

Change summary batches from 2015 to 2022

Change summary between 2015-16 and 2016-17 admitted batches (i.e.2015-2018 batch and 2016-2019 batch)		
Course Code: 15ECAC708	Course Title: Problem solving using C	
L-T-P: 3-0-0	Credits: 3	Contact Hrs: 3
ISA Marks: 50	ESA Marks: 50	Total Marks: 100
Teaching Hrs: 42		Exam Duration: 3 Hours
No	Content	Hrs
Unit I		
1	Chapter 1: Constants, Variables and Data Types Character set, C tokens, keywords & identifiers, structure of C program, executing a C program. Constants, variables, data types, declaration of variables, declaration of storage classes, assigning values to variables defining symbolic constants, declaring a variable as constant, declaring a variable as volatile, overflow and underflow of data	3 Hrs
2	Chapter 2: Operators and Expressions Arithmetic operators, relational operators, logical operators, assignment operator, increment and decrement operator, conditional operator, bitwise operators, comma operator, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, type conversions in expressions, operator precedence and associativity, mathematical functions	3 Hrs
3	Chapter 3: Managing Input and Output Operations The scanf() & printf() functions for input and output operations, reading a character, writing a character, (the getchar() & putchar() functions) , the address operator(&), formatted input and output using format specifiers, Writing simple complete C programs	3 Hrs
4	Chapter 4 : Control Statements Decision making with if statement, simple if statement nt, the if..else statement, nesting of if..else statements, the else..if ladder, the switch statement, the ? : operator, the goto statement, the break statement, programming examples	3 Hrs
5	Chapter 5 : Loop Control Structures The while statement, the do..while statement, the for statement, nested loops, jumps in loops, the continue statement, programming examples.	4 Hrs
Unit II		
6	Chapter 6 : Arrays The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading, writing and manipulation of above types of arrays,	3 Hrs

	multidimensional arrays, dynamic arrays, programming examples	
7	Chapter 7 : Character Arrays and Strings Declaring and initialing string variables, reading string from terminal, writing string to screen, arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions, table of strings, other features of strings, programming examples	3 Hrs
8	Chapter 8 : User Defined Functions Need for user defined functions, a multi function program, elements of User defined functions, defining functions, return values and their types, function calls, function declaration, category of functions, no arguments and no return values, arguments but no return values, arguments with return values, no arguments with return value, functions that return multiple values, nesting of functions, recursion, passing arrays to functions, passing string to functions, programming examples	4 Hrs
9	Chapter 9 : Structures and Unions Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members, array of structures, structures within structures, structures and functions, Unions, size of structures, bit fields, programming examples	3 Hrs
10	Chapter 10: Pointers Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, chain of pointers, pointer expressions, pointers and arrays, pointer and character strings, array of pointers, pointer as function arguments, functions returning pointers, pointers to functions, pointers and structures, programming examples	3 Hrs
Unit – III		
11	Chapter 11: File Management in C, Dynamic Memory Allocation, The Preprocessor Defining and opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access files, command line arguments, programming examples. Dynamic memory allocation, allocating a block of memory: malloc, allocating multiple blocks of memory: calloc, releasing the used space: Free, altering the size of a block: realloc, programming examples. Introduction, macro substitution, files inclusion, compiler control directives, ANSI additions, programming exercises	5 Hrs
12	Chapter 12: Basic Concepts of Parallel Programming Motivating parallelism, Scope for parallel computing, Thread basics, Why threads? OpenMP: A standard for directive – based parallel programming, The OpenMP programming model, Specifying concurrent tasks in OpenMP, Synchronization constructs in OpenMP, Data handling in OpenMP, OpenMP library functions, Environment variables in OpenMP.	5 Hrs

Text Book:

1. Balagurusamy, Programming in ANSI C, 3ed., Tata McGraw Hill, 2003. Chapters: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.1 to 13.6 , 14.
2. Rajaraman, V. Computer Programming in C, Prentice Hall India, 2000. Chapters: 1.1, 1.3, 2.1, 2.3, 3.1, 3.2, 3.3.
3. Introduction to Parallel Computing, 2nd Edition, Pearson Education, 2003.

References:

1. Forouzan, B.A. and Gilberg, R. F., Structured Programming Approach C, 2ed., Thomson, 2001.
2. Dromey, R.G., How to Solve it by Computer, Prentice -Hall India, 1982.
3. Anami, Computer Concepts and C Programing, Prentice-Hall India, 2007
4. Horton Ivor, Beginning C: From Novice to Professional, 4ed., Springer, India , 2006.
5. Kamthane, A.N. Programming with ANSI and Turbo C, Pearson Education Asia, 2002.
6. Venugopal, K.R.and Prasad, S.R., Mastering C, Tata McGraw Hill, 2006.

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Weightage in Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks each	1, 2, 3, 4, 5	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks each	6, 7, 8, 9, 10	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks each	11,12	Any 1 question is to be answered

Course Code: **15ECAC711**

Course Title: **PHP Programming**

L-T-P: **4-0-0**

Credits: **4**

Contact Hrs: **4**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: 50		Exam Duration: 3 Hours
No	Content	Hrs
Unit I		
1	Chapter No. 1- Introducing PHP History, Unique features, Basic development concepts , Creating your first PHP script, Writing & running the script, Understanding the scripts , Handling script errors	4 Hrs
2	Chapter No. 2- Using variables & operators Storing data in variables, Understanding PHP's data types, Setting & checking variable data types, Using constants, Manipulating variables with operators, Handling form input	4 Hrs
3	Chapter No. 3- Controlling Program Flow Writing Simple Conditional Statements, Writing More Complex Conditional Statements , Combining Conditional Statements, Repeating actions with loops, Working with string & numeric functions	3 Hrs
4	Chapter No. 4- Working with Arrays Storing data in Arrays, Processing arrays with loops & iterators, Using arrays with forms, Using arrays with forms, Working with array functions, Working with dates & times.	5 Hrs
5	Chapter No. 5- Using functions & Classes Creating user defined function, Creating classes ,Using Advanced OOP concepts	4 Hrs
Unit II		
6	Chapter No. 6. Working with Files & Directories Reading files, Writing files , Processing directories , Performing Other files & directory operations	8 Hrs
7	Chapter No. 7. Working with databases & SQL Introducing databases & SQL, Using PHP MySQLi extension, Adding or modifying data, Handling errors , Using PHP's PDO extension, Building a Login form	6 Hrs
8	Chapter No. 8. Working with XML Introducing XML, Using PHP's Simple XML extension, Converting XML to SQL, Reading RSS feeds ,Using PHP's DOM extension, Recursively processing an XML document tree	6 Hrs
Unit – III		
9	Chapter No. 9. Working with Cookies, Sessions & Headers Working with Cookies ,Cookie Basics , Cookie Attributes , Cookie Headers , Setting Cookies ,Reading Cookies , Removing Cookies, Working with Sessions , Session Basics , Creating Sessions and Session Variables , Removing Sessions and Session Variables, Using HTTP headers	6 Hrs
10	Chapter No. 10. Securing PHP Sanitizing Input and Output , Securing Data , Securing Configuration Files, Securing Database Access , Securing Sessions , Validating User Input, Working with Required	4 Hrs

Fields , Working with Numbers , Working with Strings , Working with Dates

Text Books :

1. Vikram Vaswani, A Beginner's Guide PHP, Mc Graw Hill, 2009.

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Weightage in Marks
ISA- 1	20
ISA- 2	20
Assignments	10
Total	50

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3,4,5	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	6,7,8	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	9,10	Any 1 question is to be answered

Course Code: **15ECAP708**

Course Title: **Web Services Lab.**

L-T-P: **0-1-1**

Credits: **2**

Contact Hrs: **4**

ISA Marks: **80**

ESA Marks: **20**

Total Marks: **100**

Teaching Hrs: **48**

Exam Duration: **3 Hours**

1) PHP

2) AJAX

1. XMLHttpRequest Object
2. Creating a request object
3. Sending a request to server
4. Receiving a response from the server
5. Ready State and Status of a request

3) JQUERY

6. Introduction and Installation
7. Syntax

8. jQuery Selectors
9. jQuery Events
10. jQuery Effects
 - i. jQuery Hide and Show Effect
 - ii. jQuery Fade Effect
 - iii. jQuery Slide Effect
 - iv. jQuery Animate
1. jQuery Callbacks
2. jQuery and HTML
 - i. jQuery Get
 - ii. jQuery Set
 - iii. jQuery Add
 - iv. jQuery Remove
 - v. jQuery css
 - vi. jQuery Width
 - vii. jQuery Height
3. jQuery and AJAX (Pre-Requisite: ServerEnd Technology)
 - i. AJAX Function
4. JQuery UI
 - i. Implementing Accordion
 - ii. Implementing Date picker
 - iii. Implementing Slider
 - iv. Implementing Progressbar
 - v. Implementing Tabs

4) HTML 5

1. Introduction
2. HTML5 New Elements
3. HTML5 Video
4. HTML5 Video/DOM
5. HTML5 Audio
6. HTML5 Drag and Drop
7. HTML5 Canvas
8. HTML5 SVG
9. HTML5 Canvas vs. SVG
10. HTML5 Geolocation

5) BOOTSTRAP

6) GOOGLE MAPS API

Evaluation Scheme

1. In Semester Assessment (ISA) : Continuous Internal Assessment for 80 Marks.
2. End Semester Assessment (ESA) for 20 Marks.

Course Title: Software Engineering	Credits: 4	Course Code: 15ECAC706
L-T-P: 4-0-0	SEE Marks: 50	Contact Hours: 4 hrs
CIE Marks: 50	Examination Duration: 3 hrs	Total Marks: 100
Teaching Hours: 50hrs		

Unit I

Chapter 1: Overview 04 hrs

Introduction: Professional Software Development Attributes of good software, software engineering diversity, IEEE/ ACM code of software engineering ethics, case studies.

Chapter 2: Software Process & Agile Software Development 10 hrs

Software Process models: waterfall, incremental development, reuses oriented, Process activities; Coping with change, The rational Unified process. Agile methods, Plan-driven and agile Development, Extreme Programming, Agile project management, Scaling agile methods.

Chapter 3: Requirements Engineering 6 hrs

Functional and non-functional requirements, The software requirements document, Requirements specification, Requirements engineering processes, Requirement elicitation and analysis, Requirements validation, Requirements management.

Unit II

Chapter 4: System Modeling, Architectural Design, Design & Implementation 10hrs

Context models, Interaction models, Structural models, Behavioral models, Model-driven engineering, Software architecture: the role of software architecture, architectural views, component and connector view, Architectural styles for C&C view, Documenting architectural design. Design: Design concepts, Function oriented design, detailed design, verification, matrix (Complexity matrix for function oriented design).

Chapter 5: Component-based software engineering 4 hrs

Components and component model, CBSE process, Component composition.

Chapter 6: Software Testing 6 hrs

Testing fundamentals, Black-box testing, White-box testing, Testing process.

Unit III

Chapter 7: Planning a software Project 5 hrs

Process planning, Effort estimation, Project scheduling and staffing, Software configuration management plan, Quality plan, Risk Management, Project monitoring plan.

Chapter 8: Distributed Software engineering 5 hrs

Distributed system issues, Client-server computing, Architectural patterns for distributed systems, Software as a service.

Text Books :

1. Ian Sommerville: Software Engineering, 9 ed., Person Education Ltd., 2011. (Chapters 1,2,3,4,5,17,18)
2. Pankaj Jalote: Software Engineering, Wiley India Pvt. Ltd., 2010 (Chapters 4,6.1,6.2,6.5,6.6)

Reference Books:

1. Roger S. Pressman., Software Engineering-A Practitioners approach, 6th ed., McGraw-Hill, 2010

Scheme for Semester End Examination (SEE)

UNIT	8 Questions to be set of 20 Marks Each	Chapter numbers	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3,	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **16ECAC803**

Course Title: **Python Programming**

L-T-P:**2-0-1**

Credits: **3**

Contact Hrs: **3**

ISA Marks-Theory: **50** +Practice: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter No. 1. Getting started with Python, LANGUAGE AND ITS BUILT-INS Introduction to python – Installation - Python Interpreter – Interpreter and its environment. The Python Language - Object Oriented Python - Exceptions - Modules – Core Built-Ins - Regular Expression – Levels of Abstraction – Software Development Process. Programming Basics, Operators, Variables, Decision Statements, Functions, Classes and Objects, File Handling.	6 Hrs
2	Chapter No. 2. LIBRARIES AND MODULES For loops, strings and tuples, using for loops, using sequence operators and functions with strings, indexing strings, string immutability, building a new string, slicing strings, tuples, Lists and dictionaries – using Lists, list methods, understanding when to use tuples and lists, nested sequences, shared references, dictionaries, hangman game. Functions, creating functions, parameters and return values, keyword arguments, default parameters, global variables, tic-tac-toe game. Threads.	6 Hrs
3	Chapter No. 3. Database handling	4 Hrs

Database Connectivity Using Python: Working with DBM persistent Dictionaries, Working with Relational Databases: SQL statements, Defining Tables, Setting up a Database, Python database API's: Creating connections, Working with Cursors, Database Transactions, and Error Handling.

Unit II

- 4 Chapter No. 4. Working with XML** **6 Hrs**
Python with XML: Introduction to XML, Document Type Definitions, Schemas, HTML with XML, XML Libraries for Python: SAX, DOM.
- 5 Chapter No. 5. NETWORK AND WEB PROGRAMMING** **6 Hrs**
Client side Network Protocol Modules – Socket and Server side Network Protocol Modules – CGI Scripting and Alternatives – MIME and Network Encodings.
- 6 Chapter No. 6. EXTENDING AND EMBEDDING** **4 Hrs**
Extending and Embedding Classic Python – Extending and Embedding Jython – Distributing Extensions and Programs – Tkinter GUI Programming.

Unit – III

- 7 Chapter No. 7. MVC with Python** **5 Hrs**
Introduction to Django: Introduction to Frameworks, MVC Design Pattern, Django Architecture, Basics of Dynamic Web Pages, Template System, Interacting with Databases.
- 8 Chapter No. 8. Sound and Animation development** **5 Hrs**
Sound, animation and program development – reading keyboard, rotating a sprite, creating an animation, working with sound and music.

References:

1. Timothy A. Budd 'Exploring Python' – TATA McGRW-HILL Edition – 2011
2. James Payne: Beginning Python, 1st Edition, Wiley India, 2010.
3. Michael DAWSON, Python Programming, 3rd Edition, Course technology PTR, 2010

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

* **Course project:** In this course, group of 2 students will carry out project using Python.

Course Code: **16ECAP803**

Course Title: **Mini Project-1**

L-T-P: **0-0-3**

Credits: **3**

Contact Hrs: **3**

ISA Marks: **100**

ESA Marks: **100**

Total Marks: **200**

Teaching Hrs: **48**

Exam Duration: **3 Hours**

Theme: “Development of Rich Internet Applications using Client and Server side Technology”

Rich Internet Applications engage users in ways never before imagined in technology. The advancement of technologies like XML, Windows Presentation Foundation (WPF), Adobe's Flash, and HTML5 has allowed for products to bring experiences to consumers that not only engage and inspire but also creates user interaction that simplifies technology use. Companies, whether in the consumer space or enterprise, can harness the power of what Rich Internet Applications offer by transforming traditionally static experiences into fluid, animated, and engaging applications.

Purpose:

- Developing rich reporting and analytics interfaces for enterprise-level information presentation.
- Developing cutting edge mobile applications that can be ported to multiple smart-phones without having to re-develop the application for each device.
- Developing animated experiences for consumers on the web.
- Cost-effectively modernizing existing application to appeal to new users.

Evaluation:

Students Assessment through CIE (80%) + SEE (20%)

Continuous Internal Evaluation	Assessment	Marks
	Problem Definition, Literature Review	10
	Synopsis and SRS Deliverables	10
	Design (Module wise algorithmic design)	20
	Coding	10
	Integration and testing	10
	Report	10
	Presentation skills and Viva-voce	10
	Total	80
Semester End Examination	Presentation	10
	Viva-voce	10
	Total	100

Course Code: 16ECAP805	Course Title: PL / SQL Lab.	
L-T-P: 0-0-1.5	Credits: 1.5	Contact Hrs: 3
ISA Marks: 100	ESA Marks: 00	Total Marks: 100
Teaching Hrs: 36	Exam Duration: 3 Hours	
<i>Expt No.</i>	<i>Brief description about the experiment</i>	<i>Remarks</i>
Demonstration		
1	Introduction to basic PL/SQL control structures.	No-Evaluation
2	Introduction to Functions	No-Evaluation
3	Introduction to Procedures	No-Evaluation
4	Introduction to cursers and curser variables.	No-Evaluation
5	Introduction to Triggers and records.	No-Evaluation
Exercise		
6	Implementation of basic PL/SQL control structures on a given database	Evaluation
7	Implementation of PL/ SQL Functions on a given database	Evaluation
8	Implementation of Procedures on a given database.	Evaluation
9	Implementation of Cursors and curser variables on a given database.	Evaluation
10	Implementation of Triggers on a given database.	Evaluation
11	Implementation of Records on a given database.	Evaluation
Structured Enquiry		
12	Implementing a PL/SQL operations on a real time data base	Evaluation
Evaluation Scheme		
1. In Semester Assessment (ISA): Continuous Internal Assessment for 100 Marks.		

Course Code: 16ECAC806	Course Title: Programming in C# with .NET	
L-T-P: 3-0-0	Credits: 3	Contact Hrs: 3
ISA Marks Theory: 50	ESA Marks: 50	Total Marks: 100
Teaching Hrs: 42	Exam Duration: 3 Hours	
No	Content	Hrs
	Unit I	

1	<p>Chapter No. 1.The Philosophy of .NET</p> <p>Understanding the Previous State of Affairs, The .NET Solution, Introducing the Building Blocks of the .NET Platform (CLR,CTS, and CLS), The Role of the .NET Base Class Libraries, What C# Brings to the Table, An Overview of .NET Assemblies, The Role of the Common Intermediate Language , The Role of .NET Type Metadata, The Role of the Assembly Manifest, Compiling CIL to Platform –Specific Instructions, Understanding the Common Type System, Intrinsic CTS Data Types, Understanding the Common Languages Specification, Understanding the Common Language Runtime, The Assembly/namespace/Type Distinction, Using ildasm.exe, Deploying the .NET Runtime, The Platform independent nature of .NET, Installing the .NET Framework, C# Command-Line Compiler, Building C# Applications using csc.exe, Working with csc.exe Response Files.</p>	6 Hrs
2	<p>Chapter No. 2.C# Language Fundamentals.</p> <p>The Anatomy of a Simple C# Class, An Interesting Aside : The System.Environment Class, Defining Classes and Creating objects, The System.Console Class, Establishing Member Visibility, Default Values of Class Member Variables, Member Variable Initialization Syntax, Defining Constant Data, Defining Read-only fields, Understanding the static keyword, Method Parameter Modifiers, Iteration Constructs, Decision Constructs and the Relational/Equality Operators, Understanding Value Types and Reference Types, Understanding Boxing and Unboxing Operations, Working with .NET Enumerations, The Master Class: System.Object, Overriding some default behaviours of System.Object, The System Data types(and C# Shorthand notation), The System.String data types, The role of System.Text.StringBuilder, .NET Array Types, Understanding C# Nullable Types, Defining Custom Namespaces</p>	5 Hrs
3	<p>Chapter No. 3. Object-Oriented Programming with C#</p> <p>Understanding the C# Class Type, Reviewing the Pillars of OOP, The First Pillar: C#'s Encapsulation Services, The Second Pillar: C#'s Inheritance Support, Programming for Containment/Delegation, The Third Pillar: C#'s Polymorphic Support, C# Casting rules, Understanding C# Partial types, Documenting C# Source Code via XML</p>	5 Hrs
Unit II		
4	<p>Chapter No. 4.Object Lifetime and Exceptions Handling.</p> <p>Classes, Objects and References, the basics of Object Lifetime, The role of Application Roots, Understanding Object Generations, System.GC type, Building Finalizable Objects, Building Disposable Objects, Building Finalizable and Disposable types. Ode to Errors, Bugs, and Exceptions, The Role of .NET Exception Handling, The Simplest possible example, Configuring the state of an exception, System – Level Exception (System. System Exception), Application-Level Exception (System.ApplicationException), Processing Multiple Exception, The Finally Block, The result of unhandled exceptions, Debugging Unhandled exceptions using VS. NET .</p>	6 hrs
5	<p>Chapter No. 5.Interfaces and Collections</p> <p>Defining Interfaces in C#, Implementing an Interface in C#, Contrasting Interfaces to Abstract Base Classes, Invoking Interface Members at the Object Level, Interfaces As</p>	5 Hrs

Parameters, Interfaces As Return Values, Arrays of Interfaces Types, Understanding Explicit Interface Implementation, Building Interface Hierarchies, Implementing Interfaces Using Visual Studio 2005, Building Enumerable Types (IEnumerable and IEnumerator),

Building Cloneable Objects (ICloneable), Building Comparable Objects (IComparable), The Interfaces of the System.Collections Namespace, The Class Types of System.Collections.

6 Chapter No. 6. Callback Interfaces, Delegates, and Events, Advanced C# Techniques 5 Hrs

Understanding Callback Interfaces, Understanding the .NET Delegate type, Defining a Delegate in C#, The System.MulticastDelegate and System.Delegate Base Classes, Investigating a Delegate Object, Delegates as Parameters, Understanding C# Events Building a Custom Indexer, Internal Representations of Type Indexers: Final Details, Understanding Operator Overloading Binary Operators, Unary Operators, Equality Operators, Comparison Operators, Understanding Custom Type Conversions, The Advanced Key words of C#, C# Preprocessor Directives.

Unit – III

7 Chapter No. 7. Programming with Windows Forms. 5 hrs

Controls - Labels, Text boxes, Masked Text boxes, Buttons, Check boxes, Radio Buttons, Group Boxes, Checked List Boxes, List Boxes, Combo Boxes, Configuring the Tab Order, Setting the Form's Default Input Button, Working with more Exotic Controls – Month Calendars, Tool Tips, Tab Controls, Track Bars, Panels, Up Down Controls, Error Providers, Tree Views, Web Browsers, Building Custom Windows Forms Controls – Creating Images, Building Design-Time UI, Defining Custom Events, Defining Custom Properties.

8 Chapter No. 8. Database Access with MSSQL Server 5 hrs

Overview of Data Access, Creating database connections, connecting to MSSQL Server, Dataset and Data table features, using inline SQL Statements, using stored procedures, Executing select commands, SQL transaction

Text Book:

1. Andrew Troelsen: Pro C# with .NET 3.0, Special Edition, Dream tech Press, India, 2007. Chapters: 1 to 11 (up to pp.389, except Chapter 10)

Evaluation Scheme

1. Assessment

Assessment	Theory
ISA- 1	25
ISA- 2	25
ESA	50
Total	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks	Chapter Nos.	Instructions

	each		
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **16ECAP806**

Course Title: **Mini Project-2**

L-T-P: **0-0-3**

Credits: **3**

Contact Hrs: **6**

ISA Marks: **100**

ESA Marks: **100**

Total Marks: **200**

Teaching Hrs: **72 approx.**

Exam Duration: **3 Hours**

Theme: “Mini project Using Java”

Java is one of the fundamental programming languages that can be used in many applications as well as product developments. The simple reason for this is because Java can be put to use in various platforms due to its multi-platform nature. Java is one of the favorite choices for developers for many reasons like security, object oriented(reusability), cross platform computing, multithreaded capability, Rich API, Powerful development tools ,availability of various frameworks, Great collection of open source libraries, wonderful community support, Excellent documentation support. Support for various databases and many more.

Students can use the following tools in web and mobile applications as well as product developments:

- ✓ Struts, Spring, Hibernate and JPA
- ✓ JAXB and Apache Axis 2/Java
- ✓ JSP, Servlets, JDBC, EJB, JMS, JTA and JUnit
- ✓ Apache Tomcat, JBoss and GlassFish
- ✓ JavaScript, JSF, GWT and jQuery
- ✓ Eclipse, Netbeans and JBoss tools
- ✓ TestNG
- ✓ jBPM and Drools
- ✓ JCR

Objectives:

Help students to utilize and strengthen the knowledge of java which they have learnt in previous semester.

Methodology:

Students are asked to make a team of 3-4 members and can choose the different categories of projects

like desktop applications, web applications, mobile application and distributed application and work once it is approved by the coordinator.

Assessment:

Students Assessment through CIE (80%) + SEE (20%)

Continuous Internal Evaluation	Assessment	Marks
	Problem Definition, Literature Review	10
	Synopsis and SRS Deliverables	10
	Design (Module wise algorithmic design)	20
	Coding	10
	Integration and testing	10
	Report	10
	Presentation skills and Viva-voce	10
	Total	80
Semester End Examination	Presentation	10
	Viva-voce	10
	Total	100

Course Objectives:

The Mini Project being part of the course work is not only a mechanism to demonstrate the abilities and specialization but also provides the opportunity to demonstrate originality, teamwork, inspiration, planning and organization in a software project. One can put into practice the techniques that have been taught throughout the previous courses. Mini-projects develop practical skills in students. The idea is to propose a problem that one might encounter in future career (be it in academia, industry, or government). Then propose a solution and implement it.

Theme: Java Based E-Commerce Applications with Multilingual Support

E-commerce Objectives:

Most business houses are shifting their operations to the online world. Right from buying apparels to computers to booking tickets and renting out apartments, everything can be done through the Internet now. It is a win-win formula for both the customers and the business houses. Digital India aims to boost E-business and the E-commerce industry with the vision that it would in turn boost the economy is a whole.

Multilingual Objectives:

Language is an essential driver of enterprise growth. The user interface is the key component of any application that needs to support various language speaking audiences. Making an app that appeals to and is available for more users broadens the market and brings more revenue in the app sales and there will be more exposure to the business.

Evaluation:

- The project assessment is done by an evaluation team as per the schedule.

Guidelines for In Semester Assessment (ISA) Scheme

Phase wise distribution of marks	Marks
Identification and defining the problem	15
Software Requirement Specification	20
Software Design	15
Mid-way Implementation	10
Final Demo and Report Submission	20
Total	80

End Semester Assessment (ESA):

There will be a final presentation /demonstration//viva-voce at the end of the semester for 20 Marks

Course Code: 16ECAE804	Course Title: Web Content Management	
L-T-P: 3-0-1	Credits: 4	Contact Hrs: 5
ISA Marks-Theory: 50 +Lab: 100	ESA Marks: 50	Total Marks: 200
Teaching Hrs: 50 + 24		Exam Duration: 3 Hours

No	Content	Hrs
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Unit I		
1	Chapter 1: What Content Management Is (and Isn't) What Is Content?, What Is a Content Management System?, Types of Content Management Systems, What a CMS Does, What a CMS Doesn't Do	6 Hrs
2	Chapter 2 :Points of Comparison Target Site Type, Systems Versus Implementations, Platform Versus Product, Open Source Versus Commercial, Technology Stack, Management Versus Delivery, Coupled Versus Decoupled, Installed Versus Software-as-a-Service (SaaS), Code Versus Content, Code Versus Configuration, Uni- Versus Bidirectional Publishing, Practicality Versus Elegance, and the Problem of Technical Debt	7 Hrs
3	Chapter 3 :Acquiring a CMS Open Source CMSs, Commercial CMSs, Software-as-a-Service, Build Your Own,	7 Hrs

	Questions to Ask	
Unit II		
4	Chapter 4: The Content Management Team Editors, Site Planners, Developers, Administrators, Stakeholders	7 Hrs
5	Chapter 5: CMS Feature Analysis The Difficulties of Feature Analysis, An Overview of CMS Features	6 Hrs
6	Chapter 6 Content Modeling Data Modeling 101, Data Modeling and Content Management, Separating Content and Presentation, Defining a Content Model, Relationships, Content Composition, Content Model Manageability, A Summary of Content Modeling Features	7 Hrs
Unit – III		
7	Chapter 7 :Content Aggregation The Shape of Content, Content Geography, Aggregation Models: Implicit and Explicit, Aggregation Functionality, By Configuration or by Code, A Summary of Content Aggregation Features	5 Hrs
8	Chapter 8 :Editorial Tools and Workflow The Content Lifecycle, The Editing Interface, Versioning, Version Control, and Version Labels, Dependency Management, Content Scheduling and Expiration, Workflow and Approvals, Collaboration, Content File Management, Permissions, A Summary of Editorial Tools	5 Hrs
<p>Text Book:</p> <ol style="list-style-type: none"> 1. “Web Content Management”, Systems, Features, and Best Practices, Publisher: O'Reilly Media, March 2016. <p style="text-align: center;">WEB CONTENT MANAGEMENT SYSTEM – COURSE PROJECT</p> <p>COURSE DESCRIPTION:</p> <p>Today, many web publishers use content management systems (CMS) to allow them to instantly and dynamically update web pages and properties as new content becomes available so that every visit to a site is engaging, informative, and meaningful. The course project shall explore any one of the three most popular open source web-based content management systems—WordPress, Joomla, and Drupal—to create dynamic and flexible websites and landing pages. Students shall explore the fundamentals of planning dynamic websites, CMS database management, developing CSS-controlled site templates, and creating database-driven websites through the planning and creation of their own topic-based sites.</p> <p>OBJECTIVES</p>		

- Introduce learners to any one of the three most popular open source content management systems (CMS) such as WordPress, Drupal, or Joomla.
- Create, deploy and Maintain websites using CMS, including creating and editing content, adding functionality, and creating custom templates and themes.

COURSE PROJECT TITLE: BUILDING WEBSITE USING CMS (JOOMLA / WORDPRESS OR DRUPAL)

To build website for any real world examples such as Corporate web sites or portals, Online magazines, newspapers, and publications, E-commerce and online reservations, Government applications, Small business web sites, Community-based portals, School, religious web sites or Personal or family homepages using popular Web Content Management System. The website shall facilitate to create, manage, store and deploy content on the Web, including text, graphics, video or audio as a part of Enterprise Content Management.

EXECUTION PLAN:

Sl.No	Demonstration	Implementation	Number of Slots
1.	<p>Introducing Content Management Systems</p> <ul style="list-style-type: none"> ○ An overview of some of the different tools and methods that today's web publishers are using to create highly-tailored dynamic web content. ○ Purchasing and configuring a domain name and web hosting. 	<ol style="list-style-type: none"> 1. Introduction to Joomla & Installation 2. Domain Name Registration & Configuration and Hosting 3. Create a Database 4. Content Preparation and Planning 	02
2.	<p>Introduction to Joomla</p> <ul style="list-style-type: none"> ○ Explore the CAM model (Categories, Articles, and Menus) approach to creating content for Joomla environments. ○ Administration and management of users and media. ○ Installing Joomla ○ Exploring the Admin Interface ○ Content creation using the CAM model ○ Content customization: images, video, audio, tags, formats, etc. 	<ol style="list-style-type: none"> 1. Write an article & put your articles in order with categories. 2. Customize Administrator's Panel 3. Change your website's look with Templates. 4. Expand your website's functionality with different extensions. 5. Content creation & Customization using the CAM model 	02

3.	Joomla Menus <ul style="list-style-type: none"> ○ Creating and controlling menus for Joomla site. ○ To link to articles and create special menu items. ○ Adding and displaying menus ○ Linking menus to articles and other features 	<ol style="list-style-type: none"> 1. Categorize the articles which allow grouping your content better. 2. Create menu items for website. 	02
4.	Extending Joomla –Plug-ins, Modules <ul style="list-style-type: none"> ○ Use of Joomla, Plug-ins, Modules, Components and other extensions. ○ Installation of extensions, Finding and adding Joomla extensions ○ Adding and setting up 2 “big” extensions (choose blog, calendar, image gallery, Paypal-based shopping cart, or portfolio. Other extensions on approval) 	Select Create Joomla Modules for the website such as Feed Display Module, Footer Module, Latest News Module, Search Module, Random Image Module, Who's Online Module etc.	02
5.	Custom Templates <ul style="list-style-type: none"> ○ Explore the addition of creation and uses of customized Joomla templates ○ Modifying templates using CSS and HTML tricks. 	Select and Customize template for website.	02
6.	User management and permissions <ul style="list-style-type: none"> ○ Explore how to manage users in Joomla site, including managing who sees what based on login, as well as who can do what based on permissions assigned. 	Control the use of Captcha, registration allowed and type of registration, default user group new users, reset password, and new user registration email notice to administration.	02

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
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I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **16ECAE806**

Course Title: **Cyber Security and Forensics**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks-Theory: **50** +Lab: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **50 +24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter 1: Introduction and Overview	10 Hrs
	Introduction and Overview of Cyber Crime, Nature and Scope of Cyber Crime, Types of Cyber Crime, Social Engineering, Categories of Cyber Crime, Property Cyber Crime.	
2	Chapter 2: Computer Forensic	10 Hrs
	Unauthorized Access to Computers, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation, Stalking and Obscenity in Internet, Digital laws and legislation, Law Enforcement Roles and Responses.	
Unit II		
3	Chapter 3: Digital Forensic	10 Hrs
	Introduction to Digital Forensics, Forensic Software and Hardware, Analysis and Advanced Tools, Forensic Technology and Practices, Forensic Ballistics and Photography, Face, Iris and Fingerprint Recognition, Audio Video Analysis, Windows System Forensics, Linux System Forensics, Network Forensics.	
4	Chapter 4: Cyber Crime Investigation	10 Hrs
	Introduction to Cyber Crime Investigation, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, Email Recovery, Hands on Case Studies, Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.	

Unit – III

5 Chapter 5: Laws and Ethics

10 Hrs

Laws and Ethics, Digital Evidence Controls, Evidence Handling Procedures, Basics of Indian Evidence ACT IPC and CrPC , Electronic Communication Privacy ACT, Legal Policies.

Text Book:

1. Bernadette H Schell, Clemens Martin, “Cybercrime”, ABC – CLIO Inc, California, 2004. https://www.amazon.com/dp/1851096833/ref=rdr_ext_tmb
2. “Understanding Forensics in IT “, NIIT Ltd, 2005. https://www.google.co.in/search?tbo=p&tbm=bks&q=subject:%22Computer+crimes%22&source=gbs_ge_summary_r&cad=0
3. Nelson Phillips and Enfinger Steuart, “Computer Forensics and Investigations”, Cengage Learning, New Delhi, 2009. https://www.amazon.com/dp/1435498836/ref=rdr_ext_tmb

References:

1. Kevin Mandia, Chris Proise, Matt Pepe, “Incident Response and Computer Forensics “, Tata McGraw -Hill, New Delhi, 2006.
2. Robert M Slade,” Software Forensics”, Tata McGraw - Hill, New Delhi, 2005.

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	3,4	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	5	Any 1 question is to be answered

Course Code: 16ECAE807	Course Title: IT Infrastructure Management	
L-T-P: 3-0-1	Credits: 4	Contact Hrs: 5
ISA Marks-Theory: 50 +Lab: 100	ESA Marks: 50	Total Marks: 200

Teaching Hrs: 50		Exam Duration: 3 Hours
.No	Content	Hrs
Unit I		
1	Chapter 1. Introduction Basic Conceptual Overview of Router, Routing Protocols and Routed Protocols & Conceptual Overview of the concept of Zoning, Internet , Extranet, Intranet (Military Zone), De-Military Zones.	5 Hrs
2	Chapter 2. IT Infrastructure Components and their associated Zones Firewall , IPS (Intrusion Prevention System) , VPN (Virtual Private Network), NATing, Servers-Domain Name System Server, Proxy Server, Web Application Server, DHCP Server, FTP Server, Mail Server	5 Hrs
3	Chapter 3. Firewall : Basic Operation of Firewall, Types of Firewall-Stateless-Static Packet Filtering Firewall, Stateful-Dynamic Filtering Firewall, Firewall Rule Set-Conceptual Overview, Standard Firewall Rules, How to Create a Firewall Rule ;Windows Firewall -Configuration of a Windows Based Firewall on PC, Host Based Firewall, Security Products ;Modern Firewall Architecture- Deep Packet Inspection; Essence of a Firewall in the Corporate IT Infrastructure- How it protects the Servers in the Corporate Infrastructure; Protection to Corporate IT Infrastructure in absence of a Firewall.	5 Hrs
4	Chapter 4. IPS (Intrusion Prevention System) What is an IPS Device, Uses of IPS Device, Modes of Operation of IPS Device, IPS Device Update Mechanism, Advantages of IPS Device, Disadvantages of IPS Device	5 Hrs
Unit II		
5	Chapter 5. VPN (Virtual Private Network) Leased Line Network and the Advnet of VPN, What is VPN (Virtual Private Network)? How VPN can be Helpful? How does VPN Work? Types of VPN - Remote Access, VPN Tunneling, Equipments to set up VPN Connectivity, VPN Case let – Challenge, VPN Technology - SSL VPN and IPSec VPN, Encryption and Security Protocols in VPN, Advantages of VPN, VPN Related Threats- End Point Security Posture , Split Tunneling-Concept, Advantages, Configuration, ICS Split Tunneling Problem, Web Application Attacks, Unauthorized Access to Host, Insecure Storage of Authentication Credentials by VPN Clients, Misconfiguration, RSA - VPN Implementation, Setting Client Based VPN Connection NATing- Conceptual Overview, NATing Operation - How it works? Applications of	10Hrs

	NATing	
6	<p>Chapter 6. Domain Name System Server-</p> <p>Conceptual Overview, DNS Hierarchical Structure, Distributed Database- Top Level Domains Classification - Geographical and organizational, Fully Qualified Domain Name; DNS Server Classification - Zone Information/ Function, DNS Operation Modes - Recursive and Iterative, DNS Caching-a. Conceptual Overview, How DNS Resolves Queries; DNS Records - A, AAAA, MX, NS, PTR, CNAME-Registering DNS Records in Corporate/ ISP DNS Servers; DNS Zone Files, DEMO:nslookup utility -Command Line tool for forward DNS query, Reverse DNS Query and Extracting Domain Related Information; DNS Threats and Mitigation- Split Zone Architecture, Zone Information Leakage -Unauthorized Zone Zone Transfer, Reverse DNS Lookup, Zone Transfers Applications to keep DNS updated, Security Zone Transfers using DNS/ TSIG, Security Zone Transfers using DNSSEC (DNS Security) Protocol- How DNSSEC Works? Difference between DNS TSIG and DNSSEC; Cache Poisoning Attack, Conceptual Overview - How it happens, Implications- Mail Redirection, Web Redirection, URL Redirection; Deletion Attack, DoS Attack- Demo:DoS Attack on a DNS Server, Dynamic Updates using DHCP Client/ Server, Integrated with ADS, Wrong Configuration - Non-Authoritative, Recursive Mode, Integrity Compromise of ROOT Hints File, DNS Amplification Attacks, Other Security Parameters- Restrict DNS servers to listen on specific addresses, Configure Global Query Block List.</p>	10Hrs
Unit – III		
7	<p>Chapter 7. Proxy Server- Conceptual Overview, Operation - How Proxy Server Works , Applications of Proxy Server; Antivirus - Types of Malwares - Virus, Worms, Trojans, Spyware, Ghostware, RansomWare etc., What is an Antivirus- How does an Antivirus Work? Web Application Server- Conceptual Overview, Web Application Attacks</p>	5 Hrs
8	<p>Chapter 8. DHCP Server -Conceptual Overview, Overview of DHCP Operation, Uses of DHCP Server; FTP Server- Conceptual Overview, FTP Operations - Active and Passive FTP, Uses of FTP Server; Mail Server- Conceptual Overview, Overview of Email Filter Devices.</p>	5 Hrs
<p>References:</p> <ol style="list-style-type: none"> 1. Kemp, Juliet, Spinger, "Linux System Administration" 2. Anita Sengar "IT Infrastructure Management" 2012 Edition, publisher: S K Kataria and Sons 3. Sjaak Laan "Infrastructure Architecture - Infrastructure Building Blocks and Concepts Second Edition, Kindle Edition, Lulu Press Inc; Second Edition <p style="text-align: center;">IT Infrastructure Management Practices</p> <p>COURSE DESCRIPTION:</p>		

IT infrastructure consists of a set of physical devices and software applications that are required to operate the entire enterprise. IT infrastructure is also consists both human and technical capabilities. These services include the following- Computing platforms used to provide computing services, that connect employees, customers, and suppliers into a coherent digital environment, including servers ,Data management services that store and manage corporate data and provide capabilities for analyzing the data and Application software services that provide enterprise-wide capabilities such as enterprise resource planning, customer relationship management, supply chain management, and knowledge management systems that are shared by all business units. It allows an organization to deliver IT solutions and services to its employees, partners and/or customers and is usually internal to an organization and deployed within owned facilities.

OBJECTIVES

- Acquire comprehensive knowledge, technical expertise and hands-on experience in IT Infrastructure Management
- To learn all aspects of IMS such as Networking, Operating Systems, Virtualizations and Data Center technologies.

LAB REQUIREMENTS:

- A modern web-browser with HTML5 and JavaScript enabled.
- Remote Desktop Client connection software.
- Internet connectivity Microsoft Account (LiveID).

LIST OF EXERCISES

Expt. / Job No.	Lab assignments/experiment	Implementation	Number of Slots
1.	Web Server	Apache Web Server, IIS Server: Install and Configure the Apache Web Server on Linux and IIS server on windows.	01
2.	Samba Server	Implementation of Windows files and print services for Linux allowing the sharing of files and printers between Windows and Linux.	01
3.	LDAP Server	LDAP Server: Lightweight Directory Access Protocol- Server Installation to access a directory service.	01
4.	Mail Server	Mail Server configuration- POP3 Server, IMAP Server	01
5.	Proxy Server	Develop a small web proxy server, which is able to cache web pages. It is a very simple proxy server which only understands simple GET-requests, but is able to handle all kinds of objects - not just HTML pages, but also images.	01
6.	Firewalls and NAT (Network	Use of iptables to build a permissive firewall by selectively filtering packets based on protocol type.	01

	Address Translation)	To demonstrate how addresses may be translated from private addresses to public and vice versa as they pass in and out of the firewall.	
7.	Cloud Infrastructure: Azure Hands-on Lab (HOL) Build your Infrastructure in the Cloud using Windows Azure Infrastructure Services -	<ol style="list-style-type: none"> 1. Login to the Windows Azure Management Portal, Define a new Windows Azure Affinity Group and Create a new Windows Azure Storage Account. 2. Register a DNS Server in Windows Azure. 3. Define a Virtual Network in Windows Azure. 4. Configure Windows Server Active Directory in a Windows Azure VM. 5. Configure New Machine for File Services in a Windows Azure VM. 	01

References:

1. <https://amizone.net/AdminAmizone/WebForms/Academics/NewSyllabus/194201472058683.pdf>
2. <http://itproguru.com/azurehol/#sthash.HMydlzVA.dpuf>
3. <https://simms-teach.com/docs/cis192/cis192lab08.pdf>
4. <https://simms-teach.com/resources.php>
5. http://www.cs.rpi.edu/~kotfid/security1/PDF2/NS1_lab_6_1_4_en.pdf
6. <http://www.cse.unsw.edu.au/~cs3331/12s1/Labs/>
7. <https://www.6diss.org/workshops/ca/dns-practical.pdf>
8. <http://www.dwaynewhitten.com/info306/pages/lab.html>
9. http://www.bo.ingv.it/~scacciag/home_files/teach/netadminguide.pdf
10. <https://techpolymath.com/2015/02/16/how-to-setup-a-dns-server-for-a-home-lab-on-ubuntu-14-04/>
11. <http://www.dwaynewhitten.com/info306/lab2.pdf>

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3, 4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5, 6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7, 8	Any 1 question is to be answered

Course Code: **16ECAE802**

Course Title: **NoSQL**

L-T-P: **3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks-Theory: **50** +Practice: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **50**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter 1 – Introduction to NoSQL What it is & Why you need it, Hello NoSQL : Getting Initial hands-on Experience, Interfacing and Interacting with NoSQL	8 Hrs
2	Chapter 2 – NoSQL Basics Understanding the Storage Architecture, Performing CRUD operations, Querying NoSQL Stores, Modifying Data Stores & Managing Evolution, Indexing and ordering datasets.	12Hrs
Unit II		
3	Chapter 3 – Advanced NoSQL Using NoSQL in the CLOUD, Scalable Parallel Processing with MapReduce, Analyzing BigData with Hive.	8 Hrs
4	Chapter 4 – Working with NoSQL Surveying Database Internals, Using MySQL as a NoSQL solution, WebFrameworks and NoSQL, Migrating from RDBMS to NoSQL.	12 Hrs
Unit – III		
5	Chapter 5 – Developing Web Application with NoSQL Php and MongoDB – Comparing documents in MongoDB & PHP, MongoDB classes, Connecting & Disconnecting, Inserting Data, listing your data, Modifying data with PHP, Deleting data, DBRef, GridFS & PHP Driver, Creating a Blog Application with PHP driver - Designing the Application, Listing the Posts, Looking at a Single Post, Searching the Psots, Adding, Deleting & modifying Posts, Creating the Index Pages, Recapping the blog application.	6 Hrs
6	Chapter 6 – NoSQL Database Administration Using Administrative tools, Backing up the MongoDB Server, Digging Deeper into Backups, Restoring Individual Databases or Collections, Automating Backups, Backing up Large Databases, Importing Data into MongoDB, Exporting data into MongoDB, Securing.	4 Hrs

Text Book:

1. "Professional NoSQL" by Shashank Tiwari, 2011, WROX Press (Chapter 1,2,3,4,5,6,7,8,9,10,11,12,13,15)
2. The Definitive guide to MongoDB, The NoSQL Database for Cloud and Desktop Computing, Apress 2010. (Chapter 6,7,8,9).

NOSQL PRACTICES

COURSE DESCRIPTION:

The widespread emergence of big data storage needs has driven the development and adoption of a new class of non - relational databases commonly referred to as NoSQL databases. The NoSQL (or Not-Only SQL) databases are basically developed to meet the requirements of the modern cloud-based decentralized apps and are a good solution as compared to the relational databases in many ways. These unstructured databases are widely known for their non-relational and schema less data model, improved performance and scalability factors which are always an issue with relational database systems. This course will explore the origins of NoSQL databases and the characteristics that distinguish them from traditional relational database management systems. Core concepts of NoSQL databases will be presented followed by an exploration of how different database technologies implement these core concepts.

OBJECTIVES

- Demonstrate competency in designing NoSQL database management systems.
- Demonstrate competency in describing how NoSQL databases differ from relational databases from a theoretical perspective.
- Demonstrate competency in selecting a particular NoSQL database for specific use cases.

LAB REQUIREMENTS:

- Computer with latest configuration having Windows and Unix OS Versions.
- Java software installed.

LIST OF EXERCISES

Expt./ Job No.	Lab assignments/experi ment	Implementation	Numbe r of Hours
1.	Set up MongoDB environment.	i. Installation of MongoDB on Windows and Unix platform. ii. Operations on Start, Stop and Restart MongoDB. iii. Using MongoDB Help. iv. Getting MongoDB Statistics.	02
2.	Create/Drop, NoSQL Datatypes	i. Differentiate between database, document and collection. ii. Create Database, Drop Database. iii. Create Collection, Drop Collection. iv. MongoDB Datatypes.	02
3.	Working with MongoDB Documents	Insert Document, Update Document, Delete Document,	02
4.	Data Retrieval	i. Projection ii. Limit Records iii. Sort Records iv. Indexing v. Aggregation	02
5.	Creating Backup	i. Replication ii. Sharding iii. Create Backup iv. Deployment	02
6.	MongoDB in Java	Set up MongoDB JDBC driver, Connect to database, Create a Collection, Retrieve a Collection, Insert a Document, Retrieve a Documents, Update Document.	04

References:

- https://www.tutorialspoint.com/mongodb/mongodb_tutorial.pdf
- https://blog.codecentric.de/files/2012/12/MongoDB-CheatSheet-v1_0.pdf
- <http://www.guru99.com/mongodb-tutorials.html>

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	3,4	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	5,6	Any 1 question is to be answered

Course Code: **16ECAE803**

Course Title: **Database Administration**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks-Theory: **50** +Lab: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **50**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter No. 1 : Introduction Why Learn Database Administration?, A Unique Vantage Point, The Management Discipline of Database Administration, Evaluating a DBA Job Offer, Database, Data and System Administration, DBA Tasks, DBMS Release Migration, Types of DBAs.	7 Hrs
2	Chapter No. 2: Creating the Database Environment Defining the Organization's DBMS Strategy, Installing the DBMS, Upgrading DBMS Versions and Releases, Database Standards and Procedures.	7 Hrs
3	Chapter No. 3: Database Change Management Change management Requirements, Types of changes, Impact of Change on Database Structures,	6 Hrs
Unit II		
4	Chapter No. 4 Performance Management Defining Performance, Monitoring versus Management, Service-Level Management, Types of performance tuning, Performance Tuning tools, DBMA performance Basics.	7 Hrs
5	Chapter No. 5 System and Database Performance The Larger Environment, DBMS Installation and Configuration Issues, System Monitoring, Techniques for optimizing Databases, Database reorganization.	7 Hrs
6	Chapter No. 6 Application Performance Designing Applications for Relational Access, Relational Optimization, Additional Optimization Considerations, Reviewing Access Paths, SQL Coding and Tuning for Efficiency.	6 Hrs
Unit – III		
7	Chapter No. 7 Database Security Data Breaches, Database Security Basics, Granting and Revoking Authority,	5 Hrs

Authorization Roles and Groups, Other Database Security Mechanisms, Encryption.

8 Chapter No. 8 Database Backup and Recovery 5 Hrs

The Importance of Backup and Recovery, Preparing for Problems, Backup, Recovery, Alternatives to Backup and Recovery

Text Book:

1. Craig S. Mullins "Database Administration: The complete guide to DBA Practices and Procedures" 2nd Edition, Addison Wesley.

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **16ECAE808**

Course Title: **Cloud Computing**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks-Theory: **50** +Lab: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **50 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
	Unit I	
1	Chapter 1:Cloud Computing Basics Cloud Computing Overview, Applications, Intranets and the Cloud, First Movers in the Cloud.	7 Hrs
2	Chapter 2:Cloud Computing with the Titans Google, EMC, Microsoft, Amazon. Salesforce.com, IBM, Partnerships.	6 Hrs

3	Chapter 3:Hardware and Infrastructure Clients, Security, Network, Services.	7 Hrs
Unit II		
4	Chapter 4:Cloud Storage and Standards Overview, Cloud Storage Providers. Standards: Application, Client, Infrastructure.	7 Hrs
5	Chapter 5: Software as a Service Overview, Driving Forces, Company Offerings, Industries.	6 Hrs
6	Chapter 6: Software plus Services Overview, Mobile Device Integration, Providers, Microsoft Online.	7 Hrs
Unit – III		
7	Chapter 7: Developing Applications Google, Microsoft, Cast Iron Cloud, Development, Troubleshooting, Application Management.	5 Hrs
8	Chapter 8: Best Practices and the Future of Cloud Computing Analyze Your Service, Best Practices, How Cloud Computing Might Evolve.	5 Hrs
Text Book:		
1. Anthony T.Velete, Toby J.Velete, Cloud Computing A Practical Approach, Mc Graw Hill, 2009.		
Cloud Computing Practices		
Objective		
This is the lab course for Cloud Computing. Each student as to accomplish given lab EXERCISE .The goals are expose students to the process of Cloud environment with intent of practical understanding of cloud services.		
Concepts		
Windows Azure, Google app, Amazon VPC, Amazon EC2.		
Required Textbooks		
Anthony T.Velete, Toby J.Velete, Cloud Computing A Practical Approach, Mc Graw Hill, 2009		
<i>Expt No.</i>	<i>Brief description about the experiment</i>	<i>Number Of Slots</i>
DEMONSTRATION		
1	Introduction Cloud using Windows Azure Infrastructure Services	1
2	Introduction to Registering a DNS Server in Windows Azure	1
3	Introduction to Google app engine for Java.	1
4	Introduction to how to create an Amazon VPC.	1
5	Introduction to Setting up Routing in VPC and Deploying Amazon EC2 instance	1

	in Amazon VPC	
EXERCISE		
6	Implementation of cloud using windows Azure.	1
7	Collaborating on Calendars Schedules and Task Management, Event Management, Contact Management, Project Management, Word Processing, Spreadsheets, Databases, Presentations.	1
8	Implementation of web app on google app engine.	1
9	Implementation of Amazon VPC.	1
10	Implementation of Storing and Sharing Files, Sharing Digital Photographs.	1
11	Collaborating via Web Based Communication Tools, Social Networks and Groupware, Blogs and Wikis.	1
STRUCTURED ENQUIRY		
12	Developing a task management web application on Google app engine.	2

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **16ECAC903**

Course Title: **Mobile Application Development**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks-Theory: **50** +Lab: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter No. 1- Mobility and Android Introduction, Mobility Panorama, Mobile Platforms, App Development Approaches,	2 Hrs

Android Overview.

2	Chapter No. 2- Getting Started with Android	2 Hrs
	Introduction, Setting up Development Environment, Saying Hello to Android, Traversing an Android App, Project Structure, Logical Components of an Android App, Android Tool Repository, Installing and Running App Devices.	
3	Chapter No. 3- Learning with an Application	3 Hrs
	Introduction, 3CheersCable App, Mobile App Development, Challenges, Tenets of a Winning App.	
4	Chapter No. 4- App User Interface	5 Hrs
	Introduction, Activity, UI Resources, UI Elements and Events, Interaction among Activities, Fragments, Action Bar and Applications.	
5	Chapter No. 5- App Functionality - Beyond UI	4 Hrs
	Introduction, Threads, AsyncTask, Service, Notifications, Intents and Intent Resolution, Broadcast Receivers, Telephony and SMS- Their Application.	
Unit II		
6	Chapter No. 6. App Data - Persistence and Access	4 Hrs
	Introduction, Flat Files, Shared Preferences, Relational Data, Data Sharing Across Apps, Enterprise Data.	
7	Chapter No. 7. Graphics and Animation	4 Hrs
	Introduction, Android Graphics, Android Animation.	
8	Chapter No. 8. Multimedia	4 Hrs
	Introduction, Audio, Video and Images, Playback, Capture and Storage.	
9	Chapter No. 9. Location Services and Maps	4 Hrs
	Introduction, Google Play Services, Location Services, Maps	
Unit – III		
10	Chapter No. 10. Sensors	4 Hrs
	Introduction, Sensors in Android, Android Sensor Framework, Motion Sensors, Position Sensors, Environment Sensors.	
11	Chapter No. 11. Testing Android Apps	4 Hrs
	Introduction, Testing Android App Components, App Testing Landscape Overview Publishing Apps: Introduction, Groundwork, Configuring, Packaging, Distributing.	
12	Chapter No. 12. Publishing Apps	2 Hrs
	Introduction, Groundwork, Configuring, Packaging, Distributing.	

Text Book:

1. AnubhavPradhan, Anil V Deshpande, Composing Mobile Apps using Android, 2010, Wiley, 2010

References:

1. Barry Burd, Android Application Development All in one for Dummies.
2. Ian F Darwin, Android Cookbook.
3. Frank Ableson, RobiSen, Chris King, C. Enrique Ortiz, Android in Action, Manning Publications.

Mobile Application Development Course Project

Objective:

This is the course Project for the Mobile App Development. The students will be divided into project teams, and each team will develop a marketable mobile app. ideally, each project team will have 2 or 3 students with a maximum of 4. The goals are to expose students to the process of developing a new mobile app from start to finish and to provide an experience very similar to what a developer would have at any company where they work to produce an app that not only works but is also something that meets the needs of their clients.

Concepts:

Mobile app development, project management, and quality assurance.

Required Textbooks

AnubhavPradhan, Anil V Deshpande, Composing Mobile Apps using Android, 2010 wiley, 2010.

Chapters	Topic	Course Project	Slots
Ch-01: Mobility and Android. Ch-02: Getting Started with Android. Ch-03: Learning with an Application.	Mobility Panorama, App Development Approaches, Setting Development Environment, Installing and Running App Devices, Mobile App Development Challenges.	Development of logical Architecture for given Mobile Application.	2
Ch-04: App User Interface. Ch-05: App Functionality.	Activity, UI Resources, UI Elements and Events, Threads, AsyncTask, Notification, Broadcast Receivers	Building User Interface for given Application.	2
Ch-06: App Data – Persistence and Access.	Flat Files, Shared Preferences, Relational Data, Data Sharing Across Apps.	Exchanging a Data with in Enterprise Application.	2
Ch-07: Graphics and Animation.	Android Graphics, Android Animation.	Adding Animation and Graphics into Application.	2

Ch-11: Testing Android Apps.	Testing Android App Components, App testing Landscape Overview.	Testing an App.	2
Ch-12: Publishing Apps.	Groundwork, Configuring, Packaging, Distribution.	Deploying an App.	2

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3,4,5	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	6,7,8,9	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	10,11,12	Any 1 question is to be answered

Course Code: **16ECAP901**

Course Title: **Mini Project-3**

L-T-P: **0-0-2**

Credits: **2**

Contact Hrs: **4**

ISA Marks: **100**

ESA Marks: **100**

Total Marks: **200**

Teaching Hrs: **36**

Exam Duration: **3 Hours**

Theme: "Development of Applications using .NET/ JavaTechnology"

.NET Technology

The Microsoft .NET framework has major advantages over previous programming languages and environments. Applications written in .NET may be in any of several different programming languages (language interoperability). .NET consists of a re-useable library of classes (small components that help developers create applications). It also consists of a development environment to help developers rapidly and graphically build applications. All operating system functions can be encapsulated within .NET. The framework manages the execution of applications and Web services, and provides many functionalities including security enforcement and memory management. Because of these advantages, corporations and industry are beginning to embrace .NET. They will need graduates who know how to use it. Hence, a project done using this technology would give an insight of the powerful features of .NET and help the students to find a job in this field. Below is a list of some of the types of applications that can be created using the .NET platform.

- Customer relationship management
- Accounting applications
- Product/inventory applications
- Warehousing applications using hand-held devices
- Web sites
- Value chain/supply management
- Integration with partners through the Internet
- XML Web services
- PDA (hand-held) applications

Objectives of using .NET Technology-

Student doing a project in .NET technology should be able to:

1. Develop an application that is pure OOP, platform independent, language independent and interoperable.
2. Use the features of .NET to make the application scalable, maintainable, easily deployable, reliable and secure.
3. Work with databases using ADO.NET.
4. Develop background processes windows services.
5. Create animations using .NET's WPF.
6. Create and use Web Services through SOA.

Java Technology

Java is one of the fundamental programming languages that can be used in many applications as well as product developments. The simple reason for this is because Java can be put to use in various platforms due to its multi-platform nature. Java is one of the favorite choices for developers for many reasons like security, object oriented(reusability), cross platform computing, multithreaded capability, Rich API, Powerful development tools ,availability of various frameworks, Great collection of open source libraries, wonderful community support, Excellent documentation support. Support for various databases and many more.

Students can use the following tools in web and mobile applications as well as product developments:

- ✓ Struts, Spring, Hibernate and JPA
- ✓ JAXB and Apache Axis 2/Java
- ✓ JSP, Servlets, JDBC, EJB, JMS, JTA and JUnit
- ✓ Apache Tomcat, JBoss and GlassFish
- ✓ JavaScript, JSF, GWT and jQuery
- ✓ Eclipse, Netbeans and JBoss tools
- ✓ TestNG
- ✓ jBPM and Drools
- ✓ JCR

Objectives:

Help students to utilize and strengthen the knowledge of Java which they have learnt in previous semester.

Methodology:

Students are asked to make a team of 3-4 members and can choose the different categories of projects like desktop applications, web applications, mobile application and distributed application and work once it is approved by the coordinator.

Evaluation:

Students Assessment through CIE (80%) + SEE (20%)

Continuous Internal Evaluation	Assessment	Marks
	Problem Definition, Literature Review	10
	Synopsis and SRS Deliverables	10
	Design (Module wise algorithmic design)	20
	Coding	10
	Integration and testing	10
	Report	10
	Presentation skills and Viva-voce	10
	Total	80
Semester End Examination	Presentation	10
	Viva-voce	10
	Total	100

Course Code: **16ECAE905**

Course Title: **Wireless & Mobile Computing**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50 + 100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter1:Introduction	4 Hrs
	Mobility Of Bits & Bytes, Wireless-The Beginning, Mobile Computing, Dialog Control, Networks, Middle Gear & Gateways, Applications & Services, Developing Mobile Computing Applications, Security In Mobile Computing, Standard And Standard Bodies And Players In The Wireless Space.	
2	Chapter 2 : Wireless LAN	4 Hrs
	Introduction, Wireless LAN advantages, IEEE 802.11 standards, Wireless LAN architectures, Mobility in Wireless LAN, Deploying Wireless LAN, Mobile adhoc Networks	

and Sensor Networks. Wireless LAN security, WiFi versus 3G.

3 Chapter 3: Mobile Computing Architecture 4 Hrs

History of computers, History of Internet, Internet-the ubiquitous networks, Architecture for mobile computing, The three-tier architectures, Design consideration for mobile computing, Mobile computing through internet, Making existing applications mobile enable.

4 Chapter 4: Mobile Computing through Telephony 4 Hrs

Evaluation of telephony, Multiple access procedure, Mobile computing through telephone, Developing an IVR application, Voice XML, Telephony application Programming Interphase(TAPI).

Unit II

5 Chapter 5:Emerging Technologies 4 Hrs

Introduction, Blue-tooth, Radio Frequency Identification (RFID), Wireless Broad Band (WiMAX), Mobile IP, Internet protocol Ver 6 (IP v6), Java card.

6 Chapter 6 : Global System for Mobile Communication (GSM) 4 Hrs

Introduction, GSM architectures, GSM entities, Call routing in GSM, PLMN interface, GSM address and identifiers, Network aspect in GSM, GSM frequency allocation, Authentication and security,

7 Chapter 7: Short Message Services (SMS) 4 Hrs

Mobile Computing over SMS, Short Message Services (SMS), Value Added Services through SMS, Accessing the SMS Bearer.

8 Chapter 8: General Packet Radio Service (GPRS) Introduction, GPRS and 4 Hrs
packet data network, GPRS network architecture, GPRS network operation, Data services in GPRS, Application for GPRS, Limitation of GPRS, Billing and Charging in GPRS.

Unit – III

9 Chapter 09 : Wireless Application Protocol (WAP) 5 Hrs
Introduction, WAP, MMS, GPRS, Application

10 Chapter 10 : CDMA & 3G 5 Hrs
Introduction, Spread Spectrum technology, IS-95, CDMA vs GSM, Wireless Data, 3rd generation network, Application on 3G.

Text Book:

1. Asoke K Talukder & Roopa R Yavagal . Mobile Computing , Tata McGraw Hill Education Private Limited, New Delhi.

References:

1. Raj Kamal , Mobile Computing, Oxford University Press

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignments	10
Total	50

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3,4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5,6,7,8	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	9,10	Any 1 question is to be answered

Course Code: **16ECAE906**

Course Title: **Machine Learning**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks-Theory: **50** +Lab: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
	Unit I	
1	Chapter 1. Introduction	4 Hrs
	Introduction: Statistical Decision Theory - Regression, Classification, Bias Variance:	
2	Chapter 2. Linear Regression and Linear Classification	6 Hrs
	Linear Classification, Logistic Regression, Linear Discriminant Analysis; Perceptron; Linear Regression, Multivariate Regression, Subset Selection, Shrinkage Methods, Principal Component Regression, Partial Least squares.	

3	Chapter 3. Support Vector Machines and Artificial Neural Networks	6 Hrs
	Support Vector Machines, Neural Networks - Introduction, Early Models, Perceptron Learning, Backpropagation, Initialization, Training & Validation.	
	Unit II	
4	Chapter 4. Bayesian Learning and Decision Trees	6 Hrs
	Parameter Estimation - MLE, MAP, Bayesian Estimation Decision Trees, Regression Trees, Stopping Criterion & Pruning Loss functions, Categorical Attributes, Multiway Splits, Missing Values Decision Trees - Instability.	
5	Chapter 5. Evaluation Measures and Hypothesis Testing	4 Hrs
	Evaluation Measures, Bootstrapping & Cross Validation, Class Evaluation Measures, ROC curve, MDL	
6	Chapter 6. Ensemble Methods and Clustering	6 Hrs
	Ensemble Methods - Bagging, Committee Machines and Stacking, Boosting, Gradient Boosting, Random Forests, Multi-class Classification, Naive Bayes, Bayesian Networks; Partitional Clustering, Hierarchical Clustering, Birch Algorithm, CURE Algorithm, Density-based Clustering.	
	Unit – III	
7	Chapter 7. Graphical Models and Expectation Maximization	5 Hrs
	Undirected Graphical Models, HMM, Variable Elimination, Belief Propagation; Gaussian Mixture Models, Expectation Maximization.	
8	Chapter 8. Learning Theory and Reinforcement Learning	5 Hrs
	Learning Theory, Introduction to Reinforcement Learning, RL framework, TD learning, Solution Methods, Applications.	
	Text Book:	
	1. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e,	
	2. Christopher Bishop. Pattern Recognition and Machine Learning. 2e.	
	References:	
	1. Introduction to machine learning with python by Andreas C. Müller and Sarah Guido	
	Machine Learning Practices Using Python	
	1) Implement linear regression with one variable to predict profits for a food truck. Suppose you are the CEO of a restaurant franchise and are considering different cities	

for opening a new outlet. The chain already has trucks in various cities and you have data for profits and populations from the cities.

- 2) Build a logistic regression model to predict whether a student gets admitted to a university. Suppose that you are the administrator of a university department and you want to determine each applicant's chance of admission based on their results on two exams.
- 3) Implement one-vs-all logistic regression and neural networks to automate handwritten digit recognition (0 to 9)
- 4) Implement the backpropagation algorithm for neural networks and apply it to task of hand –written digit recognition.
- 5) Build a Spam Classifier using Support Vector Machines.
- 6) Implement the K-means clustering algorithm and apply it to compress an image.
- 7) Build Principle Component analysis to find a low dimensional representation of face images.
- 8) Implement the anomaly detection algorithm and apply it to detect failing servers on a network.
- 9) Build a recommender system for movies by using collaborative filtering.

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3,4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5,6,7	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	8,9	Any 1 question is to be answered

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50 + 100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter 1: Cryptography Basics Introduction, Classic Crypto: Modern Crypto, Taxonomy of Cryptography & Cryptanalysis	4 Hrs
2	Chapter 2: Symmetric Key Crypto Introduction, Stream Ciphers, Block Ciphers, Block cipher modes	6 Hrs
3	Chapter 3: Public Key Crypto and Hash Functions Introduction, Knapsack, RSA, Diffie-Hellman, Elliptic Curve Cryptography, Public Key Notation, Uses for Public Key Crypto, Public Key Infrastructure Hash Functions: Introduction, The Birthday Problem, Non-Cryptographic Hashes, Tiger Hash, HMAC	6 Hrs
Unit II		
4	Chapter 4: Authentication and Authorization Authentication: Introduction, Authentication Methods, Passwords, Biometrics, Two-Factor Authentication, Single Sign-On and Web Cookies, Authorization: Introduction, Access Control Matrix, Multilevel Security Models	4 Hrs
5	Chapter 5: Authorization and Authentication Protocols Authorization: Multilateral Security, Firewalls, Intrusion Detection, Simple Authentication Protocols: Introduction, Simple Security Protocols, Authentication Protocols	6 Hrs
6	Chapter 6: Security Protocols Service-orientation and contemporary SOA; Service layer abstraction; Application service layer; Business service layer, Orchestration service layer; Agnostic services; Service layer configuration scenarios.	6 Hrs
Unit – III		
7	Chapter 6: Software Flaws and Malware Introduction, Software Flaws, Malware, Miscellaneous Software Based Attacks, software tamper resistance, Digital Rights Management.	5 Hrs
8	Chapter 6: Cyber Crimes and Laws Introduction, Computer Forensics, Online Investigative tool, tracing and recovering electronic evidence, Internet fraud, Identity Theft, Industrial Espionage, Cyber Terrorism.	5 Hrs

Indian IT laws: Introduction and briefs of Law clauses.

Text Book:

1. Mark Stamp, "Information Security: Principles and Practices", 2nd Edition, John Wiley and Sons, 2011.

References:

1. Michael E. Whitman and Herbert J. Mattord, "Principles of Information Security", 2nd Edition, Thompson, 2005.
2. William Stallings, "Network Security Essentials Applications and Standards", Person Education, 2000.
3. Behrouz A. Forouzan, "Cryptography and Network Security", Tata McGraw-Hill, 2007.

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Change summary between 2016-17 and 2017-18 admitted bathces
(i.e. 2016-2019 batch and 2017-2020 batch)

Course Code: **17ECAC701**

Course Title: **Web Programming**

L-T-P: **3-0-0**

Credits: **3**

Contact Hrs: **3**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42**

Exam Duration: **3 Hours**

No

Content

Hrs

Unit I

1	Chapter 1: Fundamentals of Web, XHTML	2Hrs
	Internet, WWW, Web Browsers, and Web Servers; URLs; MIME; HTTP; The Web Programmers Toolbox. XHTML: Basic syntax; Standard structure; Basic text markup; Images; Hypertext Links; Lists.	
2	Chapter 2: XHTML – 2, CSS	4 Hrs
	XHTML (continued): Tables; Forms; Frames. CSS: Introduction; Levels of style sheets; Selector forms; Property value forms; Font properties; List properties; Color; Alignment of text; The box model; Background images; The and <div> tags.	
3	Chapter 3: JavaScript	4 Hrs
	Overview of JavaScript; Syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input; Control statements; Object creation and modification; Arrays; Functions; Constructor; Pattern matching using regular expressions; Errors in scripts; Examples.	
4	Chapter 4: JavaScript and HTML Documents, Dynamic Documents with JavaScript	6Hrs
	The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object. Introduction to dynamic documents; Element positioning; Moving elements; Element visibility; Changing colors and fonts; Dynamic content; Stacking elements; Locating the mouse cursor; Reacting to a mouse click; Slow movement of elements; and dropping elements.	
Unit II		
5	Chapter 5: XML	8Hrs
	Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML processors; Web services.	
6	Chapter 6: Perl, CGI Programming	8Hrs
	Origins and uses of Perl; Scalars and their operations; Assignment statements and simple input and output; Control statements; Fundamentals of arrays; Hashes; References; Functions; Pattern matching; file input and output; Examples. The Common Gateway Interface; CGI linkage; Query string format; CGI.pm module; A survey example; Cookies.	
Unit – III		
7	Chapter 7: PHP	5 Hrs
	Origins and uses of PHP; Overview of PHP; General syntactic characteristics; Primitives, operations and expressions; Output; Control statements; Arrays;	

Functions; Pattern matching; Form handling; Files; Cookies; Session tracking.

8 Chapter 8: Database Access

5 Hrs

Relational databases; Architectures for database access; MySQL; Database access with Perl and MySQL; Database access with PHP and MySQL.

Text Book:

1. Sebesta, R.W., Programming the World Wide Web, 3rd, Pearson education, 2006.(Chapters 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14.1, 14.3 to 14.6)

References:

1. Deitel, P.J. and Goldberg, Internet & World Wide Web How to H program, 3rd, Pearson education, 2004.
2. Chris Bates, Web Programming Building Internet Applications, 3rd, Wiley India, 2006.
3. Xue Bai et al The Web Warrior Guide to Web Programming, Thomson, 2003.

Evaluation Scheme

1. Assessment

Assessment	Theory
ISA- 1	25
ISA- 2	25
ESA	50
Total	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3, 4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **17ECAP703**

Course Title: **UNIX Lab**

L-T-P: **0-0-2**

Credits: **2**

Contact Hrs: **4**

ISA Marks: **100**

ESA Marks: **--**

Total Marks: **100**

Teaching Hrs: **24 (T) + 24 (P)**

Exam Duration: **3 Hours**

- | | | |
|----------|--|--------------|
| 1 | Chapter 1: Introduction to Scripting Languages | 2 Hrs |
| 2 | Chapter 2: UNIX architecture:
General Purpose Utilities, File System, Handling Ordinary Files, Basic File attributes, vi editor. | 6Hrs |
| 3 | Chapter 3: Introduction To Shell Scripting :
Shell Basics, Shell Environment, Shell Script Programming Concepts, Decision Structures, Looping Structures, Command line arguments, Links, Functions and Arrays, Regular Expression & Filters, Processes, Pipe- Inter-Process Communication, Advanced Shell Programming, Advanced Tech & Tools, Script Design and Management Issues. | 8Hrs |
| 4 | Chapter 4: Essential System Administration :
System Administrator Login, System Administrator Privileges, Maintaining Security, User Management, Startup and Shutdown, Backup program. | 2Hrs |
| 5 | Chapter 5: awk Scripting :
BEGIN and END sections, arrays, functions, control flow. | 6Hrs |

Expt./ Job No.	Lab assignments/experiment	No. of Lab. Slots per batch (estimate)
1-2	Shell Scripts on conditional statements, loops, Case Construct, Command Line arguments.	02
3-5	Shell Scripts on Process and Filters, Links	03
6-7	Shell Scripts on Pattern matching	02
8-10	Shell Scripts on automating the task	03
11-12	awk scripts	02

1. Sumithabh Das "UNIX Concepts and Applications" Fourth Edition, McGraw Hill.
2. Arnold Robbins and Nelson H.F.Beeba "Classic Shell Script", 1st Edition., O'Reilly, 2005.

Evaluation Scheme

- 1. In Semester Assessment (ISA): Continuous Internal Assessment for 100 Marks.**

In Semester Assessment (ISA) through Tests for Tutorial.	Assessment	Marks
	<i>Test-1</i>	20
	<i>Test-2</i>	20
	Total	40
In Semester Assessment for Practical	<i>ISA</i>	60
	Total	100

Course Code: **17ECAP706**

Course Title: **Mini Project-1**

L-T-P: **0-0-2**

Credits: **2**

Contact Hrs: **4**

ISA Marks: **100**

ESA Marks: **100**

Total Marks: **200**

Teaching Hrs: **48**

Exam Duration: **3 Hours**

Project Theme: "Software Design & Development"

Objectives:

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

1. Carry-out the survey of the given or real world problem and prepare the SRS as per the industry standard (IEEE-ISO).
2. Work effectively and collectively in a team.
3. Identify various components; design the suitable architecture for the system by applying knowledge of Object Oriented Design.
4. Use CASE tools to design various models required for the given problem.

Expt./Job No.	Brief description about the experiment/job	Lab Slots per batch (1Labslot=3Hrs.)
1	Discussion on Problem statements.	1
2	Presentation should include <ul style="list-style-type: none"> • Problem Statement • Problem Definition • Relevance & Literature Survey • Scope & Objectives 	1
3	Discussion on SRS template (IEEE format)	1
4	Presentation should include <ul style="list-style-type: none"> • Block diagram • Functional Requirements 	1

	<ul style="list-style-type: none"> • Nonfunctional Requirements • External interface requirements • General constraints • Design constraints 	
5	Discussion on System design	1
6	Presentation should include <ul style="list-style-type: none"> • System Design <ul style="list-style-type: none"> ○ Architectural model ○ DFD ○ UI model ○ ER Model ○ UML models 	1
7	Discussion on Detailed design	1
8	Presentation should include: <ul style="list-style-type: none"> • Database Table description • Flowchart/Algorithm/Pseudo code 	1
9	Discussion on Report writing	1
10	Final Report should be submitted in standard format.	1

Materials and Resources Required:

1. Books/References: Relevant Text Books of the Semesters
2. Document: IEEE SRS Template

Evaluation:

Students Assessment through CIE 100 + SEE 100

Continuous Internal Evaluation (100)	Assessment	Weight age in Marks
		Problem Definition
	SRS	20
	System Design	20
	Detailed Design	20
	Report Submission	20
Semester End Examination (100)	Presentation	50
	Viva-voce	50
	Total	200

Course Code: 17ECAP802

Course Title: **OOAD Lab.**

L-T-P: **0-0-1.5**

Credits: **1.5**

Contact Hrs: **3**

ISA Marks: **100**

ESA Marks: **00**

Total Marks: **100**

Teaching Hrs: **36**

Exam Duration: **3 Hours**

Objectives :

- To develop a problem statement.
- Identify Use Cases and develop the Use Case model.
- Identify the business activities and develop an UML Activity diagram. 5. Identify the conceptual classes and develop a domain model with UML Class diagram.
- Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
- Draw the State Chart diagram.
- Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
- Draw Component and Deployment diagrams.

Expt No.	DEMONSTRATION	Slots
1	Overview of the UML and its Basic building blocks, Rules, Common Mechanisms	1
2	Introduction to Rose Tool and simple case studies examples.	1
3	Introduction to Static Modeling and Dynamic Modeling's	1
4	Introduction to Architectural Modeling	1
EXERCISE		
5	Design OO design Models for the following cases. Cases: <ol style="list-style-type: none"> 1. Passport automation system. 2. Banking and ATM system 3. Exam Registration 4. Stock maintenance system. 5. Online course reservation system 6. E-ticketing 7. Software personnel management system 8. Credit card processing 9. e-book management system 10. Recruitment system 11. Hostel Management 12. Conference Management System 13. BPO Management System. 14. Pay roll system 15. Library management System 16. Payment Gateway 	1
6	Design following diagrams for chosen case study. <ol style="list-style-type: none"> i. Class Diagrams ii. Object Diagrams 	1

7	Design following diagrams for chosen case study.	1
	<ul style="list-style-type: none"> i. Interaction Diagrams ii. Sequence Diagrams iii. Collaboration Diagrams 	
8	Design following diagrams for chosen case study.	1
	<ul style="list-style-type: none"> i. Behavioral Modeling ii. Use case Diagrams iii. Activity Diagrams 	
9	Design following diagrams for chosen case study.	1
	<ul style="list-style-type: none"> i. Advanced Behavioral Modeling ii. State Chart Diagrams 	
STRUCTURED ENQUIRY		
10	Design following diagrams for chosen case study.	1
	<ul style="list-style-type: none"> i. Architectural Modeling ii. Component Diagrams iii. Deployment Diagrams 	

Evaluation Scheme

2. In Semester Assessment (ISA): Continuous Internal Assessment for 100 Marks.

Course Code: 17ECAE801		Course Title: Information Storage and Management	
L-T-P: 3-0-1		Credits: 4	Contact Hrs: 5
ISA Marks: Theory: 50 +Practice: 100		ESA Marks: 50	Total Marks: 200
Teaching Hrs: 42 + 24		Exam Duration: 3 Hours	
No	Content	Hrs	
Unit I			
1	Chapter 1: Introduction to Information Storage: Information Storage, Evolution of storage architecture, Data Center Infrastructure, Virtualization and Cloud Computing. Data center environment: Application, DBMS, Host, Connectivity, Storage, Disk Drive Components, Disk Drive Performance, Host Access To Data, Direct Attached Storage, Storage Design Based on Application, disk native Command Queuing	6 Hrs	
2	Chapter 2 : Data protection: RAID RAID Implementation Methods, RAID Array Components, RAID Techniques, Raid Levels,	5 Hrs	

RAID Impact on Disk performance, RAID Comparison, HOT Spares

- 3 Chapter 3. Intelligent Storage Systems: 5 Hrs**
Components of an Intelligent storage system, LUN Masking, Types of Intelligent storage Systems

Unit II

- 4 Chapter 4: Fibre Channel Storage Area Networks: 6 Hrs**
Fiber channel: Overview, Components of SAN, FC Connectivity, Switched Fabric ports, Fibre Channel Architecture, Zoning, FC SAN Topologies, Virtualization in SAN. IP SAN: iSCSI, FCIP.

- 5 Chapter 5: Network Attached Storage (NAS): 5 Hrs**
Components of NAS, NAS Implementations, NAS File sharing Protocols, Factors Affecting NAS Performance, File Level Virtualization.

- 6 Chapter 6: Content Addressed Storage(CAS) and Unified Storage 5 Hrs**
Object Based Storage Devices, Content Addressed Storage, Unified Storage

Unit – III

- 7 Chapter 7: Local Replication and Remote Replication : 5 Hrs**
Local Replication Technologies, Remote Replication Technologies.

- 8 Chapter 8: Securing & Managing the Storage Infrastructure 5 Hrs**
Information security Framework, Risk Traid, Storage Security Domains, Monitoring the Storage Infrastructure, Storage Infrastructure Management activities, Storage Infrastructure Management Challenges.

Text Book:

1. G.Somasundaram, Aloka Shrivastava, "EMC Education Services, Information Storage and Management", Wiley, 2009.

References:

1. Foundations ULF Troppens, Rainer Erkens and Wolfgang Muller, "Storage Networks Explained", John Wiley & Sons, 2003.
2. Robert Spalding, "Storage Networks: The complete Reference", Tata Mc Graw Hill, 2003.
3. Richard barker and Paul Massiglia, "Storage Area Networks Essentials: A complete Guide to understanding and Implementing SANS", John Wiley India, 2002.
4. Marc Farely, " Building Storage Networking Fundamentals", Cisco press, 2005

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20

ISA- 2	20
Assignments	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **17ECAE803**

Course Title: **Digital Image Processing**

L-T-P: **2-0-1**

Credits: **3**

Contact Hrs: **4**

ISA Marks-Theory: **50** +Practice: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter No. 1- Digital Image Fundamentals Introduction: Origins of digital image processing, Electromagnetic spectrum, Applications, Components of image processing system, Image sensing and acquisition, Digitization, Sampling and Quantization	4 Hrs
2	Chapter No. 2- Intensity Transformations and Spatial Filtering Image Enhancement: Basic gray level transformations, histogram processing, enhancement using arithmetic/ logic operations, basics of spatial filtering, smoothing and sharpening spatial filters.	6 Hrs
3	Chapter No. 3- Filtering in the frequency domain Frequency domain: introduction to the Fourier transform and the Frequency domain, smoothing and sharpening frequency domain filters, Discrete Fourier transforms, Properties of DFT, FFT	6 Hrs
Unit II		
4	Chapter No. 4- Image Restoration and Reconstruction A model of the image degradation/restoration process, noise models, Spatial Filtering- mean filters, order static filters, adaptive filters	10Hrs
5	Chapter No. 5- Color Image Processing Color models, pseudo color image processing, smoothing and sharpening.	6 Hrs

Unit – III

6	Chapter No. 6- Morphological Image Processing	5
	Introduction, structuring elements, dilation and erosion, opening and closing, Hit-or-Miss transformation, basic morphological algorithms	Hrs
7	Chapter No. 7- Image Segmentation	5
	Detection of discontinuities, edge linking and boundary detection, Thresholding, Region based approach, segmentation by morphological watersheds	Hrs

Text Book:

3. Rafael.C.Gonzalez, Richard.E.Woods, Digital Image Processing, Pearson, 3rd Edition, 2008.
4. http://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_table_of_contents_imgproc/py_table_of_contents_imgproc.html)

DIP Practices using Python

COURSE DESCRIPTION:

Computer vision is the automated extraction of information from images. Information can mean anything from 3D models, camera position, object detection and recognition to grouping and searching image content. This course provide hands-on programming practices and introduces basic tools for working with images using python OpenCV library.

OBJECTIVES

- To provide hands-on programming with images using Python.
- To demonstrate computer vision techniques behind a wide variety of real-world applications.
- To implement many of the fundamental algorithms using OpenCV library.

LAB REQUIREMENTS:

- Computer with latest configuration having Windows and Linux OS Versions.
- Python with OpenCV Library installed.

LIST OF EXERCISES

Expt./ Job No.	Lab assignments/ experiment	Implementation	Number of Hours
1.	Changing Colorspaces	Learn to change images between different color spaces. Plus learn to track a colored object in a video.	1
2.	Geometric Transformations of Images :	Learn to apply different geometric transformations to images like rotation, translation etc.	
3.	Image Thresholding :	Learn to convert images to binary images using global thresholding, Adaptive thresholding, Otsu's binarization etc	1
4.	Smoothing Images:	Learn to blur the images, filter the images with custom kernels etc	
5.	Morphological Transformations	Learn about morphological transformations like Erosion, Dilation, Opening, Closing etc	1
6.	Image Gradients :	Learn to find image gradients, edges etc	
7.	Canny Edge Detection:	Learn to find edges with Canny Edge Detection	1
8.	Image Pyramids:	Learn about image pyramids and how to use them for image blending	
9.	Contours in OpenCV:	All about Contours in OpenCV	1
10.	Histograms in OpenCV:	All about histograms in OpenCV	
11.	Image Transforms in OpenCV:	Meet different Image Transforms in OpenCV like Fourier Transform, Cosine Transform etc.	1
12.	Template Matching :	Learn to search for an object in an image using Template Matching	1
13.	Hough Line Transform :	Learn to detect lines in an image	1
14.	Hough Circle Transform:	Learn to detect circles in an image	
15.	Image Segmentation with Watershed Algorithm:	Learn to segment images with watershed segmentation.	1
16.	Interactive Foreground Extraction using GrabCut Algorithm:	Learn to extract foreground with GrabCut algorithm	1

References:

- https://www.tutorialspoint.com/mongodb/mongodb_tutorial.pdf
- https://blog.codecentric.de/files/2012/12/MongoDB-CheatSheet-v1_0.pdf
- <http://www.guru99.com/mongodb-tutorials.html>

Evaluation Scheme

3. Assessment

Assessment	Theory	Lab.
ISA- 1	25	

Course Code: **17ECAE802**

Course Title: **Linux Administration**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks-Theory: **50** +Lab: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42+24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter 1. Basic System Configuration Opening Graphical Applications, System Locale and Keyboard Configuration: Setting the System Locale, Changing the Keyboard Layout, Managing Users and Groups; Introduction to Users and Groups, Managing Users in a Graphical Environment..	6 Hrs
2	Chapter 2. Package Management, Services and Daemons Yum: Checking For and Updating Packages, Packages and Package Groups, Configuring Yum and Yum Repositories. Configuring Services, Running Services OpenSSH: The SSH Protocol, An Open SSH Configuration, Open SSH Clients	6 Hrs
3	Chapter 3. Web & Mail Servers : Web Servers: The Apache HTTP Server Updating the Configuration, Running the httpd Service, Editing the Configuration Files, Working with Modules , Setting Up Virtual Hosts, Setting Up an SSL Server. Mail Servers- Email Protocols, Email Program Classifications, Mail Transport Agents, Mail Delivery Agents, Mail User Agents	8 Hrs
Unit II		
4	Chapter 4. File & Directory Servers : FTP Servers : The File Transfer Protocol, FTP Servers, Files Installed with vsftpd , Starting and Stopping vsftpd,vsftpd Configuration Options.Runing FTP Server Samba Server : Introduction to Samba, Samba Daemons and Related Services, Connecting to a Samba Share, Configuring a Samba Server ,Starting and Stopping Samba, Samba Server Types and the smbconf File, Samba Security Modes, Samba Account Information Databases, Samba Network Browsing , Samba with CUPS Printing Support, Samba Distribution Programs Directory Servers -OpenLDAP, Introduction to LDAP, Installing the OpenLDAP Suite , Configuring an OpenLDAP Server , SELinux Policy for Applications Using LDAP, Running an OpenLDAP Server, Configuring a System to Authenticate Using OpenLDAP	10 Hrs

5	Chapter 5 Viewing and Managing Log Files - Locating Log Files, Basic Configuration of Rsyslog, Working with Queues in Rsyslog , Using Rsyslog Modules , Interaction of Rsyslog and Journal, Structured Logging with Rsyslog , Debugging Rsyslog, Using the Journal, Managing Log Files in a Graphical Environment.	5 Hrs
Unit – III		
6	Chapter. 6. Working with the GRUB 2 Boot Loader Configuring the GRUB 2 Boot Loader, Customizing GRUB Menu, GRUB 2 Password Protection, Reinstalling GRUB , GRUB 2 over Serial Console, Terminal Menu Editing During Boot, UEFI Secure Boot	5 Hrs
8	Chapter 7. Automating System Tasks -Cron and Anacron- Installing Cron and Anacron, Running the Crond Services, Configuring Anacron Jobs, Configuring Cron Jobs, Controlling Access to Cron, Black and White Listing of Cron Jobs At and Batch-Installing At and Batch, Running the At Service, Configuring an At Job, Configuring a Batch Job, Viewing Pending Jobs, Additional Command Line Options, Controlling Access to At and Batch.	5 Hrs
<p>Textbook:</p> <p>4. Fedora 21 System Administrator's Guide Deployment, Configuration, and Administration of Fedora 21 Edition 1.0, Author Jaromír Hradílek jhradilek@redhat.com, Douglas Silas silas@redhat.com , Martin Prpič mprpic@redhat.com etc.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Kemp, Juliet, Spinger, "Linux System Administration" 2. Anita Sengar "IT Infrastructure Management" 2012 Edition, publisher: S K Kataria and Sons 3. Sjaak Laan "Infrastructure Architecture - Infrastructure Building Blocks and Concepts Second Edition, Kindle Edition, Lulu Press Inc; Second Edition 		

Linux Administration Practices

COURSE DESCRIPTION:

IT infrastructure consists of a set of physical devices and software applications that are required to operate the entire enterprise. IT infrastructure is also consists both human and technical capabilities. These services include the following- Computing platforms used to provide computing services, that connect employees, customers, and suppliers into a coherent digital environment, including servers ,Data management services that store and manage corporate data and provide capabilities for analyzing the data and Application software services that provide enterprise-wide capabilities such as enterprise resource planning, customer relationship management, supply chain management, and knowledge management systems that are shared by all business units. It allows an organization to deliver IT solutions and services to its employees, partners and/or customers and is usually internal to an organization and deployed within owned facilities.

OBJECTIVES

- Acquire comprehensive knowledge, technical expertise and hands-on experience in IT Infrastructure Management
- To learn all aspects of IMS such as Networking, Operating Systems, Virtualizations and Data Center technologies.

LAB REQUIREMENTS:

- A modern web-browser with HTML5 and JavaScript enabled.
- Remote Desktop Client connection software.
- Internet connectivity Microsoft Account (LiveID).

LIST OF EXERCISES

Expt./ Job No.	Lab assignments/experiment	Implementation	Number of Slots
8.	Web Server	Apache Web Server, IIS Server: Install and Configure the Apache Web Server on Linux and IIS server on windows.	01
9.	Samba Server	Implementation of Windows files and print services for Linux allowing the sharing of files and printers between Windows and Linux.	01
10.	LDAP Server	LDAP Server: Lightweight Directory Access Protocol- Server Installation to access a directory service.	01
11.	Mail Server	Mail Server configuration- POP3 Server, IMAP Server	01

12.	Proxy Server	Develop a small web proxy server, which is able to cache web pages. It is a very simple proxy server which only understands simple GET-requests, but is able to handle all kinds of objects - not just HTML pages, but also images.	01
13.	Firewalls and NAT (Network Address Translation)	Use of iptables to build a permissive firewall by selectively filtering packets based on protocol type. To demonstrate how addresses may be translated from private addresses to public and vice versa as they pass in and out of the firewall.	01
14.	Cloud Infrastructure: Azure Hands-on Lab (HOL) Build your Infrastructure in the Cloud using Windows Azure Infrastructure Services -	6. Login to the Windows Azure Management Portal, Define a new Windows Azure Affinity Group and Create a new Windows Azure Storage Account. 7. Register a DNS Server in Windows Azure. 8. Define a Virtual Network in Windows Azure. 9. Configure Windows Server Active Directory in a Windows Azure VM. 10. Configure New Machine for File Services in a Windows Azure VM.	01

References:

12. <https://amizone.net/AdminAmizone/WebForms/Academics/NewSyllabus/194201472058683.pdf>
13. <http://itproguru.com/azurehol/#sthash.HMydlzVA.dpuf>
14. <https://simms-teach.com/docs/cis192/cis192lab08.pdf>
15. <https://simms-teach.com/resources.php>
16. http://www.cs.rpi.edu/~kotfid/security1/PDF2/NS1_lab_6_1_4_en.pdf
17. <http://www.cse.unsw.edu.au/~cs3331/12s1/Labs/>
18. <https://www.6diss.org/workshops/ca/dns-practical.pdf>
19. <http://www.dwaynewhitten.com/info306/pages/lab.html>
20. http://www.bo.ingv.it/~scacciag/home_files/teach/netadminguide.pdf
21. <https://techpolymath.com/2015/02/16/how-to-setup-a-dns-server-for-a-home-lab-on-ubuntu-14-04/>
22. <http://www.dwaynewhitten.com/info306/lab2.pdf>

Evaluation Scheme

Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3, 4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5, 6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7, 8	Any 1 question is to be answered

Course Code: **17ECAP901**

Course Title: ASP .NET Lab **Lab.**

L-T-P:**0-0-1**

Credits: **1**

Contact Hrs: **2**

ISA Marks:: **100**

ESA Marks: --

Total Marks: **100**

Teaching Hrs: **24**

Exam Duration: **3 Hours**

<i>Expt./ Job No.</i>	<i>Lab assignments/experiment</i>	<i>No. of Lab. Slots per batch (estimate)</i>
Demonstration		
1	Program to demonstrate ASP.Net Web Forms	01
2	Program to demonstrate validation in ASP.Net	01
3	Program to demonstrate working with Data Base applications.	01
4	Program to demonstrate session tracking in ASP.Net	01
Exercises		
5	a) Write a program to display a feedback form. The different options for the list box must be ASP-XML, Dot NET, JavaPro and Unix, C, C++. When the Submit Form button is clicked after entering the	01

	<p>data, a message must be displayed.</p> <p>b) Write a program containing the following controls:</p> <ul style="list-style-type: none"> a. A List Box b. A Button c. An Image d. A Label <p>The listbox is used to list items available in a store. When the user clicks on an item in the listbox, its image is displayed in the image control. When the user clicks the button, the cost of the selected item is displayed in the control.</p>																					
6	<p>a) Write a program to get a user input such as the boiling point of water and test it to the appropriate value using Compare Validator.</p> <p>b) Declare one TextBox control, one Button control, one Label control, and one RegularExpressionValidator control in an .aspx file. The submit() function checks if the page is valid. If it is valid, it returns "The page is valid!" in the Label control. If it is not valid, it returns "The page is not valid!" in the Label control. If validation fails, the text "The zip code must be 5 numeric digits!" will be displayed in the RegularExpressionValidator control.</p>	01																				
7	<p>I. Create table CANDIDATE with the following</p> <table border="1" data-bbox="394 1291 1230 1507"> <thead> <tr> <th>Column name</th> <th>Datatype</th> </tr> </thead> <tbody> <tr> <td>Ccode</td> <td>Int</td> </tr> <tr> <td>Name</td> <td>Char(20)</td> </tr> <tr> <td>DOJ</td> <td>Date</td> </tr> </tbody> </table> <p>i) Insert following records into the table:</p> <table border="1" data-bbox="394 1585 1230 1717"> <tbody> <tr> <td>Code</td> <td>1001</td> <td>1002</td> <td>1003</td> </tr> <tr> <td>Name</td> <td>S.Raman</td> <td>M.Sushil</td> <td>Mohanyes</td> </tr> <tr> <td>DOJ</td> <td>12-Jun-97</td> <td>12-Nov-97</td> <td>30-Jul-97</td> </tr> </tbody> </table> <p>ii) Order the records on the basis of seniority of employees. iii) Drop the table.</p>	Column name	Datatype	Ccode	Int	Name	Char(20)	DOJ	Date	Code	1001	1002	1003	Name	S.Raman	M.Sushil	Mohanyes	DOJ	12-Jun-97	12-Nov-97	30-Jul-97	01
Column name	Datatype																					
Ccode	Int																					
Name	Char(20)																					
DOJ	Date																					
Code	1001	1002	1003																			
Name	S.Raman	M.Sushil	Mohanyes																			
DOJ	12-Jun-97	12-Nov-97	30-Jul-97																			
8	Write a Program in ASP that has a form taking the user's name as	01																				

	input. Store this name in a permanent cookie & whenever the page is opened again, then value of the name field should be attached with the cookie's content.	
9	Create a Session dictionary using object tag. In session-on start add keys for Time, UserAgent, RemoteIP& add appropriate values. Create a simple page to display the values.	01
10	Write a Program to delete all cookies of your web site that has created on the client's computer	01
Structured enquiry		
11	Write an application that contains a list of following technologies: <ul style="list-style-type: none"> • ASP.NET, ADO.NET, C#. • It also contains a textbox in which the user has to enter a name and a textarea in which the user has to enter his comments. When the Submit is clicked, the output should display the name entered in the textbox and the user-selection from the listbox. All the above should be displayed with the tracing for the page being enabled. 	02

Course Code: **17ECAE903**

Course Title: **RESTful Web Services**

L-T-P: **3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42+24**

Exam Duration: **3Hrs**

No	Content	Hrs
Unit I		
1	Chapter 1 : The Programmable Web and Its Inhabitants Kinds of Things on the Programmable Web, HTTP: Documents in Envelopes, Method Information, Scoping Information, The Competing Architectures, RESTful, Resource-Oriented Architectures, RPC-Style Architectures, REST-RPC Hybrid Architectures, The Human Web Is on the Programmable Web, Technologies on the Programmable Web, HTTP, URI, XML-RPC, SOAP, WS-*, WSDL, WADL, Leftover Terminology.	4 Hrs
2	Chapter 2 : Writing Web Service Clients Web Services Are Web Sites , Wrappers, WADL, and ActiveResource, del.icio.us: The Sample Application, What the Sample Clients Do, Making the Request: HTTP Libraries,	4 Hrs

	Optional Features, Ruby: rest-open-uri and net/http, Python: httplib2, Java: HttpClient, C#: System.Web.HTTPWebRequest, PHP: libcurl, JavaScript: XMLHttpRequest, The Command Line: curl, Other Languages. Processing the Response: XML Parsers: Ruby: REXML, I Guess, Python: ElementTree, Java: javax.xml, Xerces, or XMLPull, C#: System.Xml.XmlReader, PHP, JavaScript: responseXML, Other Languages, JSON Parsers: Handling Serialized Data, Clients Made Easy with WADL	
3	Chapter 3 : What Makes RESTful Services Different?	4 Hrs
	Introducing the Simple Storage Service, Object-Oriented Design of S3, A Few Words About Buckets, A Few Words About Objects, What If S3 Was a Standalone Library? Resources, HTTP Response Codes, An S3 Client, The Bucket List : The Bucket, The S3 Object, Request Signing and Access Control: Signing a URI, Setting Access Policy: Using the S3 Client Library, Clients Made Transparent with ActiveResource : Creating a Simple Service, An ActiveResource Client, A Python Client for the Simple Service, Parting Words.	
4	Chapter 4 : The Resource-Oriented Architecture	4 Hrs
	Resource-Oriented What Now? What's a Resource? URIs: URIs Should Be Descriptive, The Relationship Between URIs and Resources : Addressability, Statelessness : Application State Versus Resource State, Representations: Deciding Between Representations, Links and Connectedness, The Uniform Interface: GET, PUT, and DELETE : HEAD and OPTIONS, POST: Creating subordinate resources, Appending to the resource state, Overloaded POST: The not-so-uniform interface, Safety and Idempotence, Safety: Idempotence, Why safety and idempotence matter Why the Uniform Interface Matters, That's It!	
5	Chapter 5 : Designing Read-Only Resource-Oriented Services	4 Hrs
	Resource Design, Turning Requirements Into Read-Only Resources, Figure Out the Data Set, General Lessons, Split the Data Set into Resources, General Lessons, Name the Resources, Encode Hierarchy into Path Variables, No Hierarchy? Use Commas or Semicolons, Map URIs, Scale, Algorithmic Resource? Use Query Variables, URI Recap, Design Your Representations: The Representation Talks About the State of the Resource, The Representation Links to Other States, Representing the List of Planets, Representing Maps and Points on Maps, Representing the Map Tiles, Representing Planets and Other Places, Representing Lists of Search Results, Link the Resources to Each Other, The HTTP Response : What's Supposed to Happen? Conditional HTTP GET, What Might Go Wrong? Conclusion.	
	Unit II	
6	Chapter 6 : Designing Read/Write Resource-Oriented Services	4 Hrs
	<u>User Accounts as Resources : Why Should User Accounts Be Resources? Authentication, Authorization, Privacy, and Trust, Turning Requirements into Read/Write Resources, Figure Out the Data Set, Split the Data Set into Resources, Name the Resources with URIs, Expose a Subset of the Uniform Interface, Design the Representation(s) Accepted from the Client, Design the Representation(s) to Be</u>	

[Served to the Client, Link This Resource to Existing Resources, What's Supposed to Happen? What Might Go Wrong?](#)

[Custom Places : Figure Out the Data Set, Split the Data Set into Resources, Name the Resources with URIs, Expose a Subset of the Uniform Interface ,Design the Representation\(s\) Accepted from the Client, Design the Representation\(s\) Served to the Client, Link This Resource to Existing Resources, What's Supposed to Happen? What Might Go Wrong?](#)

[A Look Back at the Map Service](#)

7 Chapter 7 : A Service Implementation :

4 Hrs

[A Social Bookmarking Web Service, Figuring Out the Data Set, Resource Design: REST in Rails, The User Controller, The Bookmarks Controller, The User Tags Controller, The Calendar Controller, The URI Controller, The Recent Bookmarks Controller, The Bundles Controller, The Leftovers, Remodeling the REST Way, Implementation: The routes.rb File. Design the Representation\(s\) Accepted from the Client, Design the Representation\(s\) Served to the Client, Connect Resources to Each Other, What's Supposed to Happen? What Might Go Wrong? Controller Code : What Rails Doesn't Do:Conditional GET: param\[:id\] for things that aren't IDs, The Application Controller, The Users Controller The Bookmarks Controller, The Tags Controller, The Lesser Controllers, The Calendar Controller : The RecentController, The UrisController, Model Code: The User Model The Bookmark Model, What Does the Client Need to Know? Natural-Language Service Description, Description Through Standardization ,Hypermedia Descriptions](#)

8 Chapter 8 : REST and ROA Best Practices

4 Hrs

[Resource-Oriented Basics, The Generic ROA Procedure, Addressability : Representations Should Be Addressable : State and Statelessness: Connectedness, The Uniform Interface : Safety and Idempotence, New Resources: PUT Versus POSTOverloading POST, This Stuff Matters : Why Addressability Matters, Why Statelessness Matters, Why the Uniform Interface Matters, Why Connectedness Matters A terrifying example. Resource Design : Relationships Between Resources, Asynchronous Operations, Batch Operations, Transactions: When In Doubt, Make It a Resource, URI Design, Outgoing Representations, Incoming Representations, Service Versioning, Permanent URIs Versus Readable URIs, Standard Features of HTTP : Authentication and Authorization: Basic authentication, Digest authentication, WSSE username token : Compression, Conditional GET, Caching : Please cache Thank you for not caching, Default caching rules, Look-Before-You-Leap, Requests Partial GET : Faking PUT and DELETE, The Trouble with Cookies, Why Should a User Trust the HTTP Client?, Applications with a Web Interface, Applications with No Web Interface What Problem Does this Solve?](#)

9 Chapter 9 : The Building Blocks of Services

4 Hrs

[Representation Formats : XHTML, XHTML with Microformats, Atom, OpenSearch SVG, Form-Encoded Key-Value Pairs, JSON, RDF and RDFa,](#)

[Framework-Specific Serialization Formats](#) : Ad Hoc XHTML, Other XML Standards and Ad Hoc Vocabularies, Encoding Issues, XML and HTTP: Battle of the encodings, The character encoding of a JSON document

[Prepackaged Control Flows](#): General Rules, Database-Backed Control Flow, GET, PUT, POST for creating a new resource, POST for appending to a resource, DELETE

[The Atom Publishing Protocol](#): Collections, Members, Service document, Category documents, Binary documents as APP members, **GData**: Querying collections, Data extensions, POST Once Exactly,

[Hypermedia Technologies](#) : URI Templates, XHTML 4, XHTML 4 links, XHTML 4 forms, Shortcomings of XHTML 4, XHTML 5, WADL : Describing a del.icio.us resource, Describing an APP collection, Is WADL evil?

- | | | |
|-----------|---|--------------|
| 10 | <p>Chapter 10 : The Resource-Oriented Architecture Versus Big Web Services</p> <p><u>What Problems Are Big Web Services Trying to Solve?</u>
 <u>SOAP :The Resource-Oriented Alternative, <u>WSDL: The Resource-Oriented Alternative, <u>UDDI: The Resource-Oriented Alternative, <u>Security: The Resource-Oriented Alternative, <u>Reliable Messaging : The Resource-Oriented Alternative, <u>Transactions: The Resource-Oriented Alternative, <u>BPEL, <u>ESB, and <u>SOA, <u>Conclusion.</u></u></u></u></u></u></u></u></u></u></p> | 4 Hrs |
|-----------|---|--------------|

Unit – III

- | | | |
|-----------|--|--------------|
| 11 | <p>Chapter 11 : Ajax Applications as REST Clients</p> <p><u>From AJAX to Ajax, <u>The Ajax Architecture, <u>A del.icio.us Example, <u>The Advantages of Ajax, <u>The Disadvantages of Ajax, <u>REST Goes Better, <u>Making the Request, <u>Handling the Response, <u>JSON, <u>Don't Bogart the Benefits of REST, <u>Cross-Browser Issues and Ajax Libraries : <u>Prototype, <u>Dojo, <u>Subverting the Browser Security Model, <u>Request Proxying, <u>JavaScript on Demand: <u>Dynamically writing the script tag, <u>Library support.</u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></p> | 5 Hrs |
| 12 | <p>Chapter 12 : Frameworks for RESTful Services</p> <p><u>Ruby on Rails : <u>Routing, <u>Resources, <u>Controllers, and <u>Views, <u>Outgoing Representations, <u>Incoming Representations, <u>Web Applications as Web Services, <u>The Rails/ROA Design Procedure. <u>Restlet: <u>Basic Concepts: <u>Writing Restlet Clients, <u>Writing Restlet Services: <u>Resource and URI design, <u>Request handling and representations, <u>Compiling, <u>running, and <u>testing, <u>Conclusion. <u>Django: <u>Create the Data Model, <u>Define Resources and Give Them URIs, <u>Implement Resources as Django Views, <u>The bookmark list view, <u>The bookmark detail view: <u>Further directions, <u>Conclusion</u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></p> | 5 Hrs |

Text Book:

- 1 RESTful Web Services by Sam Ruby, Leonard Richardson, Publisher: O'Reilly Media, Inc. Release Date: May 2007 ISBN: 9780596529260

References:

1. Hands-On RESTful Python Web Services: Develop RESTful web services or APIs ... By Gaston C. Hillar

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3, 4, 5	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	6, 7, 8, 9,10	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	11, 12	Any 1 question is to be answered

RESTFull Web Services

SI NO Topics

1. Working on XML-RPC and SOAP Protocol
2. Working on Web Service Client using httplib2 python library
3. Understanding of CURL command and its options
4. Implementation of XML and JSON Parsing using Python
5. Working on client application to store and retrieve the data using S3 Bucket
6. Implementation of RESTfull services for data request and response
7. Working on Authentication and Authorization for RESTfull services
8. Implementation of RESTfull services for data and serialization formats, Database connectivity
9. Integration of AJAX and REST Clients

Course Code:17ECAE902

Course Title: Full Stack Development - MEAN

L-T-P: **3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42+24**

Exam Duration:**3Hrs**

No	Content	Hrs
1	Chapter 1 : Introduction to MEAN	5 Hrs

Three-tier web application development, The evolution of JavaScript, Introducing

MEAN, Installing MongoDB, Installing Node.js, Introducing NPM.

2 Chapter 2 : Getting Started with Node.js 5 Hrs

Introduction to Node.js, JavaScript closures, Node modules, Developing Node.js web applications.

3 Chapter 3 : Building an Express Web Application 6 Hrs

Introduction to Express, Installing Express, Creating your first Express application, The application, request, and response objects, External middleware, Implementing the MVC pattern, Configuring an Express application, Rendering views, Serving static files, Configuring sessions.

Unit II

4 Chapter 4 : Introduction to MongoDB 5 Hrs

Introduction to NoSQL, Introducing MongoDB , Key features of MongoDB, MongoDB shell, MongoDB databases , MongoDB collections, MongoDB CRUD operations

5 Chapter 5 : Introduction to Mongoose 6 Hrs

Introducing Mongoose, Understanding Mongoose schemas, Extending your Mongoose schema, Defining custom model methods, Model validation, Using Mongoose middleware, Using Mongoose DBRef.

6 Chapter 6 : Managing User Authentication Using Passport 6 Hrs

Introducing Passport, Understanding Passport strategies, Understanding Passport OAuth strategies; **Introduction to AngularJS:-** Introducing AngularJS, Key concepts of AngularJS, Installing AngularJS, Structuring an AngularJS application, Bootstrapping your AngularJS application, AngularJS MVC entities

Unit – III

7 Chapter 7: Creating a MEAN CRUD Module 4 Hrs

Introducing CRUD modules, Setting up the Express components, Introducing the ngResource module, Implementing the AngularJS MVC module, Finalizing your module implementation.

8 Chapter 8: Testing MEAN Applications 5 Hrs

Introducing JavaScript testing, Testing your Express application, Testing your AngularJS application; Adding Real-time Functionality Using Socket.io:- Introducing WebSockets, Introducing Socket.io, Installing Socket.io, Building a Socket.io chat.

Text Book:

1. Amos Q, Haviv, Mean Web Development, Packt Publishing 2014.

References:

1. COLIN J. IHRIG, Full Stack Javascript Development with MEAN, Sitepoint.

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4.5.6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Practice Experiments for Full Stack

Sl No	EXPERIMENT NAME
1	Build a real-time polls application with Node.js, Express, AngularJS, and MongoDB
2	Setting Up a MEAN Stack Single Page Application
3	A Sample App with Node.js, Express and MongoDB
4	REST Service with Web Interface using the MEAN Stack
5	Creating an RSS Feed Reader With the MEAN Stack
6	Create a TV Show Tracker using AngularJS, Node.js and MongoDB
7	Deploying a MEAN App to Amazon EC2

Course Code: **17ECAE901**

Course Title: **Block Chain Technologies**

L-T-P: **3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42+24**

Exam Duration:**3Hrs**

No	Content	Hrs
Unit I		
1	Introduction What blockchain is, What blockchain isn't, Blockchain definitions, How are blockchains different from databases? History of blockchain, Blockchain 2.0, The motivations behind blockchain, Characteristics of blockchain, Background of DLT, The different types of blockchain, Overview of blocks, Influence of Moore's law on blockchain technology.	5 hrs
2	A Bit of Cryptography. Cryptography in blockchain, Classical cryptography, Cryptographic primitives, Symmetric key cryptography, Asymmetric key cryptography, Elliptic-curve cryptography, Digital signatures, Cryptographic hashing.	6 hrs
3	Cryptography in Blockchain Hashing in blockchain, Linking blocks in a blockchain, Linking blocks using an SHA256 hashing algorithm, Block structure, Blockchain functionality, Creating a blockchain, Byzantine failure problem in blockchain, Digital signatures in blockchain, Creating an identity, Signatures in transaction, Asset ownership in blockchain, Transferring an asset, Transmitting the transaction, Claiming the asset, Blockchain wallets.	6 hrs
Unit - 2		
4	Networking in Blockchain. Peer-to-peer (P2P) networking, Network discovery, Block synchronization, Building a simple blockchain in a P2P network, Validating a new block, Selecting the longest chain, Conflict resolution, Block exchange between peers, Initial block synchronization, Broadcasting scenarios, Application interfaces.	6 hrs
5	Cryptocurrency. Bitcoin basics, Getting started with Bitcoin Core, Keys and addresses, Transactions, Mining and consensus, Blockchain, Blockchain networks, Bitcoin hard forks and altcoins, A simple cryptocurrency application: Transactions, Wallet, Transaction management.	6 hrs
6	Diving into Blockchain - Proof of Existence. MultiChain blockchain platform, Setting up a blockchain environment, Getting started with MultiChain, Proof of Existence architecture, Building the Proof of Existence application, Executing and deploying the application.	5 hrs
Unit - 3		
7	Diving into Blockchain - Proof of Ownership. Digital assets and identity, Proof of ownership, Smart contracts, Choosing the smart contract platform, NEO blockchain: Building blocks of a NEO blockchain, NEO technology, NEO nodes, NEO network, NEO transactions, Ethereum blockchain: Ethereum nodes, Getting started, Creating a decentralized application.	4 hrs

- 8** Blockchain Security. 4 hrs
Transaction security model, Decentralized security model, Attacks on the blockchain,
Threats of quantum computing.

Text Book:

1. Foundations of Blockchain, O'REILLY publications, 2019

References:

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3,	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4, 5, 6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7, 8	Any 1 question is to be answered

Practices

1. Implementation of basic cryptographic algorithms such as AES, ECC, RSA, ECDSA, SHA256.
2. Implementation of cryptographic primitives such as hash functions and digital signatures.
3. Implementation of P2P blockchain application.
4. Implementation of Interface for the cryptocurrency application such as wallet application and explorer application.
5. Implement decentralized application development using MultiChain blockchain framework by considering real time use case.
6. Develop decentralized application using smart contract concept in NEO and Ethereum blockchain platforms by considering real time use case.
7. Simulation of double spend attack on the Bitcoin unconfirmed transaction.

Course Code: **17ECAP904**

Course Title: **Robotics Process Automation**

L-T-P: **0-0-2**

Credits: **2**

Contact Hrs: **Full Time**

ISA Marks: **100**

ESA Marks: **--**

Total Marks: **100**

Teaching Hrs: Full Time	Exam Duration: 3 Hours	
<p>The students shall undergo certification on Robotics Process Automation (RPA) during the IV or V semester vacation by choosing Automation Anywhere or UiPath course or both. The evaluation for the course shall be done after successful completion of certification on any one or both during VI semester followed by internal assessment and submission of report.</p>		
<p>Change summary between 2017-18 and 2018-19 admitted batches (i.e. 2017-2020 batch and 2018-2021 batch)</p>		
Course Code: 17ECAC702	Course Title: Web Programming	
L-T-P: 2-1-0	Credits: 3 Contact Hrs: 4	
ISA Marks: 50	ESA Marks: 50 Total Marks: 100	
Teaching Hrs: 42	Exam Duration: 3 Hours	
No	Content	Hrs
	Unit I	
1	Chapter 1: Introduction to HTML	4 Hrs
	HTML Attributes, Styles in Tags, Current and Evolving Standard: HTML5, Headings, Paragraphs, Comments	
2	Chapter 2: Organizing Information with List & Link	8 Hrs
	Numbered Lists, Customizing Ordered Lists & Unordered Lists, Nesting Lists, Creating Links, Linking Local Pages Using Relative and Absolute Pathnames, Anatomy of a URL, Kinds of URLs, HTTP and Anonymous FTP.	
3	Chapter 3: Formatting Text with HTML	4 Hrs
	Character-Level Elements, Semantic HTML Tags, Font Properties, Quotations, Special Characters, Character Encoding	
	Unit II	
5	Chapter 4: Structuring a Page with HTML5 Tables & Forms	6 Hrs
	Cell Padding, Cell and Caption Alignment, Spanning Multiple Rows or Columns, Dynamic Overlays, Controlling Stacking, Creating Drop-Down Menus, Creating Form Controls, Access Keys, Displaying Updates with progress and meter	
6	Chapter 5: Creating CSS with Images	10 Hrs
	Creating Page-Level Styles, Contextual Selectors, Classes and IDs, Editing Styles with	

Developer Tools, The Box Model, Borders, Margins and Padding, Controlling Size and Element Display, Inline Images in HTML, Image Dimensions and Scaling, usemap Attribute, Image Etiquette, Integrating Multimedia: Video and Sound

Unit – III

7 Chapter 6: Using JavaScript and jQuery 5 Hrs

Overview of JavaScript, Syntactic characteristics, Primitives, operations and expressions, Control statements, Object creation and modification, Arrays, Functions, Constructor, Pattern matching using regular expressions, Errors in scripts, Getting Started with jQuery, Selecting Elements from the Document, Binding Events, Retrieving and Changing Style Sheet Properties, Special Effects.

8 Chapter 7: XML 5 Hrs

Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets; XML processors; Web services.

Text Book:

1. Laura Lemay, Rafe colburn, jennifer Kyrnin, MASTERING HTML, CSS & Java Script Web Publishing, BPB publications, 2016.
2. Sebesta, R.W., Programming the World Wide Web, 3rd, Pearson education, 2013.

Evaluation Scheme

3. Assessment

Assessment	Theory
ISA- 1	25
ISA- 2	25
ESA	50
Total	100

4. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3, 4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **18ECAP701**

Course Title: **Software Engineering Lab.**

L-T-P: **0-0-2**

Credits: 2

Contact Hrs: **4**

ISA Marks: **100**

ESA Marks: --

Total Marks: **100**

Teaching Hrs: **24 (T) + 24 (P)**

Exam Duration: **3 Hours**

Objectives :

- To develop a problem statement.
- Identify Use Cases and develop the Use Case model.
- Identify the business activities and develop an UML Activity diagram. 5. Identify the conceptual classes and develop a domain model with UML Class diagram.
- Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
- Draw the State Chart diagram.
- Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
- Draw Component and Deployment diagrams.

Expt No.	DEMONSTRATION	Slots
1	Overview of the UML and its Basic building blocks, Rules, Common Mechanisms	1
2	Case study - SRS, DFD, ER Model .	1
3	Introduction to Static Modeling and Dynamic Modeling's	1
4	Introduction to Architectural Modeling	1
EXERCISE		
5	Design OO design Models for the following cases. Cases: <ol style="list-style-type: none"> 17. Passport automation system. 18. Banking and ATM system 19. Exam Registration 20. Stock maintenance system. 21. Online course reservation system 22. E-ticketing 23. Software personnel management system 24. Credit card processing 25. e-book management system 26. Recruitment system 27. Hostel Management 28. Conference Management System 29. BPO Management System. 30. Pay roll system 31. Library management System 	1

	32. Payment Gateway	
6	Design following diagrams for chosen case study. i. Class Diagrams ii. Object Diagrams	1
7	Design following diagrams for chosen case study. i. Interaction Diagrams ii. Sequence Diagrams iii. Collaboration Diagrams	1
8	Design following diagrams for chosen case study. i. Behavioral Modeling ii. Use case Diagrams iii. Activity Diagrams	1
9	Design following diagrams for chosen case study. i. Advanced Behavioral Modeling ii. State Chart Diagrams	1
STRUCTURED ENQUIRY		
10	Design following diagrams for chosen case study. i. Architectural Modeling ii. Component Diagrams iii. Deployment Diagrams	1

Evaluation Scheme

In Semester Assessment (ISA): Continuous Internal Assessment for 100 Marks.

Course Title: Operating Systems

Course Code: 15ECAC704

L-T-P : 4-0-0

Credits: 4

Contact Hours: 4 hrs

CIE Marks: 50

SEE Marks: 50

Total Marks: 100

Teaching Hours: 50 Hours

Examination Duration: 3 hrs

Unit I

Chapter 1: Introduction to Operating Systems, System structures **6 hrs**

What operating systems do; Computer System organization; Computer System architecture; Operating System structure; Operating System operations; Process management; Memory management; Storage management; Protection and security; Distributed system; Special-purpose systems; Computing environments. Operating System Services; User - Operating System interface; System Types of system calls; System programs; Operating System design and implementation; Operating System structure; Virtual machines; Operating System generation; System boot.

Chapter 2: Process Management **7 hrs**

Process Concept, Process scheduling Operation on Processes, Interprocess communication, Multi-Threaded Programming: Overview; Multithreading models; Thread Libraries; Threading issues. Process Scheduling: Basic concepts; Scheduling criteria Scheduling algorithms Multiple-Processor scheduling; Thread scheduling.

Chapter 3: Process Synchronization **7 hrs**

Synchronization: The Critical section problem; Peterson's solution; Synchronization hardware; Semaphores; Classical problems of synchronization; Monitors.

Unit II

Chapter 4: Deadlocks **6 hrs**

Deadlocks: System model; Deadlock characterization; methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock

Chapter 5: Memory Management **7 hrs**

Memory Management Strategies: Background; Swapping Contiguous memory allocation; Paging Structure of page table; Segmentation Virtual Memory Management: Background; Demand paging; Copy-on-write; Page replacement Allocation of frames; Thrashing

Chapter 6: File System, Implementation of File System **7 hrs**

File System: File concept; Access methods Directory structure ,File system mounting File sharing; Protection. Implementing File System: File system structure File system implementation; Directory implementation; Allocation methods; Free space management

Unit III

Chapter 7: Secondary Storage Structures, Protection **5 hrs**

Mass storage structures; Disk structure; Disk attachment; Disk scheduling; Disk management; Swap space management. Protection: Goals of protection, Principles of protection Domain of protection, Access matrix Implementation of access matrix, Access control, Revocation of access rights, Capability-Based systems

Chapter 8: Case study – Linux operating system **5 hrs**

Design principles Kernel modules, Process management Scheduling, memory Management File systems, Input & output, Interprocess Communication.

Text Books:

1. Abraham Silberschatz, Peter Galvin and Greg Gagne': Operating System Principles, 7th edition, Wiley-India, 2006. (Chapters: 1,2,3.1, to 3.4, 4.1 to 4.4, 5.1 to 5.5, 6.1 to 6.7, 7, 8.1 to 8.6, 9.1 to 9.6, 10, 11.1 to 11.5, 12.1 to 12.6, 17.1 to 17.8, 21.1 to 21.9.)

Reference Books:

1. D.M.Dhamdhere': Operating systems-A concept based Approach 2nd Edition, Tata McGraw-Hill 2002
2. P.C.P. Bhatt : Operating systems, 2nd Edition, PHI, 2006.
3. Harvey M Deital ; Operating Systems 3rd Edition, Addison Wesley, 1990.

Scheme for Semester End Examination (SEE)

UNIT	8 Questions to be set of 20 Marks Each	Chapter numbers	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3,	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **17ECAC801**

Course Title: **Java Programming**

L-T-P: **2-1-0**

Credits: **3**

Contact Hrs: **4**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42**

Exam Duration: **3Hrs**

No	Content	Hrs
Unit I		
1	Chapter No. 1. Introduction and Fundamental Programming Structures in Java History of java, features of java, A simple java programming, Comments, Data Types, Variables, Constants, Operators, Control Flow, Big Numbers, Arrays	4 Hrs
2	Chapter No. 2. Objects and Classes Introduction to Object-Oriented Programming, Classes, Objects, Identifying Classes, Relationships between Classes, Using Predefined Classes, Objects and Object	6 Hrs

	Variables, Mutator and Accessor Methods, First Steps with Constructors, Implicit and Explicit Parameters, Benefits of Encapsulation, Class-Based Access Privileges, Private Methods, Static Fields and Methods, Method Parameters, Object Construction, Overloading, Packages.	
3	Chapter No. 3. Inheritance and Java Strings Classes, Superclasses, and Subclasses, Inheritance Hierarchies, Polymorphism, Dynamic Binding, Preventing Inheritance: Final Classes and Methods, Casting, Abstract Classes. Java String, Strings Are Immutable, StringBuffer class, StringBuilder class, toString() method, StringTokenizer in Java..	6 Hrs
	Unit II	
4	Chapter 4: Interfaces and Inner Classes Interfaces, Properties of Interfaces, Interfaces and Abstract Classes, Object Cloning, Interfaces and Callbacks, Inner Classes, Use of an Inner Class to Access Object State, Special Syntax Rules for Inner Classes, Local Inner Classes, Accessing final Variables from Outer Methods, Anonymous Inner Classes, Static Inner Classes.	6 Hrs
5	Chapter 5 : Exceptions and Multithreading Dealing with Errors, The Classification of Exceptions, Declaring Checked Exceptions, How to Throw an Exception, Creating Exception Classes, Catching Exceptions, Catching Multiple Exceptions, Rethrowing and Chaining Exceptions, The finally Clause; Multithreading:- What Are Threads?, Interrupting Threads, Thread States, Thread Properties.	6 Hrs
6	Chapter 6: Collections Collection Interfaces, Collection and Iterator Interfaces in the Java Library, Linked Lists, Array Lists, Hash Sets, Tree Sets, Object Comparison, Queues and Dequeues, Priority Queues, Maps..	4 Hrs
	Unit – III	
7	Chapter 7: Servlets Background; The life cycle of servlet, A simple servlet, The Servlet API, The javax.servlet Package ,The Servlet Interface, The ServletConfig Interface, ServletContext Interface, ServletRequest Interface, ServletResponse Interface, The Cookies class.	5 Hrs
8	Chapter 8: JSP and Database Access Overview of JSP, Invoking java code from JSP, JSP expressions, scriplet, page directive.JDBC Driver, JDBC Packages, Database Connection, JDBC/ODBC Bridge with the Database, ResultSet, Transaction Processing.	5 Hrs

Text Book:

1. Core Java Volume-I Fundamentals 10th Edition, 2016, by CAY S. Horstmann, Gray Cornell.
2. Jim Keogh, J2EE The Complete Reference, Tata McGraw Hill 2007.

References:

1. Head First Java 2nd Edition by Kathy Sierra and Bert Bates, OREILLY.

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code:**18ECAE802**

Course Title: **User Interface Design**

L-T-P: **2-0-1**

Credits: **3**

Contact Hrs: **4**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42+24**

Exam Duration:**3Hrs**

No	Content	Hrs
Unit I		
1	Chapter 1 : What Users Do The Basics of User Research ,Users' Motivation to Learn, The Patterns.	5 Hrs
2	Chapter 2 : Organizing the Content: Information Architecture and Application Structure The Big Picture, The Patterns:- Feature, Search, and Browse, News Stream, Picture Manager, Dashboard, Canvas Plus Palette, Wizard.	6 Hrs
3	Chapter 3 : Getting Around: Navigation, Signposts, and Wayfinding Staying Found, The Cost of Navigation, Navigational Models, Design Conventions for Websites, The Patterns:- Clear Entry Points, Menu Page, Pyramid, Modal Panel, Deep-linked State, Escape Hatch, Fat Menus, Sitemap	6 Hrs

Footer, Sign-in Tools, Sequence Map, Breadcrumbs, Annotated Scrollbar, Animated Transition.

Unit II

- | | | |
|----------|--|--------------|
| 4 | Chapter 4 : Organizing the Page: Layout of Page Elements
The Basics of Page Layout, The Patterns:- Visual Framework, Center Stage, Grid of Equals, Titled Sections, Module Tabs, Collapsible Panels, Movable Panels, Right/Left Alignment, Diagonal Balance. | 5 Hrs |
| 5 | Chapter 5 : Lists of Things
Use Cases for Lists, Back to Information Architecture, The Patterns:- Two-Panel Selector, One-Window Drilldown, List Inlay, Thumbnail Grid, Row Striping, Jump to Item, Cascading Lists, Tree Table. | 6 Hrs |
| 6 | Chapter 6 : Doing Things: Actions and Commands
Pushing the Boundaries, The Patterns:- Button Groups, Hover Tools, Action Panel, Smart Menu Items, Preview, Progress Indicator, Macros. | 6 Hrs |

Unit – III

- | | | |
|----------|---|--------------|
| 7 | Chapter 7: Showing Complex Data: Trees, Charts, and Other Information Graphics
The Basics of Information Graphics, The Patterns:- Overview Plus Detail, Datatips, Data Spotlight, Dynamic Queries, Data Brushing, Local Zooming, Sortable Table, Radial Table, Multi-Y Graph, Small Multiples, Treemap. | 4 Hrs |
| 8 | Chapter 8: Getting Input from Users: Forms and Controls
The Basics of Form Design, Control Choice, The Patterns:- Forgiving Format, Structured Format, Fill-in-the-Blanks, Input Hints, Input Prompt, Password Strength Meter, Autocompletion, Dropdown Chooser, Same-Page Error Messages. | 4 Hrs |

Text Book:

1. Jenifer Tidwell , Designing Interfaces, 2nd Edition, O'Reilly ,2010

References:

1. Jodie Moule., Killer UX Design, SitePoint,2012

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
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I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4.5.6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

User Interface Design Practices		
Sl.No	Activity	Hours
1	Find two examples of user interfaces (might be desktop software, web applications, smartphone apps, consumer devices, car dashboards, building entrances, traffic intersections, shower controls, etc), one that you consider a good design and one that you consider a bad design. For each interface, you should: <ul style="list-style-type: none"> Describe its purpose intended users. Analyze its good and bad points of usability with reference to all the dimensions of usability (learnability, visibility, efficiency, errors) Illustrate your analysis with appropriate screenshots or photographs.	2
2	Design a user interface for a specific task that communicates its conceptual model to the user more effectively, so that users are less likely to make this mistake. Sketch your ideas (alternate designs) on a whiteboard. Critique it, and update the designs.	2
3	Guided by the categories below, make a list of what needs to be made visible, and then brainstorm (and sketch) how the interface might make it visible. <ul style="list-style-type: none"> Actions: what can the user do? State: what is the current state of the system? Feedback: what was the effect of the user's actions 	2
4	Explore the undo models used in single-user text editing. Choose a few different kinds of textboxes. Experiment with a web browser's undo model for text editing by typing, deleting, changing properties, and using Undo. Try to figure out: <ul style="list-style-type: none"> How many undo streams are there—one, or many? How is the history divided into undoable units? How much previous state is recovered when you undo? (Selections? cursor positions?) What visible feedback does Undo give? (e.g., if the Undo affects a location scrolled out of the box?) 	2
5	User-centered design process, by conducting a lightweight UCD process on a few problems in the classroom.	2
6	User Analysis, Task Analysis, Domain Analysis by observing a real environment of people working.	2
7	Designing UIs by sketching.	2
8	Exploring some of the main structuring patterns of GUI software: the view tree, listeners, and model-view-controller using HTML, Javascript, and jQuery, along with a handy online HTML editor.	2
9	Explore about low-fidelity prototyping by creating a simple, hand-drawn prototype in less than 5 minutes, and simulating it with another user.	2
10	Information visualization by experimenting with modifications to an existing visualization using a browser.	2
11	Exploring some of the principles and pitfalls of color design and typography.	2
12	Heuristic evaluation of an e-commerce web site. Record the usability problems	2

4	<p>Chapter 4 : The Resource-Oriented Architecture</p> <p>Resource-Oriented What Now? What's a Resource? URIs: URIs Should Be Descriptive, The Relationship Between URIs and Resources : Addressability, Statelessness : Application State Versus Resource State, Representations: Deciding Between Representations, Links and Connectedness, The Uniform Interface: GET, PUT, and DELETE : HEAD and OPTIONS, POST: Creating subordinate resources, Appending to the resource state, Overloaded POST: The not-so-uniform interface, Safety and Idempotence, Safety: Idempotence ,Why safety and idempotence matter Why the Uniform Interface Matters, That's It!</p>	4 Hrs
5	<p>Chapter 5 : Designing Read-Only Resource-Oriented Services</p> <p>Resource Design, Turning Requirements Into Read-Only Resources, Figure Out the Data Set, General Lessons, Split the Data Set into Resources, General Lessons, Name the Resources, Encode Hierarchy into Path Variables, No Hierarchy? Use Commas or Semicolons, Map URIs, Scale, Algorithmic Resource? Use Query Variables, URI Recap, Design Your Representations:_The Representation Talks About the State of the Resource, The Representation Links to Other States, Representing the List of Planets, Representing Maps and Points on Maps, Representing the Map Tiles, Representing Planets and Other Places, Representing Lists of Search Results, Link the Resources to Each Other, The HTTP Response : What's Supposed to Happen? Conditional HTTP GET, What Might Go Wrong? Conclusion.</p>	4 Hrs
Unit II		
6	<p>Chapter 6 : Designing Read/Write Resource-Oriented Services</p> <p><u>User Accounts as Resources : Why Should User Accounts Be Resources? Authentication, Authorization, Privacy, and Trust, Turning Requirements into Read/Write Resources, Figure Out the Data Set, Split the Data Set into Resources , Name the Resources with URIs, Expose a Subset of the Uniform Interface, Design the Representation(s) Accepted from the Client, Design the Representation(s) to Be Served to the Client, Link This Resource to Existing Resources, What's Supposed to Happen? What Might Go Wrong?</u></p> <p><u>Custom Places : Figure Out the Data Set, Split the Data Set into Resources, Name the Resources with URIs, Expose a Subset of the Uniform Interface ,Design the Representation(s) Accepted from the Client, Design the Representation(s) Served to the Client, Link This Resource to Existing Resources, What's Supposed to Happen? What Might Go Wrong?</u></p> <p><u>A Look Back at the Map Service</u></p>	4 Hrs
7	<p>Chapter 7 : A Service Implementation :</p> <p><u>A Social Bookmarking Web Service, Figuring Out the Data Set, Resource Design: REST in Rails, The User Controller, The Bookmarks Controller, The User Tags Controller, The Calendar Controller, The URI Controller, The Recent Bookmarks Controller, The Bundles Controller, The Leftovers, Remodeling the REST Way, Implementation: The routes.rb File.</u></p>	4 Hrs

	<p><u>Design the Representation(s) Accepted from the Client, Design the Representation(s) Served to the Client, Connect Resources to Each Other, What's Supposed to Happen? What Might Go Wrong?</u> Controller Code : What Rails Doesn't Do:Conditional GET: param[:id] for things that aren't IDs, <u>The Application Controller, The Users Controller The Bookmarks Controller, The Tags Controller, The Lesser Controllers, The Calendar Controller : The RecentController, The UrisController, Model Code: The User Model The Bookmark Model, What Does the Client Need to Know? Natural-Language Service Description, Description Through Standardization ,Hypermedia Descriptions</u></p>	
8	<p>Chapter 8 : REST and ROA Best Practices</p> <p><u>Resource-Oriented Basics, The Generic ROA Procedure, Addressability : Representations Should Be Addressable : State and Statelessness: Connectedness, The Uniform Interface : Safety and Idempotence, New Resources: PUT Versus POSTOverloading POST, This Stuff Matters : Why Addressability Matters, Why Statelessness Matters, Why the Uniform Interface Matters, Why Connectedness Matters A terrifying example. Resource Design : Relationships Between Resources, Asynchronous Operations, Batch Operations, Transactions: When In Doubt, Make It a Resource, URI Design, Outgoing Representations, Incoming Representations, Service Versioning, Permanent URIs Versus Readable URIs, Standard Features of HTTP : Authentication and Authorization: Basic authentication, Digest authentication, WSSE username token : Compression, Conditional GET, Caching : Please cache Thank you for not caching, Default caching rules, Look-Before-You-Leap, Requests Partial GET : Faking PUT and DELETE, The Trouble with Cookies, Why Should a User Trust the HTTP Client?, Applications with a Web Interface, Applications with No Web Interface What Problem Does this Solve?</u></p>	4 Hrs
9	<p>Chapter 9 : The Building Blocks of Services</p> <p>Representation Formats : XHTML, XHTML with Microformats, Atom, OpenSearch SVG, Form-Encoded Key-Value Pairs, JSON, RDF and RDFa, Framework-Specific Serialization Formats : Ad Hoc XHTML, Other XML Standards and Ad Hoc Vocabularies, Encoding Issues, XML and HTTP: Battle of the encodings, The character encoding of a JSON document Prepackaged Control Flows: General Rules, Database-Backed Control Flow, GET, PUT, POST for creating a new resource, POST for appending to a resource, DELETE The Atom Publishing Protocol: Collections, Members, Service document, Category documents, Binary documents as APP members, GData: Querying collections, Data extensions, POST Once Exactly, Hypermedia Technologies : URI Templates, XHTML 4, XHTML 4 links, XHTML 4 forms, Shortcomings of XHTML 4, XHTML 5, WADL : Describing a del.icio.us resource, Describing an APP collection, Is WADL evil?</p>	4 Hrs
10	<p>Chapter 10 : The Resource-Oriented Architecture Versus Big Web Services</p> <p><u>What Problems Are Big Web Services Trying to Solve?</u> SOAP :The Resource-Oriented Alternative, WSDL: The Resource-Oriented Alternative, UDDI: The Resource-Oriented Alternative, Security: The Resource-Oriented</p>	4 Hrs

Alternative, Reliable Messaging : The Resource-Oriented Alternative, Transactions: The Resource-Oriented Alternative, BPEL, ESB, and SOA, Conclusion.

Unit – III

11 Chapter 11 : Ajax Applications as REST Clients 5 Hrs

From AJAX to Ajax, The Ajax Architecture, A del.icio.us Example, The Advantages of Ajax, The Disadvantages of Ajax, REST Goes Better, Making the Request, Handling the Response, JSON, Don't Bogart the Benefits of REST, Cross-Browser Issues and Ajax Libraries : Prototype, Dojo, Subverting the Browser Security Model, Request Proxying, JavaScript on Demand: Dynamically writing the script tag, Library support.

12 Chapter 12 : Frameworks for RESTful Services 5 Hrs

Ruby on Rails : Routing, Resources, Controllers, and Views, Outgoing Representations, Incoming Representations, Web Applications as Web Services, The Rails/ROA Design Procedure. Restlet: Basic Concepts: Writing Restlet Clients, Writing Restlet Services: Resource and URI design, Request handling and representations, Compiling, running, and testing, Conclusion. Django: Create the Data Model, Define Resources and Give Them URIs, Implement Resources as Django Views, The bookmark list view, The bookmark detail view: Further directions, Conclusion

Text Book:

- 1 RESTful Web Services by Sam Ruby, Leonard Richardson, Publisher: O'Reilly Media, Inc. Release Date: May 2007 ISBN: 9780596529260

References:

1. Hands-On RESTful Python Web Services: Develop RESTful web services or APIs ... By Gaston C. Hillar

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3, 4, 5	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	6, 7, 8, 9,10	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	11, 12	Any 1 question is to be answered

.RESTFull Web Services

1. Working on XML-RPC and SOAP Protocol
2. Working on Web Service Client using httplib2 python library
3. Understanding of CURL command and its options
4. Implementation of XML and JSON Parsing using Python
5. Working on client application to store and retrieve the data using S3 Bucket
6. Implementation of RESTfull services for data request and response
7. Working on Authentication and Authorization for RESTfull services
8. Implementation of RESTfull services for data and serialization formats, Database connectivity
9. Integration of AJAX and REST Clients

Course Code: **17ECAC805**

Course Title: **Data Mining**

L-T-P: **3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50 + 100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter No. 1. Introduction Fundamentals of data mining, Kinds of pattern, technologies used, and technologies used, applications, issues, data objects and attribute types, Basic Statistical Descriptions of Data, Data Visualization,.	8 Hrs
2	Chapter No. 2. Data Preprocessing Need of preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization.	5 Hrs
3	Chapter No. 3. . Data Warehousing and Online Analytical Processing Data Warehouse: Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction.	7 Hrs
Unit II		
4	Chapter No. 4. Mining Frequent Patterns, Associations, and Correlations Basic Concepts, Frequent Itemset Mining Methods, Which Patterns Are Interesting?: Pattern Evaluation Methods, Pattern Mining in Multilevel, Multidimensional Space, Constraint-Based Frequent Pattern Mining.	6 Hrs
5	Chapter No. 5. . Classification Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification	7 Hrs

Accuracy, Bayesian Belief Networks, Classification by Backpropagation.

6 Chapter No. 6. Graph Mining, Social Network Analysis, and Multi-relational Data Mining 7 Hrs

Methods for Mining Frequent Sub graphs, Mining Variant and Constrained Substructure Patterns, Characteristics of Social Networks, Mining on Social Networks, Multirelational mining, Multirelational Classification, Multirelational Clustering with User Guidance..

Unit – III

7 Chapter No. 7. . Cluster Analysis 5 Hrs

Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering..

8 Chapter No. 8. Mining Complex Types of Data 5 Hrs

Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

Text Book:

1. J. Han, M. Kamber., Data Mining Concepts and Techniques, 3rd edition, Kaufmann publishers, 2011.

References

1. Pujari, A.K, Datamining Techniques, 1, Universities Press, 2010

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA 1	20
ISA 2	20
Seminar by individual student*	05
Course Project Activity**	05
Total	50

* **Seminar** topic should be on application of DM in various domains such as health, insurance, sports, social networks, education, politics, business and so on.

****Course Project Activity:** Group of 2 students need to demonstrate the DM tool/s for the extraction of various knowledge from real life data.

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4, 5, 6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7, 8	Any 1 question is to be answered

Data Mining

List of Practices

S. No	Assignment
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1	Demonstration of preprocessing on given dataset	Using DM tools such as Weka Rapid Miner Orange KNIME Tableau Excel Google Analytics
2	Demonstration of mining Discrimination between different Classes in given dataset	
3	Demonstration of Association rule process on given dataset using Apriori algorithm	
4	Demonstration of classification rule process on given dataset using Decision tree algorithm	
5	Demonstration of classification rule process on dataset using naïve Bayes algorithm	
6	Demonstration of prediction on given dataset using regression techniques	
7	Demonstration of data visualization on given dataset	
8	Demonstration of quartiles using FIVE number summary on given dataset	
9	Demonstration of Graph displays of statistical class description on given dataset using: <ul style="list-style-type: none"> 1. Histogram 2. A quantile plot 3. A quantile-quantile plot 4. A scatter plot 5. A loess curv 	
10	Demonstration of web mining for given portal.	

Course Code: **18ECAE808**

Course Title: **DevOps**

L-T-P: **2-0-1**

Credits: **3**

Contact Hrs: **4**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42+24**

Exam Duration: **3Hrs**

No	Content	Hrs
Unit I		
1	Chapter 1 : Introduction to DevOps and Continuous Delivery Introducing DevOps, How fast is fast?, The Agile wheel of wheels, Beware the cargo cult Agile fallacy, DevOps and ITIL.	4 Hrs
2	Chapter 2 : A View from Orbit : The DevOps process and Continuous Delivery – an overview : The developers, The revision control system, The build server, The artifact repository, Package managers, Test environments, Staging/production, Release management, Scrum, Kanban, and the delivery pipeline, Wrapping up – a complete example, Identifying bottlenecks	4 Hrs
3	Chapter 3 : How DevOps Affects Architecture Introducing software architecture, The monolithic scenario, Architecture rules of thumb, The separation of concerns, The principle of cohesion, Coupling, Back to the monolithic scenario, A practical example, Three-tier systems, The presentation tier, The logic tier, The data tier, Handling database migrations, Rolling upgrades, Hello world in Liquibase, The changelog file, The pom.xml file, Manual installation,	6 Hrs

	Microservices, Interlude – Conway's Law, How to keep service interfaces forward compatible, Microservices and the data tier, DevOps, architecture, and resilience	
4	Chapter 4 : Everything is Code The need for source code control, The history of source code management, Roles and code, Which source code management system? A word about source code management system migrations, Choosing a branching strategy, Branching problem areas, Artifact version naming, Choosing a client, Setting up a basic Git server, Shared authentication, Hosted Git servers, Large binary files, Trying out different Git server implementations, Docker intermission, Gerrit : a) Installing the git-review package, b) The value of history revisionism, The pull request model, GitLab	6 Hrs
Unit II		
5	Chapter 5 : Building the Code Why do we build code? The many faces of build systems, The Jenkins build server, Managing build dependencies, The final artifact, Cheating with FPM, Continuous Integration, Continuous Delivery, Jenkins plugins, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, A look at the Jenkins filesystem layout, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers, Collating quality measures, About build status visualization, Taking build errors seriously, Robustness	6 Hrs
6	Chapter 6 : Testing the Code Manual testing, Pros and cons with test automation, Unit testing, JUnit in general and JUnit in particular, A JUnit example, Mocking, Test Coverage, Automated integration testing, Docker in automated testing, Arquillian, Performance testing, Automated acceptance testing, Automated GUI testing, Integrating Selenium tests in Jenkins, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development, A complete test automation scenario : Manually testing our web application, Running the automated test, 3 Finding a bug, Test walkthrough, Handling tricky dependencies with Docker	6 Hrs
7	Chapter 7 : Deploying the Code Why are there so many deployment systems? Configuring the base OS, Describing clusters, Delivering packages to a system, Virtualization stacks: Executing code on the client, A note about the exercises, The Puppet master and Puppet agents, Ansible, PuppetOps, Deploying with Chef, Deploying with SaltStack, Salt versus Ansible versus Puppet versus PuppetOps execution models, Vagrant, Deploying with Docker, Comparison tables, Cloud solutions, AWS, Azure.	4 Hrs
8	Chapter 8 : Monitoring the Code Nagios, Munin, Ganglia, Graphite, Log handling, Client-side logging libraries, The ELK stack.	4 Hrs
Unit – III		
9	Chapter 9 : Issue Tracking What are issue trackers used for? Some examples of workflows and issues, What do	5 Hrs

we need from an issue tracker? Problems with issue tracker proliferation, All the trackers : Bugzilla, Trac, Redmine, The GitLab issue tracker, Jira

10 Chapter 10 : The Internet of Things and DevOps

5 Hrs

Introducing the IoT and DevOps, The future of the IoT according to the market, Machine-to-machine communication, IoT deployment affects, software architecture, IoT deployment security, Okay, but what about DevOps and the IoT again?, A hands-on lab with an IoT device for DevOps

Text Book:

1. Practical DevOps by Joakim Verona Publisher: Packt Publishing, Release Date: February 2016, ISBN: 9781785882876

References:

1. **Effective DevOps**, Building a Culture of Collaboration, Affinity, and Tooling at Scale , By Jennifer Davis, Ryn Daniels, **Publisher:** O'Reilly Media, **Release Date:** June 2016 , **Pages:** 410.
2. **The DevOps Handbook: How to Create World-Class Speed, Reliability, and Security in Technology Organizations**, Gene Kim, Patrick Debois, John Willis, Jez HumbleIT Revolution Press, 2016 - Business & Economics - 480 pages.

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3, 4,	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5, 6, 7, 8,	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	9, 10	Any 1 question is to be answered

DevOps Practice Exercise:

The objectives of these practice exercise is to learn DevOps best practices and to define entire infrastructure as code and learn about infrastructure as code, continuous integration, continuous delivery, Terraform, AWS, Packer, Docker, and much more.

- 1) **DevOps basics:** Learn the origins of DevOps and the basic principles and techniques.
- 2) **AWS crash course:** Hands-on session where you learn to use the most important AWS services, including IAM, EC2, ASG, EBS, ELB, S3, and RDS.
- 3) **Infrastructure as code:** Overview of different techniques to manage infrastructure, including ad-hoc scripts (e.g., Bash, Python), configuration management tools (e.g., Chef, Puppet), machine images (e.g., VMs, Docker), and provisioning tools (e.g., Terraform, CloudFormation).
- 4) **Terraform introduction:** Go through a series of coding exercises that cover the basic Terraform syntax, state management, loops, conditionals, lifecycle management, and common gotchas.

- 5) **Advanced Terraform:** Go through a series of coding exercises that cover Terraform modules, file layout, keeping code DRY, team workflows, and automated testing.
- 6) **Immutable infrastructure:** Overview of immutable infrastructure practices, versioning artifacts, promoting artifacts through environments, and deployment.
- 7) **Packer introduction:** Build your own AMIs and other virtual machine images using Packer.
- 8) **Docker introduction:** Create your own Docker images and deploy them using Docker orchestration tools.
- 9) **Continuous delivery:** Learn how to integrate Terraform, Packer, and Docker into a continuous delivery pipeline.
- 10) **DevOps best practices:** Learn about continuous integration, microservices, feature toggles, canary deployments, monitoring, alerting, and log aggregation.
- 11) **Production readiness review:** A Gruntwork engineer goes through a checklist of questions with your team to see what work you need to do to be ready for prod.
- 12) **Architecture deployment:** Deploy your customized Reference Architecture in AWS.
- 13) **Architecture walkthrough:** Overview of how the architecture works and how to use it.
- 14) **Migrating to the new architecture:** Learn the process of migrating your apps and data to the new architecture.

Course Code: **16ECAC902**

Course Title: **Advanced Java Programming**

L-T-P: **2-1-0**

Credits: **3**

Contact Hrs: **4**

ISA Marks-Theory: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter 1: Java Server Pages JSP Technologies, Understanding the Client-Server Model, Understanding Web server software, Configuring the JSP Server, Handling JSP Errors, JSP Translation Time Errors, JSP Request Time Errors o Creating a JSP Error Page.	9 Hrs
2	Chapter 2: Session Management HTTP as a stateless protocol, Hidden form fields, Cookies, session tracking Http Session, Exception handling and error pages, Directives	3 Hrs
3	Chapter 3: Java Beans Concepts of Java Beans, Developing Java Beans, Controls and Properties of a Bean, Types of Properties.	5 Hrs
Unit II		
4	Chapter 4: Struts Introduction to the Apache Struts o MVC Architecture o Struts Architecture, How Struts Works? ,Introduction to the Struts Controller o Introduction to the Struts Action Class ,Using Struts Action From Class Using Struts HTML Tags Introduction to Struts Validator Framework ,Client Side Address Validation in Struts o Custom Validators	7 Hrs

- Example, Developing Application with Struts Tiles
- 5 Chapter 5: Spring Framework** **7 Hrs**
Introduction to spring 3.0, steps to use spring framework in applications, understanding IOC and Dependency Injection, Understanding the bean life-cycle, annotation based dependency injection.
- 6 Chapter 6: Hibernate** **3 Hrs**
Introduction to Hibernate 3.0 ,Hibernate Architecture ,First Hibernate Application
- Unit – III**
- 7 Chapter 7: RMI** **4 Hrs**
RMI Architecture, Designing RMI application, Executing RMI application.
- 8 Chapter 8: Maven (Project Management Tool)** **4 Hrs**
What is Maven, Ant Vs Maven, Install Maven ,Maven Repository(Local, Central ,Remote) , Maven pom.xml, Maven web App, Maven plugin

Text Book:

1. Java Server Programming Java EE7 (J2EE 1.7), Black Book Kindle Edition 2014
2. Spring in action 4th edition by Carig walls

References:

1. www.Javatpoint.com
2. www.tutorialspoint.com

Evaluation Scheme

1. Assessment

Assessment	Theory
ISA- 1	25
ISA- 2	25
ESA	50
Total	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **18ECAE907**

Course Title: **Machine Learning**

L-T-P: **2-0-1**

Credits: **3**

Contact Hrs: **4**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **42 + 24**

Exam Duration:**3Hrs**

No

Content

Hrs

Unit I

- | | | |
|-------------------|---|--------|
| 1 | Introduction to machine learning
Introduction to Machine Learning, Applications of Machine Learning, Types of Machine Learning: Supervised, Unsupervised and Reinforcement learning, Dataset formats, Features and observations. | 6 hrs |
| 2 | Supervised Learning: Linear Regression, Logistic Regression
Linear Regression, Logistic Regression Linear Regression: Single and Multiple variables, Sum of squares error function, The Gradient descent algorithm, Application, Logistic Regression, The cost function, Classification using logistic regression, one-vs-all classification using logistic regression, Regularization. | 10 hrs |
| Unit II | | |
| 3 | Supervised Learning: Neural Network
Introduction to perceptron learning, Model representation, Gradient checking, Back propagation algorithm, Multi-class classification, and Application- classifying digits. Support vector machines, | 8 hrs |
| 4 | Unsupervised Learning : Clustering and Dimensionality reduction
Introduction, K means Clustering, Algorithm, Cost function, Application, Dimensionality reduction, PCA- Principal Component Analysis Applications, Clustering data and PCA. | 8 hrs |
| Unit – III | | |
| 5 | Introduction to Deep Learning
What is deep learning?, Difference between machine learning and deep learning, Convolution Neural Networks (CNN), Recurrent Neural Networks(RNN), When to use deep learning? | 10 hrs |

Text Book:

1. Tom Mitchell., Machine Learning, Mc Graw Hill, McGraw-Hill Science, 3rd edition.
2. Christopher Bishop., Pattern Recognition and Machine Learning, Springer, 2006

References:

1. Hands-On Machine Learning with Scikit-Learn and Tensor Flow, Concepts, Tools, and Techniques to Build Intelligent Systems, Aurelian Gerona, Publisher: O'Reilly Media, July 2016.
2. Advanced Machine Learning with Python Paperback, 28 Jul 2016 by John Hearty.

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	15
ISA- 2	15
Integrated Lab Practices	20
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
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I	3 Questions to be set of 20 Marks Each	1, 2	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	3, 4	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	5	Any 1 question is to be answered

Sl. No.	Practice	Hours
1.	Introduction to Scikit, Numpy, Scipy and TensorFlow	1
2.	Linear Regression , Nonlinear Regression, Logistic Regression Activation Functions,	1
3.	Training a multi-layer perceptron using APIs	1
4.	Training a neural network – construction, execution and use of neural network.	1
5.	Training Neural Networks - a sequence classifier and to predict time series.	1
6.	Classification using Neural Networks	1
7.	Principal Component Analysis on <ul style="list-style-type: none"> • simple matrix • on iris dataset 	1
8.	Course Project: Students in a group of four shall implement machine learning solution to a real world problem using Scikit.	4

Course Code: **18ECAE903**

Course Title: Web Mapping

L-T-P: **2-0-1**

Credits: 3

Contact Hrs: 4

ISA Marks: **Theory:50+Lab:50**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42+24**

Exam Duration:**3Hrs**

No	Content	Hrs
Unit I		
1	Chapter 1 : Introduction to Digital Mapping and Digital Mapping Tasks and Tools The Power of Digital Maps, the Difficulties of Making Maps, Different Kinds of Web Mapping, Common Mapping Tasks, Common Pitfalls, Deadends and Irritations, Identifying the Types of Tasks for a Project.	7Hrs
2	Chapter 2 : Converting and Viewing Maps Raster and Vector, OpenEV, MapServer, Geospatial Data Abstraction Library (GDAL), OGR Simple Features Library, PostGIS, Summary of Applications.	5 Hrs
3	Chapter 3 : Installing MapServer and Acquiring Map Data How MapServer Applications Operate, Walkthrough of the Main Components, Installing MapServer, Appraising Your Data Needs, Acquiring the Data You Need	5 Hrs

Unit-II

4	Chapter 4 : Analyzing and Converting Map Data Downloading the Demonstration Data, Installing Data Management Tools: GDAL and FWTools, Examining Data Content, Summarizing Information Using Other Tools, Converting Map Data, Converting Vector Data, Converting Raster Data to Other Formats.	6 Hrs
5	Chapter 5 : Visualizing Mapping Data in a Desktop Program Visualization and Mapping Programs, Using OpenEV, OpenEV Basics, Create and Edit Personal Map Data:- Planning Your Map, Preprocessing Data Examples, Creating Static Maps:- MapServer Utilities, Sample Uses of the Command-Line Utilities, Setting Output Image Formats.	6 Hrs
6	Chapter 6 : Publishing Interactive Maps on the Web Preparing and Testing MapServer, Create a Custom Application for a Particular Area, Continuing Education, Accessing Maps Through Web Services:- Web Services for Mapping, What Do Web Services for Mapping Do?, Using MapServer with Web Services.	6 Hrs
Unit – III		
7	Chapter 7: Managing a Spatial Database Introducing PostGIS, What Is a Spatial Database?, Downloading PostGIS Install Packages and Binaries, Compiling from Source Code, Steps for Setting Up PostGIS, Creating a Spatial Database, Load Data into the Database, Spatial Data Queries.	4 Hrs
8	Chapter 8: Custom Programming with MapServer's MapScript Introducing MapScript, Getting MapScript, MapScript Objects, MapScript Examples , Other Resources, Parallel MapScript Translations	3 Hrs

Text Book:

1. Tyler Mitchell, Web Mapping Illustrated, O'Reilly ,2010

References:

1. Pinde Fu, Jiulin Sun, Web GIS: Principles and Applications, ESRI Press,2012

Activities

#	TOPICS	ACTIVITY	WEIGHTAGE
1	Introduction to MapWindow (FEATURES, ABOUT THE SOFTWARE, MAIN USER INTERFACE).	Lab. Practice ASSIGNMENTS QUIZ	5
2	Georeferencing using MapWindow	Lab. Practice ASSIGNMENTS QUIZ	10
3	Digitization Using MapWindow	Lab. Practice ASSIGNMENTS QUIZ	10

4	Working With POSTGIS	Lab. Practice ASSIGNMENTS QUIZ	15
5	Working with PostgreSQL	Lab. Practice ASSIGNMENTS QUIZ	10
6	Working With Topology	Lab. Practice ASSIGNMENTS QUIZ	15
7	Buffering using map window	Lab. Practice ASSIGNMENTS QUIZ	15
8	Watershed Delineation with Map Window and Implement Visualization, Symbolization and Classification techniques	Lab. Practice ASSIGNMENTS QUIZ	20
		Total	100

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	10
ISA- 2	10
Activities	30
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4.5.6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: 18ECAE908		Course Title: E-Commerce	
L-T-P:2-0-1		Credits: 3	Contact Hrs: 4
ISA Marks-Theory: 50 +Lab: 100		ESA Marks: 50	Total Marks: 200
Teaching Hrs: 42+24		Exam Duration: 3 Hours	
No	Content	Hrs	
Unit I			
1	Chapter 1: Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.	5 Hrs	
2	Chapter 2: Consumer Oriented Electronic commerce - Mercantile Process models.	6 Hrs	
3	Chapter 3: Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.	5 Hrs	
Unit II			
4	Chapter 4: Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.	5 Hrs	
5	Chapter 5: Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.	5 Hrs	
6	Chapter 6: 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.	6 Hrs	
Unit – III			
7	Chapter 7: Consumer Search and Resource Discovery - Information search and Retrieval,Commerce Catalogues, Information Filtering.	5 Hrs	
8	Chapter 8: Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.	5 Hrs	
Text Book:			
1. Frontiers of electronic commerce – Kalakota, Whinston, Pearson			
References:			
1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.			

2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver

E-Commerce and Security Practices

Expt./ Job No.	Lab assignments/experiment	Slots
Demonstration		
1	Introduction to Secure Web Transaction.	1
2	Introduction to Web Server Security.	1
3	Introduction to SQL Injection.	1
4	Introduction to Cross site Scripting	1
5	Introduction to SSL/TLS Configuration in Apache Web Server.	1
6	Introduction to Payment Gateway Transaction.	1
Exercises		
1	Implementation of Secure Web Transaction.	1
2	Implementation of Web Server Security.	1
3	Implementation of SQL Injection	1
4	Implementation of Cross Site Scripting	1
5	Implementation of SSL/TLS Configuration in Apache Web Sever.	1
6	Implementation of Payment Gateway for given application	1
Structures enquiry		
12	Design and Develop a customized E-Commerce Web Application.	02

Evaluation Scheme

1. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

2. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered

II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Change summary between 2018-19 and 2019-20 admitted batches
(i.e. 2018-2021 batch and 2019-2022 batch)

Course Code: **19ECAC701**

Course Title: **Data Structures using C**

L-T-P: **3-1-0**

Credits:4

Contact Hrs: **5**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: 42

Exam Duration:**3Hrs**

No	Content	Hrs
Unit I		
1	Chapter 1 : Overview of C Information and its meaning, Data Types,Control Statements, Control Structures, Arrays Using One -dimensional Arrays, Implementing One-dimensional Arrays, Arrays as Parameters, Character Strings, Character String Operations, Structures, Implementing Structures, Structure as Parameter, Unions, Implementation of Unions, Allocation of Storage and Scope of Variables, Pointers, Dynamic Memory Allocation and Cancellation.	8 Hrs
2	Chapter 2 : Stacks Definition and examples, Primitive operations, Example , The stack as an ADT, Representing stacks in C, Implementing the pop operation, Testing for exceptional conditions, Implementing the push operation, Examples for infix, postfix, and prefix expressions, Basic definition and examples, Program to evaluate a postfix expression, Converting an expression from infix to postfix, Program to convert an expression from infix to postfix.	4 Hrs
3	Chapter 3 : Recursion Recursive definition and processes, Factorial function, Multiplication of natural numbers, Fibonacci sequence, Binary search, Properties of recursive definition or algorithm. Recursion in C, Factorial in C, Fibonacci numbers in C, Binary search in C, Towers of Hanoi problem.	4 Hrs
Unit II		
4	Chapter 4 : Queues and Lists The queue and its sequential representation, the queue as ADT, C implementation of queues, Insert operation, Priority queue, Array implementation of a priority queue. Linked lists, Inserting and removing nodes from a list, Linked implementation of	8 Hrs

stacks, get node and free node operations, Linked implementation of queues, Linked list as a data structure, Example of list operations, Header nodes, Lists in C, Array implementation of lists, Limitations of array implementation, allocating and freeing dynamic variables, Linked lists using dynamic variables, Queues as lists in C, Examples of list operations in C, Non integer and non- homogeneous lists, Other list structures: Circular lists, Stack as a circular list, Queue as a circular list, Primitive operations on circular lists, doubly linked lists.

5 Chapter 5 : Graphs and Trees 8 Hrs

Binary trees, operations on binary trees, Applications of binary trees, Binary tree representation, Node representation of binary tree, Internal and external nodes, Implicit array representation of binary trees, Choosing a binary tree representation, Binary tree traversal in C, Threaded binary trees. Graphs: Definitions, Application of graphs, C representation of graphs, Traversal methods for graphs, Depth first traversal, Breadth first traversal.

Unit – III

6 Chapter 6: Sorting 5 Hrs

Bubble Sort, Quick Sort, Selection Sort, Tree Sorting: Binary Tree Sort, Heap Sort, Insertion Sorts: Simple Insertion, Shell Sort, Address Calculation Sort, Merge and Radix Sort.

7 Chapter 7: Searching 5 Hrs

Basic Search Techniques: Algorithmic notation, Sequential searching, Searching an ordered table, Indexed sequential search, Binary search, Interpolation search, Tree searching: Inserting into a Binary Search Tree, Deleting from a Binary Search Tree, Hashing: Resolving hash clashes by open addressing, Choosing a hash function.

Text Book:

1. Yedidyah Langsam, Augenstein, M.J. and Tenenbaum, A.M., Data Structures using C, 2ed., Pearson Education Asia, 2015 Reprint.
2. Programming in ANSI C, Balaguruswamy, McGraw Hill Education

References:

1. Gilberg, R.F. and Forouzan, B.A. Data Structures A Pseudo code Approach with C, 3rd Reprint, Thomson Course Technology, 2005.

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Assignment	10
Total	50

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
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I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	6,7	Any 1 question is to be answered

Course Code: **19ECAP702**

Course Title: **Rich Internet Applications Lab**

L-T-P:0-0-1.5

Credits: 1.5

Contact Hrs:3

ISA Marks:: **100**

ESA Marks: --

Total Marks: **100**

Teaching Hrs: **36**

Exam Duration: **3 Hours**

#	Lab Assignment	No. of Lab slots per Batch(Estimate)
01	Introduction to HTML,CSS and JavaScript	2
02	Introduction to Bootstrap4, Examples on BS4 grid system,Typography,BS4 Colors, Tables and Images and Carousel	1
03	Examples on Bootstrap4 Alerts, Buttons, Progress bars and Spinners,BS4 Cards, Drop-down, Collapse and Navbars,BS4 Form Inputs, Modals, Popover and Filters	2
04	JSON Introduction, Syntax, JSON vs XML, Data Types, Parse, Stringify JSON Objects, Arrays, JSON PHP, JSON HTML	1
05	Introduction to JQuery, fundamentals, Why we need JQuery, JQuery alternatives, Examples on JQuery Selectors, Events.	1
06	Examples on JQuery Effects, JQuery with CSS, Traversing DOM with JQuery, DOM Manipulation with JQuery, JQuery with AJAX	1
07	Introduction to AJAX, Making get requests with \$.ajax, Making post requests, Making rest requests	1
08	AJAX and Server side connectivity (PHP),AJAX and Database Access	1
09	AJAX Patterns Theory: Foundational Technology Patterns, Programming Patterns, Functionality and Usability Patterns, Development Patterns	1
10	AJAX Patterns Hands on	1

Course Code: **19ECAP703**

Course Title: **UNIX and Shell Programming Lab**

L-T-P: **0-0-2**

Credits: **2**

Contact Hrs: **4**

ISA Marks: **100**

ESA Marks: --

Total Marks: **100**

Teaching Hrs: **24 + 24**

Exam Duration: **3 Hours**

Sl. #	Content	Hrs
1	Chapter 1: Introduction to Scripting Languages	2 Hrs
2	Chapter 2: UNIX architecture: General Purpose Utilities, File System, Handling Ordinary Files, Basic File attributes, vi editor.	6 Hrs
3	Chapter 3: Introduction To Shell Scripting : Shell Basics, Shell Environment, Shell Script Programming Concepts, Decision Structures, Looping Structures, Command line arguments, Links, Functions and Arrays, Regular Expression & Filters, Processes, Pipe- Inter-Process Communication, Advanced Shell Programming, Advanced Tech & Tools, Script Design and Management Issues.	8 Hrs
4	Chapter 4: Essential System Administration : System Administrator Login, System Administrator Privileges, Maintaining Security, User Management, Startup and Shutdown, Backup program.	2 Hrs
5	Chapter 5: awk Scripting : BEGIN and END sections, arrays, functions, control flow.	6 Hrs

<i>Expt./ Job No.</i>	<i>Lab assignments/experiment</i>	<i>No. of Lab. Slots per batch (estimate)</i>
1-2	Shell Scripts on conditional statements, loops, Case Construct, Command Line arguments.	02
3-5	Shell Scripts on Process and Filters, Links	03
6-7	Shell Scripts on Pattern matching	02
8-10	Shell Scripts on automating the task	03
11-12	awk scripts	02

Text Book:

1. Sumithabh Das "UNIX Concepts and Applications" Fourth Edition, McGraw Hill.
2. Arnold Robbins and Nelson H.F.Beeba "Classic Shell Script", 1st Edition., O'Reilly, 2005.

Evaluation Scheme

In Semester Assessment (ISA): Continuous Internal Assessment for 100 Marks.

In Semester Assessment (ISA) through Tests for Tutorial.	Assessment	Marks
	<i>Test-1</i>	20
	<i>Test-2</i>	20
	Total	40
In Semester Assessment for Practical	<i>ISA</i>	60
	Total	100

Course Code: **19ECAP706**

Course Title: **Computer Networks Lab.**

L-T-P: 0-0-1.5

Credits: 1.5

Contact Hrs: 3

ISA Marks: **100**

ESA Marks: --

Total Marks: **100**

Teaching Hrs: **36**

Exam Duration: **3 Hours**

#	Lab Assignment	No. of Lab slots per Batch (Estimate)
01	Introduction to hardware components and Ethernet LAN setup.	2
02	Investigation of IP addressing and subnet design.	1
03	Application of Windows OS Built-in Networks Diagnostic Tools.	2
04	Network Packet Monitoring and Analysis.	1
05	Analysis of the Data Link Layer Protocols (Ethernet, ARP)	1
06	Analysis of the Web Protocols (DNS, HTTP)	1
07	Analysis of the Email Protocols (SMTP, POP3)	1
08	Computer Network Routing Using Static Routes and RIP Protocol	1
09	Computer Network Routing by Using Open shortest Path First (OSPF) Dynamic Routing Protocol.	1
10	Getting acquainted with switching environment	1

Course Code: **19ECAC802**

Course Title: **Information Security**

L-T-P: 3-0-1

Credits: 4

Contact Hrs: 5

CIE Marks: 50

SEE Marks: 50

Total Marks: 100

Teaching Hrs: 40+24

Exam Duration: 3 hrs

No	Content	Hrs
Unit - 1		
1. Chapter No. 1 : Cryptography Basics		04 hrs
	Introduction, Classic Crypto: Modern Crypto, Taxonomy of Cryptography & Cryptanalysis.	
2. Chapter No. 2: Symmetric Key Crypto		06 hrs
	Introduction, Stream Ciphers, Block Ciphers, Block cipher modes	
3. Chapter No. 3: Public Key Crypto and Hash Functions		06 hrs
	Introduction, Knapsack, RSA, Diffie-Hellman, Elliptic Curve Cryptography, Public Key Notation, Uses for Public Key Crypto, Public Key Infrastructure Hash Functions: Introduction, The Birthday Problem, Non-Cryptographic Hashes, Tiger Hash, HMAC	
Unit - 2		
4. Chapter No. 4 Authentication and Authorization		05 hrs
	Authentication: Introduction, Authentication Methods, Passwords, Biometrics, Two-Factor Authentication, Single Sign-On and Web Cookies, Authorization: Introduction, Access Control Matrix, Multilevel Security Models	
5. Chapter No. 5 Authorization and Authentication Protocols		06 hrs
	Authorization: Multilateral Security, Firewalls, Intrusion Detection, Simple Authentication Protocols: Introduction, Simple Security Protocols, Authentication Protocols	
6. Chapter No. 6 Security Protocols		05 hrs
	Real World Security Protocols: Introduction, Secure Socket Layer, IPSec, Kerberos, GSM	
Unit - 3		
7. Chapter No. 7 Software Flaws and Malware		04 hrs
	Introduction, Software Flaws, Malware, Miscellaneous Software Based Attacks, software tamper resistance, Digital Rights Management.	
8. Chapter No. 8 Cyber Crimes and Laws		04 hrs
	Introduction, Computer Forensics, Online Investigative tool, tracing and recovering electronic evidence, Internet fraud, Identity Theft, Industrial Espionage, Cyber Terrorism. Indian IT laws: Introduction and briefs of Law clauses.	
Text Book:		
	2. Mark Stamp, "Information Security: Principles and Practices", 2 nd Edition, John Wiley and Sons, 2011.	
Reference Books:		
	1. Michael E. Whitman and Herbert J. Mattord, "Principles of Information Security", 2 nd Edition, Thompson, 2005.	
	2. William Stallings, "Network Security Essentials Applications and Standards", Person Education, 2000.	
	3. Behrouz A. Forouzan, "Cryptography and Network Security", Tata McGraw-Hill, 2007.	

Activities			
#	TOPICS	ACTIVITY	WEIGHTAGE
1	Cryptography Basics	<ul style="list-style-type: none"> Write a program to perform encryption and decryption using the following algorithms: a) Ceaser Cipher b) Substitution Cipher c) Hill Cipher 	05
2	Symmetric key encryption	<ul style="list-style-type: none"> Write a Java program to implement the DES algorithm logic 	05
3		<ul style="list-style-type: none"> Write a C/JAVA program to implement the Rijndael algorithm logic. 	10
4	Symmetric block cipher	<ul style="list-style-type: none"> Using Java Cryptography, encrypt the text "Hello world" using BlowFish. Create your own key using Java keytool. 	10
5		<ul style="list-style-type: none"> Write a C/JAVA program to implement the BlowFish algorithm logic 	10
6	Asymmetric cryptographic algorithm	<ul style="list-style-type: none"> Write a Java program to implement RSA Algorithm 	10
7		<ul style="list-style-type: none"> Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript. Consider the end user as one of the parties (Alice) and the JavaScript application as other party (bob). 	10
8	Secure Hash Algorithm	<ul style="list-style-type: none"> Calculate the message digest of a text using the SHA-1 algorithm in JAVA. 	10
9	Intrusion detection System	<ul style="list-style-type: none"> Explore the Intrusion Detection System "Snort" 	10
10		<ul style="list-style-type: none"> Study of Anti-Intrusion Technique – Honey pot 	10
11	IP security	<ul style="list-style-type: none"> Study of IP based Authentication 	10
TOTAL			100
Evaluation Scheme			

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	10
ISA- 2	10
Activities	30
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: 19ECAE803	Course Title: GIS Data Management	
L-T-P:2-0-1	Credits: 3	Contact Hrs: 4
ISA Marks: 50	ESA Marks: 50	Total Marks: 100
Teaching Hrs: 42+24	Exam Duration: 3 Hours	

No	Content	Hrs
Unit I		
1	Chapter 1: Fundamentals of GIS Introduction to GIS, Defining GIS, Components of GIS, Introduction to Spatial data, Maps and their influence on the character of spatial data, Basic spatial entities, Thematic characteristics of spatial data, Sources of Spatial data, Field data sources, – Surveying and GPS	8 Hrs
2	Chapter 2: Spatial Data Modeling Introduction – Entity definition – Spatial data models – Spatial data structures – Modeling surfaces – Modeling networks – Building computer networks – Modeling the third dimension – modeling the fourth dimension - Attribute data management - Introduction – Why choose a database approach? - Database data models – Creating a database – GIS database applications – Developments in databases.	8 Hrs
Unit II		
3	Chapter 3: Data Input and Editing Introduction – Methods of data input –Data editing – Towards an integrated database - Data analysis: Introduction – Measurements in GIS – lengths, perimeters and areas – Queries – Reclassification – Buffering and neighborhood functions – Integrating data – map overlay – Spatial interpolation – Network analysis.	8 Hrs

4	Chapter 4: Analytical Modeling in GIS Introduction – process models – Modeling physical and environmental processes – Modeling human Processes – Modeling the decision making process – Problems with using GIS to model spatial processes - Output: from new maps to enhanced decisions: Introduction – Maps as output – Non-cartographic output – Spatial multimedia – Mechanisms of delivery – GIS and spatial decision support.	8 Hrs
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Unit – III

5	Chapter 5: Issues in GIS The development of computer methods for handling spatial data – Introduction – Handling spatial data manually – The development of computer methods for handling spatial data – The development of GIS - Data quality issues – Introduction – Describing data quality and errors sources of errors in GIS.	8 Hrs
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Text Book Ian Heywood, Sarah Cornelius and Steve carver, “Introduction to geographical information systems”, Pearson Education, 4th Edition, 2012.

References:

1. DeMers, M.N., “Fundamentals of Geographic Information Systems”, 3rd Edition, Wiley Press, 2009.
2. Lo C.P. and Yeung, A.K.W., “Concepts and Techniques of Geographic Information Systems”, Prentice Hall, 2002.
3. Burrough, P.A. and R.A. McDonald, “Principles of Geographical Information Systems”, Oxford University Press, 1998.

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	20
ISA- 2	20
Practices	10
Total	50

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	3,4	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	5	Any 1 question is to be answered

Course Code: **19ECAC801**

L-T-P:3-0-1

ISA Marks: **50**

Teaching Hrs: **42 + 24**

Course Title: Cloud Computing

Credits: 4

ESA Marks: **50**

Contact Hrs: **5**

Total Marks: **100**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter 1: Introduction, Parallel and distributed systems Network-centric computing and network centric content, peer-to-peer systems, Cloud computing basics, delivery models and services, Ethical issues, cloud vulnerabilities, major challenges; parallel computing, parallel computer architecture, Distributed systems, communication protocol and process coordination, logical clocks, message delivery rules, casual delivery, Concurrency, atomic actions, consensus protocols, modularity: client-server paradigm.	6 Hrs
2	Chapter 2: Cloud Infrastructure Cloud computing at Amazon, cloud computing: the Google perspective, Microsoft windows Azure and online services; open-source software platforms for private clouds; Cloud storage diversity and vendor lock-in; Cloud computing interoperability: the intercloud; Energy use and ecological impact of large-scale data centers; Service and compliance level agreements; User experience; Software licensing.	6 Hrs
3	Chapter 3: Cloud Computing: Applications and Paradigms Challenges for cloud computing; Existing cloud applications and new application opportunities; Architectural styles for cloud applications; Workflows: Coordination of multiple activities; The MapReduce programming model; Case studies.	4 Hrs
Unit II		
4	Chapter 4: Cloud Resource Virtualization Virtualization; Layering and virtualization; Virtual machine monitors; Virtual machines; Performance and security isolation; Full virtualization and Para virtualization; Hardware support for virtualization; Case study; Optimization of network virtualization; vBlades; A performance comparison of virtual machines; Software fault isolation;	6 Hrs
5	Chapter 5: Cloud Resource Management and Scheduling Policies and mechanisms for resource management; Applications of control theory to task scheduling on a cloud; Stability of a two-level resource allocation architecture; Feedback control based on dynamic thresholds; Coordination of specialized autonomic performance managers; A utility-based model for cloud-based web services; Resource bundling; Scheduling algorithms for computing clouds; Fair queuing; Resource management and dynamic application scaling.	6 Hrs
6	Chapter 6: Networking Support Packet-switched networks; The Internet; Internet migration to IPV6; The transformation of the Internet; Web access and the TCP congestion control window; Network resource management; Interconnection networks for computer clouds; Content-delivery networks; Overlay networks and small-world networks.	4 Hrs
Unit – III		

7 Chapter 7: Storage Systems **5 Hrs**

The evolution of storage technology; Storage models, file systems and databases; Distributed file systems: The precursors; General parallel file system; Google File System; Apache Hadoop; Locks and Chubby: A locking service; Transaction processing and NoSQL and databases; BigTable; Megastore.

8 Chapter 8: Cloud Security **5 Hrs**

Cloud security risks; Security: The top concern for cloud users; Privacy and privacy impact assessment; Trust; Operating system security; Virtual machine security; Security of virtualization; Security risks posed by shared images; Security risks posed by a management OS; A trusted virtual machine monitor.

Text Book:

1. A Dan C. Marinescu, Cloud Computing: Theory and Practice, Morgan Kaufmann publishers, 2013

References

- 1 Michael Miller, Cloud Computing: Web-Based Applications that change the Way you work and collaborate Online, Pearson Publication, 2012.
- 2 Anthony T. Volte, Toby J. Volte, Robert Elsenpeter: Cloud Computing, A Practical Approach, McGraw Hill, 2010.
- 3 Cloud Computing for Dummies: J. Hurwitz, ISBN 978-0-470-484-8
- 4 Dr. Kumar Sourabh, Cloud Computing, 2nd Edition, Wiley India, 2011.

Evaluation Scheme

Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Cloud Computing Practices

Expt No.	Brief description about the experiment	Number Of Slots
DEMONSTRATION		
1	Cloud computing resources access using Windows Azure Infrastructure Services	1

2	Registering a DNS Server in Windows Azure	1
3	Introduction to Google app engine for Java.	1
4	Creation an Amazon VPC.	1
5	Setting up Routing in VPC and Deploying Amazon EC2 instance in Amazon VPC	1
EXERCISE		
6	Introduction of cloud using windows Azure.	1
7	Collaborating on Calendars Schedules and Task Management, Event Management, Contact Management, Project Management, Word Processing, Spreadsheets, Databases, Presentations.	1
8	Implementation of web app on Google app engine.	1
9	Implementation of Amazon VPC.	1
10	Implementation of network programming using mininet.	1
11	Collaborating via Web Based Communication Tools, Social Networks and Groupware, Blogs and Wikis.	1
STRUCTURED ENQUIRY		
12	Develop a tree topology structure with more than 20 hosts using controller and switches in mininet.	2

Course Code: 15ECAC901		Course Title: Big Data Analytics	
L-T-P: 3-0-0		Credits: 3	Contact Hrs: 3
ISA Marks: 50		ESA Marks: 50	Total Marks: 100
Teaching Hrs: 42		Exam Duration: 3 Hours	
No	Content	Hrs	
Unit I			
1	Chapter 1: Big Data Overview and Data Analytics Lifecycle Data Structures, Analyst Perspective on Data Repositories, State of the Practice in Analytic, BI Versus Data Science, Current Analytical Architecture, Drivers of Big Data, Emerging Big Data Ecosystem and a New Approach to Analytics, Key Roles for the New Big Data Ecosystem, Examples of Big Data Analytics; Data Analytics Lifecycle Overview, Key Roles for a Successful Analytics Project, Background and Overview of Data Analytics Lifecycle, Phase 1: Discovery, Phase 2: Data Preparation, Phase 3:Model Planning, Phase 4: Model Building, Common Tools for the Model Building Phase..	8 Hrs	
2	Chapter 2: Review of Basic Data Analytic Methods Using R Introduction to R :R Graphical User Interfaces , Data Import and Export ,Attribute and Data Types, Descriptive Statistics ,Exploratory Data Analysis, Visualization Before Analysis, Dirty-Data, Visualizing a Single Variable , Examining Multiple Variables, Data Exploration Versus Presentation, Statistical Methods for Evaluation, Hypothesis Testing.	8 Hrs	

Unit II												
3	Chapter 3: Advanced Analytical Theory and Methods (Clustering and Regression) Overview of Clustering: K-means, Use Cases, and Overview of the Method, Determining the Number of Clusters, Diagnostics, Reasons to Choose and Cautions; Linear Regression, Use Cases, Model Description, Diagnostics, Logistic Regression, Model Description, Diagnostics, Reasons to Choose and Cautions, Additional Regression Models.	8 Hrs										
4	Chapter 4: Advanced Analytical Theory and Methods: Time Series Analysis Overview of Time Series Analysis, Box-Jenkins Methodology, ARIMA Model, Autocorrelation Function (ACF), Autoregressive Models, Moving Average Models, ARMA and ARIMA Models, Building and Evaluating an ARIMA Model.	8 Hrs										
Unit – III												
5	Chapter 5: Advanced Analytical Theory and Methods: Text Analysis Text Analysis Steps, A Text Analysis Example, Collecting Raw Text, Representing Text, Term Frequency—Inverse Document Frequency (TFIDF), Categorizing Documents by Topics, Determining Sentiments.	5 Hrs										
6	Chapter 6: Advanced Analytics—Technology and Tools: Analytics for Unstructured Data , Use Cases ,MapReduce , Apache Hadoop ,The Hadoop Ecosystem, Pig, Hive, HBase, Mahout, NoSQL.	5 Hrs										
<p>Text Book:</p> <ol style="list-style-type: none"> EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, Wiley Publications. <p>References:</p> <ol style="list-style-type: none"> Frank J Ohlhorst, —Big Data Analytics: Turning Big Data into Big Money , Wiley and SAS Business Series, 2012. Colleen Mccue, —Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis , Elsevier, 2007. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007. Bill Franks, —Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics , Wiley and SAS Business Series, 2012. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, —Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data , McGraw Hill, 2011. Jiawei Han, MichelineKamber —Data Mining Concepts and Techniques , Second Edition, Elsevier, Reprinted 2008. 												
Evaluation Scheme												
1. In Semester Assessment (ISA)												
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Assessment</th> <th>Weightage in Marks</th> </tr> </thead> <tbody> <tr> <td>ISA- 1</td> <td>20</td> </tr> <tr> <td>ISA- 2</td> <td>20</td> </tr> <tr> <td>Assignments</td> <td>10</td> </tr> <tr> <td>Total</td> <td>50</td> </tr> </tbody> </table>			Assessment	Weightage in Marks	ISA- 1	20	ISA- 2	20	Assignments	10	Total	50
Assessment	Weightage in Marks											
ISA- 1	20											
ISA- 2	20											
Assignments	10											
Total	50											
2. End Semester Assessment (ESA)												
UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.										
Instructions												

I	3 Questions to be set of 20 Marks Each	1,2	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	3,4	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	5,6	Any 1 question is to be answered

Course Code: **16ECAE906**

Course Title: **Machine Learning**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks-Theory: **50** +Lab: **100**

ESA Marks: **50**

Total Marks: **200**

Teaching Hrs: **42 + 24**

Exam Duration: **3 Hours**

No	Content	Hrs
	Unit I	
1	Chapter 1. Introduction Introduction: Statistical Decision Theory - Regression, Classification, Bias Variance:	4 Hrs
2	Chapter 2. Linear Regression and Linear Classification Linear Classification, Logistic Regression, Linear Discriminant Analysis; Perceptron; Linear Regression, Multivariate Regression, Subset Selection, Shrinkage Methods, Principal Component Regression, Partial Least squares.	6 Hrs
3	Chapter 3. Support Vector Machines and Artificial Neural Networks Support Vector Machines, Neural Networks - Introduction, Early Models, Perceptron Learning, Backpropagation, Initialization, Training & Validation.	6 Hrs
	Unit II	
4	Chapter 4. Bayesian Learning and Decision Trees Parameter Estimation - MLE, MAP, Bayesian Estimation Decision Trees, Regression Trees, Stopping Criterion & Pruning Loss functions, Categorical Attributes, Multiway Splits, Missing Values Decision Trees - Instability.	6 Hrs
5	Chapter 5. Evaluation Measures and Hypothesis Testing Evaluation Measures, Bootstrapping & Cross Validation, Class Evaluation Measures, ROC curve, MDL	4 Hrs
6	Chapter 6. Ensemble Methods and Clustering Ensemble Methods - Bagging, Committee Machines and Stacking, Boosting, Gradient Boosting, Random Forests, Multi-class Classification, Naive Bayes, Bayesian Networks; Partitional Clustering, Hierarchical Clustering, Birch Algorithm, CURE Algorithm, Density-based Clustering.	6 Hrs
	Unit – III	
7	Chapter 7. Graphical Models and Expectation Maximization Undirected Graphical Models, HMM, Variable Elimination, Belief Propagation; Gaussian Mixture Models, Expectation Maximization.	5 Hrs
8	Chapter 8. Learning Theory and Reinforcement Learning Learning Theory, Introduction to Reinforcement Learning, RL framework, TD learning, Solution Methods, Applications.	5 Hrs

Text Book:

3. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e,
4. Christopher Bishop. Pattern Recognition and Machine Learning. 2e.

References:

1. Introduction to machine learning with python by Andreas C. Müller and Sarah Guide
Machine Learning Practices Using Python

- 1) Implement linear regression with one variable to predict profits for a food truck. Suppose you are the CEO of a restaurant franchise and are considering different cities for opening a new outlet. The chain already has trucks in various cities and you have data for profits and populations from the cities.
- 2) Build a logistic regression model to predict whether a student gets admitted to a university. Suppose that you are the administrator of a university department and you want to determine each applicant's chance of admission based on their results on two exams.
- 3) Implement one-vs-all logistic regression and neural networks to automate handwritten digit recognition (0 to 9)
- 4) Implement the backpropagation algorithm for neural networks and apply it to task of hand-written digit recognition.
- 5) Build a Spam Classifier using Support Vector Machines.
- 6) Implement the K-means clustering algorithm and apply it to compress an image.
- 7) Build Principle Component analysis to find a low dimensional representation of face images.
- 8) Implement the anomaly detection algorithm and apply it to detect failing servers on a network.
- 9) Build a recommender system for movies by using collaborative filtering.

Evaluation Scheme

3. Assessment

Assessment	Theory	Lab.
ISA- 1	25	100
ISA- 2	25	
ESA	50	00
Total	100	100

4. End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3,4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5,6,7	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	8,9	Any 1 question is to be answered

Course Code: **19ECAE901**

Course Title: **Linux Administration**

L-T-P:**2-0-1**

Credits: **3**

Contact Hrs: 4

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **40**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter 1. Basic System Configuration Opening Graphical Applications, System Locale and Keyboard Configuration: Setting the System Locale, Changing the Keyboard Layout, Managing Users and Groups; Introduction to Users and Groups, Managing Users in a Graphical Environment..	4 Hrs
2	Chapter 2. Package Management, Services and Daemons Yum: Checking For and Updating Packages, Packages and Package Groups, Configuring Yum and Yum Repositories. Configuring Services, Running Services OpenSSH: The SSH Protocol, An Open SSH Configuration, Open SSH Clients	6 Hrs
3	Chapter 3. Web & Mail Servers : Web Servers: The Apache HTTP Server Updating the Configuration, Running the httpd Service, Editing the Configuration Files, Working with Modules , Setting Up Virtual Hosts, Setting Up an SSL Server. Mail Servers- Email Protocols, Email Program Classifications, Mail Transport Agents, Mail Delivery Agents, Mail User Agents	6 Hrs
Unit II		
4	Chapter 4. File & Directory Servers : FTP Servers : The File Transfer Protocol, FTP Servers, Files Installed with vsftpd , Starting and Stopping vsftpd,vsftpd Configuration Options.Runing FTP Server Samba Server : Introduction to Samba, Samba Daemons and Related Services, Connecting to a Samba Share, Configuring a Samba Server ,Starting and Stopping Samba, Samba Server Types and the smbconf File, Samba Security Modes, Samba Account Information Databases, Samba Network Browsing , Samba with CUPS Printing Support, Samba Distribution Programs Directory Servers -OpenLDAP, Introduction to LDAP, Installing the OpenLDAP Suite , Configuring an OpenLDAP Server , SELinux Policy for Applications Using LDAP, Running an OpenLDAP Server, Configuring a System to Authenticate Using OpenLDAP	10 Hrs
5	Chapter 5 Viewing and Managing Log Files - Locating Log Files, Basic Configuration of Rsyslog, Working with Queues in Rsyslog , Using Rsyslog Modules , Interaction of Rsyslog and Journal, Structured Logging with Rsyslog , Debugging Rsyslog, Using the Journal, Managing Log Files	6 Hrs

in a Graphical Environment.

Unit – III

6	Chapter. 6. Working with the GRUB 2 Boot Loader Configuring the GRUB 2 Boot Loader, Customizing GRUB Menu, GRUB 2 Password Protection, Reinstalling GRUB , GRUB 2 over Serial Console, Terminal Menu Editing During Boot, UEFI Secure Boot	4 Hrs
7	Chapter 7. Automating System Tasks -Cron and Anacron- Installing Cron and Anacron, Running the Crond Services, Configuring Anacron Jobs, Configuring Cron Jobs, Controlling Access to Cron, Black and White Listing of Cron Jobs At and Batch-Installing At and Batch, Running the At Service, Configuring an At Job, Configuring a Batch Job, Viewing Pending Jobs, Additional Command Line Options, Controlling Access to At and Batch.	4 Hrs

Textbook:

1. Fedora 21 System Administrator's Guide Deployment, Configuration, and Administration of Fedora 21 Edition 1.0, Author Jaromír Hradílek jhradilek@redhat.com, Douglas Silas silas@redhat.com , Martin Prpič mprpic@redhat.com etc.

References:

1. Kemp, Juliet, Springer, "Linux System Administration"
2. Anita Sengar "IT Infrastructure Management" 2012 Edition, publisher: S K Kataria and Sons
3. Sjaak Laan "Infrastructure Architecture - Infrastructure Building Blocks and Concepts Second Edition, Kindle Edition, Lulu Press Inc; Second Edition

Linux Administration Practices

COURSE DESCRIPTION:

IT infrastructure consists of a set of physical devices and software applications that are required to operate the entire enterprise. IT infrastructure is also consists both human and technical capabilities. These services include the following- Computing platforms used to provide computing services, that connect employees, customers, and suppliers into a coherent digital environment, including servers ,Data management services that store and manage corporate data and provide capabilities for analyzing the data and Application software services that provide enterprise-wide capabilities such as enterprise resource planning, customer relationship management, supply chain management, and knowledge management systems that are shared by all business units. It allows an organization to deliver IT solutions and services to its employees, partners and/or customers and is usually internal to an organization and deployed within owned facilities.

OBJECTIVES

- Acquire comprehensive knowledge, technical expertise and hands-on experience in IT Infrastructure Management
- To learn all aspects of IMS such as Networking, Operating Systems, Virtualizations and Data Center technologies.

LAB REQUIREMENTS:

- A modern web-browser with HTML5 and JavaScript enabled.

- Remote Desktop Client connection software.
- Internet connectivity Microsoft Account (LiveID).

LIST OF EXERCISES

#	Topics	ACTIVITY
1.	Web Server	Apache Web Server, IIS Server: Install and Configure the Apache Web Server on Linux and IIS server on windows.
2.	Samba Server	Implementation of Windows files and print services for Linux allowing the sharing of files and printers between Windows and Linux.
3.	LDAP Server	LDAP Server: Lightweight Directory Access Protocol- Server Installation to access a directory service.
4.	Mail Server	Mail Server configuration- POP3 Server, IMAP Server
5.	Proxy Server	Develop a small web proxy server, which is able to cache web pages. It is a very simple proxy server which only understands simple GET-requests, but is able to handle all kinds of objects - not just HTML pages, but also images.
6.	Firewalls and NAT (Network Address Translation)	Use of iptables to build a permissive firewall by selectively filtering packets based on protocol type. To demonstrate how addresses may be translated from private addresses to public and vice versa as they pass in and out of the firewall.
7.	Cloud Infrastructure: Azure Hands-on Build your Infrastructure in the Cloud using Windows Azure	<ol style="list-style-type: none"> 1. Login to the Windows Azure Management Portal, Define a new Windows Azure Affinity Group and Create a new Windows Azure Storage Account. 2. Register a DNS Server in Windows Azure. 3. Define a Virtual Network in Windows Azure. 4. Configure Windows Server Active Directory in a Windows Azure VM. 5. Configure New Machine for File Services in a Windows Azure VM.

	Infrastructure Services -	
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References:

23. <http://amizone.net/AdminAmizone/WebForms/Academics/NewSyllabus/194201472058683.pdf>
24. <http://itproguru.com/azurehol/#sthash.HMydlzVA.dpuf>
25. <https://simms-teach.com/docs/cis192/cis192lab08.pdf>
26. <https://simms-teach.com/resources.php>
27. http://www.cs.rpi.edu/~kotfid/security1/PDF2/NS1_lab_6_1_4_en.pdf
28. <http://www.cse.unsw.edu.au/~cs3331/12s1/Labs/>
29. <https://www.6diss.org/workshops/ca/dns-practical.pdf>
30. <http://www.dwaynewhitten.com/info306/pages/lab.html>
31. http://www.bo.ingv.it/~scacciag/home_files/teach/netadminguide.pdf
32. <https://techpolymath.com/2015/02/16/how-to-setup-a-dns-server-for-a-home-lab-on-ubuntu-14-04/>
33. <http://www.dwaynewhitten.com/info306/lab2.pdf>

Evaluation Scheme

Assessment

Assessment	Marks
ISA- 1	15
ISA- 2	15
Activities	20
ISA	50
ESA	50
Total	100

End Semester Assessment (ESA) Pattern:

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	6,7	Any 1 question is to be answered

Course Code: **19ECAE902**

Course Title: **Cyber Security and Forensics**

L-T-P: **2-0-1**

Credits: **3**

Contact Hrs: **4**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **40**

Exam Duration: **3Hrs**

No	Content	Hrs
	Unit I	
1	Chapter 1: Introduction to Cybercrime, Cyber offenses & Cybercrime Cybercrime definition and origins of the world, Cybercrime and information security, Classifications of cybercrime, A global Perspective on cybercrimes. Cyber attack plans, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets, Proliferation of Mobile and Wireless Devices, Credit Card Frauds in Mobile and Wireless Computing Era.	8 Hrs
2	Chapter No. 2. Methods used in Cybercrime Phishing, password Cracking, Keyloggers and Spyware, Virus and Worms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless networks, Identity theft.	8 Hrs
	Unit II	
3	Cybercrimes and Cyber security: The Legal Perspectives Why do we need Cyber law: The Indian Context, The Indian IT Act, Digital Signature and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment.	8 Hrs
4	Chapter 4: Understanding computer Forensics, Forensics of Hand-held devices Historical background of forensics; Digital forensics science; need for computer forensics; cyber forensics and digital evidence; Analysis E-mail; Digital forensics life cycle; chain of custody concepts; network forensics; Forensics and social networking; challenges in computer forensics; Hand-held devices and digital forensics; Toolkits for Hand-held device forensics; Techno-legal challenges form hand-held devices	8 Hrs
	Unit – III	
5	Chapter 5: Social, political, Ethical and Psychological Dimensions Intellectual property in the cyberspace; Ethical dimension of cybercrimes; Psychology, mindset and skills of hackers and other cybercriminals; Sociology of cybercriminals.	4 Hrs
6	Chapter 6: Cybercrime: Illustrations, Examples and Case studies Introduction, Real-Life Examples, Case Studies: Illustrations of Financial Frauds in Cyber Domain, Digital Signature-Related Crime Scenarios, Digital forensics case illustrations Online Scams.	4 Hrs

Text Book

1. Nina Godbole & Sunit Belapure, "Cyber Security", Wiley India, 2011 and Reprint 2018.

References

1. Dhiren R Patel, "Information security theory & practice", PHI learning PVT. Ltd, 2010.
2. Bill Nelson, "Guide to Computer Forensics and Investigations", 4th Edition, CENGAGE Publication. 2009

Evaluation Scheme

In Semester Assessment (ISA)

Assessment	Theory
ISA- 1	15
ISA- 2	15
Activities	20
ISA	50
ESA	50
Total	100

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	3,4	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	5,6	Any 1 question is to be answered

Proposed Cyber Security and Forensics Practices

S No	Practices	Tools
1	Implementation of SQL Injection and avoidance	Python Php Tools (Crime, Security or Forensics)
2	Implementation of Digital signature	
3	Implementation of .Steganography	
4	Writing Literature survey report on various issues in Cybersecurity and Forensics	
5	Presentation on domain chosen in Cybercrime, Cyber security or Cyber Forensics.	
6	Demonstration of tool/s used in Cybercrime, Cyber Security or Cyber Forensics	

Change summary between 2019-20 and 2020-21 admitted batches
(i.e. 2019-2022 batch and 2020-2022 batch)

L-T-P: 4-0-2	Credits: 6	Contact Hrs: 8
ISA Marks: 50	ESA Marks: 50	Total Marks: 100
Teaching Hrs: 50+48		Exam Duration: 3Hrs
No	Content	Hrs
	Unit I	
1	Chapter No. 1 : Overview of C Information and its meaning, Data Types, Control Statements, Control Structures, Arrays Using One -dimensional Arrays, Implementing One-dimensional Arrays, Arrays as Parameters, Character Strings, Character String Operations, Structures, Implementing Structures, Structure as Parameter, Unions, Implementation of Unions, Allocation of Storage and Scope of Variables, Pointers, Dynamic Memory Allocation and Cancellation..	10 Hrs
2	Chapter No.2: Stacks Definition and examples, Primitive operations, Example , The stack as an ADT, Representing stacks in C, Implementing the pop operation, Testing for exceptional conditions, Implementing the push operation, Examples for infix, postfix, and prefix expressions, Basic definition and examples, Program to evaluate a postfix expression, Converting an expression from infix to postfix, Program to convert an expression from infix to postfix.	5 Hrs
3	Chapter No. 3: Recursion Recursive definition and processes, Factorial function, Multiplication of natural numbers, Fibonacci sequence, Binary search, Properties of recursive definition or algorithm. Recursion in C, Factorial in C, Fibonacci numbers in C, Binary search in C, Towers of Hanoi problem	5 Hrs
	Unit II	
4	Chapter No. 4 : Queues and Lists The queue and its sequential representation, the queue as ADT, C implementation of queues, Insert operation, Priority queue, and array implementation of a priority queue. Linked lists, Inserting and removing nodes from a list, Linked implementation of stacks, get node and free node operations, Linked implementation of queues, Linked list as a data structure, Example of list operations, Header nodes, Lists in C, Array implementation of lists, Limitations of array implementation, allocating and freeing dynamic variables, Linked lists using dynamic variables, Queues as lists in C, Examples of list operations in C, Non integer and non- homogeneous lists, Other list structures: Circular lists, Stack as a circular list, Queue as a circular list, Primitive operations on circular lists, doubly linked lists	10 Hrs
5	Chapter No. 5: Trees and Graphs Binary trees, operations on binary trees, Applications of binary trees, Binary tree representation, Node representation of binary tree, Internal and external nodes, Implicit array representation of binary trees, Choosing a binary tree representation, Binary tree traversal in C, Threaded binary trees. Graphs: Definitions, Application of graphs, and C representation of graphs, Traversal methods for graphs, Depth first traversal, and Breadth first traversal.	10 Hrs
	Unit – III	
6	Chapter No. 6: Sorting	5 Hrs

Bubble Sort, Quick Sort, Selection Sort, Tree Sorting: Binary Tree Sort, Heap Sort Insertion Sorts: Simple Insertion, Shell Sort, Address Calculation Sort, Merge and Radix Sort.

7 Chapter No. 7: Searching

5 Hrs

Basic Search Techniques: Algorithmic notation, Sequential searching, Searching an ordered table, Indexed sequential search, Binary search, Interpolation search, Tree searching: Inserting into a Binary Search Tree, Deleting from a Binary Search Tree, Hashing: Resolving hash clashes by open addressing, Choosing a hash function

Text Book:

2. Yedidyah Langsam, Augenstein, M.J. and Tenenbaum, Data Structures using C and C++ , 2, Pearson Education Asia, 2002

References:

3. Weiss, M.A., Data Structures and Algorithm Analysis in C, 2, Pearson Education Asia, 1997
4. Gilberg, R.F. and Forouzan, B.A. , Data Structures A Pseudo code Approach with C, 3, Reprint,Thomson Course Technology, 2005

Activities

#	TOPICS	ACTIVITY	WEIGHTAGE
1	Arrays, functions, pointers, structures and dynamic memory allocation in C.	Program to demonstrate the following for a given set of elements: <ul style="list-style-type: none"> • Array as a parameter • Structure as a parameter • Process of allocating memory during program execution 	10
2	Stack data structure	Program to illustrate implementation of stack using the following: <ul style="list-style-type: none"> • Array • Structures • Functions and pointers. 	10
3	Applications of stack	Implement the two application of stack. <ul style="list-style-type: none"> • Postfix expression evaluation • Conversion of Infix expression to Postfix expression 	10
4	Recursion	Write recursive functions in C program for the following: <ul style="list-style-type: none"> • Simple recursive functions: Tower of Hanoi, factorial, Fibonacci series. • Reverse a stack using recursion • Sort a stack using recursion 	10
5	Queue and Circular Queue concepts	Program to illustrate implementation of queue and circular queue using array	10
6	Queue.	Implementation of queue using Linked list	10

7	Singly Linked List and Circular Linked List.	Implementation of singly and circular linked list.	10
8	Doubly Linked List	Perform all the operations on doubly linked list	10
9	Searching and sorting techniques.	Implementation of the following searching and sorting techniques: Linear search, binary search, insertion sort, heap sort, quick sort.	10
10	Tree and graph traversal	<ul style="list-style-type: none"> Construction and traversal of binary search tree Program to demonstrate the graph traversal. 	10
Total			100

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	10
ISA- 2	10
Activities	30
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	6,7	Any 1 question is to be answered

Course Code: **20ECAC702**

Course Title: : **Database Management Systems**

L-T-P: **3-0-1**

Credits: 4

Contact Hrs: 5

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **40+24**

Exam Duration:**3Hrs**

No	Content	Hrs
	Unit I	
1	Chapter 1 : Introduction to Databases Introduction; An example; Characteristics of Database approach; Actors on the scene; Workers behind the scene; Advantages of using DBMS approach; A brief history of database applications; When not to use a DBMS. Data models, schemas and instances; Three-schema Architecture and Data Independence; Database Languages and Interfaces.	5 Hrs

2	Chapter 2 : Conceptual Data Modeling Using Entities and Relationships Using High Level Conceptual Data Models for database Design; A Sample Database Application, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types, Refining the ER Design for the COMPANY Database, ER Diagram, Naming Conventions and Design Issues, Relationships Higher than Two.	5 Hrs
3	Chapter 3 : The Basic (Flat) Relational Model and Relational Algebra Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and dealing with constraint violations. Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations: JOIN and DIVISION; Additional Relational Operations; Examples of Queries in Relational Algebra. Relational Database Design using ER-to-Relational Mapping.	6 Hrs
Unit II		
4	Chapter 4 : SQL SQL Data Definition and Data Types; Specifying Constraints in SQL; Basic Retrieval Queries in SQL; Insert, Delete and Update statements in SQL; More Complex SQL Retrieval Queries, Specifying Constraints as Assertions and Action as Triggers; Views (Virtual Tables) in SQL; Schema Change Statements in SQL; Database programming issues and techniques.	7 Hrs
5	Chapter 5: Database Design Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form; Multivalued Dependencies and Fourth Normal Form; Join Dependencies and Fifth Normal Form.	6 Hrs
6	Chapter 6: Object and Object-Relational Databases Overview of Object Database Concepts, Object-Relational Features: Object Database Extensions to SQL.	3 Hrs
Unit – III		
7	Chapter 7: Foundations of Database Transaction Processing and Concurrency Control Introduction to Transaction Processing; Transaction and System Concepts; Desirable Properties of Transactions; Characterizing Schedules Based on Recoverability; Characterizing Schedules Based on Serializability; Transaction Support in SQL. Two-Phase Locking Techniques for Concurrency control; Concurrency control based on Timestamp Ordering; Multiversion Concurrency control Techniques; Validation Concurrency Control Techniques; Granularity of Data Items & Multiple Granularity Locking; Using Locks for Concurrency Control in Indexes; Other Concurrency Control Issues.	4 Hrs
8	Chapter 8. Introduction to Database Recovery Protocols Recovery Concepts, NO-UNDO/REDO Recovery Based on Deferred update; Recovery Techniques based on Immediate update; Shadow paging; The ARIES Recovery Algorithm; Recovery in Multi database Systems; Database Backup and Recovery from Catastrophic Failures.	4 Hrs

Text Book:

1. RamezElmasri, Shamkant B. Navathe, Database Systems, Sixth Edition, PEARSON, 2013

References:

1. Elmasri and Navathe, Fundamentals of Database Systems, Fifth Edition, Addison- W, 2007
2. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill, 2003

Activities

#	TOPICS	ACTIVITY	WEIGHTAGE
1	Conceptual Data Modeling Using Entities and Relationships	Draw the ER diagrams for the following databases* i) Student-Enrollment Data base ii) Insurance Database iii) Company Database iv) Movie Database	15
2	The Basic (Flat) Relational Model and Relational Algebra	Convert the ER diagrams mentioned in activity 1 to Relational Schema diagrams.	15
3	SQL	SQL query implementation for following schemas * i) Student-Enrollment Data base ii) Insurance Database iii) Company Database iv) Movie Database	50
4	Database Design	Assignments on Normalization	10
5	Transaction Processing	Assignments on Transaction Processing	10
		Total	100

Schemas *

i) Student-Enrollment Database.

Consider the following relations:

Student(snum: integer, sname: string, major: string, level: string, age: integer)

Class(name: string, meets at: string, room: string, fid: integer)

Enrolled(snum: integer, cname: string)

Faculty(fid: integer, fname: string, deptid: integer)

Enrolled has one record per Student-class pair such that the student is enrolled in the class.

Write the following queries in SQL.

1. Create the above tables by properly specifying all the integrity constraints.
2. Insert at least five tuples into each table.
3. Find the names of all Juniors (level=JR) who are enrolled in a class taught by I.John.
4. For each level, print the level and the average age of students for that level.
5. Find the names of students not enrolled in any class.

ii) Insurance Database.

Consider the insurance database given below.

PERSON (driverid: String, name: String, address: String)

CAR (regno: String, model: String, year: Int)

ACCIDENT (repno: Int, dat: Date, location: String)

OWNS (driverid: String, regno: String)

PARTICIPATED (driverid: String, regno: String, repno: Int, damageamt: Int)

Write the following queries in SQL.

1. Create the above tables by properly specifying the integrity constraints.
2. Enter at least five tuples for each relation.
3. Demonstrate how you

* Update the damage amount for the car with a specific Regno in the accident with report number 12 to 25000

* Add a new accident to the database

4. Find the total number of people who owned cars that were involved in accidents in 2002.
5. Find the number of accidents in which cars belonging to a specific model were involved.

iii) Company Database:

- The company is organized into departments. Each department has a unique name, a unique number, and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.
- A department controls a number of projects, each of which has a unique name, a unique number, and a single location.
- We store each employee's name, Social Security number, address, salary, gender) and birth date. An employee is assigned to one department, but may work on several projects, which are not necessarily controlled by the same department. We keep track of the current number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee (who is another employee).
- We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent's first name, gender, birth date, and relationship to the employee.

Write the following queries in SQL for the Company database

1. To display the details of all the Employee whose first name starts with "S".
2. To display name and address of all employee who work for "MCA" department.
3. To display the names of employee who do not have supervisor.
4. To retrieve First name and salary of all employees in department 5 whose salary is between Rs.30,000 and 40,000.
5. For each department, to retrieve the department number, the number of employees in that department and their average salary.

iv) Movie Database

Movie Database. Data requirements of movie industry are captured.

- Each movie is identified by title and year of release. Each movie has length in minutes and classified under one genres (like action, horror etc.). Each movie has a plot outline.
- Production companies are identified by name and each has an address. A production company

produces one or more movies.

- Actors are identified by id. Other details like name and date of birth of actors are also stored. Each actor acts in one or more movies. Each actor has a role in movie.
- Directors are identified by id. Other details like name and date of birth of directors are also stored. A Director can act in a movie (including the one that he or she may also direct). Each director directs one or more movies.
- Each movie has one or more actors and one or more directors and is produced by a production company.

Solve the following queries in SQL:-

- List the details of horror movies released in 2012 and directed by more than 2 directors.
- List the details of actors who acted in movies having same titles but released before 2000 and after 2010.
- List the details of production companies producing maximum movies.
- List the details of movies where director and actor have same date of birth.
- Retrieve the names of directors directed all the movies produced by any one production company.

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	15
ISA- 2	15
Activities	20
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **20ECAC703**

Course Title: **Computer Networks**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **40+24**

Exam Duration:**3Hrs**

No

Content

Hrs

Unit I

- | | | |
|----------|--|--------------|
| 1 | Chapter 1 : Overview of data communication and Networking
Introduction; Data communications: components, data representation (ASCII, ISO etc.), direction of data flow (simplex, half duplex, full duplex); Networks: distributed processing, network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN, WAN); Internet: brief history, internet today, Protocols and Standards, Network models: layered tasks, Internet Model, OSI Mode. | 4 Hrs |
| 2 | Chapter 2 : Physical layer
Overview of analog & digital data, signals and transmission, Multiplexing: FDM, WDM, TDM; Transmission Media: Guided Media, Unguided Media; Circuit Switching, Telephone Network. | 4 Hrs |
| 3 | Chapter 3 : Data link layer
Types of errors, Error detection ; Error correction ; Flow and Error Control; Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC | 4 Hrs |
| 4 | Chapter 4 : Medium access sub layer
Point to point protocol, LCP, NCP, Random Access, Controlled Access, Channelization | 4 Hrs |

Unit II

- | | | |
|----------|---|--------------|
| 5 | Chapter 5 : Network layer
Internetworks; Addressing; Routing; Routing algorithms: flooding, shortest path routing algorithm, distance vector routing, link state routing; Network layer Protocols: ARP, RARP, IP, ICMP, IPV6; Uni-cast and multicast routing protocols. | 8 Hrs |
| 6 | Chapter 6: Transport layer
Process to process delivery; UDP; TCP; Congestion, Congestion control, Quality of service, Techniques to improve QoS. | 8 Hrs |

Unit – III

- | | | |
|----------|---|--------------|
| 7 | Chapter 7 : Application layer
Domain Name System: Name Space, Domain Name Space, Distribution of Domain Name space, DNS in the Internet, Resolution, DNS Messages; SMTP, FTP, HTTP & WWW. | 4 Hrs |
| 8 | Chapter 8 : Security
Cryptography, user authentication, security protocols in internet, Firewalls | 4 Hrs |

Text Book:

1. B. A. Forouzan Data Communications and Networking (3rd Ed.) TMH

References:

2. Kurose and Rose, Computer Networking -A top down approach featuring the internet, 3rd Edition –Pearson Education
“Computer Networks” by ‘Andrew S. Tanenbaum’, Pearson Education Asia, 4th Edition

Activities

#	TOPICS	ACTIVITY	WEIGHTAGE
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1	Introduction to Data Communications	1. Overview of networks and layered communications	10
2	Physical Layer: Cable constructions and testing of different cable connectivity	1. Practice the cable construction for twisted pairs and fiber optics. 2. Test the configured cable connectivity.	15
3	Physical Layer: Analyzing the packet content using network monitoring tools	1. Understanding of packet capture using network interface. 2. Analyze the content of the packet using Wireshark tool correlated with OSI model.	15
4	Physical Layer ,Data Link Layer: Understanding of network devices and protocol simulation tool	1. Understanding of different network devices used for data communication. 2. Illustrate packet tracer simulation tool for design of the network.	15
5	Data Link Layers: ARQ Protocol implementation using C Program.	1. Implement the different supported ARQ protocols implementation using C Program.	15
6	Network Layer: Network Operations and troubleshooting	1. Outline the network properties and testing the network connectivity. 2. Explain the addressing protocols.	15
7	Network Layer:	1. Simulation and Implementation of Routing Protocols.	15
			100

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	10
ISA- 2	10
Activities	30
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3, 4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: 20ECAC705	Course Title: Web Technology	
L-T-P: 3-0-1	Credits: 4	Contact Hrs: 5
ISA Marks: 50	ESA Marks: 50	Total Marks: 100
Teaching Hrs: 40+24		Exam Duration: 3 Hrs

No	Content	Hrs
Unit I		
1	Chapter 1 : Fundamentals of Web A Brief Introduction to the Internet, The World Wide Web, Web Browsers, Web Servers, Uniform Resource Locators, The Hypertext Transfer Protocol, Security, The Web Programmer's Toolbox.	5 Hrs
2	Chapter 2 : HTML Origins and Evolution of HTML , Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, Audio and Video elements, Syntactic Differences between HTML and XHTML.	5 Hrs
3	Chapter 3 : CSS and Bootstrap Levels of Style Sheets, Style Specification Formats, Selector Forms, Property-Value Forms, Properties of Font and List, Alignment of Text, The Box Model, Background Images, The span and div Tags, Conflict Resolution, Bootstrap buttons, panels, alerts and themes.	6 Hrs
Unit II		
4	Chapter 4 :Dynamic documents and JavaScript The JavaScript Execution Environment, Element Access in JavaScript, Events and Event Handling, Handling Events from Body, Button, Text Box and Password Elements, Positioning Elements, Dynamic Content, Stacking Elements, Reacting to a Mouse Click, Dragging and Dropping Elements.	6 Hrs
5	Chapter 5: PHP Programming History, Unique features, Basic development concepts, Creating your first PHP script, Writing & running the script, Understanding the scripts, Handling script errors, Storing data in variables, Understanding PHP's data types, Setting & checking variable data types, Using constant and Manipulating variables with operators, Handling form input and conditional statements, Processing arrays with loops & iterators, Creating user defined function, Creating classes, Using Advanced OOP concepts.	10Hrs
Unit – III		
6	Chapter No. 6. Working with databases & SQL Introducing databases & SQL, Using PHP MySQLi extension, Adding or modifying data, Handling errors, Building a Login form.	4 Hrs
7	Chapter 7: Working with Cookies, Sessions & Headers Working with Cookies ,Cookie Basics , Cookie Attributes , Cookie Headers ,Setting Cookies ,Reading Cookies , Removing Cookies, Working with Sessions , Session Basics , Creating Sessions and Session Variables , Removing Sessions and Session Variables, Using HTTP headers.	4 Hrs

Text Book:

1. Robert W Sebesta, Programming the World Wide Web, 8th Edition, Pearson education, 2015.

2. Vikram Vaswani, A Beginner's Guide PHP, Mc Graw Hill, 2009.

References:

1. Chris Bates, Web Programming: Building internet applications, John Wiley & Sons, 2007
2. Luke welling & Laura Thomson, PHP and MySQL Web Development 4th Edition, 2012
3. Steven Holzner, PHP Complete Reference, Mc Graw Hill, 2010

Sl. no	TOPICS	ACTIVITY	WEIGHTAGE
1.	Fundamentals of Web	<ul style="list-style-type: none"> • To Perform the content exploration of real time web application using SEO http://www.seowebpageanalyzer.com/ • Analyze the HTTP header using inspect element in Google chrome • Collect the data of HTTP header from multiple websites and prepare the report • Explore the elements of URL with following properties relevance, link type, authority, location and smell test. • Quiz on World wide web , URL, HTTP and Web Programmers toolbox 	10
2	HTML	<ul style="list-style-type: none"> • Develop a website of a real time application by including all HTML tags • Validate the developed website using online tools like https://validator.w3.org/ • Install and explore Blue Griffon HTML editor tool for development of web application http://bluegriffon.org/ 	15
3	CSS and Bootstrap	<ul style="list-style-type: none"> • Design and develop a GUI for the web application by adding all CSS styles • Install and configure BootMetro UI framework and design a web page using bootstrap http://aozora.github.io/bootmetro/ 	15
4	Dynamic documents and JavaScript	<ul style="list-style-type: none"> • Design and develop the registration page by performing the validation for all fields using JavaScript regular expression • Create a responsive web page using event handling methods of JavaScript <p>Explore any two different online editors of JavaScript https://js.do/ https://playcode.io/online-javascript-editor</p>	20

5	PHP Programming	<ul style="list-style-type: none"> Install and configure the Wamp/Xampp server environment https://www.wampserver.com/en/ https://www.apachefriends.org/download.html Program to demonstrate the control statements, user defined function and OOP concepts of PHP 	10
6	Working with databases & SQL	<ul style="list-style-type: none"> Install and explore Laravel, CodeIgniter and Symfony PHP frameworks by integrating MySQL with webpage application. https://laravel.com/ https://www.codeigniter.com/ https://symfony.com/ \ Perform the CRUD operations in MySQL using PHP by accessing the data from webpage 	15
7	Working with Cookies, Sessions & Headers	<ul style="list-style-type: none"> PHP program to store current date-time in a Cookie and display the 'Last visited on' date-time on the web page upon reopening of the same page. PHP program to store page views count in Session, to increment the count on each refresh, and to show the count on web page Explore the session, persistent and third party cookie stored in the browser of websites and analyze the features of it. View and edit session storage with Chrome Dev Tools https://developers.google.com/web/tools/chrome-devtools/storage/sessionstorage Tracking Cookies with Light beam https://chadsansing.github.io/curriculum-testing/expanded-privacy-curriculum/tracking-cookies.html 	15
TOTAL			100

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	10
ISA- 2	10
Activities	30
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	6,7	Any 1 question is to be answered

Course Code: **20ECAP701**

Course Title: **Python Programming Lab.**

L-T-P:**0-0-1**

Credits: **1**

Contact Hrs: **2**

ISA Marks: **80**

ESA Marks: **20**

Total Marks: **100**

Teaching Hrs: **24 Hrs**

Exam Duration: **3 Hours**

Expt. No.	Demonstration	Hrs
1	Demonstrate python data types, operators and control statements	1
2	Introduction to Inheritance and exceptions	1
3	Demonstrate the file operations and text processing	1
4	Design and implement CRUD operations using sqlite3	1
Exercise		
5	Implementation of different types of operators and control statements	1
6	Explore Tkinter module for designing the GUI components	1
7	Explore the following libraries to perform the different scientific and matrix operations - <ul style="list-style-type: none"> • Numpy • Scipy 	1
8	Implement the different methods of pandas and matplotlib library to perform the dataframe operations and data visualization	1
9	Explore the libraries scikit-learn, tensorflow and keras of machine learning to resolve the real time problems.	2
Structured Enquiry		
10	Develop an enterprise web application using machine learning for recommendation of buying products in e-commerce app	2

Evaluation:

Students Assessment through CIA (80%) and ESA (20%)

Assessment	Weightage in Marks
Demonstration	20
Exercises	40
Structured Enquiry	20
ESA	20
Total	100

Course Code: **20ECAC706**

Course Title: **Object Oriented Programming using Java**

L-T-P: **3-0-1**

Credits: **4**

Contact Hrs.:**5**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs.: **40+24**

Exam Duration:**3Hrs**

No	Content	Hrs.
Unit I		
1	Chapter No. 1. Introduction and Fundamental Programming Structures in Java History of java, features of java, A simple java programming, Comments, Data Types, Variables, Constants, Operators, Control Flow, Big Numbers, Arrays	4 Hrs.
2	Chapter No. 2. Objects and Classes Introduction to Object-Oriented Programming, Classes, Objects, Identifying Classes,	6 Hrs.

	Relationships between Classes, Using Predefined Classes, Objects and Object Variables, Mutator and Accessor Methods, First Steps with Constructors, Implicit and Explicit Parameters, Benefits of Encapsulation, Class-Based Access Privileges, Private Methods, Static Fields and Methods, Method Parameters, Object Construction, Overloading, Packages.		
3	Chapter No. 3. Inheritance and Java Strings Classes, Super classes, and Subclasses, Inheritance Hierarchies, Polymorphism, Dynamic Binding, Preventing Inheritance: Final Classes and Methods, Casting, Abstract Classes. Java String, Strings Are Immutable, String Buffer class, String Builder class, to String () method, String Tokenizer in Java.	6 Hrs.	
	Unit II		
4	Chapter 4: Interfaces and Inner Classes Interfaces, Properties of Interfaces, Interfaces and Abstract Classes, Object Cloning, Interfaces and Callbacks, Inner Classes, Use of an Inner Class to Access Object State, Special Syntax Rules for Inner Classes, Local Inner Classes, Accessing final Variables from Outer Methods, Anonymous Inner Classes, Static Inner Classes.	6 Hrs.	
5	Chapter 5 : Exceptions and Multithreading Dealing with Errors, The Classification of Exceptions, Declaring Checked Exceptions, How to Throw an Exception, Creating Exception Classes, Catching Exceptions, Catching Multiple Exceptions, Rethrowing and Chaining Exceptions, The finally Clause; Multithreading:- What Are Threads?, Interrupting Threads, Thread States, Thread Properties.	6 Hrs.	
6	Chapter 6: Collections Collection Interfaces, Collection and Iterator Interfaces in the Java Library, Linked Lists, Array Lists, Hash Sets, Tree Sets, Object Comparison, Queues and Dequeues, Priority Queues, Maps.	4 Hrs.	
	Unit – III		
7	Chapter 7: Servlets Background; The life cycle of servlet, A simple servlet, The Servlet API, The javax.servlet Package ,The Servlet Interface, The Servlet Config Interface, Servlet Context Interface, Servlet Request Interface, Servlet Response Interface, The Cookies class.	4 Hrs.	
8	Chapter 8: JSP and Database Access Overview of JSP, Invoking java code from JSP, JSP expressions, scriplet, page directive.	4 Hrs.	
Text Books			
1. Core Java Volume-I Fundamentals 10 th Edition, 2016, by CAY S. Horstmann, Gray Cornell.			
2. Jim Keogh, J2EE The Complete Reference, Tata McGraw Hill 2007.			
References			
1. Head First Java 2 nd Edition by Kathy Sierra and Bert Bates, OREILLY.			
Links https://www.studytonight.com/java/component-of-java.php			
https://www.javatpoint.com/java-programs .			
Activities			
#	TOPICS	ACTIVITY	WEIGHTAGE

1	Introduction and Fundamental Programming Structures in Java	<ul style="list-style-type: none"> • Java installation, path setting ,steps for compilation and Running the java program, • Simple java programming and usage of the followings: Comments, Data Types, Variables, Constants, Operators, Control Flows, Big Numbers, and Arrays. 	10
2	Objects and Classes	<ul style="list-style-type: none"> • Java Programs on: Relationships between Classes and Objects, • Class Constructors, Access Privileges, • Static Fields and Methods, • Overloading and Packages. 	10
3	Inheritance and Java Strings	Java Programs on : <ul style="list-style-type: none"> • Inheritance and different String class. • Use of Final, Static, Abstract keys in program 	15
4	Interfaces and Inner Classes	Java Programs on : <ul style="list-style-type: none"> • Abstract Classes, Object Cloning • Interfaces and different Inner Classes. 	10
5	Exceptions and Multithreading	Java Programs on : <ul style="list-style-type: none"> • Exception ,Chaining Exceptions handlings • Multithreading's,multitaskings 	15
6	Collections	Java Programs on : <ul style="list-style-type: none"> • Java Programs on Collection packages. • Linked Lists, Array Lists, • Hash Sets, Tree Sets, Object Comparison, • Queues and Dequeues, Priority Queues, Maps. 	15
7	Servlets	Java Programs on <ul style="list-style-type: none"> • A simple servlet programs, • The Servlet API, • Servlet Interface and Cookie classes. 	15
8	JSP and Database Access	Java Programs on <ul style="list-style-type: none"> • JSP and Database Access. 	10
		Total	100

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	10

ISA- 2	10
Activities	30
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1, 2, 3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4, 5, 6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7, 8	Any 1 question is to be answered

Course Code: **20ECAC707**

Course Title: **Data Mining**

L-T-P: **3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **40+24**

Exam Duration: **3Hrs**

No	Content	Hrs
	Unit I	
1	Chapter 1 : Introduction Fundamentals of data mining, Kinds of pattern, technologies used, and technologies used, applications, issues, data objects and attribute types, Basic Statistical Descriptions of Data, Data Visualization.	7 Hrs
2	Chapter 2 : Data Preprocessing Need of preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization.	4 Hrs
3	Chapter 3 : Data Warehousing and Online Analytical Processing Data Warehouse: Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction.	5 Hrs
	Unit II	
4	Chapter 4 : Mining Frequent Patterns, Associations, and Correlations Basic Concepts, Frequent Itemset Mining Methods, Which Patterns Are Interesting?: Pattern Evaluation Methods, Pattern Mining in Multilevel, Multidimensional Space, Constraint-Based Frequent Pattern Mining.	5 Hrs
5	Chapter 5 : Classification Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy, Bayesian Belief Networks, Classification by Backpropagation	6 Hrs
6	Chapter 6 : Graph Mining, Social Network Analysis, and Multi-relational Data Mining	5 Hrs

Methods for Mining Frequent Sub graphs, Mining Variant and Constrained Substructure Patterns, Characteristics of Social Networks, Mining on Social Networks, Multirelational mining, Multirelational Classification, Multirelational Clustering with User Guidance.

Unit III

7 Chapter 7 : Cluster Analysis 4 Hrs

Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering

8 Chapter 8 : Mining Complex Types of Data 4 Hrs

Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

Text Book:

1. J. Han, M. Kamber., Data Mining Concepts and Techniques, 3rd edition, Kaufmann publishers, 2011

References

1. Pujari, A.K, Datamining Techniques, 1, Universities Press, 2010

Tools/Libraries:

- Weka
- Rapid Miner
- KNIME
- Orange
- Tableau
- Excel
- Google Analytic

Activities

#	TOPICS	ACTIVITY	WEIGHTAGE
1	Introduction to Data Mining	Basic Statistical Descriptions of Data and Data Visualization on a given dataset.	15
		QUIZ	
2	Data Preprocessing	Data preprocessing & Data Visualization on given a dataset – Cleaning, Integration, transformation, reduction, discretization, Imputation, Data Discrimination between different Classes in the dataset, generation of Boxplot, Scatter Plot, Histograms, QQ Plots.	20
3	Mining Frequent Patterns, Associations and Correlations	Mining Association rules using Apriori algorithm on a given transactional item dataset.	15
		QUIZ	

4	Classification	Generation of Decision Tree to classify the objects in a given dataset.	15
		QUIZ	
5	Classification	Classification of objects in a given dataset using Naïve Bayesian Algorithm.	15
		QUIZ	
6	Clustering	Demonstration of clustering of objects in a given dataset using clustering techniques.	10
7	Mining Complex Types of Data	Demonstration of web mining for a given portal.	10
TOTAL			100

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	15
ISA- 2	15
Activities	20
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **20ECAC709**

L-T-P: 3-0-1

ISA Marks: 50

Teaching Hrs: 40+24

Course Title: **Cloud Computing**

Credits: 4

ESA Marks: 50

Contact Hrs: 5

Total Marks: 100

Exam Duration: 3 hrs

No

Content

Hrs

Unit I

1	Chapter 1: Introduction, Parallel and distributed systems	6
	Network-centric computing and network centric content, peer-to-peer systems, Cloud computing basics, delivery models and services, Ethical issues, cloud vulnerabilities, major challenges; parallel computing, parallel computer architecture, Distributed systems, communication protocol and process coordination, logical clocks, message delivery rules, casual delivery, Concurrency, atomic actions, consensus protocols, modularity: client-server paradigm.	
2	Chapter 2: Cloud Infrastructure	6
	Cloud computing at Amazon, cloud computing: the Google perspective, Microsoft windows Azure and online services; open-source software platforms for private clouds; Cloud storage diversity and vendor lock-in; Cloud computing interoperability: the intercloud; Energy use and ecological impact of large-scale data centers; Service and compliance level agreements; User experience; Software licensing.	
3	Chapter 3: Cloud Computing: Applications and Paradigms	4
	Challenges for cloud computing; Existing cloud applications and new application opportunities; Architectural styles for cloud applications; Workflows: Coordination of multiple activities; The MapReduce programming model; Case studies.	
Unit II		
4	Chapter 4: Cloud Resource Virtualization	6
	Virtualization; Layering and virtualization; Virtual machine monitors; Virtual machines; Performance and security isolation; Full virtualization and Para virtualization; Hardware support for virtualization; Case study; Optimization of network virtualization; vBlades; A performance comparison of virtual machines; Software fault isolation;	
5	Chapter 5: Cloud Resource Management and Scheduling	6
	Policies and mechanisms for resource management; Applications of control theory to task scheduling on a cloud; Stability of a two-level resource allocation architecture; Feedback control based on dynamic thresholds; Coordination of specialized autonomic performance managers; A utility-based model for cloud-based web services; Resource bundling; Scheduling algorithms for computing clouds; Fair queuing; Resource management and dynamic application scaling.	
6	Chapter 6: Networking Support	4
	Packet-switched networks; The Internet; Internet migration to IPV6; The transformation of the Internet; Web access and the TCP congestion control window; Network resource management; Interconnection networks for computer clouds; Content-delivery networks; Overlay networks and small-world networks.	
Unit – III		
7	Chapter 7: Storage Systems	4
	The evolution of storage technology; Storage models, file systems and databases; Distributed file systems: The precursors; General parallel file system; Google File System; Apache Hadoop; Locks and Chubby: A locking service; Transaction processing and NoSQL and databases; BigTable; Megastore.	
8	Chapter 8: Cloud Security	4
	Cloud security risks; Security: The top concern for cloud users; Privacy and privacy impact assessment; Trust; Operating system security; Virtual machine security; Security of virtualization; Security risks posed by shared images; Security risks posed by a	

management OS; A trusted virtual machine monitor.

Text Book (List of books as mentioned in the approved syllabus)

1. Dan C. Marinescu, Cloud Computing: Theory and Practice, Morgan Kaufmann publishers, 2013

References

- 1 Michael Miller, Cloud Computing: Web-Based Applications that change the Way you work and collaborate Online, Pearson Publication, 2012.
- 2 Anthony T. Volte, Toby J. Volte, Robert Elsenpeter: Cloud Computing, A Practical Approach, McGraw Hill, 2010.
- 3 Cloud Computing for Dummies: J. Hurwitz, ISBN 978-0-470-484-8
- 4 Dr. Kumar Sourabh, Cloud Computing, 2nd Edition, Wiley India, 2011.

ACTIVITIES

#	TOPICS	ACTIVITY	WEIGHTAGE
1	Introduction, Parallel and distributed systems	<p>Compare the three cloud computing delivery models, SaaS, PaaS, and IaaS, from the point of view of the application developers and users. Discuss the security and the reliability of each one of them. Analyze the differences between the PaaS and the IaaS.</p> <p>An IT company decides to provide free access to a public cloud dedicated to higher education. Which one of the three cloud computing delivery models, SaaS, PaaS, or IaaS should it embrace and why? What applications would be most beneficial for the students? Will this solution have an impact on distance learning? Why?</p> <p>What is in your opinion the critical step in the development of a systematic approach to all-or-nothing atomicity? What does a systematic approach mean? What are the advantages of a systematic versus an ad-hoc approach to atomicity?</p>	15
2	Cloud Infrastructure	<p>Several desirable properties of a large-scale distributed system includes transparency of access, location, concurrency, replication, failure, migration, performance, and scaling. Analyze how each one of these properties applies to AWS.</p> <p>Demonstration Cloud services using AWS or Azure or Google Cloud.</p> <p>Compare the Oracle Cloud offerings (see https://cloud.oracle.com) with the cloud services provided by</p>	15

		Amazon, Google, and Microsoft.	
3	Cloud Computing: Applications and Paradigms	<p>Download and install the Zookeeper from the site http://zookeeper.apache.org/. Use the API to create the basic workflow patterns or Use the AWS CloudFormation service to create the basic workflow patterns.</p> <p>Search the web for reports of cloud system failures and discuss the causes of each incident.</p> <p>Research the power consumption of processors used in mobile devices and their energy efficiency. Rank the components of a mobile device in terms of power consumption. Establish a set of guidelines to minimize the power consumption of mobile applications.</p>	10
4	Cloud Resource Virtualization	<p>Virtualization simplifies the use of resources, isolates users from one another, supports replication and mobility, but exacts a price in terms of performance and cost. Analyze each one of these aspects for: (i) memory virtualization, (ii) processor virtualization, and (iii) virtualization of a communication channel.</p> <p>Virtualization of the processor combined with virtual memory management pose multiple challenges; analyze the interaction of interrupt handling and paging.</p> <p>In Section 5.6 we state that a VMM for a processor can be constructed if the set of sensitive instructions is a subset of the privileged instructions of that processor. Identify the set of sensitive instructions for the x86 architecture and discuss the problem each one of these instruction poses.</p>	15
5	Cloud Resource Management and Scheduling	<p>Analyze the benefits and the problems posed by the four approaches for the implementation of resource management policies: control theory, machine learning, utility based, market-oriented.</p> <p>Can optimal strategies for the five classes of policies, admission control, capacity allocation, load balancing, energy optimization, and QoS guarantees be actually implemented in a cloud? Support your answer with solid arguments.</p> <p>Multiple controllers are probably necessary due to the scale of</p>	15

		the cloud. Is it beneficial to have system and application controllers? Justify your answers.	
6	Networking Support	Implementation Simple IPC (Client Server Communication) Simple chat server multi-threaded File Server	10
7	Storage Systems	Analyze the reasons for the introduction of storage area networks (SANs) and their properties. Block virtualization simplifies the storage management tasks in SANs. Provide solid arguments in support of this statement. The designers of the Google file system (GFS) have re-examined the traditional choices for a file system. Discuss observations regarding these choices that have guided the design of GFS.	10
8	Cloud Security	Write a survey paper on cloud computing security: Issues, threats, and solutions	10
		Total	100

Evaluation Scheme

1. In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	10
ISA- 2	10
Activities	30
ISA	50
ESA	50
Total	100

2. End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	4,5,6	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	7,8	Any 1 question is to be answered

Course Code: **20ECAC711**

Course Title: **Design & Analysis of Algorithms**

L-T-P:**3-0-1**

Credits: **4**

Contact Hrs: **5**

ISA Marks: **50**

ESA Marks: **50**

Total Marks: **100**

Teaching Hrs: **40+24**

Exam Duration: **3 Hours**

No	Content	Hrs
Unit I		
1	Chapter 1: Introduction Notion of Algorithm, Fundamentals of Algorithmic Problem Solving, Important Problem Types, Fundamental data Structures.	5 Hrs
2	Chapter2: Fundamentals of the Analysis of Algorithm Efficiency Analysis Framework, Asymptotic Notations and Basic efficiency classes, Mathematical analysis of Recursive and Non-recursive algorithms, Examples	5 Hrs
3	Chapter 3: Brute Force Selection Sort and Bubble Sort, Sequential Search and String Matching, Exhaustive Search	3 Hrs
4	Chapter 4: Divide-and-Conquer Mergesort, Quicksort, Binary Search, Binary tree Traversals and related properties.	3 Hrs
Unit II		
5	Chapter 5: Decrease-and-Conquer Insertion Sort, Depth First and Breadth First Search, Topological sorting.	3 Hrs
6	Chapter 6: Transform-and-Conquer Presorting, Balanced Search Trees, Heaps and Heapsort, Problem Reduction	3 Hrs
7	Chapter 7: Space and Time Tradeoffs Input Enhancement in String Matching, Hashing	3 Hrs
8	Chapter 8: Dynamic Programming Computing a binomial coefficient, Warshall's and Floyd's Algorithms, The Knapsack Problem and Memory Functions.	3 Hrs
9	Chapter 9: Greedy Technique Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm, Huffman Trees	4 Hrs
Unit – III		
10	Chapter 10: Limitations of Algorithm Power Lower-Bound Arguments, Decision Trees, P, NP and NP-Complete Problems	4 Hrs

11 Chapter 11: Coping with the Limitations of Algorithm Power

4 Hrs

Backtracking, Branch-and-Bound, Approximation Algorithm for NP-Hard problems.

Text Book:

1. Anany Levitin: Introduction to the Design and Analysis of Algorithms, Pearson Education, 2003.

References:

1. Cormen T.H., Leiserson C.E., and Rivest R.L., Introduction to Algorithms, PHI, 1998.
2. Horowitz E., Sahani S., Rajasekharan S.: Computer Algorithms, Galgotia Publications, 2001.

Evaluation Scheme

Activities

#	TOPICS	ACTIVITY	WEIGHTAGE
1	Divide and Conquer	implement and analyze the following : <ul style="list-style-type: none"> • Quick sort • Merge sort 	15
2	Decrease and Conquer	Implementation of the following : <ul style="list-style-type: none"> • Insertion sort • Depth first search • Breadth First Search 	15
3	Transform and Conquer	Implement the following: <ul style="list-style-type: none"> • AVL Tree • 2-3 tree 	15
4	Dynamic Programming	Implement the following: <ul style="list-style-type: none"> • Warshall's algorithm • Floyd's Algorithm 	20
5	Greedy method	Implementation of the following : <ul style="list-style-type: none"> • Knapsack problem • Kruskal's algorithm • Prim's algorithm 	25
6	Backtracking	Program to implement 8-Queen's problem.	10
10		Total	100

In Semester Assessment (ISA)

Assessment	Marks
ISA- 1	15
ISA- 2	15
Activities	20
ISA	50
ESA	50
Total	100

End Semester Assessment (ESA)

UNIT	8 Questions to be set of 20 Marks Each	Chapter Nos.	Instructions
I	3 Questions to be set of 20 Marks Each	1,2,3,4	Any 2 questions are to be answered
II	3 Questions to be set of 20 Marks Each	5,6,7,8,9	Any 2 questions are to be answered
III	2 Questions to be set of 20 Marks Each	10,11	Any 1 question is to be answered