

**Dr.AMBEDKAR INSTITUTE OF TECHNOLOGY**  
**DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING**

The Enclosed documents are verified and approved



**HOD,ISE**  
**HEAD**

**Dept. of Information Science & Engg.**  
**Dr. Ambedkar Institute of Technology**  
**Bangalore-560 099.**

# **Syllabus**

**Dr. Ambedkar Institute of Technology  
Bangalore**



**B.E**

**Department Of Information Science and Engineering**

**Courses on employability/**

**entrepreneurship/ skill development**

**Syllabus**

## ACADEMIC YEAR 2017-2018

<b>Sub Title : OBJECT ORIENTED PROGRAMMING WITH C++</b>		
<b>Sub Code:IS43</b>	<b>No. of Credits:4 = 4 : 0 : 0 (L-T-P)</b>	<b>No.of Lecture Hours/Week: 4</b>
<b>Exam Duration : 3 hours</b>	<b>Exam Marks: CIE + Assignment + SEE = 45 + 5 + 50 = 100</b>	<b>Total No. of Contact Hours : 52</b>

### Course Objectives:

1. Understand concepts of Object Oriented Programming and design programs using classes and objects for C++ .
2. Construct applications to provide flexible options for the creation of new definitions for some of the operators.
3. Specifying mechanism of deriving a new class from older classes through inheritance.
4. Implement methods to select appropriate member function during run time.
5. Design programs using Templates, exceptions and handle file I/Os

UNIT No	Syllabus Content	No of Hours
<b>1</b>	<p><b>Introduction:</b> Review of structures, Programming paradigms, Overview of C++, Sample C++ program, Console I/O , variables in C++, statements, arrays and strings, pointers &amp; user-defined types,Function Components, argument passing, inline functions, function overloading.</p> <p><b>Classes &amp; Objects–I:</b> Class Specification, Class Objects, Scope resolution operator, Access members, Defining member functions, Data hiding, Constructors, Destructors, Parameterized constructors, Static data members and static member Functions.</p>	<b>10</b>
<b>2</b>	<p><b>Classes &amp; Objects –II:</b> Friend functions, Passing objects as arguments, Returning objects, Arrays of objects, Dynamic objects, Pointers to objects, Copy constructors, Generic functions and classes, Applications.</p> <p><b>Operator overloading :</b> operator member functions to overload +, -, pre-increment, post-increment, pre-decrement, post decrement operators , friend operator function to overload &lt;&lt; and &gt;&gt; operators, Operator overloading of special operator [ ].</p>	<b>10</b>
<b>3</b>	<p><b>Inheritance-I:</b> Base Class, Inheritance and protected members, Protected base class inheritance, Inheriting multiple base classes.</p> <p><b>Inheritance – II:</b> Constructors, Destructors and Inheritance, Passing parameters to base class constructors, Granting access, Virtual base classes.</p>	<b>10</b>
<b>4</b>	<p><b>Virtual functions:</b> Virtual function, Calling a Virtual function through a base class reference, Virtual attribute is inherited, Virtual functions are hierarchical, Pure virtual functions, Abstract classes, Using virtual functions.</p> <p><b>Polymorphism:</b> Early and late binding.</p> <p><b>Exception Handling:</b> Exception handling fundamentals, Exception handling options.</p>	<b>10</b>

<b>5</b>	<p><b>C++ I/O System Basics :</b> Old vs. Modern C++ I/O, C++ Streams, The C++ Stream Classes, C++'s Predefined Streams, Formatted I/O, Formatting Using the ios Members, Setting the Format Flags, Clearing Format Flags, An Overloaded Form of setf(), Examining the Formatting Flags, Setting All Flags, Using width(), precision(), and fill(), Using Manipulators to Format I/O, Overloading &lt;&lt; and &gt;&gt;, Creating Your Own Inserters, Creating Your Own Extractors, Creating Your Own manipulator Functions</p> <p>C++ File I/O: fstream and the File Classes, Opening and Closing a File, Reading and Writing Text Files, Unformatted and Binary I/O, Characters vs. Bytes, put() and get(), read() and write(), More get() Functions, getline(), Detecting EOF, The ignore() Function, peek() and putback(), flush(), Random Access, Obtaining the Current File Position, I/O Status, Customized I/O and Files.</p> <p>STL: An overview, containers, vectors, lists, maps.</p>	<b>12</b>
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**Note 1: Unit 1 & Unit 5 will have internal choice.**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment - III from Unit 5.**

**Course Outcomes:**

After the completion of the above course students will be able to

**CO1:** Demonstrate the need of using Object Oriented Programming in the real world applications and design programs using classes and objects for C++.

**CO2:** Design and analyze programs for automatic initialization and destruction of objects.

**CO3:** Develop applications by providing new definitions for some of the operators.

**CO4:** Design and develop applications through inheritance, Virtual Base classes and dynamic polymorphism.

**CO5:** Apply concepts of Templates, Exceptions and File handling in designing programs.

<b>COs</b>	<b>Mapping with POs</b>
CO1	PO2,PO3,PO5
CO2	PO1, PO2,PO3,PO6,PO7,PO9,PO11
CO3	PO2,PO3, PO5,PO6
CO4	PO2,PO3, PO5,PO6,PO9
CO5	PO2,PO3,PO5,PO6,PO12

**TEXT BOOK:**

Herbert Schildt: C++ The Complete Reference, 4th Edition, Tata McGraw Hill, 2014

### REFERENCE BOOKS:

1. Stanley B.Lippmann, Josee Lajore: C++ Primer, 4<sup>th</sup> Edition, Addison Wesley, 2005.
2. Paul J Deitel, Harvey M Deitel: C++ for Programmers, Pearson Education, 2009.
3. K R Venugopal, Rajkumar Buyya, T Ravi Shankar: Mastering C++, Tata McGraw Hill, 1999.
4. Sourav Sahay: Object-Oriented Programming with C++, Oxford University Press, 2006.

<b>Sub Title : OBJECT ORIENTED PROGRAMMING WITH C++ LAB</b>		
<b>Sub Code:: ISL46</b>	<b>No. of Credits:1.5= 0:0:1.5 (L-T-P)</b>	<b>No. of Lecture Hours/Week: 3</b>
<b>Exam Duration : 3 hours</b>	<b>Exam Marks: CIE + Assignment + SEE = 50 + 50 = 100</b>	

### Course Objectives:

1. Design programs using classes and objects for C++.
2. Build programs for automatic initialization of objects and destroy objects that are no longer required through constructors and destructors.
3. Construct applications to provide flexible options for the creation of new definitions for some of the operators.
4. Specifying mechanism of deriving a new class from older classes through inheritance.
5. Implement methods to select appropriate member function during run time.
6. Design and implement programs using Templates and Exceptions .

### I. LIST OF PROGRAMS

- 1 Given that an EMPLOYEE class contains following members:  
Data members : Employee Number, Employee Name, Basic, DA, IT, Net Salary  
Member functions: to read the data, to calculate Net Salary and to print data members.  
Write a C++ program to read the data of N employees and compute Net Salary of each employee.  
(Dearness Allowance ( DA) = 52% of Basic and Income Tax (IT) = 30% of the gross salary.  
Net\_Salary = Basic + DA - IT)
- 2 Define a STUDENT class with  
Data members : USN, Name, and Marks in 3 tests of a subject.  
Using appropriate functions, find the average of two better marks for each student. Print the USN, Name, and the average marks of all the students. Declare an array of 10 STUDENT objects and demonstrate the functionality.
- 3 Write a C++ program to create a class called COMPLEX and implement the following overloading functions ADD that return a COMPLEX number.
  - i.  $s_2 = s_1 + a$  – where a is an integer (real part) and s1, s2 are complex numbers.

- ii.  $s3 = s1.add(s2)$  – where  $s1$ ,  $s2$  and  $s3$  are complex numbers.
- 4 Create a class called `STRING` using dynamic memory allocation technique and implement the following operations. Display the results after every operation by overloading the operator `<<`.
- `STRING s1 = "Dr AIT"`
  - `STRING s2 = "Bangalore"`
  - `STRING s3 = s1 + s2` (Use copy constructor).
- 5 Create a template function for bubble sort and demonstrate sorting of integers and doubles.
- 6 Create a template class called `STACK` with member functions to add an element and to delete an element from the queue. Implement a stack of integers and doubles.
- 7 Implement the concept of operator overloading: Create a class called `COMPLEX` and overload `+`, `-`, `*` operators to perform addition, subtraction and multiplication operations on 2 complex numbers. Also overload the operators `>>` and `<<` to accept and print the complex numbers.
- 8 Implement the concept of operator overloading: Create a class called `MATRIX` using a two-dimensional array of integers. Implement the following operations by overloading the operator `==` which checks the compatibility of two matrices  $m1$  and  $m2$  to be added and subtracted. Perform the addition and subtraction by overloading the operators `+` and `-` respectively. Display the results (sum matrix  $m3$  and difference matrix  $m4$ ) by overloading the operator `<<`.
- ```

if(m1 == m2)
{
m3 = m1 + m2;
m4 = m1 - m2;
}
else
display error

```
- 9 Create a class called `STUDENT` with data members `USN`, `Name` and `Age`. Using inheritance, create the classes `UGSTUDENT` and `PGSTUDENT` having fields as `Semester`, `Fees` and `Stipend`. Enter the data for at least 5 students. Find the semester wise average age for all UG and PG students separately.
- 10 Create a class called `Number` which has the characteristics of a decimal number. Derive a class `OCTAL`, which has the characteristics of an octal number inheriting the decimal value from the `Number` class. Derive a class `HEX`, which has the characteristics of a hexadecimal number inheriting the decimal value from the `Number` class.

Derive a class BINARY which has the characteristics of an binary number inheriting the decimal value from the Number class.

Implement the following operations (operator overloading).

- i. `int i = j + k` where i is decimal , j is hexadecimal , k is OCTAL
- ii. `int y = h + k ;` where h is an OCTAL object and k is an integer.

Display the Result by overloading the operator `<<`.

- 11 Create a class Account having data members Account No, Name, balance and member functions like input, display, deposit, withdrawal. The withdrawal function must handle an exception of type low balance.( balance should not be less than Rs 500). Implement try/throw/catch in C++ style.
- 12 Implement the concept of dynamic polymorphism to demonstrate the conversion of an expression from infix to postfix form.

Note: In the examination each student picks one question from a lot of all 12 questions.

## II. OPEN ENDED QUESTIONS

Identify the different objects in the following environments and implement different suitable operations

1. Banking System
2. Library
3. Automobile Industry
4. Home Appliances
5. User Interface design etc

### NOTE:

**1. STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY APPROVED BY THE STAFF IN CHARGE.**

**2.IN THE EXAMINATION EACH STUDENT PICKS ONE QUESTION FROM A LOT OF ALL 12 QUESTIONS**

**Course Outcomes:**

After completing the course the students are able to:

**CO1:**Design programs using classes and objects using C++.

**CO2:**Develop programs for automatic initialization of objects and destroy objects that are no longer required.

**CO3:**Develop applications to provide flexible options for the creation of new definitions for some of the operators.

**CO4:**Specify mechanism of deriving a new class from older classes through inheritance .

**CO5:** Design a program using Templates & Exception Handling.

| COs | Mapping with POs |
|-----|------------------|
| CO1 | PO2,PO3,PO5      |
| CO2 | PO2,PO3,PO6,PO9  |
| CO3 | PO2,PO3,PO5,PO6  |
| CO4 | PO2,PO3,PO5,PO9  |
| CO5 | PO2,PO3,PO5,PO6  |

**Sub Title : JAVA PROGRAMMING**

|                                |                                                            |                                        |
|--------------------------------|------------------------------------------------------------|----------------------------------------|
| <b>Sub Code:IS52</b>           | <b>No. of Credits:4=3 : 1 : 0 (L-T-P)</b>                  | <b>No. of lecture hours/week : 5</b>   |
| <b>Exam Duration : 3 hours</b> | <b>Exam Marks: CIE +Assignment + SEE = 45 + 5+ 50 =100</b> | <b>Total No. of Contact Hours : 52</b> |

**Course Objectives:**

1. Identify the different object oriented concepts and implement basic programs.
2. Present inheritance and interface concepts.
3. Introduce multithreading programming concepts and handling errors efficiently.
4. Present different ways of implementing event handling and creating user interfaces using javaFX.
5. Introduce to Java Database Access, Servlets, JSP,RMI Concepts.

| UNIT No. | Syllabus Content | No. of Hours |
|----------|------------------|--------------|
|----------|------------------|--------------|



|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1 | <p><b>Introduction To Java:</b> How java changed the internet; Java Buzz words, Byte Code; Object oriented programming; First Simple Java program, Introducing Classes :Classes Fundamentals; Declaring Objects, Assigning Object Reference Variable; Introducing Methods; Inheritance Basics- using Super; Creating Multilevel Hierarchy, When constructors are called, method Overriding, Dynamic Method Dispatch, Abstract classes, final with inheritance</p>                                                                                                                                                                                                        | 10 |
| 2 | <p><b>Packages and Interfaces:</b> Packages and Interface: Packages, Access Protection, Importing Packages, Interfaces</p> <p><b>MultiThreaded Programming ;</b> The java tread model,The main thread, Creating thread, creating multiple threads, Using isAlive() and join()Thread priorities; Synchronization; Suspending , resuming and stopping threads ;</p>                                                                                                                                                                                                                                                                                                        | 10 |
| 3 | <p><b>Applets ,Event Handling</b> The Applet Class: Two types of Applets; Appletbasics; Applet Architecture; An Applet skeleton; Simple Applet displaymethods; Requesting repainting; Using the Status Window; The HTMLAPPLET tag; Passing parameters to Applets; getDocumentbase() andgetCodebase(); ApletContext and showDocument() ; The AudioClipInterface ; The AppletStub Interface; Output to the Console.producer-consumer problems.</p> <p><b>Event Handling:</b> Two event handling mechanisms; The delegation event model; Event classes; Sources of events; Event listener interfaces; Using the delegation event model; Adapter classes; Inner classes;</p> | 10 |
| 4 | <p><b>Database Access, Servlets :</b> Overview of J2EE and J2SE.The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process;Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; ResultSet; Transaction Processing; Metadata, Data type ,Exceptions s;</p> <p>Servlets: Background; The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet ; The Servlet API; The Javax. Servlet Package; Reading Servlet Parameter; The Javax.servlet.http package;Handling HTTP Requests and Responses; Using Cookies; Session Tracking;</p>                                       | 12 |
| 5 | <p><b>JSP and RMI , JavaFX, Networking:</b> Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects. Java Remote Method Invocation. JavaFX Basics ,JavaFX Layouts and Shapes ,JavaFX Event Driven ,JavaFX Animation and Listeners ,JavaFX UI Controls ,JavaFX Review,Multimedia &amp; Making a Games</p> <p>Networking:Networking basics, Networking classes and Interfaces, InetAddress, Inet4 Address and Inet6 Address, TCP/IP ClientSockets, URL, URLconnection HttpURL Connection,URIclass,Datagrams</p>                                                                                                            | 10 |

**Note 1: Unit 1 & Unit 4 will have internal choice.**

**Note 2:Three assignments are evaluated for 5 marks:**

**Assignment – I from units 1 and 2.**  
**Assignment - II from units 3 and 4**  
**Assignment – III from unit 5**

**Course Outcomes**

After completing the course the students are able to:

- CO1:** Apply object oriented programming, exception handling and multithreading concepts in problem solving.
- CO2:** Design and implement Applets, Parameterized Applets incorporating multithreading and event handling mechanisms.
- CO3:** Use javaFX aspects in graphical interactive application development and JDBC for database transactions, Handling HTTP requests and responses.
- CO4:** Develop applications using RMI and JSP
- CO5:** Design client server applications for connection oriented and connection less services.

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO2,PO5,PO6,PO10        |
| CO2        | PO2,PO4,PO5,PO10        |
| CO3        | PO2,PO6,PO10            |
| CO4        | PO2,PO4,PO6,PO10        |
| CO5        | PO2,PO4,PO5,PO10        |

**TEXT BOOK:**

Herbert Schildt: Java - The Complete Reference, 9<sup>th</sup> Edition, Tata McGraw Hill, 2014.  
(Chapters 1, 2, 3, 4, 5, 6, 8, 9,10, 11,12,14,15,20, 21, 22, 29, 30).

**REFERENCE BOOKS / WEBLINKS:**

1. Y. Daniel Liang: Introduction to JAVA Programming, 7th Ed, Pearson Education, 2013.
2. Java Programming by Hari Mohan Pandey, Pearson Education, 2012.
3. Java 6 Programming, Black Book, KoGenT, dreamtech Press, 2012.
4. [www.tutorialspoint.com/java/](http://www.tutorialspoint.com/java/)
5. [www.javatpoint.com/java-tutorial](http://www.javatpoint.com/java-tutorial)
6. <https://www.youtube.com/watch?v=rXhdP4sKSME&list=PLrodECPviD6dUfQsc5c72>

|                                     |                                                            |                                        |
|-------------------------------------|------------------------------------------------------------|----------------------------------------|
| <b>Sub Title : WEB TECHNOLOGIES</b> |                                                            |                                        |
| <b>Sub Code: IS53</b>               | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b>                  | <b>No. of lecture hours/week : 3</b>   |
| <b>Exam Duration : 3 hours</b>      | <b>Exam Marks: CIE +Assignment + SEE = 45 + 5+ 50 =100</b> | <b>Total No. of Contact Hours : 39</b> |

**Course Objectives:**

1. To create XML documents and provide styling to documents.
2. To develop web applications using CGI/Perl.
3. To design web applications using the concepts of PHP.
4. To understand and analyze JQuery , node .js framework, basics of ajax.

| <b>UNIT No</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                   | <b>No of Hours</b> |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>       | <b>XML:</b> Introduction; Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying XML documents with CSS; XSLT style sheets; XML processors; Web services.                                                                                                             | <b>7</b>           |
| <b>2</b>       | <b>Perl:</b> Origins and uses of Perl; Scalars and their operations; Assignment statements and simple input and output, Fundamentals of arrays; Hashes; References; Functions; Pattern matching.<br><b>CGI Programming</b> The Common Gateway Interface; CGI linkage; Query string format; CGI.pm module. | <b>8</b>           |
| <b>3</b>       | <b>PHP:</b> Origins and uses of PHP, Overview of PHP, General syntactic characteristics, Arrays, Form handling, Files, Cookies, Session Tracking.                                                                                                                                                         | <b>7</b>           |
| <b>4</b>       | <b>Ajax:</b> What is Ajax? The real Ajax, Ajax Principles, Technologies behind Ajax, Who is using Ajax?<br><b>Node.js-</b> Introduction - Why Node.js?, What Exactly Is Node.js?, Installing Node.js, Building Web Applications with Express- Routing and Layers in Express, REST API Design and Modules. | <b>8</b>           |
| <b>5</b>       | <b>JQuery-</b> What jQuery does, Why jQuery works well, Selecting Elements, Using the \$() function, CSS selectors, Attribute selectors, Custom selectors, Handling Events- Handling simple events, Styling and                                                                                           | <b>9</b>           |

|  |                                                                                                     |  |
|--|-----------------------------------------------------------------------------------------------------|--|
|  | Animating- modifying CSS with inline properties, Hiding and showing elements, effects and duration. |  |
|--|-----------------------------------------------------------------------------------------------------|--|

**Note 1: Unit 4 & Unit 5 will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After completing the course the students are able to:

**CO1:** Describe the syntactic structure of XML documents and provide styling to documents.

**CO2:** Design and develop web pages using CGI/Perl.

**CO3:** Implement PHP programming to develop web application.

**CO4:** Analyze basics of ajax.

**CO5:** Analyze, design web applications using the JQuery , node .jsFramework.

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1                     |
| CO2        | PO1, PO5                |
| CO3        | PO1, PO4, PO5           |
| CO4        | PO1, PO5                |
| CO5        | PO1, PO4, PO5           |

**TEXT BOOKS:**

1. Robert W. Sebesta: Programming the World Wide Web, 4<sup>th</sup> Edition, Pearson education, 2011.
2. Learning jQuery , Better interaction, design, and web development with simple JavaScript techniques , Fourth Edition , Jonathan Chaffer, Karl Swedberg 2013.
3. Learning Node.js , A Hands-On Guide to Building Web Applications in JavaScript, Marc Wandschneider, 2013
4. Professional AJAX – Nicholas C Zakas et al, Wrox publications, 2006.

**REFERENCE BOOKS / WEBLINKS:**

1. M. Deitel, P.J. Deitel, A. B. Goldberg: Internet & World Wide Web How to Program, 4th Edition, Pearson education, 2011.
2. Ajax: The Complete Reference – Thomas A. Powel, McGraw Hill, 2008.
3. Pro PHP and jQuery- JASON LENGSTORF,2010.
4. <http://nptel.ac.in>
5. <http://www.w3schools.com/>

|                                         |                                             |                                      |
|-----------------------------------------|---------------------------------------------|--------------------------------------|
| <b>Sub Title : WEB TECHNOLOGIES LAB</b> |                                             |                                      |
| <b>Sub Code: ISL58</b>                  | <b>No. of Credits:1=0: 0 : 1 (L:T:P)</b>    | <b>No. of lecture hours/week : 2</b> |
| <b>Exam Duration :<br/>3 hours</b>      | <b>Exam Marks: CIE + SEE = 50 + 50 =100</b> |                                      |

**Course Objectives:**

1. To create XML schema and XSLT style sheet.
2. To create and execute PHP to access database, cookies and do session tracking.
3. Use PERL for CGI programming and access MySQL databases.
4. Use XHTML programming to access the database.
5. Analyze jquery effects.

**I. LIST OF PROGRAMS**

1. Design an XML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, Name of the College, Branch, Year of Joining, and e-mail address. Make up sample data for three students. Create a CSS style sheet and use it to display the document.
2. Design an XML document to store information about employee in a software company. The information must include employee id, Name, qualification, Year of Joining, e-mail address, contact no. Make up sample data for three employee. Create an XSLT style sheet and use it to create a display of that element.
3. a) Write a Perl script to demonstrate the string concatenation and repetition.  
b) Write a Perl program to display various Server Information like Server Name, Server Software, Server protocol, CGI Revision etc.
4. a) Write a perl script to demonstrate built-in array functions (PUSH, POP, SHIFT, UNSHIFT).  
b) Write a Perl program to accept UNIX command from a HTML form and to display the output of the command executed.
5. a) Write a Perl script to calculate the value of any given expression using functions.  
[Ex: 10ab-((c-1)/17.44) ]  
b) Write a Perl program to accept the User Name and display a greeting message randomly chosen from a list of 4 greeting messages.
6. a) Write a Perl program to display a digital clock which displays the current time of the  
7. server.
- b) Write a program to demonstrate hide and show effects of html elements using jquery.
8. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.
9. a) Write a PHP program to store current date-time in a COOKIE and display the 'Last

- visited on' date-time on the web page upon reopening of the same page.
- b) Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.
10. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name.
11. Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.

## II. OPEN ENDED QUESTIONS

### Develop web based applications for any of the following

1. Simple employee portal.
2. Shopping cart.
3. Quiz application.
4. Reservation system.
5. Search engine.
6. Any Application

#### **NOTE :**

**1. STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.**

**2. IN THE EXAMINATION EACH STUDENT PICKS ONE QUESTION FROM A LOT OF ALL 10 QUESTIONS.**

#### **Course Outcomes:**

Students will demonstrate the knowledge and the skills acquired with respect to:

**CO1:** Design and develop XML document and use the style sheet to display.

**CO2:** Develop web pages using PERL and CGI programs.

**CO3:** Design and develop PHP programs to perform database access, session tracking and Implement jquery effects.

**CO4:** Design and develop XHTML programs to perform database access.

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1, PO4                |
| CO2        | PO1, PO4                |
| CO3        | PO1, PO4                |
| CO4        | PO1, PO4                |

|                                         |                                             |                                      |
|-----------------------------------------|---------------------------------------------|--------------------------------------|
| <b>Sub Title : JAVA PROGRAMMING LAB</b> |                                             |                                      |
| <b>Sub Code:ISL59</b>                   | <b>No. of Credits: 0 : 0 :1</b>             | <b>No. of lecture hours/week : 2</b> |
| <b>Exam Duration : 3 hours</b>          | <b>Exam Marks: CIE + SEE = 50 + 50 =100</b> |                                      |

### **Course Objectives:**

1. Design & Develop the fundamentals of Object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
2. Design & Develop exception handling and multithreading concepts.
3. Develop efficient Java applets and applications using OOP concepts.
4. Design & Develop basic understanding of network application programs.

### **I. LIST OF PROGRAMS**

1.
  - a. Design a JAVA Program to demonstrate Constructor Overloading and method overloading.
  - b. Develop a JAVA Program to implement Inner class and demonstrate its Access Protections.
2.
  - a. Develop a JAVA Program to demonstrate Inheritance.
  - b. Write a JAVA Program to demonstrate Exception Handling (Using Nested try catch and finally).
3. Develop a JAVA program which has
  - i. A Class called Account that creates account with 500Rs minimum balance, a deposit() method to deposit amount, a withdraw() method to withdraw amount and also throws LessBalanceException if an account holder tries to withdraw money which makes the balance become less than 500Rs.
  - ii. A Class called LessBalanceException which returns the statement that says withdraw amount (\_\_\_Rs) is not valid.
  - iii. A Class which creates 2 accounts, both account deposit money and one account tries to withdraw more money which generates a LessBalanceException take appropriate action for the same.
4. Design a JAVA program using Synchronized Threads, which demonstrates Producer Consumer concept.
5. Develop a JAVA program which has
  - i. A Interface class for Stack Operations
  - ii. A Class that implements the Stack Interface and creates a fixed length Stack.
  - iii. A Class that implements the Stack Interface and creates a Dynamic length

Stack.

iv A Class that uses both the above Stacks through Interface reference and does the Stack operations that demonstrates the runtime binding.

6. Develop JAVA programs which demonstrates utilities of LinkedList Class
7. Write a JAVA Program which uses FileInputStream / FileOutputStream Classes.
8. Develop a JAVA program which uses Datagram Socket for Client Server Communication.
9. Design JAVA Applet programs which handles MouseEvent
10. Develop JAVA Applet programs which handles KeyboardEvent

## II. OPEN ENDED QUESTIONS

Develop applications for data base access, servlet request/response, rmi, jsp, user interface for any application using javaFX, any gaming application etc

### NOTE :

**1. STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.**

**2. IN THE EXAMINATION EACH STUDENT PICKS ONE QUESTION FROM A LOT OF ALL 10 QUESTIONS.**

### Course Outcomes:

After completing the course the students are able to:

**CO1.** Recognize the basic object oriented concepts & apply them to create java applications.

**CO2.** Demonstrate java application with inheritance and interface concepts.

**CO3.** Design java applications with multithreading concepts and demonstrate the error handling concepts.

**CO4.** Create GUI applications with the help of javaFX and handle events.

**CO5.** Design client server applications and security models.

| COs | Mapping with POs |
|-----|------------------|
| CO1 | PO2,PO5,PO6,PO10 |
| CO2 | PO2,PO4,PO5,PO10 |



|     |                  |
|-----|------------------|
| CO3 | PO2,PO6,PO10     |
| CO4 | PO2,PO4,PO6,PO10 |
| CO5 | PO2,PO4,PO5,PO10 |

|                                                   |                                                            |                                       |
|---------------------------------------------------|------------------------------------------------------------|---------------------------------------|
| <b>Sub Title: MANAGEMENT AND ENTREPRENEURSHIP</b> |                                                            |                                       |
| <b>Sub Code: HS03</b>                             | <b>No. of Credits : 4:0:0(L:T:P)</b>                       | <b>No. of Lecture hours/week : 4</b>  |
| <b>Exam Duration : 3 Hours</b>                    | <b>Exam Marks: CIE +Assignment + SEE = 45 + 5+ 50 =100</b> | <b>Total No. of Contact Hours: 52</b> |

**Course Objectives :**

1. To help students understand the Management concepts & its evolution.
2. To impart the knowledge about various Managerial functions.
3. To make the student learn the Entrepreneurial process.
4. To gain an insight of funding agencies & understand the role of SSI in economic development.
5. To have a clear understanding of various business opportunities & designing the Business plan.

| <b>UNIT No.</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>No. of Hours</b> |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>1</b>        | <b>MANAGEMENT:</b> Introduction-meaning-nature, characteristics of management, scope, functions of management and functional areas of management, management as a science or an art or profession, management and administration, roles of management, levels of management, Development of management thought -Early management approaches, Modern management approaches.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>08</b>           |
| <b>2</b>        | <b>PLANNING, ORGANIZING, DIRECTING AND CONTROLLING:</b><br><b>PLANNING:</b> Meaning and Nature, Types of Plans and Steps in Planning process.<br><b>ORGANIZING:</b> as a Managerial function – Nature and purpose of organization, principles of organization, types of organization. Departmentation, Committees, Centralization Vs Decentralization of authority and responsibility span of control, MBO and MBE (only concepts), Staffing: Nature and importance of staffing, process of selection and recruitment, Decision Making: Definition, Types and Decision Making Process.<br><b>DIRECTING:</b> Meaning and nature of directing, leadership styles – Autocratic, Democratic, Charismatic, Laissez faire and Participative. Leadership theories – Trait, Behavioral and Contingency. Introduction to Motivation theories – Maslow, Herzberg, Carrot & Stick & Mc. Gregor’s Theory of X & Y. | <b>12</b>           |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|   | <p><b>CO-ORDINATION:</b> Meaning and importance of Co-ordination, Team Building &amp; Group Dynamics, Communication – meaning and importance, types and barriers of communication.</p> <p><b>CONTROLLING:</b> Meaning and steps in controlling-Essentials of a sound control system-Types of control, Method of establishing control (in brief).</p>                                                                                                                                                                                                                                                             |    |
| 3 | <p><b>ENTREPRENEUR:</b> Meaning, evolution of the concept, Scope of Entrepreneur, functions of an Entrepreneur, Characteristics of an Entrepreneur, types of entrepreneur, Intrapreneur – an emerging class. Difference between Entrepreneur, Intrapreneur &amp; Manager, Stages in Entrepreneurial process, Problems faced by an Entrepreneur, Role of Entrepreneurs in economic development, Entrepreneurship- Meaning &amp; Importance of Entrepreneurship in India, barriers, Women entrepreneur – Concept &amp; steps to develop Women Entrepreneur.</p>                                                    | 10 |
| 4 | <p><b>SMALL SCALE INDUSTRY:</b> Concept of MSME, Ancillary Industry and Tiny Industry, Definition;, Characteristics; Objectives, Scope and role of SSI in economic Development, Advantages of SSI, problems of SSI, Steps to start an SSI, Government Policy towards SSI; Introduction to GATT/ WTO/ LPG. Forms of ownership.</p> <p><b>SUPPORTING AGENCIES OF GOVERNMENT FOR SSI:</b> Meaning, Nature of support; Objectives, functions. <b>INSTITUTIONAL SUPPORT:</b> Different Schemes, TECKSOK, KIADB, KSSIDC, DIC,SISI NSIC, SIDBI, KSFC. Sources of financing an enterprise- long term and short term.</p> | 12 |
| 5 | <p><b>PREPARATION OF PROJECT:</b> Meaning, Project identification, Project selection, Project Report - Need of Project, Contents: formulation, Errors of project report, Project Appraisal, Feasibility Study-Market Feasibility Study, Technical Feasibility Study, Financial Feasibility Study, Social Feasibility Study. Business opportunities, Business plan: Definition, components of business plan, reasons for failure of business plan.</p>                                                                                                                                                            | 10 |

**Note 1 : Unit 2 and Unit 4 will have internal choice.**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes :**

**CO1 :** The students will gain knowledge on management concepts & its evolution.

**CO2 :** The students will learn the application of managerial skills & attributes.

**CO3 :** The students will get an in depth knowledge of entrepreneurial process & will be able to apply the entrepreneurial skills.

**CO4 :** Students compile information & explore the sources of funding agencies.

**CO5 :** Students will be able to identify business opportunities & prepare the business

plan.

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO12                    |
| CO2        | PO9,PO10,PO11,PO12      |
| CO3        | PO11,PO12               |
| CO4        | PO11                    |
| CO5        | PO7,PO11,PO12           |

### **TEXT BOOKS:**

1. Entrepreneurship and Management- S Nagendra and V S Manjunath- Pearson Publication 4 /e, 2009.
2. Dynamics of Entrepreneurial Development and Management-Vasant Desai-Himalaya Publishing House.
3. Principles of Management – PC Tripathi, and P N Reddy – Tata MacGraw Hill.

### **REFERENCE BOOKS:**

1. Entrepreneurship Development – Poornima M Charanthimath Pearson Education 2006.
2. Entrepreneurship and management - Shashi k Gupta- Kalyani publishers, Latest edition.
3. Organizational behaviour, Stephen P Robbins, Timothy A. Judge, Neharika Vohra, Pearson, 14/e, 2012.
4. Financial Management- Shashi k Gupta- Kalyani publishers, Latest edition.

|                                                   |                                                                |                                            |
|---------------------------------------------------|----------------------------------------------------------------|--------------------------------------------|
| <b>Sub Title : MOBILE APPLICATION DEVELOPMENT</b> |                                                                |                                            |
| <b>Sub Code:IS61</b>                              | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b>                      | <b>No. of lecture hours/week : 3</b>       |
| <b>Exam Duration :<br/>3 hours</b>                | <b>Exam Marks: CIE +Assignment +<br/>SEE = 45 + 5+ 50 =100</b> | <b>Total No. of Contact Hours :<br/>39</b> |

**Course Objectives:**

1. To understand the Mobile - Android OS architecture and life cycle.
2. To analyze and use appropriate tools for Android Application development.
3. To be familiar with managing of application resources.
4. To build elegant user interfaces with views, layouts & form widgets.
5. To understand the usage of Services and Notifications in Android Apps.

| UNIT No | Syllabus Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | No of Hours |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1       | <b>An Overview of Android:</b> Introducing Android – History of Mobile Software Development, The Open Handset Alliance, Android Platform differences, Android Platform. Setting Up Your Android Development Environment - Configuring Your Development environment, Exploring Android software development Kit. Writing first android application - Testing Your Development Environment, Building Your First Android Application.<br><b>Android Application Design Essentials:</b> Understanding the Anatomy of an Android Application - Mastering Important Android Terminology, Using the Application Context, Receiving and Broadcasting Intents. | 7           |
| 2       | <b>Defining the application using Android Manifest File</b> – Understanding and Configuring the Android Manifest File.<br><b>Managing Application Resources:</b> Resources, Working with Resources<br><b>Designing User Interfaces with Layouts:</b> Creating User Interfaces in Android, Using Built-In Layout Classes.                                                                                                                                                                                                                                                                                                                              | 7           |
| 3       | <b>Android User Interface Design Essentials:</b> Exploring User Interface Screen Elements, Introducing Android Views and Layouts, Displaying Text to Users with TextView, Retrieving Data from Users, Using Buttons, Check Boxes, and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display Data to Users, Adjusting Progress with SeekBar, Providing Users with Options and Context Menus, Working with Dialogs                                                                                                                                                                                                              | 9           |
| 4       | <b>Drawing and Working with Animation</b> -Working with Animation - Working with Frame-by-Frame Animation, Working with Tweened Animations.<br><b>Working with Files and Directories:</b> Exploring with the Android Application Directories, Working with Other Directories and Files on the Android File System<br><b>Storing Structured Data Using SQLite Databases:</b><br>Creating a SQLite Database, Creating, Updating, and Deleting Database Records, Querying SQLite Databases, Closing and Deleting a SQLite Database                                                                                                                       | 9           |

|   |                                                                                                                                                                                                                                                                                               |   |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 5 | <p><b>Working with Services:</b> Determining When to Use Services, Understanding the Service Lifecycle, Creating a Service, Controlling a Service.</p> <p><b>Working with Notifications:</b> Notifying the User, Notifying with the Status Bar, Vibrating the Phone, Blinking the Lights.</p> | 7 |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|

**Note 1: Unit 3 & Unit 4 will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After completing the course the students are able to:

**CO1:** Analyze the fundamentals of Mobile application development.

**CO2:** Analyze the problems to build Mobile apps by assessing the basic framework and usage of SDK.

**CO3:** Design and develop Android applications using various resources and built-in classes.

**CO4:** Develop the skills in designing and deploying the sophisticated mobile applications.

**CO5:** Design and deploy Android applications with compelling User Interfaces.

| COs | Mapping with POs      |
|-----|-----------------------|
| CO1 | PO1,PO2,PO3,PO5       |
| CO2 | PO1,PO2,PO4,PO5,PO6   |
| CO3 | PO1,PO3,PO4,PO6,PO7   |
| CO4 | PO6,PO7,PO9,PO11,PO12 |
| CO5 | PO1,PO3,PO4,PO6,PO7   |

**TEXT BOOK:**

Shane Conder, Lauren Darcey: Android Wireless Application Development, Pearson education, 2010.

**REFERENCE BOOKS:**

1. Reto Meier: Professional Android 4 Application Development , Wrox Publication,2015
2. ZigurdMednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura: Programming Android, 2nd Edition , O'Reilly Publication, 2012.
3. SatyaKomatineni , Dave MacLean , SayedHashimi : Pro Android 3, Apress publication ,2011.

|                                    |                                                                |                                            |
|------------------------------------|----------------------------------------------------------------|--------------------------------------------|
| <b>Sub Title : CLOUD COMPUTING</b> |                                                                |                                            |
| <b>SubCode:IS63</b>                | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b>                      | <b>No. of lecture hours/week : 3</b>       |
| <b>Exam Duration :<br/>3 hours</b> | <b>Exam Marks: CIE +Assignment +<br/>SEE = 45 + 5+ 50 =100</b> | <b>Total No. of Contact Hours :<br/>39</b> |

**Course Objectives:**

1. To study the history and the fundamental concepts of Cloud Computing, Parallel, Distributed Computing and Virtualization.
2. To understand the concept of cloud computing architecture and different Cloud models.
3. To impart Cloud offerings which enhances the usage of Cloud.
4. To analyze the Cloud Storage and Security maintenances.
5. To become familiar with the different applications of Cloud Computing.

| <b>UNIT No</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                           | <b>No of Hours</b> |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>       | <b>Introduction to Cloud Computing:</b> Cloud Computing at a Glance, Historical Developments, Building Cloud Computing Environments Computing Platforms and Technologies                                                                                                                                                                                                          | <b>7</b>           |
| <b>2</b>       | <b>Principles of Parallel and Distributed Computing:</b> Eras of Computing , Parallel vs. Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing, Technologies for Distributed Computing<br><b>Virtualization:</b> Introduction, Characteristics of Virtualized Environments, Virtualization and Cloud Computing, Pros & Cons of Virtualization | <b>7</b>           |
| <b>3</b>       | <b>Cloud Computing Architecture:</b> Introduction, Cloud Reference Model, types of Clouds, Economics of the cloud, Open challenges                                                                                                                                                                                                                                                | <b>7</b>           |
| <b>4</b>       | <b>Cloud offerings:</b> Cloud Analytics, Testing under cloud, Information Security, Virtual Desktop Infrastructure, Storage Cloud.<br><b>Cloud management:</b> Introduction, Resiliency, Provisioning, Asset management. Cloud governance, High availability and disaster recovery, Charging models, Usage reporting, Billing and metering.                                       | <b>9</b>           |
| <b>5</b>       | <b>Cloud Platforms in Industry:</b> Amazon Web Services, Google AppEngine<br><b>Cloud Applications:</b> Scientific Applications, Business and Consumer Applications                                                                                                                                                                                                               | <b>9</b>           |

**Note 1: Unit 4 & Unit 5 will have internal choice.**

**Note 2: Three assignments are evaluated for 5 marks**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After the completion of course, the student will be able to:

**CO1:** Analyze core concepts and fundamentals of the Cloud Computing.  
**CO2:** Analyze systems, protocols and mechanisms to support Cloud Infrastructure.  
**CO3:** Identify the hardware necessary for Cloud Computing.  
**CO4:** Develop applications and host on Cloud Computing.  
**CO5:** To manage the Cloud Environment.

| COs | Mapping with POs        |
|-----|-------------------------|
| CO1 | PO1,PO7,PO11,PO12       |
| CO2 | PO1,PO4,PO7,PO11,PO12   |
| CO3 | PO1,PO2,PO3, PO5,PO8    |
| CO4 | PO1,PO8, PO10,PO11,PO12 |
| CO5 | PO4,PO5,PO6,PO7,PO8     |

**TEXT BOOKS:**

1. Rajkumar Buyya, Christian Vecchiola, S Thamarai Selvi ,Mastering Cloud Computing , Tata McGraw Hill Education Private Limited, 2013.
2. Dr. Kumar Saurabh , Cloud Computing , Wiley India, 2011.

**REFERENCE BOOKS:**

1. Dinkar Sitaram, Geetha Manjunath ,Moving to the Cloud. Elsevier Publications, 2011.
2. Barrie Sosinsky, Cloud Computing Bible , Wiley Publishing, Inc, 2011.

|                                                      |                                                            |                                       |
|------------------------------------------------------|------------------------------------------------------------|---------------------------------------|
| <b>Sub Title : CRYPTOGRAPHY AND NETWORK SECURITY</b> |                                                            |                                       |
| <b>Sub Code:IS656</b>                                | <b>No. of Credits:4=4 : 0 : 0 (L-T-P)</b>                  | <b>No. of lecture hours/week : 4</b>  |
| <b>Exam Duration : 3 hours</b>                       | <b>Exam Marks: CIE +Assignment + SEE = 45 + 5+ 50 =100</b> | <b>Total No. of Contact Hours :52</b> |

**Course Objectives:**

1. To understand the working and usage of different cloud service models.
2. To study the basic understanding of Installation and Configuration of Cloud environment.
3. To understand the concept of Service Model and its usage in Cloud Computing.
4. To learn development of applications using IaaS, PaaS and SaaS.
5. Understand how Cloud environment works, for various deployment models

**I. LIST OF PROGRAMS**

1. Demonstrate the working of Google Drive to make spreadsheet and notes.
2. Installation, Configuration and working on Justcloud.
3. Demonstrate the working in Codeanywhere to demonstrate different language.

4. Demonstrate the working in Codenvy to demonstrate Provisioning and Scaling of a website.
5. Demonstrate the working and installation of Google App Engine.
6. Working and installation of Microsoft Azure.

## II. OPEN ENDED QUESTIONS

1. Working with Mangrasoft Aneka Software.
2. Installation and Configuration of Hadoop/Eucalyptus or any equivalent cloud software.

**NOTE:**

**1. STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.**

**2. STUDENT IS REQUIRED TO EXECUTE ONE PROBLEM FROM A LOT OF 6 QUESTIONS.**

**Course Outcomes:**

After the completion of course, the students will be able to:

**CO1:** Analyze the requirements to setup the Cloud Environment using IaaS.

**CO2:** Develop the ability to solve real-world problems through software development on Cloud Environment.

**CO3:** Implement, compile, test and run Java programs comprising on PaaS to address a particular software problem.

**CO4:** Design and develop useful Cloud applications with elegant user interfaces using SaaS.

**CO5:** Analyze the problem and build Cloud applications using Services models using Google/Microsoft.

| COs | Mapping with POs       |
|-----|------------------------|
| CO1 | PO1,PO2,PO5,PO7,PO11   |
| CO2 | PO1,PO2, PO5, PO7,PO12 |
| CO3 | PO1,PO7,PO9,PO10,PO12  |
| CO4 | PO1,PO2,PO6,PO9,PO12   |
| CO5 | PO1,PO5,PO6,PO7,PO11   |

**Sub Title : PYTHON PROGRAMMING**

**Sub Code:IS72**

**No. of Credits:3=3 : 0 : 0 (L-T-P)**

**No. of Lecture Hours/Week : 3**



|                                |                                                                 |                                            |
|--------------------------------|-----------------------------------------------------------------|--------------------------------------------|
| <b>Exam Duration : 3 hours</b> | <b>Exam Marks :CIE +Assignment +<br/>SEE = 45 + 5 + 50 =100</b> | <b>Total No. of Contact Hours :<br/>39</b> |
|--------------------------------|-----------------------------------------------------------------|--------------------------------------------|

### Course Objectives:

1. Understanding the syntax and semantics of the Python language.
2. To create Functions in Python.
3. To handle Files & Regular expressions in Python.
4. To apply Object Oriented Programming concepts in Python.
5. To create Threaded and Networking applications in Python .

| <b>Unit No.</b> | <b>Syllabus Content</b>                                                                                                              | <b>No of Hours</b> |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>        | Introduction to Python, Writing First python program, Datatypes in Python, Operators in python, Input and output, Control statements | <b>7</b>           |
| <b>2</b>        | Arrays in Python, Strings and characters, Functions, Lists and Tuples, Dictionaries                                                  | <b>7</b>           |
| <b>3</b>        | Files in Python, , Exceptions, Regular Expressions, Date and Time, modules and packages                                              | <b>8</b>           |
| <b>4</b>        | Introduction to OOPS, Classes and Objects, Inheritance and Polymorphism, Abstract classes and Interfaces                             | <b>8</b>           |
| <b>5</b>        | Data Structures in Python, Threads, Networking in Python, Python Database Connectivity                                               | <b>9</b>           |

**Note 1: Unit 4 & Unit 5 will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

### Course Outcomes:

After the completion of course the student will be able to:

**CO1:** Demonstrate the understanding and usage of core python scripting elements python constructs, data types

**CO2 :**Demonstrate the understanding and usage of functions ,lists,tuples and dictionaries.

**CO3:** Demonstrate the understanding and usage of modules, packages and regular expressions

**CO4:** Demonstrate usage of object oriented features such as Inheritance, Polymorphism, operator overloading.

**CO5:**Apply the knowledge of python and use the language scripting elements and constructs to develop threaded and networking applications.

| COs | Mapping with POs    |
|-----|---------------------|
| CO1 | PO1,PO2,PO4         |
| CO2 | PO1,PO2,PO4         |
| CO3 | PO1,PO2,PO4,PO5,PO8 |
| CO4 | PO1,PO2,PO4,PO5,PO8 |
| CO5 | PO1,PO2,PO4,PO5,PO8 |

### TEXT BOOK :

Introducing Python- Modern Computing in Simple Packages – Bill Lubanovic, O'Reilly Publication 2015

### REFERENCE BOOKS/WEB LINKS:

1. How to Think Like a Scientist–Learning with Python “,Allen Downey, Jeffrey Elkner, Chris Meyers, Green Tea Press, 2012, Third Edition.
2. Introduction to Computer Science Using Python–Charles Dierbach, Wiley Publication Learning with Python “, Green Tea Press, 2014, First Edition.
3. Beginning Python –From Novice to Professional,-Magnus Lie Hetland, Second Edition, A Press Publication 2014.

|                                       |                                                       |                                        |
|---------------------------------------|-------------------------------------------------------|----------------------------------------|
| <b>Sub Title : BIG DATA ANALYTICS</b> |                                                       |                                        |
| <b>Sub Code: IS73</b>                 | <b>No. of Credits: 4 = 4 : 0 : 0 (L-T-P)</b>          | <b>No. of Lecture Hours/Week : 4</b>   |
| <b>Exam Duration : 3 hours</b>        | <b>CIE + Assignment + SEE =<br/>45 + 5 + 50 = 100</b> | <b>Total No. of Contact Hours : 52</b> |

### Course Objectives:

1. To impart fundamental concepts about data and its identification.
2. Understand the basic concepts of Big data, methodologies for analyzing structured and unstructured data.
3. Discuss different technologies used for Big data along with its architecture.

| Unit No. | Syllabus Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | No. of Hours |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 1        | <p><b>Providing Structure to Unstructured Data:</b> Background, Machine Translation, Autocoding, Indexing and Term Extraction.</p> <p><b>Identification, Deidentification, and Reidentification:</b> Background, Features of an Identifier System, Registered Unique Object Identifiers, Really Bad Identifier Methods, Embedding Information in an Identifier: Not Recommended, One-Way Hashes, Use Case: Hospital Registration, Deidentification, Data Scrubbing, Reidentification.</p> <p><b>Ontologies and Semantics:</b> Background, Classification, the Simplest of Ontologies, Ontologies, Classes with Multiple Parents, Choosing a Class Model, Introduction to Resource Description Framework Schema, Common Pitfalls in Ontology Development.</p> <p><b>Data Integration and Software Interoperability:</b> Background, The Committee to Survey Standards, Standard Trajectory, Specifications and Standards, Versioning, Compliance Issues, Interfaces to Big Data Recourses.</p> | 12           |
| 2        | <p><b>Immutability and Immortality:</b> Background, Immutability and Identifiers, Data Objects, Legacy Data, Data Born from Data, Reconciling Identifiers across Institutions, Zero-knowledge Reconciliation, The Curator's Burden.</p> <p><b>Simple but Powerful Big Data Techniques:</b> Background, Look at the Data, Data Range, Denominator, Frequency Distributions, Mean and Standard Deviation, Estimation-Only Analyses, Use Case: Estimating Move Preferences.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 8            |
| 3        | <p><b>Getting Value Predictive Analytics and Big Data:</b> Why Do Predictive Analytics on Big Data?; Moving Predictive Analytics to the Front Lines; Gaining Real Business Value from Predictive Analysis; Publishing Data and Analytics to Cloud Service.</p> <p><b>Ten Things to Consider with Big Data Analytics.</b></p> <p><b>Analytics and Big Data:</b> Using Big Data to Get Results; Basic analytics; Advanced analytics.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10           |
| 4        | <p><b>Analysis:</b> Background, Analytic Tasks, Clustering, Classifying, Recommending, and Modeling, Data Reduction, Normalizing and Adjusting Data, Big Data Software: Speed and Scalability, Find Relationships, Not Similarities.</p> <p><b>Special Considerations in Big Data Analysis:</b> Background, Theory in Search of Data, Data in Search of Theory, Overfitting, Too Much Data, Fixing Data, Data Subsets in Big Data: Neither Additive nor Transitive, Additional Big Data Pitfalls.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10           |
| 5        | <p><b>Stepwise Approach to Big Data Analysis.</b></p> <p><b>Big Data Infrastructures ,Technologies and Applications:</b><br/>Hadoop: Architecture, Introduction to MapReduce; HDFS: Architecture; R language: Programming features, Examples; Zookeeper; MongoDB.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 12           |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | <p><b>Other Hadoop Related tools: Hbase:</b> Data model and implementations – Hbase clients – Hbase examples – praxis; <b>Cassandra :</b> Cassandra data model – Cassandra examples – Cassandra clients – Hadoop integration; <b>PIG:</b> Grunt – Pig data model – Pig Latin – developing and testing Pig Latin scripts. Hive – data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries.</p> <p><b>Big Data Applications:</b> Healthcare, Insurance industry, Telecom services, Financial services, Retail, Marketing etc.</p> |  |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

**Unit 1 & Unit 5 will have internal choice.**

**Note : Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After the completion of course, the students will be able to:

**CO1:** Identify the differences between Big data & small data and structured & unstructured data. Also, analyze the Ontologies and Measurement techniques of Big data along with data integration.

**CO2:** Discuss about various powerful Big data techniques.

**CO3:** Differentiate between Statistics, Data Mining & Analytics.

**CO4:** Apply special considerations in Big Data Analysis along with stepwise approach in Big Data analytics.

**CO5:** Discuss different infrastructure & technologies for Big Data and its applications.

| COs | Mapping with POs          |
|-----|---------------------------|
| CO1 | PO2, PO3, PO4, PO12.      |
| CO2 | PO2, PO3, PO12            |
| CO3 | PO2, PO3, PO4, PO9        |
| CO4 | PO2, PO3, PO9             |
| CO5 | PO3, PO4, PO5, PO10, PO12 |

**TEXT BOOKS:**

1. Principles of Big Data: Preparing, Sharing and Analyzing Complex Information, Jules.J. Berman, First Edition, MK Publishers, 2013.

2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, Big Data For Dummies, Published by John Wiley & Sons, Inc., 2013.

3. Unit 5 (Not limited to following resource) :

i. Challenges and Opportunities with Big Data by Divyakant Agrawal et al , Whitepaper,

2011.

**REFERENCE BOOKS/WEB LINKS:**

1. Ken W. Collier, Agile Analytics: A Value-Driven Approach to Business Intelligence and Data Warehousing, Author: Pearson Education, ISBN-13:- 9788131786826,2012
2. Michael Wessler, Big Data For Dummies, Published by John Wiley & Sons, Inc. ,Alteryx Special Edition,2013.
3. Big Data Applications: <http://www.nasscom.in>.
4. Big Data case studies:
  - i. [http://racunarstvo.hr/wp-content/uploads/2016/03/OA\\_day\\_Big\\_Data\\_Tomasz\\_Przybysewski.pdf](http://racunarstvo.hr/wp-content/uploads/2016/03/OA_day_Big_Data_Tomasz_Przybysewski.pdf).
  - ii. <https://www.datameer.com/pdf/eBook-Top-Five-High-Impact-UseCases-for-Big-Data-Analytics.pdf>

|                                            |                                                             |                                        |
|--------------------------------------------|-------------------------------------------------------------|----------------------------------------|
| <b>Sub Title : C# PROGRAMMING AND .NET</b> |                                                             |                                        |
| <b>Sub Code:IS744</b>                      | <b>No. of Credits:4=4 : 0 : 0 (L-T-P)</b>                   | <b>No. of Lecture Hours/Week : 4</b>   |
| <b>Exam Duration : 3 hours</b>             | <b>Exam Marks :CIE +Assignment + SEE = 45 + 5 + 50 =100</b> | <b>Total No. of Contact Hours : 52</b> |

**Course Objectives:**

1. Understand the nature of .Net application development and build C# applications.
2. Familiarize with Object-oriented Programming concepts as associated with C#, Inheritance, Interfaces, Exception Handling, Reflection, Standard I/O programming, File Handling, Generics,
3. Understand Windows Application using Winforms, File I/O, XML in .NET.Web Services and Deployment.
4. Overview of .NET framework 3.0 features like WPF, WCF and WF.

| <b>Unit No.</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>No of Hours</b> |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1               | <b>The Philosophy Of .Net:</b> Understanding the Previous State of Affairs, The .NET Solution, The Building Block of the .NET Platform (CLR,CTS, and CLS), The Role of the .NET Base Class Libraries, What C# Brings to the Table, An Overview of .NET Binaries ( aka Assemblies ), the Role of the Common Intermediate Language , The Role of .NET Type Metadata, The Role of the Assembly Manifest, Compiling CIL to Platform –Specific Instructions, Understanding the Common Type System, Intrinsic CTS Data Types, Understanding the Common Languages Specification, | <b>10</b>          |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|   | Understanding the Common Language Runtime A tour of the .NET Namespaces, Increasing Your Namespace Nomenclature, Deploying the .NET Runtime.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |
| 2 | <p><b>Building C# Applications:</b> The Role of the Command Line Compiler (csc.exe), Building C # Application using csc.exe Working with csc.exe Response Files, Generating Bug Reports , Remaining C# Compiler Options, The Command Line Debugger (cordbg.exe) Using the, Visual Studio .NET IDE, Other Key Aspects of the VS.NET IDE, C# “Preprocessor:” Directives, An Interesting Aside: The System. Environment Class.</p> <p><b>C# Language Fundamentals:</b> The Anatomy of a Basic C# Class, Creating objects: Constructor Basics, The Composition of a C# Application, Default Assignment and Variable Scope, The C# Member Initialization Syntax, Basic Input and Output with the Console Class, Understanding Value Types and Reference Types, The Master Node: System, Object, The System Data Types (and C# Aliases), Converting Between Value Types and Reference Types: Boxing and Unboxing, Defining Program Constants, C# Iteration Constructs, C# Controls Flow Constructs, The Complete Set of C# Operators, Defining Custom Class Methods, Understating Static Methods, Methods Parameter Modifies, Array Manipulation in C #, String Manipulation in C#, C# Enumerations, Defining Structures in C#, Defining Custom Namespaces.</p> | 12 |
| 3 | <p><b>Object- Oriented Programming With C#:</b> Forms Defining of the C# Class, Definition the “Default Public Interface” of a Type, Recapping the Pillars of OOP, The First Pillars: C#’s Encapsulation Services, Pseudo-Encapsulation: Creating Read-Only Fields, The Second Pillar: C#’s Inheritance Supports, keeping Family Secrets: The “Protected” Keyword, Nested Type Definitions, The Third Pillar: C #’s Polymorphic Support, Casting Between.</p> <p><b>Exceptions And Object Lifetime:</b> Ode to Errors, Bugs, and Exceptions, The Role of .NET Exception Handling, the System. Exception Base Class, Throwing a Generic Exception, Catching Exception, CLR System – Level Exception (System. System Exception), Custom Application-Level Exception (System. System Exception), Handling Multiple Exception, The Family Block, the Last Chance Exception Dynamically Identifying Application – and System Level Exception Debugging System Exception Using VS. NET, Understanding Object Lifetime, the CIT of “new”, The Basics of Garbage Collection,, Finalization a Type, The Finalization Process, Building an Ad Hoc Destruction Method, Garbage Collection Optimizations, The System. GC Type.</p>                                    | 10 |
| 4 | <b>Interfaces And Collections:</b> Defining Interfaces Using C# Invoking Interface Members at the object Level, Exercising the Shapes Hierarchy, Understanding Explicit Interface Implementation, Interfaces As                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 10 |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|   | Polymorphic Agents, Building Interface Hierarchies, Implementing, Implementation, Interfaces Using VS .NET, understanding the IConvertible Interface, Building a Custom Enumerator (IEnumerable and Enumerator), Building Cloneable objects (ICloneable), Building Comparable Objects (I Comparable), Exploring the system. Collections Namespace, Building a Custom Container (Retrofitting the Cars Type).                                                                                                                                                                                                                                                                                                                       |           |
| 5 | <b>Understanding .Net Assembles:</b> Problems with Classic COM Binaries, An Overview of .NET Assembly, Building a Simple File Test Assembly, A C#. Client Application, A Visual Basic .NET Client Application, Cross Language Inheritance, Exploring the CarLibrary's, Manifest, Exploring the CarLibrary's Types, Building the Multifile Assembly, Using Assembly, Understanding Private Assemblies, Probing for Private Assemblies (The Basics), Private A Assemblies XML Configurations Files, Probing for Private Assemblies ( The Details), Understanding Shared Assembly, Understanding Shared Names, Building a Shared Assembly, Understanding Delay Signing, Installing/Removing Shared Assembly, Using a Shared Assembly. | <b>10</b> |

**Note 1: Unit 2 & Unit 3 will have internal choice.**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment - III from Unit 5**

**Course Outcomes:**

After the completion of course, the students will be able to:

**CO1:**Analyze the nature of .Net application development .

**CO2:**Apply OOAD concepts to build C# applications

**CO3:**Design and develop console based applications using C#

**CO4:**Develop Windows Application using Winforms, File I/O, XML in .NET.Web Services and deployment.

**CO5:**Analyze .NET framework 3.0 features like WPF, WCF and WF.

| <b>COs</b> | <b>Mapping with POs</b>      |
|------------|------------------------------|
| CO1        | PO1,PO2,PO3,PO4,PO5,PO8,PO12 |
| CO2        | PO1,PO2,PO3,PO4,PO5,PO7,PO12 |
| CO3        | PO1,PO2,PO3,PO4,PO5,PO7,PO12 |
| CO4        | PO1,PO2,PO3,PO4,PO5,PO7,PO12 |
| CO5        | PO1,PO2,PO3,PO4,PO5,PO7,PO12 |

**TEXT BOOKS:**

1. Pro C# with .NET 3.0 - Andrew Troelsen, Special Edition, Dream Tech Press, India, 2013.
2. Programming in C# - E. Balagurusamy, 5<sup>th</sup> Reprint, Tata McGraw Hill, 2011.

**REFERENCE BOOKS/WEB LINKS:**

1. Inside C# - Tom Archer, WP Publishers, 2011.
2. The Complete Reference C# - Herbert Schildt, Tata McGraw Hill, 20014.

|                                           |                                                 |                                       |
|-------------------------------------------|-------------------------------------------------|---------------------------------------|
| <b>Sub. Title :PYTHON PROGRAMMING LAB</b> |                                                 |                                       |
| <b>Sub Code:ISL75</b>                     | <b>No. of Credits : 0:0:1.5</b>                 | <b>No. of lecture hours/week : 03</b> |
| <b>Exam Duration :<br/>3 hours</b>        | <b>CIE +Assignment + SEE = 45 + 5 + 50 =100</b> |                                       |

**Course objectives:**

1. Understanding the syntax and semantics of the Python language.
2. To create Functions in Python.
3. To handle Files & Regular expressions in Python.
4. To apply Object Oriented Programming concepts in Python.
5. To create Threaded and Networking applications.

**I. LIST OF PROGRAMS**

1. Write a python program using functions to search an element in an array using binary search algorithm.
2. Design a python program using regular expressions to search and print mail-id's in a text file.
3. Develop a python program to count the frequency of each word in a given file using dictionaries.
4. Write a python counting number of words, characters and lines present in a given file.
5. Develop a python program implement a stack using lists.
6. Write a python program to implement a queue using lists.
7. Design a python program to demonstrate data hiding principle of OOP.
8. Write a python program to demonstrate multiple inheritance.
9. Develop a python program to implement the multilevel inheritance.
10. Develop a python program to create singly linked linear list.
11. Write a python program to create doubly linked linear list.
12. Design a python program to illustrate the operator overloading.
13. Design a python program to illustrate the Multithreaded programming concept.



14. Develop a python program to illustrate client server programming concept.

## II.OPEN ENDED QUESTIONS

Develop a standalone/ web application using python for any of the following:

1. Crime Data Analysis.
2. Twitter Feed Sentiment Analysis.
3. Smart Agriculture And Storage.
4. Health Care Recommendation
5. Multi Label Text Classification
6. Twitter Sentiment Analysis

### NOTE :

**1. STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDEDQUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.**

**2.IN THE EXAMINATION EACH STUDENT PICKS ONE QUESTION FROM A LOT OF ALL 14 QUESTIONS.**

### Course Outcomes:

After completing the course the students are able to:

**CO1:**Demonstrate the understanding and usage of core python scripting elements  
Python constructs ,datatypes.

**CO2:**Demonstrate the understanding and usage of functions ,lists, tuples and dictionaries.

**CO3:**Demonstrate the understanding and usage of modules, packages, and regular expressions

**CO4:**Demonstrate usage of object oriented features such as Inheritance, Polymorphism, operator overloading.

**CO5:**Apply the knowledge of python and use the language scripting elements and constructs to develop threaded and networking applications.

| COs | Mapping with POs    |
|-----|---------------------|
| CO1 | PO1,PO2,PO4         |
| CO2 | PO1,PO2,PO4         |
| CO3 | PO1,PO2,PO4,PO5,PO8 |
| CO4 | PO1,PO2,PO4,PO5,PO8 |
| CO5 | PO1,PO2,PO4,PO5,PO8 |

|                                                     |                                                             |                                       |
|-----------------------------------------------------|-------------------------------------------------------------|---------------------------------------|
| <b>Sub Title : CLOUD COMPUTING AND BIG DATA LAB</b> |                                                             |                                       |
| <b>Sub Code:ISL76</b>                               | <b>No of Credits : 0:0:1.5</b>                              | <b>No. of Lecture Hours/Week : 03</b> |
| <b>Exam Duration :<br/>3 hours</b>                  | <b>Exam Marks :CIE +Assignment + SEE = 45 + 5 + 50 =100</b> |                                       |

**Course Objectives:**

1. To understand the working and usage of different cloud service models.
2. To study the basic understanding of Installation and Configuration of Cloud environment.
3. To understand the concept of Service Model and its usage in Cloud Computing.
4. To learn development of applications using IaaS, PaaS and SaaS.
5. Understand how Cloud environment works, for various deployment models.
6. To apply Hadoop concepts to various applications and NoSQL implementation

**I. LIST OF PROGRAMS**

**PART A**

**CLOUD COMPUTING:**

1. Demonstrate the working of Google Drive to make spreadsheet and notes.
2. Installation, Configuration and working on Justcloud.
3. Demonstrate the working in Cloudanywhere Cloud9 to demonstrate different language.
4. Demonstrate the working in Codenvy to demonstrate Provisioning and Scaling of a website.
5. Demonstrate the working and installation of Google App Engine.
6. Working and installation of Microsoft Azure.

**PART B**

**BIG DATA :**

1. Start by reviewing HDFS. You will find that its composition is similar to your local Linux file system. You will use the hadoop fs command when interacting with HDFS.
  - a. Review the commands available for the Hadoop Distributed File System:
  - b. Copy file foo.txt from local disk to the user's directory in HDFS
  - c. Get a directory listing of the user's home directory in HDFS

- d. Get a directory listing of the HDFS root directory
- e. Display the contents of the HDFS file user/fred/bar.txt

2. Start by reviewing HDFS. You will find that its composition is similar to your local Linux file system. You will use the `hadoop fs` command when interacting with HDFS.

- a. Move that file to the local disk, named as `baz.txt`
- b. Create a directory called `input` under the user's home directory
- c. Delete the directory `input` and all its contents
- d. Verify the copy by listing the directory contents in HDFS.

3. Using movie lens data

- a. List all the movies and the number of ratings
- b. List all the users and the number of ratings they have done for a movie
- c. List all the Movie IDs which have been rated (MovieId with at least one user rating it)

4. Using movie lens data:

- a. List all the Users who have rated the movies (Users who have rated at least one movie)
- b. List of all the User with the max, min, average ratings they have given against any movie
- c. List all the Movies with the max, min, average ratings given by any user

5. Hive allows for the manipulation of data in HDFS using a variant of SQL. This makes it excellent for transforming and consolidating data for load into a relational database. In this exercise you will use HiveQL to filter and aggregate click data to build facts about user's movie preferences. The query results will be saved in a staging table used to populate the Oracle Database.

The `moveapp_log_json` table contains an activity column. Activity states are as follows:

- RATE\_MOVIE
- COMPLETED\_MOVIE
- PAUSE\_MOVIE
- START\_MOVIE
- BROWSE\_MOVIE
- LIST\_MOVIE
- SEARCH\_MOVIE
- LOGIN
- LOGOUT
- INCOMPLETE\_MOVIE.

PURCHASE\_MOVIE

Hive maps queries into Map Reduce jobs, simplifying the process of querying large datasets in HDFS. HiveQL statements can be mapped to phases of the Map Reduce framework. Selection and transformation operations occur in map tasks, while aggregation is handled by reducers. Join operations are flexible: they can be performed in the reducer or mappers depending on the size of the leftmost table.

- a. Write a query to select only those clicks which correspond to starting, browsing, completing, or purchasing movies. Use a CASE statement to transform the

RECOMMENDED column into integers where 'Y' is 1 and 'N' is 0. Also, ensure GENREID is not null. Only include the first 25 rows.

- b. Write a query to select the customer ID, movie ID, recommended state and most recent rating for each movie.

6. The moveapp\_log\_json table contains an activity column. Activity states are as follows:

- RATE\_MOVIE
- COMPLETED\_MOVIE
- PAUSE\_MOVIE
- START\_MOVIE
- BROWSE\_MOVIE
- LIST\_MOVIE
- SEARCH\_MOVIE
- LOGIN
- LOGOUT
- INCOMPLETE\_MOVIE.

- a. Load the results of the previous two queries into a staging table. First, create the staging table:
- b. Next, load the results of the queries into the staging table.

## II. OPEN ENDED QUESTIONS

1. Working with Mangrasoft Aneka Software.
2. Installation and Configuration of Hadoop/Eucalyptus or any equivalent cloud software.
3. Word count using MapReduce.

### NOTE:

**1. STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.**

**2. STUDENT IS REQUIRED TO EXECUTE ONE PROGRAM FROM PART A and ONE PROGRAM FROM PART B .**

### **Course Outcomes:**

After the completion of course, the students will be able to:

**CO1:** Analyze the requirements to setup: Cloud Environment using IaaS, Hadoop Environment

**CO2:** Develop the ability to solve real-world problems through software development on Cloud Environment.

**CO3:** Implement, compile, test and run Java programs comprising on PaaS to address a particular software problem.

**CO4:** Design and develop useful Cloud applications with elegant user interfaces using SaaS.

**CO5:** Analyze the problem and build Cloud applications using Services models using Google/Microsoft, implement HiveQL statements.

| COs | Mapping with POs       |
|-----|------------------------|
| CO1 | PO1,PO2,PO5,PO7,PO11   |
| CO2 | PO1,PO2, PO5, PO7,PO12 |
| CO3 | PO1,PO7,PO9,PO10,PO12  |
| CO4 | PO1,PO2,PO6,PO9,PO12   |
| CO5 | PO1,PO5,PO6,PO7,PO11   |

| Sub Title : SOFTWARE TESTING   |                                                            |                                       |
|--------------------------------|------------------------------------------------------------|---------------------------------------|
| <b>Sub Code:IS81</b>           | <b>No. of Credits:4=4 : 0 : 0 (L-T-P)</b>                  | <b>No.of Lecture Hours/Week : 4</b>   |
| <b>Exam Duration : 3 hours</b> | <b>Exam Marks:CIE +Assignment + SEE = 45 + 5 + 50 =100</b> | <b>Total No. of Contact Hours :52</b> |

**Course Objectives:**

1. Discuss about terminologies of software testing .
2. Familiarize with strengths and weaknesses of a variety of test generation.
3. Analyze different types of software testing.
4. Infer functional and non functional testing.
5. Integrating the applications of Test management and automation in software testing .

| Unit No | Syllabus Content                                                                                                                                                                                                                                                                                                                                                                                   | No of Hours |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1       | <b>Basics of Software Testing:</b> Human Errors and Testing, Software Quality; Requirements, Behavior and Correctness, Correctness versus Reliability, Testing and Debugging, Test Metrics, Software and Hardware Testing, Testing and Verification, Defect Management, Execution History, Test-generation Strategies, Static Testing, Model-Based Testing and Model Checking, Control-Flow Graph. | 12          |
| 2       | <b>Test Generation from Requirements:</b> Introduction, The Test-Selection Problem, Equivalence Partitioning, Boundary Value Analysis, Category-Partition Method, Cause-Effect Graphing,                                                                                                                                                                                                           | 10          |
| 3       | <b>Types of Testing – 1:</b> White Box Testing, Introduction, Static Testing, Structural Testing, Challenges in Whit box testing, Black Box Testing: Introduction, Testing methods. Integration Testing: Introduction, Integration testing as a Type of Testing, Integration testing as a Phase of Testing, Scenario Testing, Defect Bash.                                                         | 10          |

|          |                                                                                                                                                                                                                                                                                                                                     |           |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>4</b> | <b>Types of Testing – 2:</b><br>System and Acceptance Testing, Overview, Functional System Testing, Non-functional Testing, Acceptance Testing; Summary of Testing Phases, Regression Testing: Introduction, Methodologies, Best Practices.                                                                                         | <b>10</b> |
| <b>5</b> | <b>Test Management and automation:</b> Introduction, Test planning, Test management, Test process, Test reporting, Test planning checklists, Test plan template.<br>What is Test automation? Terms used in Automation, Skills needed for Automation ,what to automate, scope of automation, design and architecture for automation. | <b>10</b> |

**Note 1:** Unit 1 & Unit 5 will have internal choice.

**Note 2:** Three Assignments are evaluated for 5 marks:

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After the completion of course, the students will be able to:

**CO1:** Apply terms associated with software testing.

**CO2:** Design various test generation strategies.

**CO3:** Implement different types of software testing in application development.

**CO4:** Summarize aspects of functional and non functional testing.

**CO5:**Apply the usage of test Management and automation in software testing.

| <b>COs</b> | <b>Mapping with Pos</b>       |
|------------|-------------------------------|
| CO1        | PO1,PO2,PO7,PO12              |
| CO2        | PO1,PO2,PO3,PO5,PO7           |
| CO3        | PO1,PO2,PO3,PO5,PO7,PO9,PO10  |
| CO4        | PO1,PO2,PO3,PO4,PO5,PO7       |
| CO5        | PO5,PO7,PO8,PO9,P10,PO11,PO12 |

**TEXT BOOKS:**

1. Aditya P Mathur, Foundations of Software Testing, Pearson Education, First Edition, 2010.ISBN-9788131707951
2. Srinivasan Desikan, Gopaldaswamy Ramesh, Software Testing - Principles and Practices, Pearson Education, First Edition, 2010. ISBN-978-8-177-58121-8

**REFERENCE BOOKS/WEBLINKS:**

Ron Patton, Software Testing, Pearson Education, Second Edition, 2010.  
ISBN-978-81-7758-030

## 2018-2019

|                                            |                                                                |                                            |
|--------------------------------------------|----------------------------------------------------------------|--------------------------------------------|
| <b>Sub Title : ARTIFICIAL INTELLIGENCE</b> |                                                                |                                            |
| <b>Sub Code:IS651</b>                      | <b>No. of Credits:4=4 : 0 : 0 (L-T-P)</b>                      | <b>No. of lecture hours/week : 4</b>       |
| <b>Exam Duration :<br/>3 hours</b>         | <b>Exam Marks: CIE +Assignment +<br/>SEE = 45 + 5+ 50 =100</b> | <b>Total No. of Contact Hours :<br/>52</b> |

**Course Objectives:**

1. Understand about agent, behavior and structure
2. Learn different search strategies
3. Representation of knowledge and reasoning
4. Gain knowledge about planning and learning strategies

| Unit No. | Syllabus Content                                                                                                                                                                                                                                                                        | No. of Hours |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 1        | Intelligent agents: Agents and environments, good behavior, concept of rationality, nature of environments, structure of agents                                                                                                                                                         | 10           |
| 2        | Problem-solving through Search: Problem solving agents, searching for solutions, uninformed search strategies, A*, minimax                                                                                                                                                              | 10           |
| 3        | Knowledge Representation and Reasoning: ontologies, representing and reasoning about objects, relations, events, actions, time, and space; predicate logic, syntax and semantics of first order logic, Propositional vs. First order inference, Forward chaining and backward chaining. | 11           |
| 4        | Planning: planning as search, partial order planning, construction and use of planning graphs                                                                                                                                                                                           | 10           |
| 5        | Machine Learning and Knowledge Acquisition: forms of learning, inductive learning, learning decision trees, Learning nearest neighbor, Reinforcement learning, passive and active RL.                                                                                                   | 11           |

**Note 1: Unit 3 & Unit 5 will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**  
**Assignment -III from Unit 5**

**Course Outcomes:**

After completing the course the students are able to:

**CO1:** Identify agent and environment.

**CO2:** Apply different Search strategies in problem solving .

**CO3:** Represent knowledge and perform reasoning.

**CO4:** Apply Planning strategies and machine learning techniques.

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1,PO12                |
| CO2        | PO7,PO12                |
| CO3        | PO1,PO2                 |
| CO4        | PO5,PO7,PO12            |

**TEXT BOOK:**

Artificial Intelligence: A Modern Approach, 3rd Edition, by Stuart Russell and Peter Norvig.2.1,2.2,2.3,2.4,3.1,3.3,3.4,4.1,4.2,6.2,8.1,8.2,9.1,9.3,9.4,10.1,10.2,10.3,10.4,11.2, 11.3,11.4,18.1,18.2,18.3,19.3,20.4,21.1,21.2,21.3)

**REFERENCE BOOKS:**

1. Luger, G. F., & Stubblefield, W. A., Artificial Intelligence - Structures and Strategies for Complex Problem Solving. New York, NY: Addison Wesley, 5th edition (2005).
2. Nilsson, N. J. Artificial Intelligence - A Modern Synthesis. Palo Alto: Morgan Kaufmann. (1998).
3. Nilsson, N. J., Principles of Artificial Intelligence. Palo Alto, CA: Tioga (1981).
4. Rich, E., & Knight, K., Artificial Intelligence. New York: McGraw-Hill (1991).

**Sub Title : PYTHON PROGRAMMING**

**Sub Code:IS653**

**No. of Credits:4=4 : 0 : 0 (L-T-P)**

**No. of Lecture Hours/Week : 4**



|                                |                                                                 |                                        |
|--------------------------------|-----------------------------------------------------------------|----------------------------------------|
| <b>Exam Duration : 3 hours</b> | <b>Exam Marks :CIE +Assignment +<br/>SEE = 45 + 5 + 50 =100</b> | <b>Total No. of Contact Hours : 52</b> |
|--------------------------------|-----------------------------------------------------------------|----------------------------------------|

### Course Objectives:

1. Understanding the syntax and semantics of the Python language.
2. To create Functions in Python.
3. To handle Files & Regular expressions in Python.
4. To apply Object Oriented Programming concepts in Python.
5. To create Threaded and Networking applications in Python .

| Unit No. | Syllabus Content                                                                                                                      | No of Hours |
|----------|---------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>1</b> | Introduction to Python, Writing First python program, Data types in Python, Operators in python, Input and output, Control statements | <b>10</b>   |
| <b>2</b> | Arrays in Python, Strings and characters, Functions, Lists and Tuples, Dictionaries                                                   | 10          |
| <b>3</b> | Files in Python, , Exceptions, Regular Expressions, Date and Time, modules and packages                                               | <b>10</b>   |
| <b>4</b> | Introduction to OOPS, Classes and Objects, Inheritance and Polymorphism, Abstract classes and Interfaces                              | <b>10</b>   |
| <b>5</b> | Data Structures in Python, Threads, Networking in Python, Python Database Connectivity                                                | <b>12</b>   |

**Note 1: Unit 4 & Unit 5 will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

### Course Outcomes:

After the completion of course the student will be able to:

**CO1:** Demonstrate the understanding and usage of core python scripting elements python constructs, data types

**CO2 :**Demonstrate the understanding and usage of functions ,lists,tuples and dictionaries.

**CO3:** Demonstrate the understanding and usage of modules, packages and regular expressions

**CO4:** Demonstrate usage of object oriented features such as Inheritance, Polymorphism, operator overloading.

**CO5:**Apply the knowledge of python and use the language scripting elements and constructs to develop threaded and networking applications.

| COs | Mapping with POs |
|-----|------------------|
| CO1 | PO1,PO2,PO4      |

|     |                     |
|-----|---------------------|
| CO2 | PO1,PO2,PO4         |
| CO3 | PO1,PO2,PO4,PO5,PO8 |
| CO4 | PO1,PO2,PO4,PO5,PO8 |
| CO5 | PO1,PO2,PO4,PO5,PO8 |

**TEXT BOOK :**

Introducing Python- Modern Computing in Simple Packages – Bill Lubanovic, O'Reilly Publication 2015

**REFERENCE BOOKS/WEB LINKS:**

1. How to Think Like a Scientist–Learning with Python “,Allen Downey, Jeffrey Elkner, Chris Meyers, Green Tea Press, 2012, Third Edition.
2. Introduction to Computer Science Using Python-Charles Dierbach, Wiley Publication Learning with Python “, Green Tea Press, 2014, First Edition.
3. Beginning Python –From Novice to Professional, -Magnus Lie Hetland, Second Edition, A Press Publication 2014.

|                                          |                                            |                                       |
|------------------------------------------|--------------------------------------------|---------------------------------------|
| <b>Course Title : INTERNET OF THINGS</b> |                                            |                                       |
| <b>Course Code: IS72</b>                 | <b>No. of Credits: 4-4 : 0 : 0 (L-T-P)</b> | <b>No. of lecture hours/week : 4</b>  |
| <b>Exam Duration : 3 hours</b>           | <b>CIE + SEE = 50 + 50 =100</b>            | <b>Total No. of Contact Hours :52</b> |

**Course Objectives**

1. To learn the basic issues, policy and challenges in the IoT
2. To understand the Mechanism and Key Technologies in IoT
3. To analyze the managing of the resources in the IoT
4. To deploy the resources into business
5. To comprehend Data Analytics for IoT

| <b>UNIT No</b> | <b>Syllabus Content</b>                                                                                                                                             | <b>No of Hours</b> |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>       | <b>Introduction to IoT</b><br>Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & | <b>12</b>          |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|          | APIs. IoT & M2M Machine to Machine, Difference between IoT and M2M, Software define Network                                                                                                                                                                                                                                                                                                                                                                 |           |
| <b>2</b> | <b>Fundamentals IoT</b><br>Mechanism and Key Technologies-Identification of IoT Object and Services, Structural Aspects of the IoT, Key IoT Technologies. Evolving IoT Standards-Overview and Approaches,IETF IPV6 Routing Protocol for RPL Roll, Constrained Application Protocol, Representational State Transfer, ETSI M2M,Third Generation Partnership Project Service Requirements for Machine-Type Communications, CENELEC, IETF IPv6 Over Lowpower . | <b>10</b> |
| <b>3</b> | <b>Challenges in IoT</b><br>Design challenges, Development challenges, Security challenges, Other challenges                                                                                                                                                                                                                                                                                                                                                | <b>10</b> |
| <b>4</b> | <b>Domain specific applications of IoT</b><br>Home automation, Industry applications, Surveillance applications, Other IoT applications                                                                                                                                                                                                                                                                                                                     | <b>10</b> |
| <b>5</b> | <b>Data Analytics for IoT</b> – Introduction, Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Apache Spark, Apache Storm, Using Apache Storm for Real-time Data Analysis, Structural Health Monitoring Case Study.                                                                                                                                                                                                             | <b>10</b> |

**Note 1: Unit 2 & Unit 5 will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course outcomes:**

On successful completion of the course, the student will

**CO1:** Understand the concepts of Internet of Things.

**CO2:** Identify different technologies of IoT with machine type communication.

**CO3:** Design IoT applications in different domain and be able to analyze their performance.

**CO4:** Implement basic IoT applications on embedded platform.

**CO5:**Understand data sets received through IoT devices and tools used for analysis

| <b>COs</b> | <b>Mapping with PO's</b>     |
|------------|------------------------------|
| CO1        | PO3,PO4,PO5,PO6,PO9,PO10     |
| CO2        | PO3,PO4,PO5,PO6,PO7,PO9,PO10 |
| CO3        | PO4,PO6,PO7,PO8,PO9,PO11     |
| CO4        | PO4,PO5,PO8,PO9,PO10,PO11    |

|     |                          |
|-----|--------------------------|
| CO5 | PO4,PO5,PO6,PO7,PO9,PO10 |
|-----|--------------------------|

**TEXT BOOK:**

1. ArshdeepBahga, Vijay Madiseti, "Internet of Things : A Hands on Approach" Universities Press., 2015
2. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6:The Evolving World of M2M Communications", Wiley, 2013

**REFERENCE BOOKS/WEBLINKS**

1. Michael Miller, "The Internet of Things", First Edition, Pearson, 2015.
2. Claire Rowland, Elizabeth Goodman et.al., "Designing Connected Products", First Edition, O'Reilly, 2015

|                                                        |                                                 |                                       |
|--------------------------------------------------------|-------------------------------------------------|---------------------------------------|
| <b>Sub. Title : MOBILE APPLICATION DEVELOPMENT LAB</b> |                                                 |                                       |
| <b>Sub Code:ISL75</b>                                  | <b>No. of Credits : 0:0:1.5</b>                 | <b>No. of lecture hours/week : 03</b> |
| <b>Exam Duration :<br/>3 hours</b>                     | <b>CIE +Assignment + SEE = 45 + 5 + 50 =100</b> |                                       |

**Course objectives:**

1. To understand the Mobile - Android OS architecture and life cycle.
2. To analyze and use appropriate tools for Android Application development.
3. To be familiar with managing of application resources.
4. To build elegant user interfaces with views, layouts& form widgets.
5. To understand the usage of Services and Notifications in Android Apps

**6. LIST OF PROGRAMS**

1. Develop an android application that uses GUI components, Font and Colors.
2. Design an android application that uses Layout Managers and event listeners.
3. Develop a native android calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an android application that makes use of database.
6. Implement an android application that implements Multi-threading concept.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that creates alarm clock

**II.OPEN ENDED QUESTIONS**

Develop an android application using Android Studio/ADT Bundle for any of the following:

- 1.Mobile Based Attendance System.
- 2.Android Campus Recruitment System.
- 3.Android Book Store Project.
- 4.Student Faculty Document Sharing Android Project
- 5.Android Based Feedback System.

**NOTE :**

1. Student is permitted to submit open ended solution to any other open ended question apart from the list above . but it has to be approved by the staff in charge.
2. In the examination each student picks one question from a lot of all 10 questions.

**Course Outcomes:**

After completing the course the students are able to:

**CO1:** Analyze the fundamentals of Mobile application development.

**CO2:** Analyze the problems to build Mobile apps by assessing the basic framework and usage of SDK.

**CO3:** Design and develop Android applications using various resources and built-in classes.

**CO4:** Develop the skills in designing and deploying the sophisticated mobile applications.

**CO5:** Design and deploy Android applications with compelling User Interfaces.

| COs | Mapping with POs      |
|-----|-----------------------|
| CO1 | PO1,PO2,PO3,PO5       |
| CO2 | PO1,PO2,PO4,PO5,PO6   |
| CO3 | PO1,PO3,PO4,PO6,PO7   |
| CO4 | PO6,PO7,PO9,PO11,PO12 |
| CO5 | PO1,PO3,PO4,PO6,PO7   |

| Sub Title : BIG DATA LAB   |                                                      |                                |
|----------------------------|------------------------------------------------------|--------------------------------|
| Sub Code:ISL76             | No of Credits : 0:0:1.5                              | No. of Lecture Hours/Week : 03 |
| Exam Duration :<br>3 hours | Exam Marks :CIE +Assignment + SEE = 45 + 5 + 50 =100 |                                |

**Course Objectives:**

1. To understand the concept of Big data with hands on.
2. Understand installation of various Big data tools.
3. To apply Hadoop concepts to various applications and NoSQL implementation.

**I. LIST OF PROGRAMS**

1. Start by reviewing HDFS. You will find that its composition is similar to your local Linux file system. You will use the `hadoop fs` command when interacting with HDFS.
  - a. Review the commands available for the Hadoop Distributed File System:
  - b. Copy file `foo.txt` from local disk to the user's directory in HDFS
  - c. Get a directory listing of the user's home directory in HDFS
  - d. Get a directory listing of the HDFS root directory
  - e. Display the contents of the HDFS file `user/fred/bar.txt`
2. Start by reviewing HDFS. You will find that its composition is similar to your local Linux file system. You will use the `hadoop fs` command when interacting with HDFS.
  - a. Move that file to the local disk, named as `baz.txt`
  - b. Create a directory called `input` under the user's home directory
  - c. Delete the directory `input old` and all its contents
  - d. Verify the copy by listing the directory contents in HDFS.

**3.MapReduce Programs:**

Using movie lens data

- a. List all the movies and the number of ratings
- b. List all the users and the number of ratings they have done for a movie
- c. List all the Movie IDs which have been rated (MovieId with at least one user rating it).

**4. Hive Programs:**

Hive allows for the manipulation of data in HDFS using a variant of SQL. This makes it excellent for transforming and consolidating data for load into a relational database. In this exercise you will use HiveQL to filter and aggregate click data to build facts about user's movie preferences. The query results will be saved in a staging table used to populate the Oracle Database.

The `moveapp_log_json` table contains an activity column. Activity states may be as follows:

- RATE\_MOVIE
- COMPLETED\_MOVIE
- PAUSE\_MOVIE
- START\_MOVIE
- BROWSE\_MOVIE
- LIST\_MOVIE
- SEARCH\_MOVIE
- LOGIN

- LOGOUT
- INCOMPLETE\_MOVIE.

Hive maps queries into Map Reduce jobs, simplifying the process of querying large datasets in HDFS. HiveQL statements can be mapped to phases of the Map Reduce framework. Selection and transformation operations occur in map tasks, while aggregation is handled by reducers. Join operations are flexible: they can be performed in the reducer or mappers depending on the size of the leftmost table. Write query to:

- Create the database "movieworks" and it's corresponding table.
- Write a query to insert movie details into the query.
- Load the table with the data.
- Create an external table(example: movieapp\_log). An external table is created for the conversion text file to binary file which can then be sent to HSFS through the operating system. Avro system is usedfor conversion of text file to binary file
- Insert the details of internally created table(movie\_details1) using insert overwrite command to the external table ( loading the external table with the data).

## 5. R-PROGRAMMING:

Write R program to:

- Create two matrices and perform multiplication & division on those matrices.
- Create a data frame and print the: data frame, structure of data frame and summary of data frame.
- Create a Bar chart and sketch the Bar chart by taking months as input & plot it against revenue. Also, add legend to the chart that includes regions.

## II. OPEN ENDED QUESTIONS

- Word count using MapReduce.
- Execute basic PIG commands.

### NOTE:

**1.STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY THE STAFF IN CHARGE.**

**2. STUDENT IS REQUIRED TO EXECUTE ONE QUESTION FROM A LOT OF ALL 5 QUESTIONS.**

### Course Outcomes:

After the completion of course, the students will be able to:

**CO1:** Elucidate installation of various Big data tools.

**CO2:** Implement HiveQL statements.

**CO3:** Differentiate between SQL and NoSQL commands.

| COs | Mapping with POs  |
|-----|-------------------|
| CO1 | PO2,PO5,PO7,PO11  |
| CO2 | PO5, PO7,PO12     |
| CO3 | PO7,PO9,PO10,PO12 |

2019-2020

|  | SOFT SKILLS                 |                         |                                                        |
|------------------------------------------------------------------------------------|-----------------------------|-------------------------|--------------------------------------------------------|
|                                                                                    | <b>Subject Code: 18HS33</b> | <b>Mandatory Course</b> | <b>No of lecture hours per week: 2 Hrs</b>             |
|                                                                                    | <b>Exam Duration:</b>       | <b>Exam marks: NIL</b>  | <b>Total No. of lecture hours: 26 hrs per semester</b> |

**COURSE OBJECTIVES:**

1. The lessons under unit 1 is to help students to recognize oneself as an individual being aware of one's knowledge, personality, environment and lifestyle, through different base and measures like SWOC analysis, personal developments.
2. The lessons under this unit make students to understand the importance of soft skills and hard skills and how to think critically and also learn the importance of creative thinking.
3. The lessons under this unit make students to understand the importance of attitude, time, and also learn to manage them.
4. The objective of this unit is to help a student to learn the art of goal setting and being motivated in achieving his goal in spite of all the hardships with different problems along with teamwork, and leadership qualities.
5. The unit 5 aims at teaching the students about importance of handwriting, punctuation marks, spellings, which helps them, improve in writing skills.

| UNIT NO | SYLLABUS CONTENT | HRS /COS |
|---------|------------------|----------|
|---------|------------------|----------|



|          |                                                                                                                                                                                           |                        |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>1</b> | a. <b>SWOC ANALYSIS</b><br>b. <b>SELF – AWARENESS AND PERSONAL DEVELOPMENT</b><br>c. <b>ETTIQUTTE AND MANNERS</b>                                                                         | <b>5</b><br><b>CO1</b> |
| <b>2</b> | d. <b>INTRODUCTION TO SOFT SKILLS AND HARD SKILLS</b><br>e. <b>CREATIVITY</b><br>f. <b>CRITICAL THINKING</b>                                                                              | <b>5</b><br><b>CO2</b> |
| <b>3</b> | g. <b>ATTITUDE</b><br>h. <b>ADAPTABILITY</b><br>i. <b>TIME MANAGEMENT/ PRIORITY</b><br>j. <b>STRESS MANAGEMENT</b>                                                                        | <b>5</b><br><b>CO3</b> |
| <b>4</b> | k. <b>GOAL SETTING</b><br>l. <b>MOTIVATION</b><br>m. <b>TEAM WORK</b><br>n. <b>PROBLEM SOLVING</b><br>o. <b>LEADERSHIP</b>                                                                | <b>5</b><br><b>CO4</b> |
| <b>5</b> | p. <b>GUIDELINES FOR HANDWRITING</b><br>q. <b>PUNCTUATION MARKS</b><br>r. <b>SPELLING</b><br>s. <b>VISUAL NARRATIVES( Ramayana, Mahabharata, Short Stories, films and advertisements)</b> | <b>6</b><br><b>CO5</b> |

### **COURSE OUTCOME:**

1. After the completion of this unit students will know about their self assessments and personality that how to handle various situations in a positive way.
2. At the end of this unit student will be able to see how important it is to consider things carefully and from different angles, something one sees, hears, experiences or reads in order to understand it fully. The student will also have understood the importance of soft skills and thinking creatively.
3. After the completion of this unit students will have learnt about attitude and adaptability and also how to deal with problems and stress in the present world.
4. At the end of this unit students will have learnt some simple ways of planning to achieve his dream and also feel enthusiastic about doing something individually and as well in team.
5. After the completion of this unit students writing skills will have improved.

### **REFERENCE:**

- English for Job Seekers (Language and Soft Skills for the Aspiring) by Geetha Rajeevan, C.L.N. Prakash at al) Cambridge University Press pvt,Ltd.

- New International Business English by Leo Jones and Richard Alexander. Cambridge University Press pvt,Ltd
- Business Benchmark by Norman Whitby. Cambridge University Press pvt,Ltd
- Grammar practice Activities (practical guide for teachers) Cambridge University Press pvt,Ltd

|                                             |                                                               |                                        |
|---------------------------------------------|---------------------------------------------------------------|----------------------------------------|
| <b>Sub Title : OBJECT ORIENTED CONCEPTS</b> |                                                               |                                        |
| <b>Sub Code:18IS43</b>                      | <b>No. of Credits:4 = 4 : 0 : 0 (L-T-P)</b>                   | <b>No.of Lecture Hours/Week: 4</b>     |
| <b>Exam Duration : 3 hours</b>              | <b>Exam Marks: CIE + Assignment + SEE = 45 + 5 + 50 = 100</b> | <b>Total No. of Contact Hours : 52</b> |

**Course Objectives:**

1. To understand the object oriented concepts.
2. To understand the concepts of java.
3. To understand the concept of inheritance and exception handling.
4. To understand the concept of event handling and threads.
5. To design and write a applet and swing programs.

| <b>Unit No.</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>No. of Hours</b> |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>1</b>        | <b>Introduction to Object Oriented Concepts:</b> A Review of structures, Procedure–Oriented Programming system, Object Oriented Programming System, Comparison of Object Oriented Language with C, Console I/O, variables and reference variables, Function Prototyping, Function Overloading. Class and Objects: Introduction, member functions and data, objects and functions, objects and arrays, Namespaces, Nested classes, Constructors, Destructors.<br><b>Text book 1: Ch 1: 1.1 to 1.9 Ch 2: 2.1 to 2.6 Ch 4: 4.1 to 4.2</b> | 10                  |
| <b>2</b>        | <b>Introduction to Java: Java’s magic:</b> the Byte code; Java Development Kit (JDK); the Java Buzzwords, Object-oriented programming; Simple Java programs. Data types, variables and arrays, Operators, Control Statements.<br><b>Text book 2: Ch:1 Ch: 2 Ch:3 Ch:4 Ch:5</b>                                                                                                                                                                                                                                                         | 10                  |
| <b>3</b>        | <b>Classes, Inheritance, Exceptions, Packages and Interfaces:</b> Classes: Classes fundamentals; Declaring objects; Constructors, this keyword, garbage collection. Inheritance: inheritance basics, using super, creating multi level hierarchy, method overriding. Exception handling: Exception handling in Java. Packages, Access Protection, Importing Packages, Interfaces.<br><b>Text book 2: Ch:6 Ch: 8 Ch:9 Ch:10</b>                                                                                                         | 10                  |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 4 | <b>Multi Threaded Programming, Event Handling:</b> Multi Threaded Programming: What are threads? How to make the classes threadable ; Extending threads; Implementing runnable; Synchronization; Changing state of the thread; Bounded buffer problems, read-write problem, producer consumer problems. Event Handling: Two event handling mechanisms; The delegation event model; Event classes; Sources of events; Event listener interfaces; Using the delegation event model; Adapter classes; Inner classes.<br><b>Text book 2: Ch 11: Ch: 22</b>                                                                                                                                                                                 | 11 |
| 5 | <b>The Applet Class:</b> Introduction, Two types of Applets; Applet basics; Applet Architecture; An Applet skeleton; Simple Applet display methods; Requesting repainting; Using the Status Window; The HTML APPLETTAG tag; Passing parameters to Applets; getDocumentbase() and getCodebase(); ApletContext and showDocument(); The AudioClip Interface; The AppletStub Interface;Output to the Console. Swings: Swings: The origins of Swing; Two key Swing features; Components and Containers; The Swing Packages; A simple Swing Application; Create a Swing Applet; JLabel and ImageIcon; JTextField;The Swing Buttons; 08 Hours JTabbedPane; JScrollPane; JList; JComboBox; JTable.<br><b>Text book 2: Ch 21: Ch: 29 Ch: 30</b> | 11 |

**Course Outcomes:**

After the completion of the course students will be able to

**CO1:** Explain the object-oriented concepts and JAVA.

**CO2:** Develop computer programs to solve real world problems in Java.

**CO3:** Develop simple GUI interfaces for a computer program to interact with users, and to comprehend the event-based GUI handling principles using Applets and swings.

| COs | Mapping with POs      |
|-----|-----------------------|
| CO1 | PO1,PO2, PO4,PO5,PO7  |
| CO2 | PO1,PO2, PO4,PO5      |
| CO3 | PO1, PO2,PO4,PO5,     |
| CO4 | PO1,PO2,PO3, PO4,     |
| CO5 | PO1,PO2, PO4,PO5, PO7 |

**TEXT BOOK:**

1. Sourav Sahay, Object Oriented Programming with C++ , 2nd Ed, Oxford University Press,2006 (Chapters 1, 2, 4)
2. Herbert Schildt, Java The Complete Reference, 7th Edition, Tata McGraw Hill, 2007. (Chapters 1, 2, 3, 4, 5, 6, 8, 9,10, 11, 21, 22, 29, 30)

**REFERENCE BOOKS:**

1. Mahesh Bhawe and Sunil Patekar, "Programming with Java", First Edition, Pearson Education, 2008, ISBN:9788131720806
2. Herbert Schildt, The Complete Reference C++, 4th Edition, Tata McGraw Hill, 2003.
3. Stanley B.Lippmann, Josee Lajore, C++ Primer, 4th Edition, Pearson Education, 2005.
4. Rajkumar Buyya, S Thamarasi selvi, xingchen chu, Object oriented Programming with java, Tata McGraw Hill education private limited.
5. Richard A Johnson, Introduction to Java Programming and OOAD, CENGAGE Learning.
6. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies.

|                                       |                                                     |                                            |
|---------------------------------------|-----------------------------------------------------|--------------------------------------------|
| <b>Sub Title : PYTHON PROGRAMMING</b> |                                                     |                                            |
| <b>Sub Code: 18IS44</b>               | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b>           | <b>No. of lecture hours/week : 3</b>       |
| <b>Exam Duration :<br/>3 hours</b>    | <b>CIE +Assignment + SEE =<br/>45 + 5 + 50 =100</b> | <b>Total No. of Contact Hours :<br/>39</b> |

**Course Objectives:**

1. Understanding the syntax and semantics of the Python language.
2. To create Functions in Python.
3. To handle Files & Regular expressions in Python.
4. To apply Object Oriented Programming concepts in Python.

To create Threaded and Networking applications in Python .

| <b>UNIT No</b> | <b>Syllabus Content</b>                                                                                                                                                    | <b>No of Hours</b> |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>       | Introduction to Python, Writing Our First Python Program, Datatypes in Python, Operators in Python, Input and Output, Control Statements<br><b>Ch1,Ch2,Ch3,Ch4,Ch5,Ch6</b> | <b>7</b>           |
| <b>2</b>       | Arrays in Python, Strings and Characters, Functions, Lists and Tuples, Dictionaries<br><b>Ch7,Ch8,Ch9,Ch10,Ch11</b>                                                        | <b>7</b>           |
| <b>3</b>       | Introduction to OOPS, Classes and Objects, Inheritance and Polymorphism, Exceptions<br><b>Ch12,Ch13,Ch14,Ch16</b>                                                          | <b>7</b>           |
| <b>4</b>       | Files in Python, Regular Expressions in Python, Data Structures in Python, Date and Time<br><b>Ch17,Ch18,Ch19,Ch20</b>                                                     | <b>9</b>           |
| <b>5</b>       | Threads, Graphical User Interface, Networking in Python, Python's Database Connectivity<br><b>Ch20,Ch21,Ch22,Ch23</b>                                                      | <b>9</b>           |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4**

**Assignment -III from Unit 5**

**Course Outcomes:**

After the completion of the above course students will be able to

**CO1:** Demonstrate the understanding and usage of core python scripting elements python constructs, data types.

**CO2 :** Demonstrate the understanding and usage of functions ,lists, tuples and dictionaries.

**CO3:** Demonstrate the understanding and usage of modules, packages and regular expressions.

**CO4:** Demonstrate usage of object oriented features such as Inheritance, Polymorphism, operator overloading.

**CO5:**Apply the knowledge of python and use the language scripting elements and constructs to develop threaded and networking applications

**Text Books:**

1. Core Python Programming: Dr.R.Nageshwara Rao,Dreadm Tech Press 2018

**Reference Books:**

1. Think Python, Allen Downey, Green Tea Press.
2. Learning Python, Mark Lutz, Orielly.

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1,PO2,PO4             |
| CO2        | PO1,PO2,PO4             |
| CO3        | PO1,PO2,PO4,PO5,PO8     |
| CO4        | PO1,PO2,PO4,PO5,PO8     |
| CO5        | PO1,PO2,PO4,PO5,PO8     |

**Sub Title : OBJECT ORIENTED CONCEPTS LAB**

|                                    |                                              |                                     |
|------------------------------------|----------------------------------------------|-------------------------------------|
| <b>Sub Code:: 18ISL46</b>          | <b>No. of Credits:1= 0:0:1 (L-T-P)</b>       | <b>No. of Lecture Hours/Week: 2</b> |
| <b>Exam Duration :<br/>3 hours</b> | <b>Exam Marks: CIE + SEE = 50 + 50 = 100</b> |                                     |

**Course Objectives:**

1. Design programs using classes and objects for java
2. Build programs for automatic initialization of objects and destroy objects that are no longer required through constructors and destructors.
3. Construct applications to provide flexible options for the creation of new definitions for some of the operators.
4. Specifying mechanism of deriving a new class from older classes through inheritance.
5. Implement methods to select appropriate member function during run time.

**I. LIST OF PROGRAMS**

|    |                                                                                                                                                                                                                                                                                                            |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Create a class called Student with the following details as variables within it.<br>(i) USN<br>(ii) Name<br>(iii) Branch<br>(iv) Phone<br>Write a Java/c++ program to create nStudent objects and print the USN, Name, Branch, and Phone of these objects with suitable headings.                          |
| 2  | Design<br>a. Java/c++ Program to demonstrate Constructor Overloading and method overloading<br>b. Develop a Java/c++ Program to implement Inner class and demonstrate its Access Protections.                                                                                                              |
| 3  | Write a Java/c++ program to implement the Stack using arrays. Write Push(), Pop(), and Display() methods to demonstrate its working.                                                                                                                                                                       |
| 4  | Design a superclass called Staff with details as StaffId, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a Java program to read and display at least 3 staff objects of all three categories. |
| 5  | Write a Java class called Customer to store their name and date_of_birth. The date_of_birth format should be dd/mm/yyyy. Write methods to read customer data as and display as using StringTokenizer class considering the delimiter character as “/”.                                                     |
| 6  | Write a Java/c++ program to read two integers a and b. Compute a/b and print, when b is not zero. Raise an exception when b is equal to zero.                                                                                                                                                              |
| 7  | Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer for every 1 second; second thread computes the square of the number and prints; third thread will print the value of cube of the number.                                   |
| 8  | Design a JAVA program using Synchronized Threads, which demonstrates Producer Consumer concept.                                                                                                                                                                                                            |
| 9  | Develop JAVA programs which demonstrate utilities of Linked List Class                                                                                                                                                                                                                                     |
| 10 | Develop JAVA Applet programs which handle Key Board Event                                                                                                                                                                                                                                                  |

Note: In the examination each student picks one question from a lot of all 12 questions.

## II. OPEN ENDED QUESTIONS

Identify the different objects in the following environments and implement different suitable operations

1. Banking System
2. Library
3. Automobile Industry
4. Home Appliances
5. User Interface design etc

**NOTE:**

**1. STUDENT IS PERMITTED TO SUBMIT OPEN ENDED SOLUTION TO ANY OTHER OPEN ENDED QUESTION APART FROM THE LIST ABOVE . BUT IT HAS TO BE APPROVED BY APPROVED BY THE STAFF IN CHARGE.**

**2.IN THE EXAMINATION EACH STUDENT PICKS ONE QUESTION FROM A LOT OF ALL 12 QUESTIONS**

**Course Outcomes:**

After completing the course the students are able to:

**CO1:**Design programs using classes and objects using JAVA/C++


**CO2:**Develop programs for automatic initialization of objects and destroy objects that are no longer required.

**CO3:**Develop applications to provide flexible options for the creation of new definitions for some of the operators.

**CO4:**Specify mechanism of deriving a new class from older classes through inheritance .

**CO5:**Design a program using Templates & Exception Handling.

| COs | Mapping with POs |
|-----|------------------|
| CO1 | PO2,PO3,PO5      |
| CO2 | PO2,PO3,PO6,PO9  |
| CO3 | PO2,PO3,PO5,PO6  |
| CO4 | PO2,PO3,PO5,PO9  |
| CO5 | PO2,PO3,PO5,PO6  |

| <b>EMPLOYABILITY SKILLS</b>                                                       |                             |                         |                                                        |
|-----------------------------------------------------------------------------------|-----------------------------|-------------------------|--------------------------------------------------------|
|  | <b>Subject Code: 18HS43</b> | <b>Mandatory Course</b> | <b>No of lecture hours per week: 2 Hrs</b>             |
|                                                                                   | <b>Exam Duration:</b>       | <b>Exam marks: NIL</b>  | <b>Total No. of lecture hours: 26 hrs per semester</b> |

**COURSE OBJECTIVE:**

1. According to the present day requirement, this unit is designed on job seeking topics, adopting a task based approach with activities and worksheets.
2. In this unit students will be taught to prepare project report effectively which is integral part of their academics by making use of referencing skills. And also they will be taught how to write an abstract and will be familiarized with research paper guidelines.
3. The unit 3 aims at preparing the student to face interviews confidently.
4. Under the topics like synonyms, antonyms and homophones students' vocabulary will be enhanced.
5. The lessons under this unit help students' to use idioms and phrases, decoding the analogies and the correct usage of collective nouns

| <b>UNI<br/>T<br/>NO</b> | <b>SYLLABUS CONTENT</b>                                                                                           | <b>HRS/COS</b>   |
|-------------------------|-------------------------------------------------------------------------------------------------------------------|------------------|
| <b>1</b>                | a. Employability Skills<br>b. PRESENTATION SKILLS<br>c. RESUME WRITING<br>d. COVERING LETTER<br>e. E-MAIL WRITING | <b>8<br/>CO1</b> |
| <b>2</b>                | a. PROJECT REPORT<br>b. REFERENCING SKILLS<br>c. ABSTRACT WRITING<br>d. RESERCH PAPER GUIDELINE AND FORMAT        | <b>2<br/>CO2</b> |
| <b>3</b>                | e. INTERVIEW SKILLS                                                                                               | <b>8<br/>CO3</b> |
| <b>4</b>                | f. SYNONYMS<br>g. ANTONYMS<br>h. HOMOPHONES                                                                       | <b>4<br/>CO4</b> |
| <b>5</b>                | i. IDIOMS & PHRASES<br>j. ANALOGY<br>k. COLLECTIVE NOUNS                                                          | <b>4<br/>CO5</b> |

**COURSE OUTCOME:**

1. After the completion of this unit students will have learnt to make presentations both in formal and informal situations. And also will have learnt the art of resume writing.
2. After the completion of this unit student will have learnt how to do a project report using referencing skills. And also they will have learnt how to write abstract and will have been familiarized with research paper guidelines.
3. This unit will have helped student to communicate with various skills required for job interviews.
4. After the completion of this unit the students will have learnt the strategies of vocabulary.
5. After the completion of this unit student will have learnt to use idioms and phrases in everyday conversation.



**REFERENCE:**

- English Skills for Technical Students by British Council, Orient Black Swan.
- A course in Grammar and Composition by Geetha Nagaraj, Cambridge University Press India Pvt. Ltd.
- Communication Skills for Professionals by Nira Konar, PHI learning Pvt. Ltd.
- Enhancing English and Employability Skills by State Board of Technical Education.

|                                        |                                                |                                            |
|----------------------------------------|------------------------------------------------|--------------------------------------------|
| <b>Course Title : MACHINE LEARNING</b> |                                                |                                            |
| <b>Course Code: IS654</b>              | <b>No. of Credits: 4 =4:0:0:0</b>              | <b>No. of lecture hours/week : 4</b>       |
| <b>Exam Duration :<br/>3 hours</b>     | <b>CIE+Assignment + SEE = 45+<br/>5+50=100</b> | <b>Total No. of Contact Hours :<br/>52</b> |

**Course objectives:**

1. To understand the basic concepts of machine learning along with decision trees.
2. To understand the neural networks and genetic algorithms
3. To understand the Bayesian techniques
4. To understand the instant based learning
5. To understand the analytical learning and reinforced learning

| <b>Unit No.</b> | <b>Syllabus</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>No. of Hours</b> |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>1</b>        | <p><b>INTRODUCTION and DECISION TREES:</b><br/> <b>Machine learning basics:</b><br/>           What is machine learning? Key terminology , Key tasks of machine learning,How to choose the right algorithm, Steps in developing a machine learning application , Why Python.</p> <p><b>Classifying with k-Nearest Neighbors</b><br/>           Classifying with distance measurements, Prepare: importing data with Python , Putting the kNN classification, algorithm into action, How to test a classifier, Example: improving matches with kNN, Prepare: parsing data from a text file, Analyze: creating scatter plots with Matplotli, Prepare: normalizing numeric values, Test: testing the classifier as a whole program, Use: putting together a useful system, Example: a handwriting recognition system, Prepare: converting images</p> | <b>11</b>           |
| <b>2</b>        | <p><b>NEURAL NETWORKS and GENETIC ALGORITHMS:</b> Biological Multilayer Networks and Back Propagation Algorithms, Genetic Algorithms, Neural Network Representation, Problems, Perceptrons,</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>10</b>           |

|          |                                                                                                                                                                                                                                                                                                                                                                 |           |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>3</b> | <b>BAYESIAN AND COMPUTATIONAL LEARNING</b> Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probably Learning – Sample Complexity for Finite and Infinite Hypothesis Spaces – Mistake Bound Model. | <b>10</b> |
| <b>4</b> | <b>K- Nearest Neighbor Learning</b> – Locally Weighted Regression – Radial Basis Functions – Case-Based Reasoning – Sequential Covering Algorithms – Learning Rule Sets – Learning First Order Rules – Learning Sets of First Order Rules – Induction as Inverted Deduction – Inverting Resolution                                                              | <b>10</b> |
| <b>5</b> | <b>MODULE V ANALYTICAL LEARNING AND REINFORCED LEARNING</b> Perfect Domain Theories – Explanation Based Learning – Inductive-Analytical Approaches - FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning                                                                                                                 | <b>11</b> |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

At the end of the course, the students will be able to:

**CO1:**Choose the learning techniques with this basic knowledge. Also, obtain knowledge on decision tree learning.

**CO2:**Apply andcomprehend neural network and genetic algorithms techniques.

**CO3:**Obtain knowledge about supervised and semi-supervised learning.

**CO4:**Differentiate between reinforcement and analytical learning techniques.

**CO5:** Differentiate different machine learning applications.

| <b>COs</b> | <b>Mapping with PO's</b> |
|------------|--------------------------|
| CO1        | PO1,PO4                  |
| CO2        | PO2,PO3,PO4              |
| CO3        | PO3,PO4                  |
| CO4        | PO3,PO4,PO5,PO6          |
| CO5        | PO4,PO8,PO9,PO11         |

**Text Books:**

1. Peter Harrington , “Machine Learning in Action”, MANNING Shelter Island Publication, ISBN 9781617290183, 2012. Unit1: Chapter 1-2.4 ( page no 1 to 36)
2. Tom M. Mitchell, “Machine Learning”, McGraw-Hill Education, 2013. Unit2, Unit3, Unit4 and Unit5: Chapter 4 to chapter 8 (Page no: 81 to 247)

**Reference Books:**

1. Ethem Alpaydin, “Introduction to Machine Learning”, 2nd Ed., PHI Learning Pvt. Ltd., 2013.
2. T. Hastie, R. Tibshirani, J. H. Friedman, “The Elements of Statistical Learning”, Springer; 1st edition, 2001.

|                                                         |                                                      |                                                  |
|---------------------------------------------------------|------------------------------------------------------|--------------------------------------------------|
| <b>Course Title : MACHINE LEARNING AND APPLICATIONS</b> |                                                      |                                                  |
| <b>CourseCode:</b><br><b>SCN424</b>                     | <b>No.of Credits:4 =4:0:0(L-T-P)</b>                 | <b>No.of lecture hours/week : 4</b>              |
| <b>Exam Duration :</b><br><b>3 hours</b>                | <b>CIE + Assignment+ SEE =</b><br><b>45+5+50=100</b> | <b>Total No. of Contact Hours :</b><br><b>52</b> |

**Course objectives:**

1. To understand the basic concepts of machine learning along with decision trees.
2. To understand the neural networks and genetic algorithms
3. To understand the Bayesian techniques
4. To understand the instant based learning
5. To understand the analytical learning and reinforced learning

| <b>Unit No.</b> | <b>Syllabus</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>No. of Hours</b> |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>1</b>        | <b>INTRODUCTION and DECISION TREES:</b><br><b>Machine learning basics:</b><br>What is machine learning? Key terminology , Key tasks of machine learning,How to choose the right algorithm, Steps in developing a machine learning application , Why Python.<br><b>Classifying with k-Nearest Neighbors</b><br>Classifying with distance measurements, Prepare: importing data with Python , Putting the kNN classification, algorithm into action, How to test a classifier, Example: improving matches with kNN, Prepare: parsing data from a text file, Analyze: creating scatter plots with Matplotli, | <b>11</b>           |

|          |                                                                                                                                                                                                                                                                                                                                                                 |           |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|          | Prepare: normalizing numeric values, Test: testing the classifier as a whole program, Use: putting together a useful system, Example: a handwriting recognition system, Prepare: converting images.                                                                                                                                                             |           |
| <b>2</b> | <b>NEURAL NETWORKS and GENETIC ALGORITHMS:</b> Biological Multilayer Networks and Back Propagation Algorithms, Genetic Algorithms, Neural Network Representation, Problems, Perceptrons,                                                                                                                                                                        | <b>10</b> |
| <b>3</b> | <b>BAYESIAN AND COMPUTATIONAL LEARNING</b> Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probably Learning – Sample Complexity for Finite and Infinite Hypothesis Spaces – Mistake Bound Model. | <b>10</b> |
| <b>4</b> | <b>K- Nearest Neighbor Learning</b> – Locally Weighted Regression – Radial Basis Functions – Case-Based Reasoning – Sequential Covering Algorithms – Learning Rule Sets – Learning First Order Rules – Learning Sets of First Order Rules – Induction as Inverted Deduction – Inverting Resolution                                                              | <b>10</b> |
| <b>5</b> | <b>MODULE V ANALYTICAL LEARNING AND REINFORCED LEARNING</b> Perfect Domain Theories – Explanation Based Learning – Inductive-Analytical Approaches - FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning                                                                                                                 | <b>11</b> |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4**

**Assignment -III from Unit 5**

### **Course Outcomes:**

At the end of the course, the students will be able to:

**CO1:** Choose the learning techniques with this basic knowledge. Also, obtain knowledge on decision tree learning.

**CO2:** Apply and comprehend neural network and genetic algorithms techniques.

**CO3:** Obtain knowledge about supervised and semi-supervised learning.

**CO4:** Differentiate between reinforcement and analytical learning techniques.

**CO5:** Differentiate different machine learning applications.

| <b>COs</b> | <b>Mapping with PO's</b> |
|------------|--------------------------|
| CO1        | PO1,PO4                  |
| CO2        | PO2,PO3,PO4              |
| CO3        | PO3,PO4                  |
| CO4        | PO3,PO4,PO5,PO6          |

|     |                  |
|-----|------------------|
| CO5 | PO4,PO8,PO9,PO11 |
|-----|------------------|

**Text Books:**

1. Peter Harrington , “Machine Learning in Action”, MANNING Shelter Island Publication, ISBN 9781617290183, 2012. Unit1: Chapter 1-2.4 ( page no 1 to 36)
2. Tom M. Mitchell, “Machine Learning”, McGraw-Hill Education, 2013. Unit2, Unit3, Unit4 and Unit5: Chapter 4 to chapter 8 (Page no: 81 to 247)

**Reference Books:**

1. Ethem Alpaydin, “Introduction to Machine Learning”, 2nd Ed., PHI Learning Pvt. Ltd., 2013.
2. T. Hastie, R. Tibshirani, J. H. Friedman, “The Elements of Statistical Learning”, Springer; 1st edition, 2001.

# 2020-2021

|                                                                                                                                                                                                                                                                            |                                                                                        |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------|
| <b>Sub Title :ARTIFICIAL INTELLIGENCE</b>                                                                                                                                                                                                                                  |                                                                                        |                                       |
| <b>Sub Code:18IS53</b>                                                                                                                                                                                                                                                     | <b>No. of Credits:3=3: 0 : 0 (L-T-P)</b>                                               | <b>No. of Lecture Hours/Week : 3</b>  |
| <b>Exam Duration :<br/>3 hours</b>                                                                                                                                                                                                                                         | <b>Exam Marks: CIE +Assignment +<br/>Group Activity + SEE =<br/>40 + 5 +5+ 50 =100</b> | <b>Total No. of Contact Hours :39</b> |
| <b>Course Objectives:</b>                                                                                                                                                                                                                                                  |                                                                                        |                                       |
| <ol style="list-style-type: none"> <li>1. Understand about agent, behavior and structure</li> <li>2. Learn different AI models and search strategies</li> <li>3. Representation of knowledge and reasoning</li> <li>4. Gain knowledge about learning strategies</li> </ol> |                                                                                        |                                       |

| <b>Unit No</b> | <b>Syllabus Content</b> | <b>No of Hours</b> |
|----------------|-------------------------|--------------------|
|----------------|-------------------------|--------------------|

|   |                                                                                                                                                                                                                                                              |   |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | What is AI? Intelligent Agents: Agents and environment; Rationality; the nature of environment; the structure of agents. Problem-solving: Problem-solving agents; Example problems                                                                           | 8 |
| 2 | Knowledge representation issues: Representations and mappings approaches to knowledge representation, Issues in knowledge representation.                                                                                                                    | 8 |
| 3 | Logical Agents: Knowledge based agents, The Wumpus world, Logic-Propositional logic Propositional theorem proving, Effective propositional model checking, Agents based on propositional logic.<br>Using predicate logic: Representing simple facts in logic | 8 |
| 4 | Resolution, Natural Deduction, Learning: Forms of Learning; Inductive learning; Learning decision trees; Ensemble learning; Computational learning theory                                                                                                    | 8 |
| 5 | Statistical learning, Maximum likelihood parameter learning, Bayesian parameter learning, passive reinforcement learning, active reinforcement learning                                                                                                      | 7 |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**After the completion of course, the students will be able to:

|                                                                                                              |                          |
|--------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>CO1:</b> Describe the modern view of AI as the study of agents that receive percepts and perform actions. |                          |
| <b>CO2:</b> Apply AI search Models and Generic search strategies.                                            |                          |
| <b>CO3:</b> Write Logic for representing Knowledge and Reasoning of AI systems.                              |                          |
| <b>CO4:</b> Design different learning algorithms for improving the performance of AI systems.                |                          |
| <b>CO5:</b> Implement projects using different AI learning techniques                                        |                          |
| <b>COs</b>                                                                                                   | <b>Mapping with POs</b>  |
| CO1                                                                                                          | PO1,PO2                  |
| CO2                                                                                                          | PO1,PO2,PO12             |
| CO3                                                                                                          | PO1,PO2,PO4,PO6,PO12     |
| CO4                                                                                                          | PO1,PO2,PO3,PO4,PO12     |
| CO5                                                                                                          | PO1,PO2,PO3,PO4,PO6,PO12 |

**TEXT BOOKS:**

1. “**Artificial Intelligence: A Modern Approach** ” by Stuart Russel, Peter Norvig, 2nd Edition, Pearson Education, 2003.
2. “**Artificial Intelligence**” by Elaine Rich, Kevin Knight, Shivashankar B Nair: Tata MCGraw Hill 3rd edition. 2013

**REFERENCE BOOKS/WEBLINKS:**

1. Luger, G. F., & Stubblefield, W. A., Artificial Intelligence - Structures and Strategies for Complex Problem Solving. New York, NY: Addison Wesley, 5th edition (2005).
2. Nilsson, N. J. Artificial Intelligence - A Modern Synthesis. Palo Alto: Morgan Kaufmann. (1998).
3. Nilsson, N. J., Principles of Artificial Intelligence. Palo Alto, CA: Tioga (1981).
4. Rich, E., & Knight, K., Artificial Intelligence. New York: McGraw-Hill (1991).

**E Books:**

1. Practical Artificial Intelligence Programming With Java, Third Edition, Mark Watson
2. Artificial Intelligence Lecture Notes MIT.

**MOOCs:**

1. Artificial Intelligence - <http://www.nptelvideos.in/2012/11/artificial-intelligence.html>

|                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                        |                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Sub Title : INTERNET OF THINGS</b>                                                                                                                                                                                                                                                                                                                                                            |                                                                                        |                                           |
| <b>Sub Code:18IS551</b>                                                                                                                                                                                                                                                                                                                                                                          | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b>                                              | <b>No. of lecture hours/week : 3</b>      |
| <b>Exam Duration :<br/>3 hours</b>                                                                                                                                                                                                                                                                                                                                                               | <b>Exam Marks: CIE +Assignment<br/>+ Group Activity + SEE = 40 + 5<br/>+5+ 50 =100</b> | <b>Total No. of Contact Hours<br/>:39</b> |
| <b>Course Objectives</b>                                                                                                                                                                                                                                                                                                                                                                         |                                                                                        |                                           |
| <ol style="list-style-type: none"> <li>1. To Learn the characteristics, designs, and challenges in the IoT</li> <li>2. To Understand the key Technologies and protocols in IoT</li> <li>3. To Analyze various Layers connectivity and motivation of IPV6</li> <li>4. To Illustrate the role of IoT in various domains of Industry</li> <li>5. Infer the role of Data Analytics in IOT</li> </ol> |                                                                                        |                                           |

| <b>UNIT No</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>No of Hours</b> |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>       | <b>Introduction to IoT</b><br>Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs. Enabling IOT Technologies, IOT and M2M-Introduction, difference between IOT and M2M.<br><b>T1:Chapter1-1.1,1.2,1.3,1.4 , Chapter3-3.1,3.2,3.3</b>                                                                                                                                                                                                                                      | 8                  |
| <b>2</b>       | <b>Fundamentals IoT</b><br>Mechanism and Key Technologies-Identification of IoT Object and Services, Structural Aspects of the IoT, Key IoT Technologies. Evolving IoT Standards-Overview and Approaches, IETF IPV6 Routing Protocol for RPL Roll, Constrained Application Protocol, Representational State Transfer, ETSI M2M, Third Generation Partnership Project Service Requirements for Machine-Type Communications, CENELEC, IETF IPv6 Over Lowpower, Zigbee.<br><b>T2:Chapter4-4.1,4.2,4.3</b><br><b>T2:Chapter5-5.1,5.2,5.3,5.4,5.5,5.6,5.7,5.8,5.9</b> | 8                  |
| <b>3</b>       | <b>Layer ½ Connectivity:</b> Wireless Technologies for the IoT- WPAN Technologies for IoT/M2M, Cellular and Mobile Network Technologies for IoT/M2M, Layer 3 Connectivity :IPv6 Technologies for the IoT: Overview and Motivations. Address Capabilities, IPv6 Protocol Overview, IPv6 Tunneling.<br><b>TEXT BOOK 2: Chapter6-6.1,6.2, Chapter7-7.1,7.2,7.3,7.4,7.5</b>                                                                                                                                                                                          | 8                  |
| <b>4</b>       | <b>Case Studies</b> Illustrating IoT Design-Introduction, Home Automation, Cities, Environment, Agriculture, Productivity Applications.<br><b>T1:Chapter 9-9.1,9.2,9.3,9.4,9.5,9.6</b>                                                                                                                                                                                                                                                                                                                                                                           | 8                  |
| <b>5</b>       | <b>Data Analytics for IoT</b> – Introduction, Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Apache Spark, Apache Storm, Using Apache Storm for Real-time Data Analysis,                                                                                                                                                                                                                                                                                                                                                           | 7                  |
|                | Structural Health Monitoring .<br><b>T1:Chapter 10-10.1,10.2,10.3,10.4,10.5,10.6,10.7,10.8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are**

**evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and**

**4 Assignment -**



### III from Unit 5

**Course outcomes:**

On successful completion of the course, the student will be able to

**CO1:** Interpret the impact and challenges posed by IoT networks

**CO2:** Appraise the role of IoT protocols for efficient network communication

**CO3:** Deployment of different sensor technologies and Layers to connect the network

**CO4:** To Deploy the role of IoT design in various domains of Industry

**CO5:** Elucidate the need for Data Analytics

| COs | Mapping with PO's            |
|-----|------------------------------|
| CO1 | PO3,PO4,PO5,PO6,PO9,PO10     |
| CO2 | PO3,PO4,PO5,PO6,PO7,PO9,PO10 |
| CO3 | PO4,PO6,PO7,PO8,PO9,PO11     |
| CO4 | PO4,PO5,PO8,PO9,PO10,PO11    |
| CO5 | PO4,PO5,PO6,PO7,PO9,PO10     |

**TEXT BOOK:**

1. ArshdeepBahga, Vijay Madiseti, "Internet of Things : A Hands on Approach" Universities Press., 2015
2. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", Wiley, 2013

**REFERENCE BOOKS/WEBLINKS**

1. Michael Miller, "The Internet of Things", First Edition, Pearson, 2015.
2. Claire Rowland, Elizabeth Goodman et.al., "Designing Connected Products", First Edition, O'Reilly, 2015

**Sub Title: MACHINE LEARNING**

|                                    |                                                                     |                                            |
|------------------------------------|---------------------------------------------------------------------|--------------------------------------------|
| <b>Sub. Code:18ISE011</b>          | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b>                           | <b>No. of lecture hours/week : 3</b>       |
| <b>Exam Duration :<br/>3 hours</b> | <b>CIE +Assignment +Group Activity<br/>+ SEE = 45 + 5 + 50 =100</b> | <b>Total No. of Contact Hours<br/>: 39</b> |

**Course objectives:** This course will enable students to:

Define machine learning and understand about various machine learning applications

| Unit No. | Syllabus Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | No. of Hours |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 1        | <p><b>INTRODUCTION TO MACHINE LEARNING:</b> Introduction; Human learning and types of human learning; What is machine learning?; Types of machine learning; Well-posed learning problems; Designing a learning system; Applications of machine learning; Tools in machine learning; Machine learning activities; Issues in machine learning.</p> <p><b>CONCEPT LEARNING AND THE GENERAL-TO-SPECIFIC ORDERING:</b> Concept learning task; Concept learning as search; Find-S algorithm; Version spaces and the Candidate-elimination algorithm.</p> <p><b>Chapter 1: 1.1- 1.8 (T2) , 1.1-1.3 (T1) ; Chapter 2:2.1-2.5 (T1), 2.2 (T2)</b></p> | 8            |
| 2        | <p><b>DECISION TREE LEARNING:</b> Decision tree representation; Appropriate problems for decision tree learning; Basic decision tree learning algorithm; Hypothesis space search in decision tree learning; Inductive bias in decision tree learning; Issues in decision tree learning;</p> <p><b>Chapter 3: 3.2-3.7 (T1)</b></p>                                                                                                                                                                                                                                                                                                           | 8            |
| 3        | <p><b>LINEAR REGRESSION:</b> Notation (Model); Error term; Least square estimation of parameters. Batch Gradient Descent</p> <p><b>LOGISTIC REGRESSION:</b> Introduction; The Sigmoid; Learning in logistic regression; Cross-entropy loss function; Batch Gradient Descent</p> <p><b>Chapter 2: 2.1-2.2 (T3) ; Chapter 5: 5.1-5.4(T4)</b></p>                                                                                                                                                                                                                                                                                              | 8            |
| 4        | <p><b>ARTIFICIAL NEURAL NETWORKS:</b> Introduction; Neural Network representations; Appropriate problems for neural network learning;</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 8            |

|          |                                                                                                                                                                                                                                         |          |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|          | Perceptrons; Back propagation algorithm.<br><br><b>BAYESIAN LEARNING-I:</b> Introduction; Bayes theorem; Bayes theorem and concept learning<br><br><b>Chapter 4: 4.1-4.4 (Till 4.4.3), 4.5 (T1);Chapter 6: 6.1-6.3(Only 6.3.1) (T1)</b> |          |
| <b>5</b> | <b>BAYESIAN LEARNING-II:</b> Bayes optimal classifier; Naive Bayes classifier; Bayesian belief networks.<br><br><b>CLUSTERING:</b> Introduction; K Means clustering<br><br><b>Chapter 6: 6.7, 6.9, 6.11 (T1)</b>                        | <b>7</b> |

**Note 1: All chapters will have internal choice.**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After completion of course students will be able to:

**CO1:** Identify problems of machine learning and it's methods

**CO2:** Apply apt machine learning strategy for any given problem

**CO3:** Design systems that uses appropriate models of machine learning

**CO4:** Solve problems related to various learning techniques

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1, PO2                |
| CO2        | PO3, PO4                |
| CO3        | PO2,PO3, PO5,PO12       |
| CO4        | PO4, PO9, PO12          |

**TEXT BOOKS:**

1. Tom M. Mitchell, “Machine Learning”, McGraw Hill Education. India Edition 2013.
2. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, “Machine Learning”, Pearson India Education Services Pvt. Ltd., 2019.

**REFERENCE BOOKS/WEB LINKS:**

1. Ethem Alpaydin, “Introduction to Machine Learning”, 2nd Ed., PHI Learning Pvt. Ltd., 2013.
2. T. Hastie, R. Tibshirani, J. H. Friedman, “The Elements of Statistical Learning”, Springer; 1st edition, 2001.
3. Peter Harrington , “Machine Learning in Action”, MANNING Shelter Island Publication, ISBN 9781617290183, 2012.

**Weblinks:**

- 1.[NPTEL course by Balaram Ravindran](#)
- 2.[FAST.ai course on ML](#)

|                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>Sub Title : INTERNET OF THINGS</b>                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                               |
| <b>Sub Code:<br/>18ISE012</b>                                                                                                                                                                                                                                                                                                                                                                   | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>No. of lecture<br/>hours/week : 3</b>      |
| <b>Exam<br/>Duration : 3<br/>hours</b>                                                                                                                                                                                                                                                                                                                                                          | <b>Exam Marks: CIE +Assignment<br/>+ Group Activity + SEE = 40 + 5<br/>+5+ 50 =100</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Total No. of<br/>Contact Hours<br/>:39</b> |
| <b>Course Objectives</b>                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                               |
| <ol style="list-style-type: none"> <li>1. To Learn the characteristics, designs,and challenges in the IoT</li> <li>2. To Understand the key Technologies and protocols in IoT</li> <li>3. To Analyze various Layers connectivity and motivation of IPV6</li> <li>4. To Illustrate the role of IoT in various domains of Industry</li> <li>5. Infer the role of Data Analytics in IOT</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                               |
| <b>UNIT<br/>No</b>                                                                                                                                                                                                                                                                                                                                                                              | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>No of<br/>Hours</b>                        |
| <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                        | <b>Introduction to IoT</b><br>Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs.Enabling IOT Technologies,IOT and M2M-Introduction, difference between IOT and M2M.<br><b>T1:Chapter1-1.1,1.2,1.3,1.4 , Chapter3-3.1,3.2,3.3</b>                                                                                                                                                                                                                                     | <b>8</b>                                      |
| <b>2</b>                                                                                                                                                                                                                                                                                                                                                                                        | <b>Fundamentals IoT</b><br>Mechanism and Key Technologies-Identification of IoT Object and Services, Structural Aspects of the IoT, Key IoT Technologies. Evolving IoT Standards-Overview and Approaches,IETF IPV6 Routing Protocol for RPL Roll, Constrained Application Protocol, Representational State Transfer, ETSI M2M,Third Generation Partnership Project Service Requirements for Machine-Type Communications, CENELEC, IETF IPv6 Over Lowpower,Zigbee.<br><b>T2:Chapter4-4.1,4.2,4.3</b><br><b>T2:Chapter5-5.1,5.2,5.3,5.4,5.5,5.6,5.7,5.8,5.9</b> | <b>8</b>                                      |

|   |                                                                                                                                                                                                                                                                                                                                                                                     |   |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 3 | <p><b>Layer ½ Connectivity:</b> Wireless Technologies for the IoT-WPAN Technologies for IoT/M2M, Cellular and Mobile Network Technologies for IoT/M2M, Layer 3 Connectivity :IPv6 Technologies for the IoT: Overview and Motivations. Address Capabilities, IPv6 Protocol Overview, IPv6 Tunneling.</p> <p><b>TEXT BOOK 2: Chapter 6-6.1,6.2, Chapter 7-7.1,7.2,7.3,7.4,7.5</b></p> | 8 |
| 4 | <p><b>Case Studies Illustrating IoT Design-</b>Introduction, Home Automation, Cities, Environment, Agriculture, Productivity Applications.</p> <p><b>T1: Chapter 9-9.1,9.2,9.3,9.4,9.5,9.6</b></p>                                                                                                                                                                                  | 8 |
| 5 | <p><b>Data Analytics for IoT–</b> Introduction, Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Apache Spark, Apache Storm, Using Apache Storm for Real-time Data Analysis, Structural Health Monitoring .</p> <p><b>T1: Chapter 10-10.1,10.2,10.3,10.4,10.5,10.6,10.7,10.8</b></p>                                                                    | 7 |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks: Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4**

**Assignment -III from Unit 5**

**Course outcomes:**

On successful completion of the course, the student will be able to

**CO1:** Interpret the impact and challenges posed by IoT networks

**CO2:** Appraise the role of IoT protocols for efficient network communication

**CO3:** Deployment of different sensor technologies and Layers to connect the network

**CO4:** To Deploy the role of IoT design in various domains of Industry

| <b>COs</b> | <b>Mapping with PO's</b>            |
|------------|-------------------------------------|
| <b>CO1</b> | <b>PO3,PO4,PO5,PO6,PO9,PO10</b>     |
| <b>CO2</b> | <b>PO3,PO4,PO5,PO6,PO7,PO9,PO10</b> |
| <b>CO3</b> | <b>PO4,PO6,PO7,PO8,PO9,PO11</b>     |
| <b>CO4</b> | <b>PO4,PO5,PO8,PO9,PO10,PO11</b>    |
| <b>CO5</b> | <b>PO4,PO5,PO6,PO7,PO9,PO10</b>     |

### **TEXT BOOK:**

1. ArshdeepBahga, Vijay Madiseti, "Internet of Things : A Hands on Approach" Universities Press., 2015
2. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6:The Evolving World of M2M Communications", Wiley, 2013

### **REFERENCE BOOKS/WEBLINKS**

1. Michael Miller," The Internet of Things", First Edition, Pearson, 2015.
2. Claire Rowland,Elizabeth Goodman et.al.," Designing Connected Products", First Edition,O'Reilly, 2015

|                                                      |                                                                                |                                        |
|------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|
| <b>Sub Title AUTOMATA THEORY AND COMPILER DESIGN</b> |                                                                                |                                        |
| <b>Sub Code: 18IS61</b>                              | <b>No. of Credits:4=3 : 1 : 0 (L-T-P)</b>                                      | <b>No. of lecture hours/week : 4</b>   |
| <b>Exam Duration : 3 hours</b>                       | <b>Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100</b> | <b>Total No. of Contact Hours : 52</b> |

**Course objectives:**

Introduce concepts in automata theory and to classify machines by their power to recognize languages.

To understand and design deterministic and non-deterministic finite automata, Regular languages.

| <b>Unit No.</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                             | <b>No. of Hours</b> |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>1</b>        | <p><b>Introduction to Finite Automata:</b> Introduction to Finite Automata; The central concepts of Automata theory; Deterministic finite automata; Non- deterministic finite Automata; Finite automata with Epsilon-transitions.</p> <p><b>Regular expressions and Languages, Properties of Regular Languages:</b> Regular expressions; Finite Automata and Regular Expressions; Minimization of automata</p> <p>T1: Ch 1-Ch 4</p> | <b>10</b>           |
| <b>2</b>        | <p><b>Context-Free Grammars And Languages:</b> Context free grammars; Writing a Grammar; Parse trees; Ambiguity in grammars.</p> <p><b>Normal forms for CFGs:</b> Useless symbols, <math>\lambda</math>-productions, Unit productions, CNF, GNF.</p> <p>T1:Ch 5: 5.1-5.4; Ch 7: 7.1</p>                                                                                                                                             | <b>10</b>           |
| <b>3</b>        | <p><b>Pushdown Automata:</b> Definition of the Pushdown automata; Acceptance by empty stack and final state methods.</p> <p><b>Introduction To Turing Machine:</b> The standard Turing machine; Design of Turning machine.</p> <p>T1:Ch 6: 6.1-6.2; Ch 8: 8.2-8.4</p>                                                                                                                                                               | <b>10</b>           |



|          |                                                                                                                                                                                                                                                                                                                             |           |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>4</b> | <p><b>Introduction, Lexical analysis:</b> Language processors; The structure of a Compiler.</p> <p><b>Lexical analysis:</b> The Role of Lexical Analyzer.</p> <p><b>Syntax Analysis – 1:</b> Introduction; Top-down Parsing: Recursive descent parser and Predictive parser.<br/>T2: Ch 1, T2: Ch 3, Ch 4: 4.1, 4.3-4.4</p> | <b>10</b> |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>5</b> | <p><b>Syntax Analysis – 2:</b> Bottom-up Parsing; Introduction to LR Parsing: Simple LR parser; More powerful LR parsers(CLR,LALR)</p> <p><b>Syntax-Directed Translation:</b> Syntax-Directed definitions; Evaluation order for SDDs.</p> <p><b>Intermediate Code Generation:</b> Variants of syntax trees; Three-address code.</p> <p><b>Code Generation:</b> Issues in the design of Code Generator; The Target language; Basic blocks and Flow graphs; Optimization of basic blocks<br/>T2: Ch 4: 4.5-4.9 Ch 5: 5.1-5.2; Ch 6: 6.1-6.2; Ch 8: 8.1-8.5</p> | <b>12</b> |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|

**Note 1: All Units will have internal choice.**

**Note 2: Three Assignments are evaluated for 5**

**marks: Assignment – I from Units 1 and 2;**

**Assignment II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After completion of course students will be able to:

**CO1:** Analyze concepts in automata theory and classify machines by their power to recognize languages.

**CO2:** Impart the knowledge of models of computation.

**CO3:** Design grammar and recognizers for different formal languages.

**CO4:** Design and solve problems related to Pushdown Automata & Turing Machine.

| COs | Mapping with POs |
|-----|------------------|
| CO1 | PO1,PO3, PO5     |
| CO2 | PO2,PO3,PO4,PO5  |
| CO3 | PO3,PO4,PO5      |

|     |             |
|-----|-------------|
| CO4 | PO3,PO4,PO5 |
| CO5 | PO2,PO3,PO4 |

**TEXT BOOKS:**

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman: Introduction to Automata Theory, Languages and Computation, 3rd Edition, Pearson Education, 2009.
2. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D Ullman, Compilers- Principles, Techniques and Tools - 2nd Edition, Addison-Wesley, 2010.

**REFERENCE BOOKS/WEB LINKS:**

1. John C Martin: Introduction to Languages and Automata Theory, 3rd Edition, Tata McGraw-Hill, 2007.
2. Nandini Prasad K.S: Automata Theory and Computability, 1<sup>st</sup> Edition, Cengage Publication, 2019.
3. Peter Linz: An Introduction to Formal Languages and Automata, 5th Edition, Jones and Bartlett, New Delhi, India, 2011.
4. Nandini Prasad K S, Principles of Compiler Design - 3rd Edition, Elsevier Publication, 2014.
5. [http://mapmf.pmfst.unist.hr/~milica/Matem teorija r/MTR web/Introduction%20To%20Automata%20Theory.pdf](http://mapmf.pmfst.unist.hr/~milica/Matem_teorija_r/MTR_web/Introduction%20To%20Automata%20Theory.pdf)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                        |                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Sub Title : MACHINE LEARNING</b>                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                        |                                            |
| <b>Sub Code: 18IS62</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>No. of Credits: 4 =4:0:0:0</b>                                                      | <b>No. of lecture hours/week : 4</b>       |
| <b>Exam Duration :<br/>3 hours</b>                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Exam Marks: CIE +Assignment +<br/>Group Activity + SEE = 40 + 5 +5+<br/>50 =100</b> | <b>Total No. of Contact Hours :<br/>52</b> |
| <p><b>Course objectives:</b> This course will enable students to:</p> <ol style="list-style-type: none"> <li>1. Define machine learning and understand about various machine learning applications</li> <li>2. Differentiate supervised, unsupervised and reinforcement learning methods</li> <li>3. Apply decision trees, neural networks, Bayes classifier, Kmeans clustering and k-nearest neighbour methods for problems in machine learning</li> </ol> |                                                                                        |                                            |

| <b>Unit No.</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>No. of Hours</b> |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>1</b>        | <p><b>INTRODUCTION TO MACHINE LEARNING:</b> Introduction; Human learning and types of human learning; What is machine learning?; Types of machine learning; Well-posed learning problems; Designing a learning system; Applications of machine learning; Tools in machine learning; Machine learning activities; Issues in machine learning.</p> <p><b>CONCEPT LEARNING AND THE GENERAL-TO-SPECIFIC ORDERING:</b> Concept learning task; Concept learning as search; Find-S algorithm; Version spaces and the Candidate-elimination algorithm.<br/>T2: Ch 1: 1.1- 1.8 ,T1: 1.1-1.3 ; T1:Ch 2:2.1-2.5 ,T2: 2.2 .</p> | <b>11</b>           |
| <b>2</b>        | <p><b>DECISION TREE LEARNING:</b> Decision tree representation; Appropriate problems for decision tree learning; Basic decision tree learning algorithm; Hypothesis space search in decision tree learning; Inductive bias in decision tree learning; Issues in decision tree learning;</p> <p>T1:Ch 3: 3.2-3.7.</p>                                                                                                                                                                                                                                                                                                | <b>11</b>           |
| <b>3</b>        | <p><b>ARTIFICIAL NEURAL NETWORKS:</b> Introduction; Neural Network representations; Appropriate problems for neural network learning; Perceptrons; Backpropagation algorithm.</p> <p><b>BAYESIAN LEARNING-I:</b> Introduction; Bayes theorem; Bayes theorem and concept learning;</p> <p>T1:Ch 4: 4.1-4.4 (Only 4.4.1), 4.5 ;T1:Ch 6: 6.1-6.3(Only 6.3.1)</p>                                                                                                                                                                                                                                                       | <b>10</b>           |
| <b>4</b>        | <p><b>BAYESIAN LEARNING-II:</b> Bayes optimal classifier; Naive Bayes classifier; Bayesian belief networks.</p> <p><b>CLUSTERING:</b> Introduction; Kmeans clustering</p> <p>T1:Ch 6: 6.7, 6.9, 6.11</p>                                                                                                                                                                                                                                                                                                                                                                                                            | <b>10</b>           |

|          |                                                                           |           |
|----------|---------------------------------------------------------------------------|-----------|
| <b>5</b> | <b>INSTANCE BASED LEARNING:</b> Introduction; k-nearest neighbor learning | <b>10</b> |
|----------|---------------------------------------------------------------------------|-----------|

|  |                                                                                                                                                                                          |  |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | <b>REINFORCEMENT LEARNING:</b> Introduction; Learning task.<br>T1:Ch 8: 8.1-8.3; T1:Ch 13: 13.1-13.3<br><br><b>Use Cases:</b> Applications of Reinforcement Learning in Finance, Banking |  |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

**Note 1: All chapters will have internal choice.**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Unit 3 and 4 .**

**Assignment - III from Unit 5**

**Course Outcomes:**

After completion of course students will be able to:

**CO1:** Identify problems of machine learning and it's methods

**CO2:** Apply apt machine learning strategy for any given problem

**CO3:** Design systems that uses appropriate models

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1, PO2                |
| CO2        | PO3, PO4                |
| CO3        | PO2,PO3, PO5,PO12       |
| CO4        | PO4, PO9, PO12          |

**TEXT BOOKS:**

1. Tom M. Mitchell, "Machine Learning", McGraw Hill Education. India Edition 2013.
2. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, "Machine Learning" , Pearson India Education Services Pvt. Ltd., 2019.

**REFERENCE BOOKS/WEB LINKS:**

1. Ethem Alpaydin, "Introduction to Machine Learning", 2nd Ed., PHI Learning Pvt. Ltd., 2013.
2. T. Hastie, R. Tibshirani, J. H. Friedman, "The Elements of Statistical Learning", Springer; 1st edition, 2001.
3. Peter Harrington , "Machine Learning in Action", MANNING Shelter Island Publication, ISBN 9781617290183, 2012.

Weblinks:

1. [NPTEL course by Balaram Ravindran](#)
2. [FAST.ai course on ML](#)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                             |                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------|
| <b>Sub Title: MACHINE LEARNING LAB</b>                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |                                      |
| <b>SubCode: 18ISL65</b>                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>No. of Credits:1=0: 0 : 1 (L-T-P)</b>    | <b>No. of lecture hours/week : 2</b> |
| <b>Exam Duration : 3 hours</b>                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Exam Marks: CIE + SEE = 50 + 50 =100</b> |                                      |
| <b>Course Objectives :</b><br>This course will enable students to: <ol style="list-style-type: none"><li>1. Define machine learning and understand about various machine learning applications</li><li>2. Differentiate supervised, unsupervised and reinforcement learning methods</li><li>3. Apply decision trees, neural networks, Bayes classifier, K-means clustering and k-nearest neighbor methods for problems in machine learning</li></ol> |                                             |                                      |

### **LIST OF PROGRAMS**

#### **PART-A:**

**Execute the following programs using Google Colab/Anaconda/Jupyter Notebook:**

1. Demonstrate the following:
  - a. Creation of .CSV files
  - b. insert synthetic data manually into .CSV files
  - c. uploading of .CSV files from local drive to python environment.
  - d. uploading of .CSV files from Google drive to python environment.
2. Demonstrate how to generate synthetic datasets(not manual entry) and generate at least 4 features.
3. Demonstrate the working of Find-S algorithm for finding the most specificities hypothesis using appropriate training samples.
4. Implement Candidate Elimination algorithm and display all the consistent hypotheses using appropriate training samples.
5. Create a .CSV file for the datasets containing the following fields( age, income, student, credit\_rating, Buys\_computer) where Buys\_computer is the target attribute and implement ID3

algorithm for the same.

6. Demonstrate the working of XOR gate using Artificial Neural network with Backpropagation method using Tanh activation function.

7. Implement KNN algorithm to classify “iris dataset” using Kaggle or Machine learning repositories.

8. Implement K-means algorithm using suitable dataset from Kaggle repository or any other Machine Learning repositories.

### **PART-B: Virtual Lab**

1.Implementation of AND/OR/NOT Gate using Single Layer Perceptron. 2.Understanding the concepts of Perceptron Learning Rule.

3.Understanding the concepts of Correlation Learning Rule.

**Web link for 1,2 and 3:**

[http://vlabs.iitb.ac.in/vlabs-dev/labs/machine\\_learning/labs/index.php](http://vlabs.iitb.ac.in/vlabs-dev/labs/machine_learning/labs/index.php)

4.Neural networks simulation

**Web link for 4:** <https://playground.tensorflow.org/>

#### **Course Outcomes:**

After completion of course students will be able to:

**CO1:** Identify problems of machine learning and it’s methods

**CO2:** Apply apt machine learning strategy for any given problem

**CO3:** Design systems that uses appropriate models of

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| <b>CO1</b> | PO1, PO2                |
| <b>CO2</b> | PO3, PO4                |
| <b>CO3</b> | PO3, PO5,PO6            |
| <b>CO4</b> | PO4, PO9, PO12          |

|                                                                                                                                                                                                                                                                                                                                                                            |                                                                |                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------|
| <b>Sub. Title : DIGITAL IMAGE PROCESSING</b>                                                                                                                                                                                                                                                                                                                               |                                                                |                                            |
| <b>Sub.Code: 18IS642</b>                                                                                                                                                                                                                                                                                                                                                   | <b>No. of Credits: 3 =3:0:0(L-T-P)</b>                         | <b>No. of lecture hours/week : 3</b>       |
| <b>Exam Duration :<br/>3 hours</b>                                                                                                                                                                                                                                                                                                                                         | <b>CIE + Assignment+Group<br/>activity+SEE = 40+5+5+50=100</b> | <b>Total No. of Contact Hours :<br/>39</b> |
| <p><b>Course objectives:</b><br/>The objectives of the course are :</p> <ol style="list-style-type: none"> <li>1. To overview of Digital image processing</li> <li>2.To gain knowledge of image enhancement.</li> <li>3.To be aware of image restoration techniques.</li> <li>4.To acquire knowledge of colour fundamentals and morphological image processing.</li> </ol> |                                                                |                                            |

| <b>Unit No.</b> | <b>Syllabus</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>No. of Hours</b> |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>1</b>        | Introduction: What is Digital Image Processing, Origins of Digital Image Processing, Examples of fields that use DIP, Fundamental Steps in Digital Image Processing, Components of an Image Processing System. Digital Image Fundamentals: Basic Concepts in Sampling and Quantization, Representing Digital Images, Spatial and Gray-level Resolution,Some Basic Relationships Between Pixels, Linear and Nonlinear Operations.                       | <b>8</b>            |
| <b>2</b>        | Image Enhancement in the Spatial Domain: Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.<br>Image Enhancement in the Frequency Domain: Introduction to the Fourier Transform and the Frequency Domain, Smoothing frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering. | <b>8</b>            |
| <b>3</b>        | Image Restoration: A Model of the Image degradation/Restoration process, Noise Models, Restoration in the Presence of Noise Only– Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering ,Minimum Mean Square Error (Wiener) Filtering, Constrained Least Square Filtering, Geometric Mean Filter.                                 | <b>8</b>            |
| <b>4</b>        | Color Fundamentals: Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation,Color Image Compression. Wavelets and Multiresolution Processing: Image Pyramids, Subband coding, The Haar Transform, Multiresolution Expansions, Wavelet Transforms in one Dimension, Fast Wavelet Transform, Wavelet Transforms in Two Dimensions, Wavelet Packets.       | <b>8</b>            |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                   |          |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>5</b> | Image Compression: Fundamentals, Image Compression Models, Error-free (Lossless) compression, Lossy Compression<br>Morphological Image Processing: Preliminaries, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation, Some Basic Morphological Algorithms. Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation. | <b>7</b> |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 10 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4**

**Assignment -III from Unit 5**

**Course Outcomes:**

At the end of the course, the students will be able to: **CO1:**understand image processing concepts.

**CO2:** Analyze image enhancement techniques. **CO3:**Choose image restoration applications.

**CO4:**Identify color fundamentals and its

**Text Books:**

1. Rafael C Gonzalez and Richard E. Woods: Digital Image Processing, PHI 2nd Edition 2005

**Reference Books:**

1. S. Sridhar, Digital Image Processing, Oxford University Press India, 2011.
2. K. Jain: Fundamentals of Digital Image Processing, Pearson, 2004.
3. Scott E. Umbaugh: Digital Image Processing and Analysis, CRC Press, 2014.
4. S. Jayaraman, S. Esakkirajan, T. Veerakumar: Digital Image Processing, McGraw Hill Ed. (India) Pvt. Ltd., 2013.
5. Anthony Scime, “Web Mining Applications and Techniques”, Idea Group Publishing,2005.

|                                               |              |                                           |
|-----------------------------------------------|--------------|-------------------------------------------|
| <b>Sub Title : NETWORK AND CYBER SECURITY</b> |              |                                           |
| <b>Sub<br/>18IS643</b>                        | <b>Code:</b> | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b> |
|                                               |              | <b>No. of lecture hours/week : 3</b>      |



|                                          |                                                                                |                                       |
|------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------|
| <b>Exam Duration :</b><br><b>3 hours</b> | <b>Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100</b> | <b>Total No. of Contact Hours :39</b> |
|------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------|

**Course Objectives:**

1. To gain knowledge of cryptography
2. To acquire knowledge of application protocols to provide security.
3. To gain knowledge of securing data in transit across networks.
4. To introduce the area of cybercrime and Cyber security to students .

| <b>UNIT No</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>No of Hours</b> |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>       | <b>Classical Encryption Techniques :</b> Symmetric Cipher Model: Cryptography, Cryptanalysis and Brute-Force Attack.<br>Substitution Techniques:caeser cipher, monoalphabetic cipher, playfair cipher, hill cipher, polyalphabetic cipher, one-time pad<br><br><b>Public-Key Cryptography</b> Principles of public-key cryptosystems: Public-key cryptosystems, Applications for public-key cryptosystems, requirements for public-key cryptosystems, public-key cryptanalysis. RSA algorithm, ECC<br>T1: Ch 1:1,2 Ch 8: 1,2 | <b>8</b>           |
| <b>2</b>       | <b>Electronic Mail Security:</b> Pretty good privacy, notation, operational; description, S/MIME, RFC5322, Multipurpose internet mail extensions, S/MIME functionality, S/MIME messages, S/MIME certificate processing.<br>T1:Ch 17: 1,2,3                                                                                                                                                                                                                                                                                   | <b>8</b>           |
| <b>3</b>       | <b>IP Security:</b> IP Security overview: Applications of IPsec, benefits of IPsec, Routing applications, IPsec documents, IPsec services, transport and tunnel modes. Encapsulating Security payload: ESP format, encryption and authentication algorithms, Padding, Anti replay service, transport and tunnel modes<br>T1 :Ch 18:1,2,3                                                                                                                                                                                     | <b>7</b>           |
| <b>4</b>       | <b>Transport Level Security:</b> Web security considerations: Web security threats, Web Traffic security approaches<br>Secure sockets layer: SSL architecture, SSL Record Protocol, Change Cipher Spec Protocol, Alert protocol, hand shake protocol<br>T1 : Ch 15: 1,2,3,4,5                                                                                                                                                                                                                                                | <b>8</b>           |
| <b>5</b>       | <b>Introduction to Cybercrime &amp; Cyber security:</b> Introduction,Cybercrime:Definition and Origins of the word. Definition of Cyber Security. Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes. Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective. Cybercrime and the Indian                                                                                                                                                                             | <b>8</b>           |

|  |                                                                                                                                                                                                                                                                                                                                                  |  |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | ITA 2000. A Global Perspective on Cybercrimes. Cybercrime Era: Survival Mantra for the Netizens.<br>Cyberoffenses: How Criminals Plan Them: Introduction, How Criminals Plan the Attacks. Social Engineering, Cyberstalking, Cyber cafe and Cybercrimes.<br>Botnets: The Fuel for Cybercrime. Attack Vector. Cloud Computing.<br>T2 : Ch 1, Ch 2 |  |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks: Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After the completion of the above course students will be able to

**CO1:** Apply the knowledge of symmetric and asymmetric technique for securing data.

**CO2:** Analyze Email Security aspects and application protocols .

**CO3:** Analyze security aspects and protocols of IP layer .

**CO4:** Secure data in transit across network by using appropriate protocol.

| COs | Mapping with POs |
|-----|------------------|
| CO1 | PO2,PO3,PO6      |
| CO2 | PO2,PO6          |
| CO3 | PO2,PO6          |
| CO4 | PO3,PO6,PO12     |
| CO5 | PO2,PO7,PO8,PO12 |

**TEXT BOOKS:**

1. William Stallings: Cryptography and Network Security, Principles and Practice Pearson, 6th edition 2014.
2. Sunit Belapure and Nina Godbole, “ Cyber Security: Understandign Cyber Crimes, Computer Forensics And Legal Perspectives”, Wiley India Pvt Ltd, ISBN:978-81-265-2179-1. Publish Date 2013.

**Sub Title : ADVANCED JAVA AND J2EE**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                |                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------|
| <b>Sub Code:18IS641</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>No. of Credits: 3=3 : 0 : 0 (L-T-P)</b>                                     | <b>No. of lecture hours/week : 3</b>   |
| <b>Exam Duration : 3 hours</b>                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Exam Marks: CIE +Assignment + Group Activity + SEE = 40 + 5 +5+ 50 =100</b> | <b>Total No. of Contact Hours : 39</b> |
| <b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. Identify the need for advanced Java concepts like Enumerations and Collections</li> <li>2. Construct client-server applications using Java socket API.</li> <li>3. Make use of JDBC to access database through Java Programs.</li> <li>4. Adapt servlets to build server side programs.</li> <li>5. Demonstrate the use of JavaBeans to develop component-based Java software</li> </ol> |                                                                                |                                        |

| <b>Unit No.</b> | <b>Syllabus Content</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>No of Hours</b> |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>        | <b>Enumerations, Autoboxing and Annotations(metadata):</b> Enumerations, Enumeration fundamentals, the values() and valueOf() Methods, java enumerations are class types, enumerations Inherits Enum, example, type wrappers, Autoboxing, Autoboxing and Methods, Autoboxing/Unboxing occurs in Expressions, Autoboxing/Unboxing, Boolean and character values, Autoboxing/Unboxing helps prevent errors, A word of Warning. Annotations, Annotation basics, specifying retention policy, Obtaining Annotations at run time by use of reflection, Annotated element Interface, Using Default values, Marker Annotations, Single Member annotations, Built-In annotations.<br>T1:Ch 12 | 7                  |
| <b>2</b>        | <b>The collections and Framework:</b> Collections Overview, Recent Changes to Collections, The Collection Interfaces, The Collection Classes, Accessing a collection Via an Iterator, Storing User Defined Classes in Collections, The Random Access Interface, Working With Maps, Comparators, The Collection Algorithms, Why Generic Collections?, The legacy Classes and Interfaces, Parting Thoughts on Collections. T1: Ch.17                                                                                                                                                                                                                                                    | 8                  |
| <b>3</b>        | <b>String Handling :</b> The String Constructors, String Length, Special String                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 08                 |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|          | Operations, String Literals, String Concatenation, String Concatenation with Other Data Types, String Conversion and toString( ) Character Extraction, charAt( ), getChars( ), getBytes( ) toCharArray(), String Comparison, equals( ) and equalsIgnoreCase( ), regionMatches( ) startsWith( ) and endsWith( ), equals( ) Versus == , compareTo( ) Searching Strings, Modifying a String, substring( ), concat( ), replace( ), trim( ), Data Conversion Using valueOf( ), Changing the Case of Characters Within a String, Additional String Methods, StringBuffer , StringBuffer Constructors, length( ) and capacity( ), ensureCapacity( ), setLength( ), charAt( ) and setCharAt( ), getChars( ),append( ), insert( ), reverse( ), delete( ) and deleteCharAt( ), replace( ), substring( ), Additional StringBuffer Methods, StringBuilder T 1: Ch 15 |    |
| <b>4</b> | <b>Background;</b> The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet; The Servlet API; The javax.servlet Package; Reading Servlet Parameter; The 08 javax.servlet.http package; Handling HTTP Requests and Responses; Using Cookies; Session Tracking. Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects T1: Ch 31, T2: Ch 11                                                                                                                                                                                                                                                                                                                                                                                                                                    | 08 |
| <b>5</b> | <b>The Concept of JDBC;</b> JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; ResultSet; Transaction Processing; Metadata, Data types; Exceptions. T2: Ch 06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 08 |

**Note 1: All Units will have internal choice.**

**Note 2: Three Assignments are evaluated for 5 marks: Assignment – I from Units 1 and 2; Assignment – II from Units 3 and 4 . Assignment -III from Unit 5**

**TEXT BOOK:**

1. Herbert Schildt: JAVA the Complete Reference, 7th/9th Edition, Tata McGraw Hill, 2007.
2. Jim Keogh: J2EE-TheCompleteReference, McGraw Hill, 2007.

**REFERENCE BOOKS:**

1. Y. Daniel Liang: Introduction to JAVA Programming, 7thEdition, Pearson Education, 2007.
2. Stephanie Bodoff et al: The J2EE Tutorial, 2nd Edition, Pearson Education,2004.
3. Uttam K Roy, Advanced JAVA programming, Oxford University press, 2015.

**Course Outcomes:**

After the completion of the course students will be able to

**CO1:** Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs

**CO2:** Build client-server applications and TCP/IP socket programs

**CO3:** Illustrate database access and details for managing information using the JDBC

**API CO4:** Describe how servlets fit into Java-based web application architecture

**CO5:** Develop reusable software components using Java Beans

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1,PO2                 |
| CO2        | PO1,PO2,PO3             |
| CO3        | PO1,PO3,PO4             |
| CO4        | PO1,PO4                 |
| CO5        | PO1,PO2,PO3             |

| <b>Sub. Title : DIGITAL IMAGE PROCESSING</b> |                                                                |                                            |
|----------------------------------------------|----------------------------------------------------------------|--------------------------------------------|
| <b>Sub.Code: 18IS642</b>                     | <b>No. of Credits: 3 =3:0:0(L-T-P)</b>                         | <b>No. of lecture hours/week : 3</b>       |
| <b>Exam Duration :<br/>3 hours</b>           | <b>CIE + Assignment+Group<br/>activity+SEE = 40+5+5+50=100</b> | <b>Total No. of Contact Hours :<br/>39</b> |

**Course objectives:**

The objectives of the course are :

1. To overview of Digital image processing
- 2.To gain knowledge of image enhancement.
- 3.To be aware of image restoration techniques.
- 4.To acquire knowledge of colour fundamentals and morphological image processing.

| <b>Unit No.</b> | <b>Syllabus</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>No. of Hours</b> |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>1</b>        | Introduction: What is Digital Image Processing, Origins of Digital Image Processing, Examples of fields that use DIP, Fundamental Steps in Digital Image Processing, Components of an Image Processing System. Digital Image Fundamentals: Basic Concepts in Sampling and Quantization, Representing Digital Images, Spatial and Gray-level Resolution, Some Basic Relationships Between Pixels, Linear and Nonlinear Operations.                      | <b>8</b>            |
| <b>2</b>        | Image Enhancement in the Spatial Domain: Some Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.<br>Image Enhancement in the Frequency Domain: Introduction to the Fourier Transform and the Frequency Domain, Smoothing frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering. | <b>8</b>            |
| <b>3</b>        | Image Restoration: A Model of the Image degradation/Restoration process, Noise Models, Restoration in the Presence of Noise Only– Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering ,Minimum Mean Square Error (Wiener) Filtering, Constrained Least Square Filtering, Geometric Mean Filter.                                 | <b>8</b>            |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>4</b> | Color Fundamentals: Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation, Color Image Compression. Wavelets and Multiresolution Processing: Image Pyramids, Subband coding, The Haar Transform, Multiresolution Expansions, Wavelet Transforms in one Dimension, Fast Wavelet Transform, Wavelet Transforms in Two Dimensions, Wavelet Packets. | <b>8</b> |
| <b>5</b> | Image Compression: Fundamentals, Image Compression Models, Error-free (Lossless) compression, Lossy Compression<br>Morphological Image Processing: Preliminaries, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation, Some Basic Morphological Algorithms. Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation.                                 | <b>7</b> |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 10 marks: Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 Assignment -III from Unit 5**

**Course Outcomes:**

At the end of the course, the students will be able to:

CO1: understand image processing concepts.

CO2: Analyze image enhancement techniques.

CO3: Choose image restoration applications.

CO4: Identify color fundamentals and its transformations.

CO5: Analyze morphological image concepts

**Text Books:** 1. Rafael C Gonzalez and Richard E. Woods: Digital Image Processing, PHI 2nd Edition 2005

**Reference Books:**

1. S. Sridhar, Digital Image Processing, Oxford University Press India, 2011.
2. K. Jain: Fundamentals of Digital Image Processing, Pearson, 2004.
3. Scott E. Umbaugh: Digital Image Processing and Analysis, CRC Press, 2014.
4. S. Jayaraman, S. Esakkirajan, T. Veerakumar: Digital Image Processing, McGraw Hill Ed. (India) Pvt. Ltd., 2013.
5. Anthony Scime, “Web Mining Applications and Techniques”, Idea Group Publishing, 2005.

# 2021-2022

|                                     |                                                                                     |                                       |
|-------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|
| <b>Sub Title : SOFTWARE TESTING</b> |                                                                                     |                                       |
| <b>Sub Code:18IS72</b>              | <b>No. of Credits:4=4: 0 : 0 (L-T-P)</b>                                            | <b>No.of Lecture Hours/Week : 4</b>   |
| <b>Exam Duration :<br/>3 hours</b>  | <b>Exam Marks:CIE +Assignment<br/>+Group Activity+ SEE = 40 +<br/>5+5 + 50 =100</b> | <b>Total No. of Contact Hours :52</b> |

|                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Objectives:</b> <ol style="list-style-type: none"><li>1. Discuss about terminologies of software testing .</li><li>2. Differentiate the various testing techniques.</li><li>3. Analyze the problem and derive suitable test cases.</li><li>4. Apply suitable technique for designing of flow graph.</li><li>5. Explain the need for planning and monitoring a process.</li></ol> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Unit No</b> | <b>Syllabus Content</b>                                                                                                                                                                                                 | <b>No of Hours</b> |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1              | Basics of Software Testing: Basic definitions, Software Quality , Requirements, Behaviour and Correctness, Correctness versus Reliability, Testing and Debugging, Test cases, Insights from a Venn diagram, Identifying | 10                 |



|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|   | test cases, Test-generation Strategies, Test Metrics, Error and fault taxonomies , Levels of testing, Testing and Verification, Static Testing. Problem Statements: Generalized pseudocode, the triangle problem, the NextDate function, the commission problem, the SATM (Simple Automatic Teller Machine) problem, the currency converter, Saturn windshield wiper<br>T1:Chapter1, Chapter2. T3:Chapter1.                                                                                                                                                                                                                                                           |    |
| 2 | Functional Testing: Boundary value analysis, Robustness testing, Worst-case testing,Robust Worst testing for triangle problem, Nextdate problem and commission problem, Equivalence classes, Equivalence test cases for the triangle problem, NextDate function, and the commission problem, Guidelines and observations, Decision tables, Test cases for the triangle problem, NextDate function, and the commission problem, Guidelines and observations. Fault Based Testing: Overview, Assumptions in fault based testing, Mutation analysis, Fault-based adequacy criteria, Variations on mutation analysis.<br>T1: Chapter 5,Chapter 6,Chapter7, T2: Chapter 16 | 10 |
| 3 | Structural Testing: Overview, Statement testing, Programme testing, Condition testing , Path testing: DD paths, Test coverage metrics, Basis path testing, guidelines and observations, Data –Flow testing: Definition-Use testing, Slice-based testing, Guidelines and observations. Test Execution: Overview of test execution, from test case specification to test cases, Scaffolding, Generic versus specific scaffolding, Test oracles, Self-checks as oracles,Capture and replay<br>T1:Chapter 9,Chapter10, T2:Chapter 17, T3:Section 6.2.1, T3:Section 6.2.4                                                                                                  | 10 |
| 4 | Process Framework :Basic principles: Sensitivity, redundancy, restriction, partition, visibility, Feedback, the quality process, Planning and monitoring, Quality goals,Dependability properties ,Analysis Testing, Improving the process, Organizational factors.Planning and Monitoring the Process: Quality and process, Test and analysis strategies and plans, Risk                                                                                                                                                                                                                                                                                              | 11 |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|   | <p>planning, monitoring the process, Improving the process, the quality team Documenting Analysis and Test: Organizing documents, Test strategy document, Analysis and test plan, Test design specifications documents, Test and analysis reports.</p> <p>T2: Chapter 3, Chapter 4, Chapter 20, Chapter 24.</p>                                                                                                                                                                                                                                                                                                                                                                            |    |
| 5 | <p>Integration and Component-Based Software Testing: Overview, Integration testing strategies, Testing components and assemblies. System, Acceptance and Regression Testing: Overview, System testing, Acceptance testing, Usability, Regression testing, Regression test selection techniques, Test case prioritization and selective execution. Levels of Testing, Integration Testing: Traditional view of testing levels, Alternative life-cycle models, The SATM system, Separating integration and system testing, A closer look at the SATM system, Decomposition-based, call graph-based, Path-based integrations.</p> <p>T1 : Chapter 12,Chapter 13 T2: Chapter 21,Chapter 22</p> | 11 |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4**

**Assignment -III from Unit 5**

Course Outcomes:

After the completion of course, the students will be able to:

CO1: Derive test cases for any given problem

CO2: Compare the different testing techniques

CO3: Classify the problem into suitable testing model

CO4: Apply the appropriate technique for the design of flow graph.

CO5: Create appropriate document for the software artefact.

|     |                      |
|-----|----------------------|
| COs | Mapping with Pos     |
| CO1 | PO1,PO2,PO7,PO8,PO12 |
| CO2 | PO1,PO2,PO3,PO5,PO7  |
| CO3 | PO1,PO2,PO3,PO5      |
| CO4 | PO1,PO2,PO3,PO4,PO5  |
| CO5 | PO5,PO7,PO9,P10,PO11 |

#### TEXT BOOKS:

1. Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2008. (Listed topics only from Chapters 1, 2, 5, 6, 7, 9, 10, 12, 13)
2. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and Techniques, Wiley India, 2009. (Listed topics only from Chapters 3, 4, 16, 17, 20,21, 22,24)
3. Aditya P Mathur: Foundations of Software Testing, Pearson Education, 2008.( Listed topics only from Section 1.2 , 1.3, 1.4 ,1.5, 1.8,1.12,6. 2.1,6. 2.4 )

#### REFERENCE BOOKS/WEBLINKS:

1. Software testing Principles and Practices – Gopalaswamy Ramesh, Srinivasan Desikan, 2 nd Edition, Pearson, 2007.
2. Software Testing – Ron Patton, 2nd edition, Pearson Education, 2004.
3. The Craft of Software Testing – Brian Marrick, Pearson Education, 1995.
4. Anirban Basu, Software Quality Assurance, Testing and Metrics, PHI, 2015.
5. <https://www.softwaretestingmaterial.com/software-testing/>
6. <https://www.guru99.com/software-testing-introduction-importance.html>

|                                           |                                                                                        |                                            |
|-------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Sub Title : BLOCK CHAIN TECHNOLOGY</b> |                                                                                        |                                            |
| <b>Sub Code: 18IS734</b>                  | <b>No. of Credits:3=3: 0 : 0 (L-T-P)</b>                                               | <b>No.of Lecture Hours/Week: 3</b>         |
| <b>Exam Duration :<br/>3 hours</b>        | <b>Exam Marks: CIE +Assignment +<br/>Group Activity + SEE =<br/>40 + 5 +5+ 50 =100</b> | <b>Total No. of Contact Hours<br/>: 39</b> |

**Course Objectives:**

1. Understand the fundamentals of BlockChain.
2. Understand the concept of decentralization, its impact, and its relationship with blockchain technology
3. Gain knowledge of the inner workings of blockchain and the mechanisms behind bitcoin and alternative cryptocurrencies.
4. Understand the theoretical foundations of smart contracts
5. Identify and examine applications of the blockchain technology - beyond currencies

| <b>UNIT No</b> | <b>Syllabus Content</b>                                                                                                                                                                                    | <b>No of Hours</b> |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>1</b>       | Blockchain 101: Distributed systems, History of blockchain, Introduction to blockchain, Types of blockchain, CAP theorem and blockchain, Benefits and limitations of blockchain.<br>Text Book 1: Chapter 1 | <b>8</b>           |

|          |                                                                                                                                                                                                                                                                                                                    |          |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>2</b> | Decentralization and Cryptography: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Decentralized organizations. Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography, Public and private keys<br>Text Book 1: Chapter 2,Chapter 4 | <b>8</b> |
| <b>3</b> | Bitcoin and Alternative Coins A: Bitcoin, Transactions, Blockchain, Bitcoin payments B: Alternative Coins Theoretical foundations, Bitcoin limitations, Namecoin, Litecoin, Primecoin, Zcash<br>Text Book 1: Chapter 3, Chapter 6, Chapter 8.                                                                      | <b>8</b> |
| <b>4</b> | Smart Contracts and Ethereum 101: Smart Contracts: Definition, Ricardian contracts. Ethereum 101: Introduction, Ethereum blockchain, Elements of the Ethereum blockchain, Precompiled contracts.<br>Text Book 1: Chapter 10                                                                                        | <b>8</b> |
| <b>5</b> | Alternative Blockchains: Blockchains Blockchain-Outside of Currencies: Internet of Things, Government, Health, Finance, 08 Media<br>Text Book 1: Chapter 17                                                                                                                                                        | <b>7</b> |

**Note 1: All units will have internal choice**

**Note 2: Three Assignments are evaluated for 5 marks:**

**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4**

**Assignment -III from Unit 5**

**Course Outcomes:**

After the completion of the course students will be able to

**CO1:** Comprehend the fundamentals of Blockchain Technology.

**CO2:** Apply the methods of Decentralization.

**CO3:** Analyse Bitcoin and alternative coins.

**CO4:** Analyze the importance of Smart Contracts and Ethereum

**CO5:** Apply blockchain technology in various fields like Government, Health finance etc.,

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1,PO2,PO3,PO12        |
| CO2        | PO2,PO3,PO4,PO12        |
| CO3        | PO5,PO9,PO12            |
| CO4        | PO2,PO3,PO12            |
| CO5        | PO2,PO3,PO12            |

**TEXT BOOKS:**

1. Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1-78712-544-5, 2017

**REFERENCE BOOKS / WEBLINKS:**

1. Blockchain Technology (Concepts and applications), Kumar saurabh, Ashutosh saxena, Wiley, 2020.
2. Bitcoin and Cryptocurrency Technologies, Arvind Narayanan, Joseph Bonneau, Edward Felten,2016.
3. Blockchain Basics: A Non-Technical Introduction in 25 Steps, Daniel Drescher, Apress, First Edition, 2017.
4. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, O'Reilly Media, First Edition, 2014.
5. <https://www.packtpub.com/in/big-data-and-business-intelligence/mastering-blockchain-second-edition>

**TEXTBOOKS:**

1. Stuart McClure, Joel Scambray and Goerge Kurtz, Hacking Exposed 7: Network Security Secrets & Solutions, 2<sup>nd</sup> Edition, Tata Mc Graw Hill Publishers, 2010.
2. Stuart McClure, Joel Scambray and Goerge Kurtz, “Hacking Exposed Network Security Secrets & Solutions”, 6th Edition, Tata Mc Graw Hill Publishers, 2010.
3. Bensmith, and Brian Komer, Microsoft Windows Security Resource Kit, Prentice Hall

**REFERENCE BOOKS/WEB LINKS**

1. Stuart McClure, Joel Scambray and Goerge Kurtz, “Hacking Exposed Network Security Secrets & Solutions”, 6th Edition, Tata Mc Graw Hill publishers, 2010.

2. Rafay Baloch, “A Beginners Guide to Ethical Hacking”

3. Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, “Gray Hat Hacking The Ethical Hackers Handbook”, 3rd Edition, McGraw-Hill Osborne Media paperback(January 27, 2011)

|                                                   |                                                                                     |                                        |
|---------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------|
| <b>Sub Title: SOFT AND EVOLUTIONARY COMPUTING</b> |                                                                                     |                                        |
| <b>Sub Code:</b><br><b>18IS743</b>                | <b>No. of Credits:3=3 : 0 : 0 (L-T-P)</b>                                           | <b>No. of lecture hours/week : 3</b>   |
| <b>Exam Duration :</b><br><b>3 hours</b>          | <b>Exam Marks:CIE +Assignment<br/>+Group Activity+ SEE = 40 +<br/>5+5 + 50 =100</b> | <b>Total No. of Contact Hours : 39</b> |

**Course objectives:** This course will enable students to:

- Define and understand important concepts in soft computing
- To gain insight onto Fuzzy logic
- To gain knowledge in machine learning through GA
- Analyze the various soft computing techniques

| <b>Unit No.</b> | <b>Syllabus Content</b> | <b>No. of Hours</b> |
|-----------------|-------------------------|---------------------|
|-----------------|-------------------------|---------------------|

|   |                                                                                                                                                                                                                                                                                                                              |   |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | <p><b>INTRODUCTION TO SOFT COMPUTING:</b> ANN, FS,GA, SI, ES, Comparing among intelligent systems<br/>ANN: introduction, biological inspiration, BNN &amp; ANN, classification, first Generation NN, perceptron, illustrative problems<br/><b>Chapter1: 1.1-1.8(T1), Chapter 2: 2.1-2.6(T1)</b></p>                          | 8 |
| 2 | <p><b>ADALINE, MADALINE, ANN:</b> (2 generation), Introduction, BPN, KNN,HNN,BAM, RBF,SVM and illustrative problems<br/><b>Chapter 2: 3.1,3.2,3.3,3.6,3.7,3.10,3.11(T1)</b></p>                                                                                                                                              | 8 |
| 3 | <p><b>FUZZY LOGIC:</b> Introduction, human learning ability, undecidability, probability theory, classical set and fuzzy set, fuzzy set operations, fuzzy relations, fuzzy compositions, natural language and fuzzy interpretations, structure of fuzzy inference system, illustrative problems<br/><b>Chapter 5(T1)</b></p> | 8 |
| 4 | <p><b>GENETIC ALGORITHMS:</b> Introduction to GAGA, procedures, working of GA, GA applications, applicability, evolutionary programming, working of EP, GA based Machine learning classifier system, illustrative problems<br/><b>Chapter 7(T1)</b></p>                                                                      | 8 |
| 5 | <p><b>Swarm Intelligent system:</b> Introduction, Background of SI, Ant colony system Working of ACO, Particle swarm Intelligence (PSO).<br/><b>Chapter 8: 8.1-8.4, 8.7(T1)</b></p>                                                                                                                                          | 7 |

**Note 1: All Units will have internal choice.**

**Note 2: Three assignments are evaluated for 5 marks:**



**Assignment – I from Units 1 and 2.**

**Assignment – II from Units 3 and 4 .**

**Assignment -III from Unit 5**

**Course Outcomes:**

After completion of course students will be able to:

**CO1:** Apprehend soft computing techniques

**CO2:**Apply the learned techniques to solve realistic problems

**CO3:** Differentiate soft computing with hard computing techniques

**CO4:** Design a Fuzzy expert system and apply GA for various applications

| <b>COs</b> | <b>Mapping with POs</b> |
|------------|-------------------------|
| CO1        | PO1, PO2, PO3           |
| CO2        | PO1, PO2, PO3, PO4      |
| CO3        | PO3, PO4, PO5,PO6       |
| CO4        | PO3, PO4, PO5, P12      |

**TEXT BOOKS:**

1. Soft computing : N. P Padhy and S P Simon , Oxford University Press 2015

**REFERENCE BOOKS/WEB LINKS:**

1. Principles of Soft Computing, Sivanandam, Deepa S. N Wiley India, ISBN 13: 2011
2. Vojislav Kecman, “Learning & Soft Computing Support Vector Machines, Neural Networks, and Fuzzy Logic Models”, Pearson Education, New Delhi, 2007.

|                                        |                                  |                                       |
|----------------------------------------|----------------------------------|---------------------------------------|
| <b>Subject : SOFTWARE TESTING LAB.</b> |                                  |                                       |
| <b>Sub Code: 18ISL77</b>               | <b>No. of Credits : 0:0:1</b>    | <b>No. of lecture hours/week : 02</b> |
| <b>Exam Duration : 3 hours</b>         | <b>CIE + SEE = 50 + 50 = 100</b> |                                       |

**Course objectives:**

1. Analyse the requirements for the given problem statement
2. Design and implement various solutions for the given problem
3. Employ various design strategies for problem solving.
4. Construct control flow graphs for the solution that is implemented
5. Create appropriate document for the software artifact

**I. LIST OF PROGRAMS**

**1.** Design and develop a program in a language of your choice to solve the triangle problem

1. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on boundary-value analysis, execute the test cases and discuss the results.

2. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of boundary value testing, derive different test cases, execute these test cases and discuss the test results.

3. Design, develop, code and run the program in any suitable language to implement the NextDate function. Analyze it from the perspective of boundary value testing, derive different test cases, execute these test cases and discuss the test results.

4. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a

triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on equivalence class partitioning, execute the test cases and discuss the results.

5. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of equivalence class testing, derive different test cases, execute these test cases and discuss the test results.

6. Design, develop, code and run the program in any suitable language to implement the NextDate function. Analyze it from the perspective of equivalence class value testing, derive different test cases, execute these test cases and discuss the test results.

7. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Derive test cases for your program based on decision-table approach, execute the test cases and discuss the results.

8. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of decision table-based testing, derive different test cases, execute these test cases and discuss the test results.

9. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of dataflow testing, derive different test cases, execute these test cases and discuss the test results.

10. Design, develop, code and run the program in any suitable language to implement the binary search algorithm. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results.

11. Design, develop, code and run the program in any suitable language to implement the quicksort algorithm. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results.

12. Design, develop, code and run the program in any suitable language to implement an absolute letter grading procedure, making suitable assumptions. Determine the basis paths and using them derive different test cases, execute these test cases and discuss the test results.

## **II. OPEN ENDED QUESTIONS**

1. Study of testing tool (e.g. winrunner)
2. Study of web testing tool (e.g. selenium)
3. Study of bug tracking tool (e.g. bugzilla)
4. Study of any test management tool (e.g. test director)
5. Study of any open source testing tool (e.g. test link)

**NOTE :**

- 1. Student is permitted to submit open ended solution to any other open ended question apart from the list above . but it has to be approved by the staff in charge.**
- 2. In the examination each student picks one question from a lot of all 12 questions.**