IV B.Tech I Semester

15ACS54-INTERNET OF THINGS
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

- *To understand the fundamentals of Internet of Things.*
- *To build a small low cost embedded system using Arduino / Raspberry Pi or equivalent boards.*
- *To apply the concept of Internet of Things in the real world scenario.*

UNIT I :Fundamentals of IOT

Introduction – Characteristics-Physical Design - Protocols – Logical Design – Enabling technologies – IoT Levels – Six Levels of IoT - Domain Specific IoTs.

UNIT II: IOT and M2M

M2M, IoTvs M2M, SDN and NFV for IoT, IOT system Management with NETCONF-YANG.

UNIT III: IoTDesign Methodology

IoT Systems Management – IoT Design Methodology – Specifications Integration and Application Development.

UNIT IV: Data Analytics for IoT

Apache Hadoop, Using HadoopMapReduce for Batch Data Analysis, Apache Oozie, Apache Spark, Apache Storm, Using Apache Storm for Real-time Data Analysis.

UNIT V :Tools for IoT

Chef, Puppet, IOT code generator Case studies: Chef. Puppet – Multi-tier Deployment, NETCONF-YANG, Raspberry Pi.

Course Outcomes:

- *Design a portable IoT using Arduino/ equivalent boards and relevant protocols.*
- *Develop web services to access/control IoT devices.*
- *Deploy an IoT application and connect to the cloud.*
- *Analyze applications of IoT in real time scenario.*

TEXT BOOKS:

1. ArshdeepBahga, Vijay Madisetti, "Internet of Things – A Hands-on Approach", Universities Press, 2015.

REFERENCES:

1. Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014.
2. Marco Schwartz, "Internet of Things with the Arduino Yun", Pack Publishing, 2014.

3. Simon Monk, "Programming the Raspberry Pi: Getting Started with Python", McGraw-Hill, 2013.
4. CharalamposDoukas,"Building Internet of Things With the Arduino", Second Edition, 2012.
5. Dr.John Bates, "Thingalytics: Smart Big Data Analytics for the Internet of Things", Software AG Publisher, 2015.

IV B.Tech I Semester

15ACS55-NATURAL LANGUAGE PROCESSING
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives: Upon completion, students will be able to explain and apply fundamental algorithms and techniques in the area of natural language processing (NLP). In particular, students will:

- Understand approaches to syntax and semantics in NLP.
- Understand current methods for statistical approaches to machine translation.
- Understand language modeling.
- Understand machine learning techniques used in NLP.

UNIT – I

Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing

UNIT-II:

Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution

UNIT –III

Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

UNIT-IV

Semantic Interpretation: Linking Syntax and Semantics, Ambiguity Resolution, other Strategies for Semantic Interpretation.

UNIT-V

Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

TEXT BOOK:

1. Natural Language Understanding – James Allen, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Speech and Language Processing – Daniel Jurafsky, James H.Martin.
2. Foundations of Statistical Natural Language Processing – Christopher Manning, HinrichSchutze, MITPress.
3. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
4. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall,2013-2014,2008.
5. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999

IV B.Tech I Semester

15ACS56-SOFTWARE PROJECT MANAGEMENT
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course objectives:

1. *To edify the core concepts of Software project management such as scheduling a software project, effort estimation, cost estimation.*
2. *To enhance the skills of analysing, Planning, developing a cost effective software project*
3. *To implant strong professional qualities and team dynamics that enables an individual to work successfully in teams with a single point objective*

UNIT I- Project Evaluation and Project Planning :

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNITT II- Software Economics - Effort & Cost Estimation :

Evolution of Software Economics: Software Economics, pragmatic software cost estimation

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

Estimation Techniques: COSMIC Full function points, COCOMO II A Parametric Productivity Model Staffing Pattern.

UNIT III - Activity Planning and Risk Management :

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT IV- Tracking Workflow of The Software Project :

Work Flows of the process: Software process workflows, Inter trans workflows.

Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation: Automation Building Blocks, the Project Environment

UNIT V- Staffing and Project Control :

Staffing- Managing people – Organizational behavior – Best methods of staff selection – The Oldham Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation.

Course outcomes:

After completion of this course, a student will be able to:

1. *Gain knowledge on project planning and management, client management and project Scheduling and monitoring.*
2. *Analyze the testing based approach to development, team management and ongoing Project schedule tracking.*
3. *Apply Software Metrics for a given Project to calculate Cost estimation models.*
4. *Communicate effectively with IT-industries or organizations.*
5. *Engage in lifelong learning for effective project management and finance monitoring.*

TEXTBOKS:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.
2. Software Project Management, Walker Royce, Pearson Education.

REFERENCES:

1. Applied Software Project Management, Andrew Stellman& Jennifer Greene, O'Reilly, 2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O"Reilly,2007
3. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004.

IV B.Tech I Semester

15ACS57-DISTRIBUTED SYSTEMS
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

1. *To have a broad and up-to-date coverage of the principles and practice in the area of Distributed Systems.*
2. *To understand the heterogeneous systems such as computers, mobile phones, other devices and Internet) and their functionalities.*

UNIT I Basic Concepts

Definition of a distributed systems, Examples, Resource sharing and the Web, Challenges, System models, Architectural and fundamental models, Networking Interprocess communication, External data representation and marshalling, Client-server and Group communication.

UNIT II Communication in Distributed System

System Model – Inter process Communication – the API for internet protocols – External data representation and Multicast communication. Network virtualization: Overlay networks. Case study: MPI Remote Method Invocation And Objects: Remote Invocation – Introduction – Request-reply protocols – Remote procedure call – Remote method invocation. Case study: Java RMI – Group communication – Publish-subscribe systems – Message queues – Shared memory approaches -Distributed objects – Case study: Enterprise Java Beans -from objects to components

UNIT III Peer to Peer Services and File System

Peer-to-peer Systems – Introduction – Napster and its legacy – Peer-to-peer – Middleware – Routing overlays. Overlay case studies: Pastry, Tapestry- Distributed File Systems –Introduction – File service architecture – Andrew File system. File System: Features-File model -File accessing models – File sharing semantics Naming: Identifiers, Addresses, Name Resolution – Name Space Implementation – Name Caches – LDAP.

UNIT IV Synchronization and Replication

Introduction – Clocks, events and process states – Synchronizing physical clocks- Logical time and logical clocks – Global states – Coordination and Agreement – Introduction – Distributed mutual exclusion – Elections – Transactions and Concurrency Control– Transactions -Nested transactions – Locks – Optimistic concurrency control – Timestamp ordering – Atomic Commit protocols -Distributed deadlocks – Replication – Case study – Coda.

UNIT V Process& Resource Management

Process Management: Process Migration: Features, Mechanism – Threads: Models, Issues, Implementation. Resource Management: Introduction- Features of Scheduling Algorithms –Task Assignment Approach.

Course Outcomes:

The primary learning outcome of the course is two-fold:

1. *Students will identify the core concepts of distributed systems: the way in which severalmachines orchestrate to correctly solve problems in an efficient, reliable and scalableway.*
2. *Students will examine how existing systems have applied the concepts of distributedsystems in designing*

TEXT BOOK:

1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.

REFERENCES:

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
2. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.
3. Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.
4. Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003.

IV B.Tech I Semester

15ACS58-ENTERPRISE APPLICATION SYSTEM
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives:

1. *Describe approaches to enterprise application integration*
2. *Understand the integration middleware*
3. *Evaluate the integration approaches suitable for a given problem*

UNIT I: Introduction

Requirements for EAI - Challenges in EAI – Integration with legacy systems – Integration with partners - Heterogeneous environment – Implementation approaches – Web services, messaging, ETL, direct data integration – Middleware requirements – Approaches to integration – services oriented and messaging.

UNIT II: Integration Patterns

Introduction to integration patterns – Architecture for application integration – Integration patterns – Point to point, broker, message bus, publish/subscribe, Challenges in performance, security, reliability - Case studies

UNIT III: Service Oriented Integration

Business process integration - Composite applications-services – Web services – Service choreography and orchestration - Business process modeling - BPMN, Business process execution - BPEL – Middleware infrastructure - Case studies

UNIT IV: Messaging Based Integration

Messaging – Synchronous and asynchronous – Message structure – Message oriented middleware – Reliability mechanisms – Challenges – Messaging infrastructure – Java Messaging Services – Case studies

UNIT V: Enterprise Service Bus

Enterprise Service Bus – routing, scalable connectivity, protocol and message transformations, data enrichment, distribution, correlation, monitoring – Deployment configurations – Global ESB, Directly connected, Federated, brokered ESBs – Application server based – Messaging system based – Hardware based ESBs – Support to SOA, message based and event based integrations - Case studies.

Course Outcomes:

1. *Describe different approaches to integration enterprise applications*
2. *Analyse specifications and identify appropriate integration approaches*
3. *Develop a suitable integration design for a given problem*
4. *Identify appropriate integration middleware for a given problem*
5. *Evaluate the integration approaches against specified requirements*

TEXT BOOKS:

1. George Mentzas and Andreas Frezen (Eds), "Semantic Enterprise Application Integration for Business Processes: Service-oriented Frameworks", Business Science Reference, 2009
2. WaseemRoshen,"SOA Based Enterprise Integration", Tata McGraw Hill, 2009.
3. G Hohpe and B Woolf, "Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions", Addison Wesley Professional, 2003

REFERENCES:

1. D Linthicum, "Next Generation Application Integration: From Simple Information to Web Services", Addison Wesley, 2003
2. Martin Fowler, "Patterns of Enterprise Application Architecture", Addison- Wesley, 2003
3. Kapil Pant and MatiazJuric," Business Process Driven SOA using BPMN and BPEL: From Business Process Modelling to Orchestration and Service Oriented Architecture", Packet Publishing, 2008.

IV B.Tech I Semester

15ACS59-SEMANTIC WEB
(CBCC (DEPARTMENT SPECIFIC))

L	T	P	C
3	1	0	3

Course Objectives

- *To learn Web Intelligence*
- *To learn Knowledge Representation for the Semantic Web*
- *To learn Ontology Engineering*
- *To learn Semantic Web Applications, Services and Technology.*

UNIT I: Introduction

Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Metadata for web information - The semantic web architecture and technologies –Contrasting Semantic with Conventional Technologies–Semantic Modeling -Potential of semantic web solutions and challenges of adoption.

UNIT II: Ontological Engineering

Ontologies – Taxonomies –Topic Maps – Classifying Ontologies - Terminological aspects: concepts, terms, relations between them – Complex Objects -Subclasses and Sub-properties definitions –Upper Ontologies – Quality – Uses - Types of terminological resources for – Methods and methodologies for building ontologies – Multilingual Ontologies-Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning.

UNIT III :Structuring and Describing Web Resources

Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing - RDF – RDF Data Model – Serialization Formats- RDF Vocabulary –Inferencing-RDFS – basic Idea – Classes – Properties- Utility Properties – RDFS ModellingforCombinations and Patterns- Transitivity.

UNIT IV: Web Ontology Language

OWL – Sub-Languages – Basic Notions -Classes- Defining and Using Properties – Domainand Range – Describing Properties - Data Types – Counting and Sets- Negative PropertyAssertions – Advanced Class Description – Equivalence – Owl Logic.

UNIT V: Semantic Web Tools and Applications

Development Tools for Semantic Web – Jena Framework – SPARL –Querying semantic web - Semantic Desktop – Semantic Wikis -Semantic Web Services – Application in Science – Business

Course Outcomes:

- *Understand the concept structure of the semantic web technology and how this technology revolutionizes the World Wide Web and its uses.*
- *Understand the concepts of metadata, semantics of knowledge and resource, ontology, and their descriptions in XML-based syntax and web ontology language (OWL).*
- *Describe logic semantics and inference with OWL.*
- *Use ontology engineering approaches in semantic applications*
- *Program semantic applications with Java API.*

TEXT BOOKS:

1. Liyang Yu, A Developer's Guide to the Semantic Web, Springer; 1st Edition.Edition, 2011.
2. John Hebeler, Matthew Fisher, Ryan Blace and Andrew Perez-Lopez, Semantic WebProgramming, Wiley; 1 edition, 2009.
3. Grigoris Antoniou, Frank van Harmelen, A Semantic Web Primer, Second Edition(Cooperative Information Systems) (Hardcover), MIT Press, 2008.
4. Robert M. Colomb, Ontology and the Semantic Web: Volume 156 Frontiers in ArtificialIntelligence and Applications (Frontier in Artificial Intelligence and Applications), IOSPress, 2007.
5. Dean Allemang and James Hendler, Semantic Web for the Working Ontologist: EffectiveModeling in RDFS and OWL, Morgan Kaufmann; 2 edition, 2011.

REFERENCES:

1. Michael C. Daconta, Leo J. Obrst and Kevin T. Smith, The Semantic Web: A Guide to theFuture of XML, Web Services, and Knowledge Management, Wiley; 1 edition 2003.
2. Karin Breitman, Marco Antonio Casanova and Walt Truszkowski, Semantic Web:Concepts, Technologies and Applications (NASA Monographs in Systems and SoftwareEngineering), Springer; Softcover, 2010.
3. VipulKashyap, ChristophBussler and Matthew Moran, The Semantic Web: Semanticsfor Data and Services on the Web (Data-Centric Systems and Applications), Springer,2008.