ACADEMIC REGULATIONS & COURSE STRUCTURE

For

SOFTWARE ENGINEERING

(Applicable for batches admitted from 2016-2017)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

L P C

I Semester

S.No.	SUBJECT	L	P	C
1	SOFTWARE REQUIREMENTS AND ESTIMATION	4	--	3
2	SOFTWARE METRICS AND REUSE	4	--	3
3	SOFTWARE PROJECT AND PROCESS MANAGEMENT	4	--	3
4	WEB TECHNOLOGIES	4	--	3
5	BIG DATA ANALYTICS	4	--	3
6	SCRIPTING LANGUAGES	4	--	3
7	SE LAB 1	--	3	2
Total Credits				**20**

II Semester

S.NO	SUBJECT	L	P	C
1	SOFTWARE ARCHITECTURE AND DESIGN PATTERNS	4	--	3
2	SOFTWARE QUALITY ASSURANCE AND TESTING	4	--	3
3	CYBER SECURITY	4	--	3
4	SERVICE ORIENTED ARCHITECTURES	4	--	3
5	**Elective – 1** 1. SECURE SOFTWARE ENGINEERING 2. SYSTEMS ENGINEERING 3. ERP & SUPPLY CHAIN MANAGEMENT 4. E-COMMERCE	4	--	3
6	**Elective - 2** 1. USER INTERFACE DESIGN 2. CLOUD COMPUTING 3. SOFTWARE DEFINED NETWORKS 4. INTERNET OF THINGS	4	--	3
7	SE LAB 2	--	3	2
Total Credits				**20**

III Semester

S. No.	Subject	L	P	Credits
1	Comprehensive Viva-Voce	**--**	**--**	2
2	Seminar – I	--	--	2
3	Project Work – Part - I	--	--	16
Total Credits				**20**

IV Semester

S. No.	Subject	L	P	Credits
1	Seminar – II	--	--	2
2	Project Work Part - II	--	--	18
Total Credits				**20**

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SOFTWARE REQUIREMENTS AND ESTIMATION

UNIT I:

Software Requirements: What and Why

Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

UNIT II:

Software Requirements Engineering : Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality **Software Requirements Modeling:** Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames

UNIT III:

Software Requirements Management : Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain

Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation

UNIT IV:

Software Estimation: Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation.

Size Estimation: Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures,

UNIT V:

Effort, Schedule and Cost Estimation: What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation

Software Estimation Tools: Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools

TEXT BOOKS:

1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, Tata Mc Graw Hill

REFERENCES:

1. Software Requirements by Karl E. Weigers, Microsoft Press.
2. Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education, 2003.
3. Mastering the requirements process, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.

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I Year – 2nd SEMESTER	**4**	**0**	**3**

SOFTWARE METRICS AND REUSE

UNIT- I

Introduction to software quality: Quality: Popular Views & Professional Views, Software Quality, Total quality management Fundamentals of Measurement Theory: Definition, Operational Definition and Measurement, Level of Measurement, Some Basic Measures, Reliability and Validity, Measurement Errors, Be Careful with Correlation, Criteria for Causality.

Software Quality Metrics Overview: Product Quality Metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metrics Programs, Collecting Software Engineering Data.

UNIT- II

Applying the Seven Basic Quality Tools in Software Development: Ishikawa's Seven Basic Tools, Checklist, Pareto Diagram, Histogram, Run Charts, Scatter Diagram, Control Chart, Cause-and-Effect Diagram, Relations Diagram.

Defect Removal Effectiveness: A closer look at Defect Removal Effectiveness, Defect Removal Effectiveness and Quality Planning, Cost Effectiveness of Phase Defect Removal

UNIT- III

In-Process Metrics for Software Testing: In-Process metrics for Software Testing, In-Process metrics and Quality Management, Possible Metrics for Acceptance Testing to evaluate Vendor Developed Software, How do you know Your Product is Good Enough to Ship?

Complexity Metrics and Models: Lines of Code, Halstead's Software Science, Cyclomatic Complexity, Syntactic Constructs, Structure Metrics, An Example of Module Design Metrics in Practice

UNIT- IV

Metrics and Lessons learned for Object-oriented projects: Object - oriented Concepts and Constructs, Design and Complexity metrics, productivity metrics, Quality and quality management metrics, Lessons learned for OO projects.

Using Function Point Metrics to Measure Software Process Improvement: Software Process Improvement Sequences, Process Improvement Economics, Measuring Process Improvements at Activity Levels.

UNIT V:

Reuse: Introduction, benefits of reuse, reuse landscape, design patterns, generator based reuse, application frame work for reuse, applications of system reuse, COTS product reuse

TEXT BOOKS:

1. Metrics and Models in Software Quality Engineering, Stephen H. Kan, Second Edition, Pearson Education Asia, 2003
2. Software Engineering, Sommerville, 7ed, Pearson

REFERENCES:

1. Software Engineering Measurement, John C. Munson Auerbach Publication, 2003
2. Estimating Software– intensive systems: projects, products and processes, Richards D. Stutzke, Addision – Wesley 2005
3. Software Metrics: A guide to planning, analysis and application, C. Ravindranath Pandian, Auerbach Publication, 2003
4. Practical Implementation of Software Metrics, Paul Goodman, Mc.Graw Hill, 1993

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SOFTWARE PROJECT AND PROCESS MANAGEMENT

UNIT I :
Software Process Maturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process. Process Reference Models Capability Maturity Model (CMM), CMMi, PCMM, PSP, TSP.

UNIT II :
Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

UNIT III:
Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures. Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments.

UNIT IV:
Process Planning and Project Organizations Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning, line-of- business organizations, project organizations, evolution of organizations, process automation.

UNIT V :
Project Control and process instrumentation The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation. CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions

TEXT BOOKS:
1. Managing the Software Process, Watts S. Humphrey, Pearson Education, 1999
2. Software Project Management, Walker Royce, Pearson Education, 1998

REFERENCE BOOKS:
1. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000 2. Process Improvement essentials, James R. Persse, O'Reilly,2006
3. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tata Mc-Graw Hill,2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006. 5. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly,2007

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WEB TECHNOLOGIES

UNIT-I:
Java script : The Basic of Java script: Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions

UNIT-II:
XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX Approaches,
AJAX A New Approach: Introduction to AJAX, Integrating PHP and AJAX.

UNIT-III:
PHP Programming: Introducing PHP: Creating PHP script, Running PHP script.
Working with variables and constants: Using variables, Using constants, Data types, Operators.
Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases such as MySQL.

UNIT-IV: PERL: Introduction to PERL, Operators and if statements, Program design and control structures, Arrays, Hashs and File handling, Regular expressions, Subroutines, Retrieving documents from the web with Perl.

UNIT-V:
RUBY: Introduction to Ruby, Variables, types, simple I/O, Control, Arrays, Hashes, Methods, Classes, Iterators, Pattern Matching. Overview of Rails.

TEXT BOOKS:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. Web Technologies, Uttam K Roy, Oxford
3. The Web Warrior Guide to Web Programming, Bai, Ekedahl, Farrelll, Gosselin, Zak, Karparhi, Maclntyre, Morrissey, Cengage

REFERENCE BOOKS:

1. Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3. Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning
5. http://www.upriss.org.uk/perl/PerlCourse.html

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BIG DATA ANALYTICS

UNIT-I

Data structures in Java: Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization

UNIT-II

Working with Big Data: Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop (Namenode, Datanode, Secondary Namenode, Job Tracker, Task Tracker), Introducing and Configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.

UNIT-III

Writing MapReduce Programs: A Weather Dataset, Understanding Hadoop API for MapReduce Framework (Old and New), Basic programs of Hadoop MapReduce: Driver code, Mapper code, Reducer code, Record Reader, Combiner, Partitioner

UNIT-IV

Hadoop I/O: The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collections, Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators

UNIT-V

Pig: Hadoop Programming Made Easier

Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

Applying Structure to Hadoop Data with Hive:

Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive, Examining the Hive Clients, Working with Hive Data Types, Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data

TEXT BOOKS:

1. Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

REFERENCE BOOKS:

1. Hadoop in Practice by Alex Holmes, MANNING Publ.
2. Hadoop MapReduce Cookbook, Srinath Perera, Thilina Gunarathne

SOFTWARE LINKS:

1. Hadoop:http://hadoop.apache.org/
2. Hive: https://cwiki.apache.org/confluence/display/Hive/Home
3. Piglatin: http://pig.apache.org/docs/r0.7.0/tutorial.html

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SCRIPTING LANGUAGES

UNIT - I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT - II

Advanced perl Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT- III

PHP Basics PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT - IV

Advanced PHP Programming PHP and Web Forms, Files, PHP Authentication and Methodologies - Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the M crypt package, Building Web sites for the World.

UNIT -V

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

Python Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling. Integrated Web Applications in Python – Building Small, Efficient Python Web Systems, Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dream tech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1, I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.

6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.

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SE LAB 1

Web Technologies programs:

1. Write Ruby program reads a number and calculates the factorial value of it and prints the Same.
2. Write a Ruby program which counts number of lines in a text files using its regular Expressions facility.
3. Write a Ruby program that uses iterator to find out the length of a string.
4. Write Ruby program which uses Math module to find area of a triangle.
5. Write Ruby program which uses tk module to display a window
6. Define complex class in Ruby and do write methods to carry operations on complex objects.
7. Write perl program takes set names along the command line and prints whether they are regular files or special files
8. An example perl program to connect to a MySQl database table and executing simple commands.
9. Example PHP program for cotactus page.

Big Data Analytics programs:

(i)Perform setting up and Installing Hadoop in its three operating modes:
Standalone, Pseudo distributed, fully distributed
(ii)Use web based tools to monitor your Hadoop setup.

7.Implement the following file management tasks in Hadoop:

- Adding files and directories
- Retrieving files
- Deleting files

Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilitie

8. Run a basic Word Count MapReduce program to understand MapReduce Paradigm**.**

9. Write a mapreduce program that mines weather data.
Weather sensors collecting data every hour at many locations across the globe
Gather a large volume of log data, which is a good candidate for analysis with
MapReduce, since it is semi structured and record-oriented.

Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

10. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

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SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

UNIT- I

Envisioning Architecture: The Architecture Business Cycle, Software Architecture, Designing the Architecture, Documenting the architecture, Reconstructing Software Architecture

UNIT- II

Creating Architecture: Quality Attributes, Moving from quality to architecture, Architectural styles and patterns, UNIT Operations, Achieving qualities, designing the Architecture, Documenting the architecture, Reconstructing Software Architecture, shared information systems

Analyzing Software Architecture: Analyzing development qualities at the architectural level, SAAM, ATAM, CBAM, Architecture Reviews

UNIT- III

Moving from Architecture to Systems: Software Product Lines, Building systems from off the shelf components, Reuse of Architectural assets within an organization.

UNIT- V

Patterns: What is pattern? Pattern categories, Pattern Description, Patterns and Software Architecture, Pattern Systems, Classification, Selection

Design Patterns Catalog: Creational Pattern, Structural Pattern, Behavioral Patterns, Pattern Community, Designing a document editor

UNIT- V

Case Studies : Key word in Context, The World Wide Web - a case study in interoperability, Instrumentation software, cruise control, three vignettes in mixed styles,

TEXT BOOKS:

1. Software Architecture in Practice, 2nd Edition by Len Bass, Paul Clements, Rick Kazman, Pearson Edition
2. Design Patterns, by Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Beyond Software architecture, Luke I-Iohmann, Addison weslcy, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR,200|
3. Pattern Oriented Software Architecture,F.Buschmann&others,John Wiley&Sons.
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006

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SOFTWARE QUALITY ASSURANCE AND TESTING

UNIT – I

Software quality assurance Framework and Standards SQA Frame work: What is Quality? Software Quality Assurance. Components of Software quality Assurance.

Software Quality Assurance Plan : Steps to develop and implement a Software quality Assurance Plan.

Standards: ISO9000, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma

UNIT II

Software Quality Assurance Metrics and Measurement Software Quality Assurance Metrics: Product Quality metrics, In- Process Quality metrics, Metrics for Software Maintenance. Examples of Metric Programs, Software quality indicators Fundamentals in Measurement Theory

UNIT -III

Building Software Testing Environment : Writing Policy for software testing, Economics of testing, Building a structured approach to software testing .

Software Testing process: Defects Hard to find, Functional and structured testing, Workbench concept, Customising the software testing process, testing tactics check list

UNIT -IV

Software Testing Techniques : Black-Box testing, Boundary value analysis, Bottom-up, Branch Coverage, Cause- Effect graphing, CRUD, Database, exception, Gray_box, Histogram, Inspections, JADs, Pareto Analysis, prototyping, random Testing, Risk based Testing, Regression Testing, Structured Walkthrough, Thread testing, Performance Testing,
White Box Testing

Software Testing Tools: Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load Runner, Win Runner and Rational Testing Tools, Java testing Tools, JMetra, JUNIT and Cactus

UNIT -V

Testing Process : Advantages of following a process, Cost of computer testing, Seven step software Testing Process, Define the scope of testing, Developing the test plan, Verification Testing. Validation Testing, Analysing and reporting test results, Acceptance and
operational Testing, Post Implementation Analysis

Testing Specialised Systems and Applications : Testing Client/Server System, Testing COTS and Contracted Software, Testing security, Testing Data Warehouse .

TEXT BOOKS:

1. William E.Perry:Effective Methods for Software Testing, 3rd Edition,Wiley Publication,

REFERENCE BOOKS:

1 Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers

2 Software Testing Techniques, by Bories Beizer, Second Edition, Dreamtech Press

3 Managing the Testing Process, by Rex Black, Wiley

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CYBER SECURITY

UNIT I:

Introduction:

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT II:

Conventional Encryption:

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC

UNIT III:

Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder theorem, Discrete logarithms

Public key: Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

UNIT IV:

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

Email Privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT V :

Intrusion Detection: Intruders, Intrusion Detection systems, Password Management.

Malicious Software: Viruses and related threats & Countermeasures.

Fire walls: Firewall Design principles, Trusted Systems.

TEXT BOOKS:

1. Network Security & Cryptography: Principles and Practices, William Stallings, PEA, Sixth edition.
2. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech

REFERENCE BOOKS:

1. Network Security & Cryptography, Bernard Menezes, Cengage,2010

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SERVICE ORIENTED ARCHITECTURES

UNIT - I

SOA Fundamentals: Defining SOA, Business Value of SOA, Evolution of SOA, SOA characteristics, concept of a service in SOA, misperceptions about SOA, Basic SOA architecture, infrastructure services, Enterprise Service Bus (ESB), SOA Enterprise Software models, IBM On Demand operating environment

UNIT - II

SOA Planning and Analysis: Stages of the SOA lifecycle, SOA Delivery Strategies, service-oriented analysis, Capture and assess business and IT issues and drivers, determining non-functional requirements (e.g., technical onstraints, business constraints, runtime qualities, no runtime qualities), business centric SOA and its benefits, Service modeling, Basic modeling building blocks, service models for legacy application integration and enterprise integration, Enterprise solution assets(ESA)

UNIT – III

SOA Design and implementation: Service-oriented design process, design activities, determine services and tasks based on business process model, choosing appropriate standards, articulate architecture,

UNIT - IV

mapping business processes to technology, designing service integration environment (e.g., ESB, registry), Tools available for appropriate designing, implementing SOA, security implementation, implementation of integration patterns, services enablement, quality
assurance

UNIT - V

Managing SOA Environment : Distributing service management and monitoring concepts, operational management challenges, Service-level agreement considerations, SOA governance (SLA, roles and responsibilities, policies, critical success factors, and metrices), QoS
compliance in SOA governance, role of ESB in SOA governance, impact of changes to services in the SOA lifecycle

TEXT BOOKS

1. Thomas Erl, “Service-Oriented Architecture: Concepts, Technology, and Design”, Prentice Hall Publication, 2005.
2. Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, “Service-Oriented Architecture Compass: Business Value, Planning,and Enterprise Roadmap”, IBM Press Publication, 2005.

REFERENCES

1. Thomas Erl, “Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services”, Prentice Hall Publication, 2004
2. Dave Chappell, “Enterprise Service Bus”, O’Reilly Publications, 2004

3. Sanjiva Weerawarana, Francisco Curbera, Frank Leymann, Tony Storey, Donald F.Ferguson, “Web Services Platform Architecture: SOAP, WSDL, WS-Policy, WSAddressing, WS-BPEL, WS-Reliable essaging, and More”, Prentice Hall Publication, 2005

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SECURE SOFTWARE ENGINEERING
(Elective -1)

UNIT- I

Why Is Security a Software Issue? Introduction, The Problem, Software Assurance and Software Security, Threats to Software Security, Sources of Software Insecurity, The Benefits of Detecting Software Security Defects Early, Managing Secure Software Development

What Makes Software Secure? Introduction, Defining Properties of Secure Software, How to Influence the Security Properties of Software, How to Assert and Specify Desired Security Properties

UNIT -II

Requirements Engineering for Secure Software: Introduction, Misuse and Abuse Cases, The SQUARE Process Model, SQUARE Sample Outputs, Requirements Elicitation, Requirements Prioritization

UNIT- III

Secure Software Architecture and Design: Introduction, Software Security Practices for Architecture and Design: Architectural Risk Analysis, Software Security Knowledge for Architecture and Design: Security Principles, Security Guidelines, and Attack Patterns

Considerations for Secure Coding and Testing: Introduction, Code Analysis, Coding Practices, Software Security Testing, Security Testing Considerations Throughout the SDLC

UNIT -IV

Security and Complexity: System Assembly Challenges: Introduction, Security Failures, Functional and Attacker Perspectives for Security Analysis: Two Examples, System Complexity Drivers and Security, Deep Technical Problem Complexity

UNIT -V

Governance, and Managing for More Secure Software: Introduction, Governance and Security, Adopting an Enterprise Software Security Framework, How Much Security Is Enough?, Security and Project Management, Maturity of Practice

TEXT BOOKS:

1. Software Security Engineering: A Guide for Project Managers, Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead, Addison-Wesley Professional

REFERENCE BOOKS:

1. Howard , M and Lipner,S : The Security Development Lifecycle , Microsoft Press, 2006
2. Swiderski, F and Snyder W. :, Threat Modeling, Microsoft Press, 2004.
3. Viega, J and MCGraw G., : Building Secure Software: How to avoid Security Problems in the Right Way, Addison-Wesley,2001
4. The Open Web Application Security Project: A Guide to Building Secure Web Applications and Web Services", 2.0 Black Hat Edition, 2005

SYSTEMS ENGINEERING
(Elective-1)

UNIT- I

Management Information Systems: A Framework: Importance of MIS, MIS: A Definition Nature and Scope of MIS ,

Structure and Classification of MIS : Structure of MIS, MIS Classification

Information and System Concepts: Information: A Definition, Types of Information, Dimensions of Information, System: A Definition, Kinds of Systems, System Related Concepts, Elements of a System, Human as an Information Processing System

Information Systems for Competitive Advantage: Introduction, Changing concepts of Information System, Competitive Advantage, Information systems Strategies for Dealing with competitive Force, Porter's Value Chain Model, Strategic Information Systems (SIS)

UNIT –II: BUSINESS APPLICATIONS OF IS

e – Commerce : Introduction, e – Commerce

ERP Systems : Introduction, Enterprise Information Systems

Decision – Support Systems: Decision – Making: A Concept, Simon's Model of Decision - Making Types of Decisions, Methods for Choosing Among Alternatives, Decision – Making and MIS, Decision Support Systems – Why?, Decision Support Systems: A framework,
Characteristics and Capabilities of DSS

Business Intelligence and knowledge Management System : Business Intelligence, Knowledge Management System

UNIT – III

Information System Planning : Information System Planning: WHY?, Planning Terminology
Information System Planning, The Nolan Stage Model, The Four –Stage Model of is planning
Selecting A Methodology, Information Resources Management (IRM), Organisation Structure and Location of MIS

System Acquisition : Acquisition of Information Systems , Acquisition of Hardware and Software

UNIT – IV

System Implementation: IMPLEMENTATION PROCESS, Organisational Change

Evaluation & Maintenance of IS : Evaluation of MIS , System Maintenance

IS Security and Control: IS Security Threats, Protecting Information System, IS Security Technology The Disaster Recovery Plan

UNIT – V : BUILDING OF IS

System Development Approaches: System Development Stages, System Development Approaches

System Analysis and Design: SYSTEM ANALYSIS - Introduction, Requirement Determination, Strategies for Requirement Determination, Structured Analysis Tools

SYSTEMS DESIGN: Design Objectives, Conceptual Design, Design Methods, Detailed System Design.

TEXT BOOKS:

1. Management Information System, Managerial Perspecives, D P Goyal, 3 ed, McMillan Publications.

REFERENCE BOOKS:

1. Information Systems for Modern Management, third edition by R. G. Murdick, J. E. Ross and J. R. Clagget, PHI – 1994.

ERP & SUPPLY CHAIN MANAGEMENT
(Elective -1)

UNIT- I

Introduction to ERP: Overview – Benefits of ERP, ERP and Related Technologies, Business Process Reengineering, Data Warehousing, Data Mining – On–line Analytical Processing, Supply Chain Management.

ERP Implementation: Implementation Life Cycle, Implementation Methodology, Hidden Costs, Organizing Implementation, Vendors, Consultants and Users, Contracts, Project Management and Monitoring.

UNIT- II

Business Modules: Business Modules in an ERP Package , Finance, Manufacturing, Human Resource, Plant Maintanance, Materials Management, Quality Management, Sales and Distribution.

Fundamentals of Supply Chain Management: Supply chain networks, Integrated supply chain planning, Decision phases in s supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT- III

SCM Strategies, Performance: Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT- IV

Planning and Managing Inventories: Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

Distribution Management: Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning.

UNIT- V

Strategic Cost Management in Supply Chain: The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

TEXT BOOKS:

1. ERP Demystified, 2/e, Alexis Leon, TMH, 2007.
2. Supply Chain Management: Strategy, Planning, Operation, Sunil Chopra, Peter Meindel, PEA, 2002

REFERENCE BOOKS:

1. Enterprise Resource Planning- Concepts and Practice; V.K. garg & N.K. V. Krishna, 1998. PHI.

E-COMMERCE
(Elective -1)

UNIT I:

Electronic Commerce, Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce, Mercantile Process models.

UNIT II:

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT III:

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks. Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT IV:

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

Advertising and Marketing, Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT V:

Consumer Search and Resource Discovery, Information search and Retrieval, Commerce Catalogues, Information Filtering.

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing.

TEXT BOOK:

1. Frontiers of Electronic Commerce, Kalakata, Whinston, PEA, 2006.

REFERENCE BOOKS:

1. E-Commerce Fundamentals and Applications Hendry Chan, Raymond Lee, Dillon, Chang, John Wiley.
2. E-Commerce, A Managerial Perspective, Turban E, Lee J, King, Chung H.M., PEA, 2001.
3. E-Commerce An Indian Perspective, 3/e, P.T. Joseph, PHI, 2009.
3. E-Commerce, S.Jaiswal, Galgotia.
5. Electronic Commerce, Gary P.Schneider, Thomson.

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I Year – 2nd SEMESTER	**4**	**0**	**3**

USER INTERFACE DESIGN
(Elective 2)

UNIT - I

Introduction: Importance of user Interface, definition, importance of good design. Benefits of good design. A brief history of Screen design

The graphical user interface: Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – interface popularity, characteristics- Principles of user interface.

UNIT - II

Design process: Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT -III

Screen Designing : Design goals, Screen planning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, Visually pleasing composition, amount of information, focus and emphasis, presentation information simply and meaningfully, information retrieval on web, statistical graphics, Technological consideration in interface design.

UNIT - IV

Windows: Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

Components : Components text and messages, Icons and increases, Multimedia, colors, uses problems, choosing colors.

UNIT - V

Software tools : Specification methods, interface, Building Tools.

Interaction Devices: Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

TEXT BOOKS :

1. Human Computer Interaction. 3/e, Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, PEA,2004.
2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

REFERENCE BOOKS :

1. Designing the user interface. 4/e, Ben Shneidermann , PEA.
2. User Interface Design, Soren Lauesen , PEA.
3. Interaction Design PRECE, ROGERS, SHARPS, Wiley .
4. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.

CLOUD COMPUTING
(Elective -2)

UNIT I:

Introduction: Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing

Parallel and Distributed Systems: introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, model concurrency with Petri Nets.

UNIT II:

Cloud Infrastructure: At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Intercloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing

Cloud Computing : Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research

UNIT III:

Cloud Resource virtualization: Virtualization, layering and virtualization, virtual machine monitors, virtual machines, virtualization- full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, vBlades

Cloud Resource Management and Scheduling: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feed back control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start time fair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling

UNIT IV:

Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system., Apache Hadoop, BigTable, Megastore (text book 1), Amazon Simple Storage Service(S3) (Text book 2)

Cloud Security: Cloud security risks, security – atop concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks

UNIT V:

Cloud Application Development: Amazon Web Services : EC2 – instances, connecting clients, security rules, launching, usage of S3 in Java, Installing Simple Notification Service on Ubuntu 10.04, Installing Hadoop on Eclipse, Cloud based simulation of a Distributed trust algorithm, Cloud service for adaptive data streaming (Text Book 1)

Google: Google App Engine, Google Web Toolkit (Text Book 2)

MicroSoft: Azure Services Platform, Windows live, Exchange Online, Share Point Services, Microsoft Dynamics CRM (Text Book 2)

TEXT BOOKS:

1. Cloud Computing, Theory and Practice, Dan C Marinescu,MK Elsevier
2. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH

REFERNCE BOOK:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi, TMH

SOFTWARE DEFINED NETWORKS
(Elective-2)

UNIT 1:
History and Evolution of Software Defined Networking (SDN): Separation of Control Plane and Data Plane, IETF Forces, Active Networking. Control and Data Plane Separation: Concepts, Advantages and Disadvantages, the Open Flow protocol.

UNIT 2:
Network Virtualization: Concepts, Applications, Existing Network Virtualization Framework (VMware and others), Mininet based examples.

UNIT 3:
Control Plane: Overview, Existing SDN Controllers including Floodlight and OpenDaylight projects.

UNIT 4:
Customization of Control Plane: Switching and Firewall Implementation using SDN Concepts. Data Plane: Software-based and Hardware-based; Programmable Network Hardware.

UNIT 5:
Programming SDNs: Northbound Application Programming Interface, Current Languages and Tools, Composition of SDNs.Network Functions Virtualization (NFV) and Software Defined Networks: Concepts, Implementation and Applications.
Data Center Networks: Packet, Optical and Wireless Architectures, Network Topologies.

TEXT BOOKS:

1. SDN: Software Defined Networks, An Authoritative Review of Network Programmability Technologies, By Thomas D. Nadeau, Ken Gray Publisher: O'Reilly Media, August 2013, ISBN: 978-1-4493-4230-2, ISBN 10: 1-4493-4230-2.

2. Software Defined Networks: A Comprehensive Approach, by Paul Goransson and Chuck Black, Morgan Kaufmann, June 2014, Print Book ISBN: 9780124166752, eBook ISBN : 9780124166844

REFERENCE BOOKS:

1. SDN and OpenFlow for Beginners by Vivek Tiwari, Sold by: Amazon Digital Services, Inc., ASIN: , 2013.

2. Network Innovation through OpenFlow and SDN: Principles and Design, Edited by Fei Hu, CRC Press, ISBN-10: 1466572094, 2014.

3. Open Networking Foundation (ONF) Documents, https://www.opennetworking.org, 2015.

4. OpenFlow standards, http://www.openflow.org, 2015.

5. Online Reading Lists, including: http://www.nec-labs.com/~lume/sdn-reading-list.html, 2015.

INTERNET OF THINGS
(Elective -2)

UNIT I:

The Internet of Things: An Overview of Internet of things ,Internet of Things Technology, behind IoTs Sources of the IoTs, M2M Communication, Examples OF IoTs, Design Principles For Connected Devices

Internet Connectivity Principles, Internet connectivity, Application Layer Protocols: HTTP, HTTPS, FTP, Telnet.

UNIT II:

Business Models for Business Processes in the Internet of Things ,IoT/M2M systems LAYERS AND designs standardizations ,Modified OSI Stack for the IoT/M2M Systems ,ETSI M2M domains and High-level capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability

UNIT III:

Design Principles for the Web Connectivity for connected-Devices, Web Communication protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for connected-Devices.

UNIT IV:

Data Acquiring, Organizing and Analytics in IoT/M2M, Applications/Services/Business Processes, IOT/M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT V:

Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology ,Sensing the World.

TEXTBOOKS:

3. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill Higher Education
4. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERNCE BOOKS:

1. Designing the Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley
2. Getting Started with the Internet of Things CunoPfister , Oreilly.

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SE LAB 2

SOFTWARE TESTING LAB

1. Study of various tools Study various tools such as Win Runner, Load Runner, Test Director, Rational Rose Suite etc.
2. Perform experiments to do the following:
    a. Requirements Testing
    b. Use – case Scenario Testing
    c. Unit Testing
    d. Regression Testing
    e. Integration Testing
    f. Validation Testing
    g. Acceptance Testing
    h. System Testing
3. Prepare test plan and develop test case hierarchy
4. Generate Test cases and Test Documentation in the following case studies
    a. Library System
    b. Course Registration System
    c. Implement a Quiz System
    d. Student Marks Analyzing System
    e. Online Ticket Reservation System

DESIGN PATTERNS LAB:

1. Using UML design Abstract factory design pattern
2. Using UML design Builder Design pattern
3. Using UML design Facade Design pattern
4. Using UML design Bridge Design pattern
5. Using UML design Decorator Design pattern
6. User gives a print command from a word document. Design to represent this chain of responsibility design pattern.