2015-16

| 15ECAP706 | Rich Internet Application Lab. |
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| **Program: MASTER OF COMPUTER APPLICATIONS** | | |
|---|---|---|
| **Course Title: Rich Internet Applications Lab.** | | **Course Code: 15ECAP706** |
| **L-T-P : 0-1-1** | **Credits: 2** | **Contact Hours: 4 hrs** |
| **CIE Marks: 80** | **SEE Marks: 20** | **Total Marks: 100** |
| **Teaching Hours: 48hrs** | **Examination Duration: 3Hrs.** | |

1)a) Write the program which describes Boolean data type.
b) Write the program which describes integer, float and string data type.
c) Write the program for type casting of different data type

2) Find the biggest of 2 numbers.
Find the biggest of 3 numbers.
Check whether a number is positive or negative.
Find the biggest of two numbers using ternary operator.
Check whether the given number is odd or even.
Find the factorial of a number (while loop)
Reverse the digit (Use do while)
Find the sum of the digits (Use for loop)
Display the Fibonacci series for a particular limit.(Use for loop)
Check the given letter is vowel or not.
3) Create an associative array with book details and display it in a table.
Write a program to create an array and try with all array functions.
4) Find the length of a string
Create a form with one text field and submit buttons for string length, string, reverse, uppercase, lowercase, string replace . Display the result according to it.
5) Write a program of function passing a two values and add the two values in the function.
Write a program of function showing with return value.
Create a registration form which contains fields name, Roll No, Gender and a submit button. All the details should be displayed in the server page when the user clicks the submit button.
Write a program to check whether the given number is prime or not.
6) Create Cookie, store a value "Ram" in the cookie.
Write a program of Cookie showing expire of cookie
7) Write a program to display the contents of a file(use fread, fgets, fgetc)
Write a program to create a file and write contents to it
Write a program to append data to an existing file.

Write a program to upload a file and display the contents in server.

8) Write a program for cinema ticketing. All the age should be over 12 years, if less than,dont

allow to get ticket.( apply the exception handling

9) Write a PHP code to connect MySql Database.

Write a PHP code to select data,delete data and update data with MySqli.

Working with MVC framework(joomla) using PHP and MySql.

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| 2016-17 | |

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| 15ECAP801 | Software Design Lab |

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| **Program: MASTER OF COMPUTER APPLICATIONS** | | |
| Course Code: **15ECAP801** | Course Title: **Software Design Lab.** | |
| L-T-P: **0-0-1** | Credits: **1** | Contact Hrs: **2** |
| ISA Marks: **80** | ESA Marks: **20** | Total Marks: **100** |
| Teaching Hrs: **24** | | Exam Duration: **3 Hours** |
| | | |

**1.SIMPLE PROGRAMS**

Identify the various classes and attributes and bring out UML class diagram, and a sequence diagram.

1. Triangle of binary numbers

2. Triangle of numbers

3. Sum of series

4.Sorting string Keyboard input/Command line input

5. Average of *n* numbers

6. Prime number checking

7. Factorial - recursion

8. Fibonacci numbers – recursio

**2. GRID LINES**

Specification: Grid with two sets of horizontal and vertical lines using Rumbhaugh approach.

Write a java program to create a window and draw horizontal and vertical lines to form a grid.

High level design: Define a subclass of Fram class and draw horizontal parallel linesand vertical lines to form the grid. Create an object of this class and display it.

Detailed level design: user interface specifications: the window contains grid of horizontal and vertical lines.

For this we define a GUI class called Ruled derived from Frame class of java swing library.

Content of window: parallel vertical and horizontal lines are drawn inside the window to form the grid. use the print( ) to draw the grid.

**3.GRID WITH TWO SETS OF DIAGONAL LINFS**

a) Identify the various use cases and actors involved and represent the user view of the system.

b) Identify the various classes and attributes and bring out a class diagram, and a sequence diagram.

Write a program to create a window and draw two sets of diagonal parallel lines crossing each other. Device the following and then implement.

(a) High level design

(b) Detail level design

**(c) User interface specification.**

**4. OOA AND OOD USING UML-I**

In the employee referral process, the HR head of the region where a vacancy exists informs employees of that region and other regional HR heads. The other regional HR heads inform employees by putting up a notice informing them about the vacancy. The employees send on their recommendations to the regional HR head of the region where a vacancy exists. The regional HR head then matches the skills of these candidates with the skills required for the vacant position and short lists them. An interview schedule is drawn up and the short listed candidates are informed. Based on the interview proceedings, interview details are updated and all the selected candidates are given offer letter. The candidate informs the HR (head where the vacancy exists) either by accepting or declining the offer letter. When a candidate referred by an employee joins the organization, the employee who has referred the candidate is paid a bonus.

a) Identify the various use cases and actors involved and represent the user view of the system.

b) Identify the various classes and attributes and bring out a class diagram, and a sequence diagram.

**5. OOAAND OOD USING UML-II**

UML class representation: Design and implement a student class with the following attributes:

i) Registration no. ii) Name of a student iii) marks in subject-l iv) marks in subject-2 v) marks in subject-3 vi) Total marks. The total of 3 subject marks must be calculated only when the student passes in all the 3 subjects. The pass marks for each subject is 50. If a candidate fails in anyone of the subjects his total marks must be declared as 0. Using these conditions write a constructor for this class. Write a method display Student ( ) to display the details of student object. In the main method create an array of 3 student objects and display the object details.

a) Identify the various use cases and actors involved and represent the user view of the system.

b) Identify the various classes. and attributes and bring out a class diagram, and a Sequence diagram.

**6. OOA AND OOD USING UMLIII**

Consider the student class defined in the problem 2. Assume that a student studies 6 subjects. Each subject has a title, passing minimum marks, and maximum marks. Design the class representation using UML notations and write a java program to define student class including the subject as attribute. Design specifications: A student studies 6 subjects. Each subject has a subject code, title, passing minimum marks, maximum marks. The following table shows the sample data:

| Subject code | Title | Passing Min | Max. Marks |
|---|---|---|---|
| CS401 | java prog. | 50 | 100 |
| CS406 | ASW lab | 18 | 50 |
| --- | --- | --- | --- |

You must first define a class called subject. For every student there is an array of 6 subjects. Since every student in this example will study only the same subjects, we declare it as static. The student class will

have the following attribute: Registration no., name, subject array, marks array, result array, and total.

a) Identify the various use cases and actors involved and represent the user view of the system.

b) Identify the various classes and attributes and bring out a class diagram, and a sequence diagram.

**7. OOA AND OOD USING UML-IV**

A class called Television has the following attributes: 1) Make 2) Screen Size 3) Purchase Date 4) Color/B&W. Define a class television. Define a method for displaying the attribute values of a T. V. Represent this problem specification using UML class notations and write a Java program for the same. The television class should be designed with the required attributes. The main method should be written to test methods of television class. For example display TV ( ) method may be used to print the attributes of television class.

a) Identify the various use cases and actors involved and represent the user view of the system.

b) Identify the various classes and attributes and bring out a class diagram, and a sequence diagram.

**8.SPECIFICATIONS: BANK INTEREST COMPUTATION**

Consider the following attributes: P=Principal,R = rate of interest, N = number of years SI = simple interest A = amount

Design UML class called Deposit with the above five attributes. In the constructor, calculate interest (SI) and amount. Implement the above specification using Java Programming Language.

**9. OOA AND OOD USING RAUMBHAG AND UML VI:**

In a bank the customer opens an account and in that account he/she deposits money. So the entities are:

A customer can have several accounts and an account can be spent as a joint account by several customers. In the customer class, the address of the customer is constructed as an object of a class called Address. Write the UML class diagram consisting Customer class and Address class. In the Account class, there is an attribute called users. This is an integer attribute. It tells no. of users of the account. If the account is a joint account by 5 persons, the value of users = 5. If it is a single user account, users = 1.

Write the UML class diagrams for account

The Account number is Longtype. Cust ( ) is an array of length = users. If the users = 5, Cust( ) is of length 5. Another attribute of the Account is an object of Deposit class. Write the UML class diagram for Deposit.

Test case:

| Object | User id | Fname | Lname | DOB | Add | Phone no |
|---|---|---|---|---|---|---|
| name | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

**Address:**

| Object | Street | City | State | Country | Pin code |
|---|---|---|---|---|---|
| Name | | | | | |
| | | | | | |

**Deposit:** Principle P = ?No. of years *n* = ?Rate of interest =?

**Account:** Account object: al

AccountNo:

Customer object:

No. of users:

Deposit object: dl

**Sample Output**

AccountNo:

Customer ID:

First Name:

Last Name:

DOB:

Address:

Phones:

Customer ID:

First Name:

Last Name:

DOB:

Address:

Phones:

No of users:

Deposit:

Principle:

Rate of interest:

No of years:

Simple interest:

Amount:

**10. OOA AND OOD USING BOOCH AND UML-VII**

Consider the object COLLEGE of Mini project. For the entire given specifications in the problem construct the following UML diagrams.

Specifications: In a college of Computer Science there are computer laboratories and equipments. Develop a system to Create the college as an object and display the contents.

(1) Class diagram(2) Object diagram(3) Interaction diagrams (4)Sequence & b)Collaboration (5) Deployment diagram.

**11. OOA AND OOD USING UML VIII**

C library information system:

A library lends books and magazines to members, who are registered in the system. Also, it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. Old books and Magazines are removed when they are out of date or in poor condition. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned or purchased by the library, that person is notified. The library can easily create, replace and delete information about the titles, members, loans and reservations in the system.

For the above problem specification devise the following UML diagrams:

1. Use case diagram 2. Class diagrams 3. State transition diagram 4. Sequence diagram 5. Collaboration diagram 6. Activity diagram 7. Component diagram 8. Deployment diagrams

**12.OOA AND OOD USING UML IX**

Develop the product using java programming Language. Write UML diagram for Railway Reservation System. Develop the product using java programming language. and devise the following UML diagrams:

1. Use case diagram 2. Class diagrams 3. State transition diagram 4. Sequence diagram 5. Collaboration diagram 6. Activity diagram 7. Component diagram 8. Deployment diagrams

## EvaluationScheme

1. **In Semester Assessment (ISA) : Continuous Internal Assessment for 80 Marks.**

**2. End Semester Assessment (ESA) for 20 Marks.**

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| 15ECAE901 | Internet of Things |
|---|---|

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| **Program: MASTER OF COMPUTER APPLICATIONS** | | |
|---|---|---|
| Course Code: **15ECAE901** | Course Title: **Internet of Things** | |
| 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 No. 1.Introduction to Internet of Things (IoT)**<br>Definition & Characteristics of IoT, Physical Design of IoT: IoT protocols, Logical Design of IoT: IoT functional blocks, communication models and APIs. | **6 Hrs** |
| 2 | **Chapter No. 2. IoT Enabling Technologies**<br>Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems, IoT Levels and Deployment Templates. | **7 Hrs** |
| 3 | **Chapter No. 3. Domain specific IoTs**<br>Home Automation ,Cities, Environment ,Energy, Retail, Logistics, Agriculture, Industry ,Health and Lifestyle | **7 Hrs** |
| | **Unit II** | |
| 4 | **Chapter No. 4. IoT Platforms Design Methodology**<br>IoT Design Methodology, Case Study on IoT System for Weather Monitoring. | **5 Hrs** |
| 5 | **Chapter No. 5. IoT systems – Logical design using Python**<br>Introduction to Python, Data types, data structures, Control of flow, functions modules, packages, file handling, data/time operations, classes, Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib. | **8 Hrs** |
| 6 | **Chapter No. 6. IoT Physical Devices and Endpoints**<br>Basic building blocks of an IoT device, Exemplary device: Rasyberry Pi, interface (serial, SPI, I2C), Programming Rasyberry Pi with Python. | **7 Hrs** |
| | **Unit – III** | |
| 7 | **Chapter No. 7. IoT Physical Servers & Cloud Offerings**<br>Introduction to Cloud Storage models and communication APIs ,Webserver – Web server for IoT, Cloud for IoT, Python web application framework, Designing a RESTful web API | **5 Hrs** |

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|---|---|---|
| **8** | **Chapter No. 8. Case Studies Illustrating IoT Design**<br>Home Automation-smart lighting, home intrusion detection, Cities-smart parking. | **5 Hrs** |

**Text Book:**


1. Arshdeep Bahga and Vijay Madisetti, “Internet of Things - A Hands-on Approach”, Universities Press, 2015


**References:**


1. Matt Richardson & Shawn Wallace, “Getting Started with Raspberry Pi”, O'Reilly (SPD), 2014


**IoT Practices**

| ***Expt No.*** | ***Brief description about the experiment*** | ***Slots*** |
|---|---|---|
| **DEMONSTRATION** | | |
| *1* | Introduction to preparing the OS for Raspberry Pi | 1 |
| *2* | Introduction to Shell basic for Raspberry Pi | |
| *3* | Introduction to GPIO Input/output | 1 |
| *4* | Introduction GPIO using Python | 1 |
| *5* | Introduction to Python and SPI | 1 |
| **EXERCISE** | | |
| 6 | Creating a Shell scripts for Hook up circuit. | 1 |
| 7 | Implementing PHP and AJAX Calls. | 1 |
| 8 | Working with SPI Protocol. | 1 |
| 9 | Creating Web interface for ADC | 1 |
| 10 | Creating GPIO using Python | 1 |
| 11 | Working with SPI using Python | 1 |
| **STRUCTURED ENQUIRY** | | |

| | | |
|---|---|---|
| 12 | Design and Develop flow control using Raspberry pi kit | 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 | 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 |

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| 15ECAC711 | PHP Programming |

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| **Program: MASTER OF COMPUTER APPLICATIONS** | | |
|---|---|---|
| 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**<br>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**<br>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**<br>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**<br>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**<br>Creating user defined function, Creating classes ,Using Advanced OOP concepts | **4 Hrs** |
| | **Unit II** | |
| **6** | **Chapter No. 6. Working with Files & Directories**<br>Reading files, Writing files , Processing directories , Performing Other files & directory operations | **8 Hrs** |
| **7** | **Chapter No. 7. Working with databases & SQL**<br>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**<br>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<br>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<br>Sanitizing Input and Output , Securing Data , Securing Configuration Files, Securing Database Access , Securing Sessions , Validating User Input, Working with Required Fields , Working with Numbers , Working with Strings , Working with Dates | **4 Hrs** |

**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 |

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| 15ECAP708 | Web Services Lab |

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| **Program: MASTER OF COMPUTER APPLICATIONS** | | |
|---|---|---|
| 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 Progessbar
    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.**

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| 16ECAC803 | Python Programming |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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** | **6 Hrs** |
| | 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. | |
| 2 | **Chapter No. 2. LIBRARIES AND MODULES** | **6 Hrs** |
| | 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. | |
| 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 McGRAW-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.

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| 16ECAP803 | Mini Project -1 |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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 |

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| 16ECAP806 | Mini Project-2 |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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|---|---|---|
| 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

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| 16ECAE804 | Web Content Management |
|---|---|

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**Program: MASTER OF COMPUTER APPLICATIONS**

| | | |
|---|---|---|
| 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 |
|---|---|---|
| | **Unit I** | |
| 1 | **Chapter 1: What Content Management Is (and Isn't)** | **6 Hrs** |
| | What Is Content?, What Is a Content Management System?, Types of Content Management Systems, What a CMS Does, What a CMS Doesn't Do | |
| 2 | **Chapter 2 :Points of Comparison** | **7 Hrs** |
| | 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 | |
| 3 | **Chapter 3 :Acquiring a CMS** | **7 Hrs** |
| | Open Source CMSs, Commercial CMSs, Software-as-a-Service, Build Your Own, Questions to Ask | |
| | **Unit II** | |
| 4 | **Chapter 4: The Content Management Team** | **7 Hrs** |
| | Editors, Site Planners, Developers, Administrators, Stakeholders | |
| 5 | **Chapter 5: CMS Feature Analysis** | **6 Hrs** |
| | The Difficulties of Feature Analysis, An Overview of CMS Features | |
| 6 | **Chapter 6 Content Modeling** | **7 Hrs** |
| | 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 | |
| | **Unit – III** | |
| 7 | **Chapter 7 :Content Aggregation** | **5 Hrs** |
| | The Shape of Content, Content Geography, Aggregation Models: Implicit and Explicit, Aggregation Functionality, By Configuration or by Code, A Summary of Content Aggregation Features | |
| 8 | **Chapter 8 :Editorial Tools and Workflow** | **5 Hrs** |
| | 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 | |

**Text Book:**

1. "Web Content Management", Systems, Features, and Best Practices, Publisher: O'Reilly Media, March 2016.

**WEB CONTENT MANAGEMENT SYSTEM – COURSE PROJECT**

**COURSE DESCRIPTION:**

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.

**OBJECTIVES**

- 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. | **Introducing Content Management Systems**<br>o An overview of some of the different tools and methods that today's web publishers are using to create highly-tailored dynamic web content.<br>o Purchasing and configuring a domain name and web hosting. | 1. Introduction to Joomla & Installation<br>2. Domain Name Registration & Configuration and Hosting<br>3. Create a Database<br>4. Content Preparation and Planning | 02 |
| 2. | **Introduction to Joomla**<br>o Explore the CAM model (Categories, Articles, and Menus) approach to creating content for Joomla environments.<br>o Administration and management of users and media.<br>o Installing Joomla<br>o Exploring the Admin Interface<br>o Content creation using the CAM | 1. Write an article & put your articles in order with categories.<br>2. Customize Administrator's Panel<br>3. Change your website's look with Templates.<br>4. Expand your website's functionality with different extensions.<br>5. Content creation & Customization using the CAM model | 02 |

| | | | | |
|---|---|---|---|---|
| | model<br>○ Content customization: images, video, audio, tags, formats, etc. | | | |
| 3. | **Joomla Menus**<br>○ Creating and controlling menus for Joomla site.<br>○ To link to articles and create special menu items.<br>○ Adding and displaying menus<br>○ Linking menus to articles and other features | 1. Categorize the articles which allow grouping your content better.<br>2. Create menu items for website. | 02 | |
| 4. | **Extending Joomla –Plug-ins, Modules**<br>○ Use of Joomla, Plug-ins, Modules, Components and other extensions.<br>○ Installation of extensions, Finding and adding Joomla extensions<br>○ 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**<br>○ Explore the addition of creation and uses of customized Joomla templates<br>○ Modifying templates using CSS and HTML tricks. | Select and Customize template for website. | 02 | |
| 6. | **User management and permissions**<br>○ 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 |
|---|---|---|---|
| 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 |

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| 16ECAE806 | Cyber Security and Forensics |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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 ofCyber 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 andMalicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, SoftwarePiracy, 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 EvidenceCollection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, EmailRecovery, Hands on Case Studies, Encryption and Decryption Methods, Search andSeizure 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 IndianEvidence 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 Prosise, 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 |

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| 16ECAE807 | IT Infrastructure & Management |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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**<br>Basic Conceptual Overview of Router, Routing Protocols and Routed Protocols & Conceptual Overview of the concept of Zoning, Internet , Extranet, Intranet (Militarized Zone), De-Militarized Zones. | **5 Hrs** |
| **2** | **Chapter 2. IT Infrastructure Components and their associated Zones**<br>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** :<br>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)**<br>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 | **5 Hrs** |

| | | |
|---|---|---|
| | Device | |
| | **Unit II** | |
| **5** | **Chapter 5. VPN (Virtual Private Network)**<br><br>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<br><br>**NATing-** Conceptual Overview, NATing Operation - How it works? Applications of NATing | **10Hrs** |
| **6** | **Chapter 6. Domain Name System Server-**<br><br>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 Queryand 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. | **10Hrs** |
| | **Unit – III** | |
| **7** | **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- | **5 Hrs** |

| | | |
|---|---|---|
| | How does an Antivirus Work? **Web Application Server-** Conceptual Overview, Web Application Attacks | |
| **8** | **Chapter 8. DHCP Serve**r -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. | **5 Hrs** |

**References:**


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


**IT Infrastructure Management 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 | Lab | Implementation | Number |
|---|---|---|---|

| No. | assignments/experiment | | 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 Address Translation) | Use of iptables to build a permissive firewall by selectively filtering packets based on protocol type.<br>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 |
| 7. | Cloud Infrastructure: Azure Hands-on Lab (HOL) Build your Infrastructure in the Cloud using Windows Azure Infrastructure Services - | 1. Login to the Windows Azure Management Portal, Define a new Windows Azure Affinity Group and Create a new Windows Azure Storage Account.<br>2. Register a DNS Server in Windows Azure.<br>3. Define a Virtual Network in Windows Azure.<br>4. Configure Windows Server Active Directory in a Windows Azure VM.<br>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 |

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| 16ECAE802 | NO SQL |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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**<br>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**<br>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**<br>Using NoSQL in the CLOUD, Scalable Parallel Processing with MapReduce, Analyzing BigData with Hive. | **8 Hrs** |
| 4 | **Chapter 4 – Working with NoSQL**<br>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**<br>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**<br>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/experiment | Implementation | Number of Hours |
|---|---|---|---|
| 1. | Set up MongoDB environment. | i. Installation of MongoDB on Windows and Unix platform.<br>ii. Operations on Start, Stop and Restart MongoDB.<br>iii. Using MongoDB Help.<br>iv. Getting MongoDB Statistics. | 02 |
| 2. | Create/Drop, NoSQL Datatypes | i. Differentiate between database, document and collection.<br>ii. Create Database, Drop Database.<br>iii. Create Collection, Drop Collection.<br>iv. MongoDB Datatypes. | 02 |
| 3. | Working with MongoDB Documents | Insert Document, Update Document, Delete Document, | 02 |
| 4. | Data Retrieval | i. Projection<br>ii. Limit Records<br>iii. Sort Records<br>iv. Indexing<br>v. Aggregation | 02 |
| 5. | Creating Backup | i. Replication<br>ii. Sharding<br>iii. Create Backup<br>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:**


1. https://www.tutorialspoint.com/mongodb/mongodb_tutorial.pdf
2. https://blog.codecentric.de/files/2012/12/MongoDB-CheatSheet-v1_0.pdf
3. 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 |

| 16ECAE803 | Database Administration |
|---|---|

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**Program: MASTER OF COMPUTER APPLICATIONS**

| | | |
|---|---|---|
| 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**<br>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**<br>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**<br>Change management Requirements, Types of changes, Impact of Change on Database Structures, | **6 Hrs** |
| | **Unit II** | |
| 4 | **Chapter No. 4 Performance Management**<br>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**<br>The Larger Environment, DBMS Installation and Configuration Issues, System Monitoring, Techniques for optimizing Databases, Database reorganization. | **7 Hrs** |
| 6 | **Chapter No. 6 Application Performance**<br>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**<br>Data Breaches, Database Security Basics, Granting and Revoking Authority, Authorization Roles and Groups, Other Database Security Mechanisms, Encryption. | **5 Hrs** |
| 8 | **Chapter No. 8 Database Backup and Recovery**<br>The Importance of Backup and Recovery, Preparing for Problems, Backup, Recovery, Alternatives to Backup and Recovery | **5 Hrs** |

**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 |

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| 16ECAE808 | Cloud Computing |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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**<br>Cloud Computing Overview, Applications, Intranets and the Cloud, First Movers in the Cloud. | **7 Hrs** |
| 2 | **Chapter 2:Cloud Computing with the Titans**<br>Google, EMC, Microsoft, Amazon. Salesforce.com, IBM, Partnerships. | **6 Hrs** |
| 3 | **Chapter 3:Hardware and Infrastructure**<br>Clients, Security, Network, Services. | **7 Hrs** |
| | **Unit II** | |
| 4 | **Chapter 4:Cloud Storage and Standards**<br>Overview, Cloud Storage Providers. **Standards:** Application, Client, Infrastructure. | **7 Hrs** |

| | | |
|---|---|---|
| 5 | **Chapter 5: Software as a Service**<br>Overview, Driving Forces, Company Offerings, Industries. | **6 Hrs** |
| 6 | **Chapter 6: Software plus Services**<br>Overview, Mobile Device Integration, Providers, Microsoft Online. | **7 Hrs** |

**Unit – III**

| | | |
|---|---|---|
| 7 | **Chapter 7: Developing Applications**<br>Google, Microsoft, Cast Iron Cloud, Development, Troubleshooting, Application Management. | **5 Hrs** |
| 8 | **Chapter 8: Best Practices and the Future of Cloud Computing**<br>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 Approch, Mc Graw Hill, 2009

| *Expt No.* | *Brief description about the experiment* | *Number Of Slots* |
|---|---|---|
| **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 in Amazon VPC | 1 |
| **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* |

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## 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 |

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| 16ECAC903 | Mobile Application Development |

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**Program: MASTER OF COMPUTER APPLICATIONS**

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

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.<br>Ch-02: Getting Started with Android.<br>Ch-03: Learning | 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 |

| | | | |
|---|---|---|---|
| with an Application. | | | |
| Ch-04: App User Interface.<br>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 |

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| 16ECAP901 | Mini Project-3 |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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|---|---|---|
| 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 (languageinteroperability). .NET consists of a re-useable library of classes (smallcomponents 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 whoknow 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** | Presentation | 10 |

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|---|---|---|
| **Examination** | Viva-voce | 10 |
| | **Total** | 100 |

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| 16ECAE905 | Wireless & Mobile Computing |
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**Program: MASTER OF COMPUTER APPLICATIONS**

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**<br>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. | **4 Hrs** |
| **2** | **Chapter 2 : Wireless LAN**<br>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. | **4 Hrs** |
| **3** | **Chapter 3: Mobile Computing Architecture**<br>History of computers, History of Internet, Internet-the ubiquities networks, Architecture for mobile computing, The three-tier architectures, Design consideration for mobile computing, Mobile computing through internet, Making existing applications mobile enable. | **4 Hrs** |
| **4** | **Chapter 4: Mobile Computing through Telephony**<br>Evaluation of telephony, Multiple access procedure, Mobile computing through telephone, Developing an IVR application, Voice XML, Telephony application Programming Interphase(TAPI). | **4 Hrs** |
| | **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 |

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| 16ECAE906 | Machine Learning |

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**Program: MASTER OF COMPUTER APPLICATIONS**

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<br>Decision Trees, Regression Trees, Stopping Criterion & Pruning<br>Loss functions, Categorical Attributes, Multiway Splits, Missing Values<br>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.

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|---|---|---|
| **8** | **Chapter8. 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.Miiller 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

### 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 |

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| 17ECAC701 | Web Programming |

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**Program: MASTER OF COMPUTER APPLICATIONS**

| | | |
|---|---|---|
| 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  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 |

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| 17ECAE801 | Information Storage & Management |
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**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, RAID Impact on Disk performance, RAID Comparison, HOT Spares | **5 Hrs** |
| 3 | **Chapter 3. Intelligent Storage Systems:** Components of an Intelligent storage system, LUN Masking, Types of Intelligent storage Systems | **5 Hrs** |
| | **Unit II** | |
| 4 | **Chapter 4: Fibre Channel Storage Area Networks:** 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. | **6 Hrs** |
| 5 | **Chapter 5: Network Attached Storage (NAS):** Components of NAS, NAS Implementations, NAS File sharing Protocols, Factors Affecting NAS Performance, File Level Virtualization. | **5 Hrs** |
| 6 | **Chapter 6: Content Addressed Storage(CAS) and Unified Storage** Object Based Storage Devices, Content Addressed Storage, Unified Storage | **5 Hrs** |
| | **Unit – III** | |
| 7 | **Chapter 7: Local Replication and Remote Replication** : Local Replication Technologies, Remote Replication Technologies. | **5 Hrs** |

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 |

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| 17ECAE802 | Linux Administration |

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|---|---|---|
| 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**<br>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**<br>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 :**<br>**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.<br>**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 :**<br>**FTP Servers :** The File Transfer Protocol, FTP Servers, Files Installed with **vsftpd,** Starting and Stopping **vsftpd,vsftpd** Configuration Options.Runing FTP Server<br>**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<br>**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** |

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|---|---|---|
| 5 | **Chapter 5 Viewing and Managing Log Files -**<br><br>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**<br>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**<br>-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** |

**Textbook:**


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.


**References:**


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 | 01 |

| | | | |
|---|---|---|---|
| | | 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. | |
| 13. | Firewalls and NAT (Network Address Translation) | Use of iptables to build a permissive firewall by selectively filtering packets based on protocol type.<br><br>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.<br>7. Register a DNS Server in Windows Azure.<br>8. Define a Virtual Network in Windows Azure.<br>9. Configure Windows Server Active Directory in a Windows Azure VM.<br>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 |

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| 17ECAP901 | ASP .Net Lab. |
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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**

| *Expt./ Job No.* | *Lab assignments/experiment* | *No. of Lab. Slots per batch (estimate)* |
|---|---|---|
| | **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** | |

<table>
<tr><td>5</td><td>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 data, a message must be displayed.<br>b) Write a program containing the following controls:<br>a. A List Box<br>b. A Button<br>c. An Image<br>d. A Label<br>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.</td><td>01</td></tr>
<tr><td>6</td><td>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.<br>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.</td><td>01</td></tr>
<tr><td>7</td><td>I. Create table CANDIDATE with the following<br><table><tr><td>Column name</td><td>Datatype</td></tr><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></table>i) Insert following records into the table:<br><table><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></table>ii) Order the records on the basis of seniority of employees. iii) Drop the table.</td><td>01</td></tr>
<tr><td>8</td><td>Write a Program in ASP that has a form taking the user’s name as</td><td>01</td></tr>
</table>

| | | |
|---|---|---|
| | 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:<br>• ASP.NET, ADO.NET, C#.<br>• 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 |

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| 17ECAE903 | RESTful Web Services |
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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**<br>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**<br>**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, 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 | **4 Hrs** |
| 3 | **Chapter 3 : What Makes RESTful Services Different?**<br>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 Hrs** |
| 4 | **Chapter 4 : The Resource-Oriented Architecture**<br>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! | **4 Hrs** |
| 5 | **Chapter 5 : Designing Read-Only Resource-Oriented Services**<br>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. | **4 Hrs** |

**Unit II**

| | | |
|---|---|---|
| 6 | **Chapter 6 : Designing Read/Write Resource-Oriented Services**<br>**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?<br>**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?<br>**A Look Back at the Map Service** | **4 Hrs** |
| 7 | **Chapter 7 : A Service Implementation :**<br>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 | **4 Hrs** |
| 8 | **Chapter 8 : REST and ROA Best Practices**<br>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 | **4 Hrs** |

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|---|---|---|
| | Client?, Applications with a Web Interface, Applications with No Web Interface What Problem Does this Solve? | |
| 9 | **Chapter 9 : The Building Blocks of Services**<br>**Representation Formats :** XHTML, XHTML with Microformats, Atom, OpenSearch SVG, Form-Encoded Key-Value Pairs, JSON, RDF and RDFa,<br>**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<br>**Prepackaged Control Flows:** General Rules, Database-Backed Control Flow, GET, PUT, POST for creating a new resource, POST for appending to a resource, DELETE<br>**The Atom Publishing Protocol:** Collections, Members, Service document, Category documents, Binary documents as APP members, **GData:** Querying collections, Data extensions, POST Once Exactly,<br>**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? | **4 Hrs** |
| 10 | **Chapter 10 : The Resource-Oriented Architecture Versus Big Web Services**<br>What Problems Are Big Web Services Trying to Solve?<br>SOAP :The Resource-Oriented Alternative, WSDL: The Resource-Oriented Alternative, UDDI: The Resource-Oriented Alternative, Security: The Resource-Oriented Alternative, Reliable Messaging : The Resource-Oriented Alternative, Transactions: The Resource-Oriented Alternative, BPEL, ESB, and SOA, Conclusion. | **4 Hrs** |
| | **Unit – III** | |
| 11 | **Chapter 11 : Ajax Applications as REST Clients**<br>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. | **5 Hrs** |
| 12 | **Chapter 12 : Frameworks for RESTful Services**<br>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 | **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 |

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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 retrive 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

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| 17ECAE902 | Full Stack Development - MEAN |

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Course Code:17ECAE902 Course Title: Full Stack Development - MEAN

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|---|---|---|
| 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 : 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 |

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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 |

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| 17ECAE901 | Block Chain Technologies |
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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: 1**00**

Teaching Hrs: **42+24** Exam Duration:**3Hrs**

| No | Content | Hrs |
|---|---|---|
| | **Unit I** | |
| 1 | **Introduction**<br>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**.<br>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**<br>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**.<br>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.**<br>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 | 6 hrs |

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|---|---|---|
| **6** | Diving into Blockchain - Proof of Existence**.**<br>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**.**<br>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**.**<br>Transaction security model, Decentralized security model, Attacks on the blockchain, Threats of quantum computing. | 4 hrs |

**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 |

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## 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.

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| 17ECAP904 | Robotic Process Automation. |

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| **Program: MASTER OF COMPUTER APPLICATIONS** | | |
| 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** |
| | | |
| 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. | | |

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| 18ECAP701 | Software Engineering Lab. |
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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. Identity 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.<br>**Cases:**<br>1. Passport automation system.<br>2. Banking and ATM system<br>3. Exam Registration<br>4. Stock maintenance system.<br>5. Online course reservation system<br>6. E-ticketing<br>7. Software personnel management system<br>8. Credit card processing<br>9. e-book management system<br>10. Recruitment system<br>11. Hostel Management<br>12. Conference Management System<br>13. BPO Management System.<br>14. Pay roll system<br>15. Library management System | 1 |

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|---|---|---|
| | 16. Payment Gateway | |
| *6* | Design following diagrams for chosen case study.<br><br>i. Class Diagrams<br>ii. Object Diagrams | 1 |
| *7* | Design following diagrams for chosen case study.<br><br>i. Interaction Diagrams<br>ii. Sequence Diagrams<br>iii. Collaboration Diagrams | 1 |
| *8* | Design following diagrams for chosen case study.<br><br>i. Behavioral Modeling<br>ii. Use case Diagrams<br>iii. Activity Diagrams | 1 |
| *9* | Design following diagrams for chosen case study.<br><br>i. Advanced Behavioral Modeling<br>ii. State Chart Diagrams | 1 |
| | **STRUCTURED ENQUIRY** | |
| *10* | Design following diagrams for chosen case study.<br><br>i. Architectural Modeling<br>ii. Component Diagrams<br>iii. Deployment Diagrams | 1 |

**Evaluation Scheme**

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

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|---|---|
| 18ECAE808 | DevOps |

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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**<br>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 :**<br>**The DevOps process and Continuous Delivery – an overview :**<br>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**<br>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, Microservices, Interlude – Conway's Law, How to keep service interfaces forward compatible, Microservices and the data tier, DevOps, architecture, and resilience | **6 Hrs** |
| 4 | **Chapter 4 : Everything is Code**<br>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**<br>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**<br>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, 3Finding a bug, Test walkthrough, Handling tricky dependencies with Docker | **6 Hrs** |

| | | |
|---|---|---|
| **7** | **Chapter 7 : Deploying the Code**<br>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, PalletOps, Deploying with Chef, Deploying with SaltStack, Salt versus Ansible versus Puppet versus PalletOps execution models, Vagrant, Deploying with Docker, Comparison tables, Cloud solutions, AWS, Azure. | **4 Hrs** |
| **8** | **Chapter 8 : Monitoring the Code**<br>Nagios, Munin, Ganglia, Graphite, Log handling, Client-side logging libraries, The ELK stack. | **4 Hrs** |
| | **Unit – III** | |
| **9** | **Chapter 9 : Issue Tracking**<br>What are issue trackers used for? Some examples of workflows and issues, What do we need from an issue tracker? Problems with issue tracker proliferation, All the trackers : Bugzilla, Trac, Redmine, The GitLab issue tracker, Jira | **5 Hrs** |
| **10** | **Chapter 10 : The Internet of Things and DevOps**<br>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 | **5 Hrs** |

***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.

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| 19ECAP706 | Computer Networks Lab.. |
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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 Statical 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 |

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| (01FM18MCAXX) | |
| 18ECAP801 | Mini Project -1 |

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Course Code: **18ECAP801** | 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**

**Theme: "Development of Rich Internet Applications using PHP"**

Rich Internet Applications (RIAs) are web applications that offer the responsiveness, "rich" features and functionality approaching that of desktop applications. This course provides an end-to-end look at building Rich Internet Applications that employ HTML5, Ajax, jQuery, etc. This course provides platform for integrating various server-side and client-side technologies to create a robust applications.

**Purpose:**

- Developing rich reporting and analytics interfaces for enterprise-level information presentation.
- To build state-of-the-art web applications utilizing the powerful features provided by the combination of the PHP language, Ajax, and Web Services.

- To provide an authoritative overview to a set of key technologies for building web applications (HTML, HTML5, JavaScript, Dynamic HTML, CSS, ASP, AJAX, and XML).
- Able to apply the above key technologies for developing light-weighted and rich-content Web applications
- To offer users a better visual experience and more interactivity than traditional browser applications that use only HTML and HTTP.
- To create advanced user interfaces.

**Evaluation:**

Students Assessment through ISA (100%) + ESA (100%)

| **In Semester Assessment** | **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 | 20 |
| | Presentation skills and Viva-voce | 20 |
| | **Total** | **100** |
| **End Semester Assessment** | Presentation | 50 |
| | Viva-voce | 50 |
| | **Total** | 100 |

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|---|---|
| 18ECAE806 | Cyber Security and Forensics |

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Course Code: **18ECAE806** 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: **42+24** Exam Duration:**3Hrs**

| **No** | **Content** | **Hrs** |
|---|---|---|

**Unit I**

| | | |
|---|---|---|
| 1 | **Chapter 1: Introduction to Cybercrime, Cyber offenses & Cybercrime**<br>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**<br>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**<br>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**<br>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**<br>Intellectual property in the cyberspace; Ethical dimension of cybercrimes; Psychology, mindset and skills of hackers and other cybercriminals; Sociology of cybercriminals. | **5 Hrs** |
| 6 | **Chapter 6: Cybercrime: Illustrations, Examples and Case studies**<br>Introduction, Real-Life Examples, Case Studies: Illustrations of Financial Frauds in Cyber Domain, Digital Signature-Related Crime Scenarios, Digital forensics case illustrations Online Scams. | **5 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 |
| Lab practices | 20 |
| **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 | 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 |

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| **Proposed Cyber Security and Forensics Practices** | | |
|---|---|---|
| **S No** | **Practices** | **Tools** |
| 1 | Implementation of SQL Injection and avoidance | Python<br>Php<br>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 | |

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| 19ECAC802 | Information Security |
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| Course Code: 19ECAC802 | Course Title: Information Security |
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|---|---|---|
| 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 |

| Content | Hrs |
|---|---|
| **Unit - 1** | |
| **Chapter No. 1 : Cryptography Basics**<br>Introduction, Classic Crypto: Modern Crypto, Taxonomy of Cryptography & Cryptanalysis. | **04 hrs** |
| **Chapter No. 2: Symmetric Key Crypto**<br>Introduction, Stream Ciphers, Block Ciphers, Block cipher modes | **06 hrs** |
| **Chapter No. 3: Public Key Crypto and Hash Functions**<br>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 | **06 hrs** |
| **Unit - 2** | |
| **Chapter No. 4 Authentication and Authorization**<br>Authentication: Introduction, Authentication Methods, Passwords, Biometrics, Two-Factor Authentication, Single Sign-On and Web Cookies, Authorization: Introduction, Access Control Matrix, Multilevel Security Models | **05 hrs** |
| **Chapter No. 5 Authorization and Authentication Protocols**<br>Authorization: Multilateral Security, Firewalls, Intrusion Detection, Simple Authentication Protocols: Introduction, Simple Security Protocols, Authentication Protocols | **06 hrs** |
| **Chapter No. 6 Security Protocols**<br>Real World Security Protocols: Introduction, Secure Socket Layer, IPSec, Kerberos, GSM | **05 hrs** |
| **Unit - 3** | |
| **Chapter No. 7 Software Flaws and Malware**<br>Introduction, Software Flaws, Malware, Miscellaneous Software Based Attacks, software tamper resistance, Digital Rights Management. | **04 hrs** |

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|---|---|
| **Chapter No. 8 Cyber Crimes and Laws**<br>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. | **04 hrs** |

**Text Book:**


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


**Reference Books:**


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.


## Activities

| # | TOPICS | ACTIVITY | WEIGHTAG |
|---|---|---|---|
| 1 | **Cryptography Basics** | • 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** | • Write a Java program to implement the DES algorithm logic | 05 |
| 3 | | • Write a C/JAVA program to implement the Rijndael algorithm logic. | 10 |
| 4 | **Symmetric block cipher** | • Using Java Cryptography, encrypt the text "Hello world" using BlowFish. Create your own key using Java keytool. | 10 |
| 5 | | • Write a C/JAVA program to implement the BlowFish algorithm logic | 10 |
| 6 | **Asymmetric cryptographic algorithm** | • Write a Java program to implement RSA Algoithm | 10 |
| 7 | | • 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 |

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|---|---|---|---|---|
| 8 | **Secure Hash Algorithm** | • Calculate the message digest of a text using the SHA-1 algorithm in JAVA. | 10 | |
| 9 | **Intrusion detection System** | • Explore the Intrusion Detection System "Snort" | 10 | |
| 10 | | • Study of Anti-Intrusion Technique – Honey pot | 10 | |
| 11 | **IP security** | • 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 |

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|---|---|
| 20ECAC706 | OOPS using Java |

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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** | **4 Hrs.** |
| | History of java, features of java, A simple java programming, Comments, Data Types, Variables, Constants, Operators, Control Flow, Big Numbers, Arrays | |
| **2** | **Chapter No. 2. Objects and Classes** | **6 Hrs.** |
| | Introduction to Object-Oriented Programming, Classes, Objects, Identifying Classes, 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** | **6 Hrs.** |
| | 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. | |
| | **Unit II** | |
| **4** | **Chapter 4: Interfaces and Inner Classes** | **6 Hrs.** |
| | 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. | |
| **5** | **Chapter 5 : Exceptions and Multithreading** | **6 Hrs.** |
| | 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** | **Chapter 6: Collections** | **4 Hrs.** |
| | 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. | |
| | **Unit – III** | |

**7 Chapter 7: Servlets** **4 Hrs.**

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.

**8 Chapter 8: JSP and Database Access** **4 Hrs.**

Overview of JSP, Invoking java code from JSP, JSP expressions, scriplet, page directive.

**Text Books**

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.

**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 | • Java installation, path setting ,steps for compilation and Running the java program,<br>• 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 | • Java Programs on: Relationships between Classes and Objects,<br>• Class Constructors, Access Privileges,<br>• Static Fields and Methods,<br>• Overloading and Packages. | 10 |
| 3 | Inheritance and Java Strings | Java Programs on :<br>• Inheritance and different String class.<br>• Use of Final, Static, Abstract keys in program | 15 |
| 4 | Interfaces and Inner Classes | Java Programs on :<br>• Abstract Classes, Object Cloning<br>• Interfaces and different Inner Classes. | 10 |

| | | | |
|---|---|---|---|
| 5 | Exceptions and Multithreading | Java Programs on :<br>• Exception ,Chaining Exceptions handlings<br>• Multithreading's,multitaskings | 15 |
| 6 | Collections | Java Programs on :<br>• Java Programs on Collection packages.<br>• Linked Lists, Array Lists,<br>• Hash Sets, Tree Sets, Object Comparison,<br>• Queues and Dequeues, Priority Queues, Maps. | 15 |
| 7 | Servlets | Java Programs on<br>• A simple servlet programs,<br>• The Servlet API,<br>• Servlet Interface and Cookie classes. | 15 |
| 8 | JSP and Database Access | Java Programs on<br>• 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)**

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