PHP ADVANCED 9

PHP Forms - PHP Include - File Handling - PHP Cookies - Sessions - Exception Handling - Date Time Functions - PHP Object Oriented - PHP and AJAX - PHP MySQLi

### UNIT IV - OPEN SOURCE DATABASES 9

MySQL: Introduction - Setting up Account - Table - Query - Data Types - Date and Time - Primary Keys and Auto Increment Fields - Record Selection Technology - Sorting Query results - Working with Metadata - SQL Injection - Using MySQL with PHP

### UNIT V - PYTHON 9

Introduction to PYTHON- Installing Python - Variables - Control Structures - Functions- Recursion - Operator- Iterations - Classes and Objects - Tuples - Lists - Exceptions - Python GUI - Python DB-API

**TOTAL = 45 Hours**

### COURSE OUTCOMES:

At the end of the course the student should be able to:

- Analyze the various open web frameworks
- Write web applications using PHP and Python
- Design for extendibility and code reuse
- Create and design a new website.
- Write web applications using Python

## REFERENCES

1. Open Technologies, Dr.T.Lalitha, Dr.T.Padma and Dr.G.M.Kadhar Nawaz, SonaVersity, 2015(UNIT 1, 2, 3, 4, 5)
2. Beginning PHP and MySQL, From Novice to Professional, 3<sup>rd</sup> Edition, W. Jason Gilmore, Apress
3. Think Python ,by Allen B. Downey,2008,An Introduction to Software Design,O'Reilly
4. Deitel, "Internet and World Wide Web, How to program" 4<sup>th</sup> Edition, Prentice Hall 2008.
5. DuBois P., MySQL , Addison-Wesley Professional,4<sup>th</sup>ed
6. Python How to Program, Harvey M. Deitel and Paul Deitel, Dietel

## P15MCA402 - MOBILE APPLICATION DEVELOPMENT

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Understand the basic programming concepts in android.
- Relate the need of different user interface component in an application and in designing.
- Identify the components beyond user interface and use them in an application.
- Discuss the basic concepts of objective C and iOS mobile Architecture.
- Understand the basic concepts of windows programming.

### UNIT I - INTRODUCTION 9

Introduction to mobile applications - Mobility landscape - Mobile platforms - Mobile apps development - Publishing and delivery of mobile applications - Requirements gathering and validation for mobile applications - Market and business drivers for mobile application.

### UNIT II - UI DESIGN & APP DEVELOPMENT IN ANDROID 9

App user interface designing - mobile UI resources(Layout,Fragment,UI elements,Drawable, Menu),Activity - states of life cycle , Interaction amongst activities, Threads - Async tasks-Services - states and life cycle - Notifications - Introduction to material designing.

### UNIT III - APP FUNCTIONALITY BEYOND USER INTERFACE IN ANDROID 9

Broadcast receivers, Telephony and SMS APIs - Shared preferences - Mobile databases using SQLite - Content Providers - Animation - Multimedia-Audio/Video Playback and Record - Location Awareness - Native Hardware access (Sensors such as Accelerometer and Gyroscope).

### UNIT IV - MOBILE TECHNOLOGY II - OBJECTIVE C & iOS ARCHITECTURE 9

Basics of Objective C programming - Basics of Object oriented programming in Objective C - Basics of Modern Objective C - iOS features - iOS6 Architecture and SDK frameworks - Application Development Architecture - UI elements - iCloud introduction - iPhone market place.

### UNIT V - MOBILE TECHNOLOGY III - WINDOWS 9

Intro to Windows RT 8.1, Windows phone Runtime - Tiles and Toasts - Push notifications - Launchers and Choosers - Alarms & Reminders - Context Menu - Dialogs - Flyouts - AppBar - Windows Store app Certification.

**TOTAL = 45 Hours**

## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Develop real time mobile applications and discuss the architecture, platform and tools required for mobile application.
- Design an application with the given user interface component.
- Develop an application beyond user interface with intricate tools like mobile databases, sensors, animation, multimedia etc.
- Analyze the Architecture, frameworks and iCloud in iOS.
- Implement the features of windows like flyouts, sensors etc in mobile applications.

## **REFERENCES**

1. "Composing Mobile Apps: Learn, Explore, Apply using Android ", Anubhav Pradhan, Anil V. Deshpande, Wiley Publications, 2014. (Unit I,II & III)
2. iPhone iOS6 development essentials ,Neil Smyth, Wiley publications 2012 First edition.(Unit IV)
3. "iOS 6 Programming Pushing the Limits", Rob Napier, Mugunth Kumar, Paperback - Wiley 2014.
4. Beginning Windows 8 Application Development paperback, Istvan Novak, Zoltan Arvai, Gyorgy Balassy, David Fulop, Wiley & Sons, 2012.
5. Android Application Development All in one for Dummies, Barry Burd, Wiley Publications (Edition 1)
6. Teach Yourself Android Application Development in 24 Hours, Lauren Darcey & Shane Conder, SAMS Publication, 2010.(Edition 1)
7. "The Advanced iOS 6 Developer's Cookbook ", Eruca Sadun, Addison Wesley 2013.
8. "Sams Teach Yourself iOS 6 Application" John Ray, Sams publications, 2013.
9. "Microsoft Mobile development Handbook", Andy Wigley, Microsoft Publications, 2001.

## P15MCA403 - SERVICE ORIENTED ARCHITECTURE

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Gain more knowledge of structure, schema, and technologies in XML and introduce web services.
- Learn the protocols are used to support the web services.
- Give the fundamental concepts of Service Oriented Architecture.
- Understand the step-by-step process of building SOA.
- Use SOA concepts to implement the web services in J2EE and .NET platforms.

### UNIT I - XML AND WEB SERVICES

9

XML Fundamentals-Elements-Attributes-XML and DTD -XML Technologies-Structuring with schemas -Presentation Technologies- Transformation - XML and Web- Web Services- .NET and J2EE.

### UNIT II - WSDL, SOAP and UDDI

9

WSDL - Overview Of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments - UDDI.

### UNIT III - SOA BASICS

9

Roots of SOA - Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures - Anatomy of SOA- How components in an SOA interrelate -Principles of service orientation - Service Layers.

### UNIT IV - Building SOA

9

SOA Delivery Strategies - SOA delivery lifecycle phases- The top-down strategy- The bottom-up strategy- The agile strategy - Service-Oriented Design - Steps to composing SOA - Considerations for choosing service layers - Considerations for positioning core SOA standards - Considerations for choosing SOA extensions - Service design overview - Entity-centric business service design - Application service design - Task-centric business service design.

### UNIT V - SOA in J2EE and .NET

9

SOA platform basics - SOA support in J2EE - Java API for XML-based web services(JAX-WS) - Java architecture for XML binding (JAXB) - Java API for XML Registries(JAXR) - Java API for XML based RPC (JAX-RPC) - JAX-RS SOA support in .NET - ASP.NET web services.

**TOTAL = 45 Hours**

## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Create a well formed XML documents for given application using xml elements, attributes, schema and transform into HTML format, and explain the overview of web services.
- Apply the basic protocols SOAP, WSDL and UDDI in creating web service.
- Illustrate the basic principles of service oriented architecture, its components and techniques.
- Discuss the methods to build SOA for web services.
- Develop an application and deploy into web services in J2EE, and .NET platform.

## **REFERENCES**

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2006. [**Unit 3,4,5**]
2. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2002.[**Unit 1, 2**]
3. Heather Williamson, "XML, The Complete Reference", McGraw Hill Education, 2012.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services. An Architect's Guide", Pearson Education, 2005.
5. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
6. Dan woods and Thomas Mattern, "Enterprise SOA designing IT for Business Innovation", O'REILLY, First Edition, 2006.

## P15MCA404 - OPEN TECHNOLOGIES LABORATORY

		L	T	P	C	M
P15MCA404	Open Technologies Laboratory	0	0	4	2	100

### Course Objectives:

- Learn a simple web based application using PHP
- Ensure of understanding the concept of file and image uploading in web application
- To gain knowledge about multilevel inheritance and Regular expression for handling web form
- Develop a registration form, employee management and online shopping web application using PHP and MYSQL.
- Familiarize to write web based application using Python

The following experiments to be practiced

- 1 Create and develop a PHP Program using Conditional statements and arrays.
- 2 Develop a PHP Program for uploading a File.
- 3 Write a PHP program for handling the Web form elements with different input types.
- 4 Develop a PHP program for multilevel inheritance using Object Oriented Programming.
- 5 Create and develop a PHP program using Regular expressions.
- 6 Connect and implement MYSQL DDL and DML statements with PHP.
- 7 Design and Create a Registration Form using PHP and MYSQL.
- 8 Design and implement an Employee management system using PHP and MYSQL.
- 9 Create and develop an online shopping mart using PHP and MYSQL.
- 10 Implement a Python program using Recursion.

**TOTAL: 45 hours**

### Course outcomes:

- Develop a web based application using PHP
- Write web applications using PHP and MYSQL
- Learn how to implement web applications using web forms, including programs that interact with MYSQL databases
- Create and maintain a database using MYSQL
- Demonstrate web application in various environments.



## P15MCA405 - MOBILE APPLICATION DEVELOPMENT LABORATRY

		L	T	P	C	M
P15MCA405	Mobile Application Development Laboratory	0	0	4	2	100

### Course Objectives:

- Understand the platform and tool available for developing mobile application
- Learn programming skills in J2ME and Android SDK
- Gain the basics about micro browser based applications in Android to access the Internet.
- Access and work with database in Android.
- Create applications that cater to users need.

### List of Programs:

1. Add a spinner. When the spinner is selected, there should be three options (e.g., android, java, testing). When you click on each option, it should go to another page containing some other components. Each of these pages should have a "back" button, which on pressing will take you back to the page with the spinner.
2. Program a calculator
3. Add two Edit Text. When a number is entered in Edit Text 1, the square of that number should be displayed in Edit Text 2 as a separate Activity.
4. Create applications to include Action Bar, Menus, Dialogs and Notifications in Android.
5. Create a camera application, where you can click a picture and then save it as the wallpaper.
6. Create a user login form and registration form. First time users have to register through the registration form and the details should be stored in the database. Then they can login using the login page.
7. Create an application that works with Android Content Provider, which searches, add, change and remove content of MIME types.
8. Create a media player, which plays an mp3 song and will record the sound.
9. Create a thread, which performs a single task, and perform multithreading in Android.
10. Create Animation apps like a. bouncing ball b. Moving arrow, etc in Android.

### Course Outcomes:

- Design basic UI functionalities in android applications.
- Implement multimedia in real time android applications.
- Demonstrate the usage of multi-threading in real-time android applications.
- Create a simple android application that communicates with a database to store the backend data and perform manipulations on that data.
- Develop applications in android that illustrates the implementation of content providers.

## P15MCA406- XML AND WEB SERVICES LABORATORY

		L	T	P	C	M
P15MCA406	Xml And Web Services Laboratory	0	0	4	2	100

### Course Objectives:

- Gain high-skill in XML document creation using DTD, schema.
- Familiarize to write XSLT code to transform XML into HTML
- Learn to import and export xml in databases.
- Understand the concept of DOM and SAX parser and known to parse the XML document in Java environment.
- Practice to create and bind the web service in J2EE platform using JAVA API.
- Provide web services from .NET platform.

### List of Programs:

#### The following experiments to be practiced

1. XML document creation.
2. Importing and Exporting XML document in database.
3. XSL Transformation.
4. Internal and External DTD creation.
5. XML Schema creation.
6. Parsing XML document using DOM/SAX parser.
7. Web Service creation using JAX-WS.
8. Web Service creation using JAX-RS.
9. Web Service creation using .NET.
10. JAXB Marshaling and Unmarshaling.  
The following applications may be applied for web service creation::
  - a. Currency Conversion
  - b. Temperature Conversion
  - c. Ticket Booking
  - d. Dictionary

### Course Outcomes:

- Demonstrate XML structure, DTD and schema in a well-form and valid XML document for a given application
- Design XML document in HTML format with the use of XSLT transformation
- Demonstrate applications to import and export XML document in databases
- Manipulate XML document in DOM and SAX parser
- Create web services for given application in J2EE platform and .NET platform

## P15MCA407 - SOFT SKILLS DEVELOPMENT LABORATORY -IV

		L	T	P	C	M
P15MCA407	SOFT SKILL DEVELOPMENT LABORATORY-IV	0	0	2	1	100

### Focus on Language

- Collocations, Phrasal Verbs, Idioms and Phrases, Link Expressions, Question Tags

### Speaking

- Mini Presentation, Group Discussion, interviews and presentation, debate, extempore

### Writing

- Resume preparation, Business Communication Letters – calling for quotations, placing orders, complaints, replies to queries from business customers, inviting dignitaries, accepting and declining invitations

### References

1. Dhanavel, S.P. 2010. English and Soft Skills. Hyderabad: Orient BlackSwan Ltd
2. Fundamentals of Business English- Infosys Campus Connect
3. Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006
4. Common Mistakes at Intermediate- Liz Driscoll

**Total – 30 hours**

### Course Outcomes:

- Differentiate language syntax in different forms like Idioms & phrases
- Apply speaking skills in mini presentation and group discussion.
- Apply speaking skills in debate, extempore and at interviews.
- Develop Writing skills as Resume preparation
- Write Business communication letters.

## P15MCA711 - USER INTERFACE DESIGN

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Learn the fundamental concepts, terms and technologies used in User interface design
- Introduce the Interface design methodologies and evaluation process.
- Construct the 3D Virtual environment.
- Understand the Natural languages in computing and usability of interaction devices.
- Know the importance of quality of services and to know the preparation of the user manuals.

### UNIT I - USABILITY OF INTERACTIVE SYSTEMS 9

Introduction - Usability Requirements - Usability Measures - Usability Motivations - Universal Usability - Guidelines, Principles, and Theories - introduction - Guidelines - Principles - Theories - Object-Action Interface Model.

### UNIT II - DEVELOPMENT PROCESSES 9

Managing Design Processes - Introduction - Organizational Design to Support Usability - The Three Pillars of -Design - Development Methodologies - Ethnographic Observation - Participatory Design - Evaluating Interface Designs: Expert Reviews - Usability Testing and Laboratories - Survey Instruments - Acceptance Tests - Evaluation During Active Use - Controlled Psychologically Oriented Experiments - Software Tools : Introduction - Specification Methods - Interface-Building Tools.

### UNIT III - INTERACTION STYLES 9

Direct Manipulation and Virtual Environments- Introduction - Examples of Direct Manipulation - Discussion of Direct Manipulation - 3D Interfaces - Tele operation - Virtual and Augmented Reality - Menu Selection, Form Filling, and Dialog Boxes - Introduction - Task-Related Menu Organization - Single Menus - Combinations of Multiple Menus - Content Organization - Fast Movement Through Menus - Data Entry with Menus: Form Filling, Dialog Boxes, and Alternatives - Audio Menus and Menus for Small Displays.

### UNIT IV - COMMAND AND NATURAL LANGUAGES 9

Introduction - Functionality to Support Users' Tasks - Command-Organization Strategies - The Benefits of Structure Naming and Abbreviations - Natural Language in Computing - Interaction Devices : Introduction - Keyboards and Keypads - Pointing Devices - Speech and Auditory Interfaces - Displays-Small and Large - Printers - Collaboration : Introduction - Goals of Collaboration - Asynchronous Distributed Interfaces: Different Time, Different Place - Synchronous Distributed Interfaces: Different Place, Same Time - Face-to-Face Interfaces: Same Place, Same Time.

## UNIT V - DESIGN ISSUES

9

Quality of Service : Introduction - Models of Response-Time Impacts - Expectations and Attitudes - User Productivity - Variability in Response Time - Frustrating Experiences - Balancing Function and Fashion : Introduction - Error Messages - Non anthropomorphic Design - Display Design - Window Design - Color . User Manuals, Online Help, and Tutorials : Introduction - Paper Versus Online Manuals - Reading from Paper Versus from Displays - Shaping the Content of the Manuals - Online Manuals and Help - Online Tutorials, Demonstrations, and Guides - Online Communities for User Assistance - The Development Process . Information Search and Visualization: Introduction - Search in Textual Documents and Database Querying - Multimedia Document Searches - Advanced Filtering and Search Interfaces - Information Visualization.

**TOTAL = 45 Hours**

### **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Design a usable and compelling user-interface given a set of requirements and available technologies.
- Demonstrate the knowledge and ability to apply the design principles, techniques and technologies to the development of creative User Interface.
- Construct the 3D virtual environment with several menu organization components.
- Become familiar with the Natural language in computing.
- Develop expertise necessary for successful completing a quality project with manuals and help.

### **REFERENCES**

1. Ben Shneiderman, Catherine plaisant, "Designing the User Interface" Pearson Addison Wesley , IV th Edition, 2004.
2. Wilbert O. Galitz , The Essential Guide to User Interface Design : An Introduction to GUI Design Principles and Techniques 3rd Revised edition John Wiley and Sons Ltd, 17 Apr 2007.
3. Avram Joel Spolsky, "User Interface Design for Programmers", Apress; 1st ed. 2001. Corr. 2nd printing 2006 edition (25 January 2006).
4. Ian Clifton, Android User Interface Design: Implementing Material Design for Developers (Addison-Wesley Usability and Hci Series) Addison Wesley; 2 edition (19 November 2015).
5. Soren Lauesen, "User Interface Design: A Software Engineering Perspective, Addison Wesley (12 November 2004).

## P15MCA716 - SOCIAL NETWORKS

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Understand social network terminology, Recognize and be able to give examples of social networks and their properties.
- Learn the basic ideas behind graph theory and study the network structure. understand graph partitioning algorithms and apply in social networks.
- Demonstrate the ability to create and interpret a hierarchical clustering; develop a black model of a social network based on one of the grouping algorithm.
- Discuss network sampling and data collection; understand the snowball sampling algorithm, understand different centrality measures.
- Understand the process of social diffusion, gain the knowledge about epidemics in social networks and describes the transmission of contagious disease through individuals.

### UNIT I - INTRODUCTION

9

Introduction - Basic Network Concepts - Adjacency Matrices - Graphs - Notation - Nodes and Links -directed network - Analyzing Relationships to Understand People and Groups - What is social network? - Types of social networkers - Social Networks vs. Link Analysis - Terrorists and Revolutionaries: The Power of Social Networks.

### UNIT II - GRAPH

9

Introduction to Graph theory - Graphs as Models of Networks - Hyper graph - Graph traversals and distances - Dividing networks into clusters - Graph partitioning - The Kernighan-Lin algorithm - Spectral partitioning algorithm.

### UNIT III - CLIQUE, CLUSTERS AND NETWORK MODELS

9

Subgraphs - ego networks - triads - cliques - clustering - clustering coefficients - Hierarchical Clustering - Triads, Network Density, and Conflict. - Block Model - Random graph.

### UNIT IV -CENTRALITY, POWER, AND BOTTLENECKS

9

Snowball sampling, contact tracing, and random walks - Centrality - Centrality Measures - degree centrality - Find the "Celebrities" - Find the Gossipmongers - Find the Communication Bottlenecks and/or Community Bridges - PageRank - How Google Measures Centrality.

### UNIT V - EPIDEMICS ON NETWORKS

9

Models of the spread of disease - Diseases and the Networks that Transmit Them - Branching Processes - SI model - SIR model - SIS model - SIRS model - Epidemic models on networks - case studies: Facebook - Twitter - LinkedIn.

**TOTAL = 45 Hours**

## COURSE OUTCOMES:

At the end of the course the student should be able to:

- Identify the network terminologies; analyze the relationship between the network groups.
- Demonstrate knowledge of fundamental concepts in graph theory and evaluate the shortest path for the given network.
- Demonstrate the ability to create and interpret a hierarchical clustering; develop a black model of a social network based on one of the grouping algorithm.
- Use any one of the centrality method to analyze power, influence, or other individual characteristics of people in a social network.
- Design compartmental diagram for the model and develop appropriate word equation for the rate of change of susceptible and infectious infective.

## REFERENCES

1. **Alexander Kouznetsov, Maksim Tsvetovat,** " Social Network Analysis for Startups: Finding Connections on The Social Web", O'Reilly Publication, 1 edition 2011. (I, III, IV)
2. Mark Newman,"Networks: An introduction", Oxford University Press; 1 edition 2010. (II, V)
3. David Easley, Jon Kleinberg,"Networks, Crowds, and Markets:Reasoning about a Highly Connected World", Cambridge University, 2010
4. Marina Hennig, Ulrik Brandes, Jurgen Pfeffer, Ines Mergel, "Studying Social Networks - A guide to Empirical research ", Campus Verlag, 2011.
5. Stanley Wassermann, Katherine faust, "Social Network Analysis: Methods and Applications ", Cambridge University Press, 1994.

## P15MCA728 - INTERNET OF THINGS

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Understand the basics of IOT, design and communication models and then emerging technologies.
- Exhibit Domain and system management for IoT applications.
- Identify the protocols of IOT.
- Understand the design and communications API for developing the IoT applications.
- Known to use cloud services for IoT applications

### UNIT I - - INTRODUCTION, DESIGN AND TECHNOLOGIES 9

Introduction- Definition & Characteristics of IoT -Physical design of IoT-Things in IoT and IoT protocols-logical Design of IoT- IoT Functional Blocks- IoT Communication Model and IoT Communication APIs - IoT Enabling Technologies - Wireless Sensor Networks -Cloud Computing- Big Data Analytics - Communication Protocols- Embedded Systems- IoT Levels & Deployment Templates.

### UNIT II -DOMAIN, M2M AND SYSTEM MANAGEMENT 9

Introduction- Home Automation - Cities - Industry- Health & Lifestyle- M2M-SDN and NFV for IoT - Software Defined Networking - Network Function Virtualization- IoT System Management- Need for IoT Systems Management -Simple Network Management Protocol - Limitations of SNMP - Network Operator Requirements

### UNIT III - PROTOCOLS 9

Protocols - IEEE 802.15.4 - The IEEE 802 Committee Family of Protocols - The Physical Layer - The Media Access Control Layer - Uses of 802.15 - BACNet Protocol - Modbus - KNX - Zigbee Architecture - Network layer - APS layer - Security.

### UNIT IV - DEVELOPING INTERNET OF THINGS 9

IoT Platforms Design Methodology - IoT System for Weather Monitoring - IoT System for Agriculture. Introduction to Cloud Storage Models & Communication APIs -WAMP - AutoBahn for IoT-Xively Cloud for IoT-Python Web Application Framework - Django Architecture -Starting Development with Django .Toolkit-arduino-raspberry pi.

### UNIT V - CLOUD SERVICES FOR IOT 9

Designing a RESTful Web API -Amazon Web Services for IoT -EC2-Autoscaling-S3-RDS-DynamoDB-Kinesis-SkyNet IoT Messaging Platform. Case studies - Environment- IoT systems for weather Reporting Bot- Air Pollution Monitoring System-Forest Fire Detection-IoT system for Energy-Smart grid- Renewable Energy Systems.

**TOTAL = 45 Hours**



## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Illustrate the design, communication model and enabling technologies for IoT.
- Analyze the system management and domain for various applications of IoT.
- Classify the various protocols that are used for developing IoT applications.
- Analyze the design methodology and cloud storage model for IoT applications.
- Identify the cloud services for various applications of IoT.

## **REFERENCES**

1. ArshdeepBahga and Vijay Madiseti, "Internet of Things - A Hands-on Approach", Universities Press, 2015(Unit-I,II,IV,V)
2. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things - Key applications and Protocols", Wiley, 2012. (Unit III)
3. Dieter Uckelmann et.al, "Architecting the Internet of Things", Springer, 2011.
4. CunoPfister, "Getting Started with the Internet of Things", O'Reilly, 2011.
5. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley, 2014.
6. Honbo Zhou , "The Internet of Things in the Cloud: A Middleware Perspective ", CRC Press , 2012.

## P15MCA729 - ADVANCED JAVA PROGRAMMING

L	T	P	C	M
3	0	0	3	100

### COURSE OBJECTIVES:

This course will enable the student to:

- Understand the architecture of Java Enterprise Edition and the concepts of Java archives (JAR).
- Learn the architecture of Java Bean and design applications using Enterprise Java Bean.
- Be familiar with networking concepts in Java and implement a simple client / server application.
- Gain a working knowledge of Servlet and learn how to create a JSP application.
- Acquire an in-depth knowledge in Java Enterprise applications with Spring architecture

### UNIT I - JAVA NETWORKING

9

Java Network Programming - Networking basics - InetAddress - TCP/IP client sockets - TCP/IP Server Sockets - URL - URL Connections - Datagram - RMI Technology - A simple client/server application using RMI.

### UNIT II - JAVA SERVLET

9

Introduction - The life cycle of a servlet - Using Tomcat for servlet development - A simple servlet - The servlet API - The javax.servlet package - Reading servlet parameters - The javax.servlet.http package - Handling HTTP requests and responses - Using Cookies - Session Tracking - Introduction to JSP - JSP overview - Setting JSP environment - JSP application development: Generating Dynamic content.

### UNIT III - ENTERPRISE JAVA BEAN

9

EJB's Architecture: Overview of EJB's Software Architecture - Building and Deploying EJBs - Roles in EJB - EJB Session Beans - EJB Entity Beans: When to use Entity Beans - Entity Bean life cycle - EJB Clients: EJB Bean as a client to another Bean - Servlet client - Applet client - Deployment: Deployment Descriptor class - Session Descriptor class - Entity Descriptor class - Building a simple application with EJB.

### UNIT IV - JAVA ENTERPRISE EDITION

9

Introduction - Enterprise Architecture Styles - J2EE Architecture - Containers - J2EE Technologies - Developing J2EE Applications - Naming and directory services - Using JNDI - JNDI Service providers - Choosing a J2EE Implementation: Implementing the J2EE Specifications - J2EE packaging and Deployment: J2EE packaging overview - Configuring J2EE packages - Java Archives (JAR): Creating JAR, Extracting JAR.

### UNIT V - JAVA ENTERPRISE FRAMEWORK - SPRING

9

Introduction to the Spring Framework: Dependency Injection and Inversion of Control (IoC) - Modules - Usage Scenarios - Introduction to the Spring IoC container and beans - Aspect Oriented Programming with Spring: Introduction - AspectJ support - Schema-based AOP support - Using AspectJ with Spring applications - ORM technologies - Introduction to Spring MVC.

**TOTAL = 45 Hours**

## **COURSE OUTCOMES:**

**At the end of the course the student should be able to:**

- Implement Java networking applications for client/server communications.
- Demonstrate applications using Java Servlets and JSP.
- Design the EJB application with the beans, categorize the different kinds of beans, and illustrate the software architecture of EJB.
- Explain the basics of a J2EE platform in terms of service providers and different types of servers. Configure and deploy the J2EE applications.
- Develop java enterprise applications using Spring framework.

## **REFERENCES**

1. Subrahmanyam Allamaraju and Cedric Buest , "Professional Java Server Programming(J2EE 1.3 Edition), ", A Press Publishers. – (Unit IV: Chapters: 1, 2, 23 & 24)
2. Tom Valesky, Enterprise Java Beans, Pearson Education, 2002. - (Unit III: Chapters: 2, 4, 5, 6 & 7).
3. Herbert Schildt, "Java - The Complete Reference", 8th Edition, Tata McGraw Hill, 2011. - (Unit I - Chapter: 20 and Unit II - Chapter: 31).
4. Hans Bergsten, "Java Server Pages", 3rd Edition, O'Reilly Media, December 2003. - (Unit II - Chapters: 1, 3, 4 and 5).
5. Rod Johnson, Jurgen Holler, Alef Arendsen, Thomas Risberg, Colin Sampaleanu, "Professional Java Development with the Spring Framework", John Wiley & Sons 2005.