



**SRI DHARMASTHALA MANJUNATHESHWARA  
COLLEGE (Autonomous) Ujire – 574240 D. K. Karnataka**  
(NAAC Re-accredited at 'A' grade with CGPA 3.61 out of 4)



**DEPARTMENT OF COMPUTER SCIENCE**  
**B.VOCATIONAL PROGRAMME SYLLABUS**  
**For the Academic Year 2019-2020**

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**I-SEMESTER**

Subject Code	Subject Title	Marks		
		IA	Term End Exam	Total
BVKAN 131	Kannada	20	80	100
BVENG-1	English	20	80	100
BVASD 101	Introduction to Python Programming	20	80	100
BVASD 102	Internet Programming	20	80	100
BVASD 103	Introduction to Python Programming Lab	30	120	150
BVASD 104	Internet Programming Lab	30	120	150
BVASD 105	Tutorial and Practical's Lab	30	120	150
<b>Grand Total</b>		<b>170</b>	<b>680</b>	<b>850</b>

No of Teaching Hours per Week: 30

No of Weeks for the Semester: 16

Total No of Hours for the Semester: 480

**II-SEMESTER**

Subject Code	Subject Title	Marks		
		IA	Term End Exam	Total
	Kannada	20	80	100
	English	20	80	100
	Database Management System	20	80	100
	Introduction to Web Programming	20	80	100
	DBMS Programming Lab	30	120	150
	Introduction to Web Programming Lab	30	120	150
	Power Pivot and Power BI Laboratory	30	120	150
<b>Grand Total</b>		<b>170</b>	<b>680</b>	<b>850</b>

No of Teaching Hours per Week: 30

No of Weeks for the Semester: 16

Total No of Hours for the Semester: 480

**III-SEMESTER**

Subject Code	Subject Title	Marks		
		IA	Term End Exam	Total
	English	20	80	100
	Elective Foundation	20	80	100
	Python for Data Science	20	80	100
	Mobile Application Development	20	80	100
	Python for Data Science Lab	30	120	150
	Mobile Application Development Laboratory	30	120	150
	Project - I / Application Oriented / Survey of Open Source Testing Tools with Mini Project	30	120	150
<b>Grand Total</b>		<b>170</b>	<b>680</b>	<b>850</b>

No of Teaching Hours per Week: 30

No of Weeks for the Semester: 16

Total No of Hours for the Semester: 480

**IV-SEMESTER**

Subject Code	Subject Title	Marks		
		IA	Term End Exam	Total
	English	20	80	100
	Elective Foundation	20	80	100
	Data Warehousing and Software Testing	20	80	100
	Computer Graphics and Visualization	20	80	100
	Manual & Automation Testing Lab	30	120	150
	Computer Graphics Laboratory with Mini Project	30	120	150
	Project - II / Application Oriented / Survey of Open Source Databases and Data Analytics Tools with Mini Project	30	120	150
<b>Grand Total</b>		<b>170</b>	<b>680</b>	<b>850</b>

No of Teaching Hours per Week: 30

No of Weeks for the Semester: 16

Total No of Hours for the Semester: 480

**V-SEMESTER**

Subject Code	Subject Title	Marks		
		IA	Term End Exam	Total
	Dot Net Framework for Application Development	20	80	100
	Machine Learning with Python	20	80	100
	Hadoop and Big Data Analytics	20	80	100
	Internship-1	20	80	100
	Dot Net Framework for Application Development Lab	30	120	150
	Machine Learning Using Python Lab	30	120	150
	Hadoop and Big Data Analytics Lab	30	120	150
<b>Grand Total</b>		<b>170</b>	<b>680</b>	<b>850</b>

No of Teaching Hours per Week: 30

No of Weeks for the Semester: 16

Total No of Hours for the Semester: 480

**Note for Internship-1:**

1. Students should complete their internship in the IV-Semester holidays and must complete at least one project and He / She must submit the internship completion certificate to the department.
2. After completion of Internship-I, students should give presentation for the work done during the internship and should submit the Internship-I project report within the completion of V-Semester and it will be evaluated for total of 100 Marks.
3. There will be Internal conducted for 20 marks for each student and marks will be allotted based on their presentation skills and report submission.
4. There will be final external exam conducted for 80 marks for each student and marks will be allotted based on their presentation skills and project report submission.

Internal Marks:20			External Marks:80		Total
Phases	IA	Obtained	Allotted	Obtained	
Phase-I	10	?	80	?	?/100
Phase-II	10	?			

**VI-SEMESTER**

Subject Code / Phases	Subject Title / Project Title	Marks				
		IA	IA Obtained	Term End Exam Obtained		Total
Phase-I	Project	50	?	680	?	?/850
Phase-II		50	?			
Phase-III		70	?			
Total		170	?			



<b>Introduction to Python Programming SEMESTER – I</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	52	Exam Hours	03
<b>CREDITS – 02</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Learn Syntax and Semantics and create Functions in Python.</li> <li>• Handle Strings and Files in Python.</li> <li>• Understand Lists, Dictionaries and Regular expressions in Python.</li> <li>• Implement Object Oriented Programming concepts in Python.</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<p><b>Introduction to Computers and Problem Solving Strategies</b></p> <p>Introduction, History, Characteristics and Classification of Computers, Basic Applications, Components and Functions, Concept of Hardware and Software, Central Processing Unit (CPU): Basic Architecture, Input and Output Devices, Computer Memory, Classification of Computer Software, Representation of Data: Bits and Bytes, Problem Solving Strategies, Program Design Tools: Algorithms, Flowcharts, Pseudo codes, Types of Errors, Testing and Debugging.</p>			<b>10 Hours</b>
<b>Module – 2</b>			
<p><b>Basics of Python Programming</b></p> <p>Features and History of Python, The Future of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved Words, Indentation, Operators and Expressions, Operation on Strings, Other Data Types.</p> <p><b>Decision Control Statements</b></p> <p>Introduction, Selection or Conditional Statements, Loops/ Iterative Statements, Nested Loops</p>			<b>14Hours</b>
<b>Module – 3</b>			
<p><b>Functions and Modules</b></p> <p>Introduction, Function Definition, Function Call, Variable Scope and Life Time, Return Statement, Arguments, Recursive Functions, Modules, Packages, Standard Library Modules.</p>			<b>7Hours</b>
<b>Module –4</b>			
<p><b>Strings:</b></p> <p>Concatenating, Appending and Multiplying, Built in String Functions, Slice Operations, Regular Expressions.</p>			<b>7Hours</b>
<b>Module –5</b>			
<p><b>Data Structures:</b></p> <p>Sequence, Lists, Tuples, Sets and Dictionary</p>			<b>14Hours</b>

**Course outcomes: The students should be able to:**

- Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python

**Question paper pattern:**

**Text Books:**

1. ReemaThareja, Python Programming using Problem Solving Approach, OXFORD University Press.
2. Allen B. Downey, “**Think Python: How to Think Like a Computer Scientist**”, 2nd Edition, Green Tea Press, 2015.

**Reference Books:**

1. Joel Grus ,Data Science from Scratch First Principles with Python, O’Reilly Media,2016
2. T.R.Padmanabhan, Programming with Python,Springer Publications,2016

<b>Introduction to Internet Programming</b>			
<b>SEMESTER – I</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	42	Exam Hours	03
<b>CREDITS – 02</b>			
<b>Course objectives:</b> This course will enable students to <ul style="list-style-type: none"> <li>• Illustrate the Semantic Structure of HTML and CSS</li> <li>• Compose forms and tables using HTML and CSS</li> <li>• Examine JavaScript framework.</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<b>Introduction to Fundamentals of Web</b> Internet, WWW, Web Browsers and Web Servers; URLs; MIME; HTTP; Security; The web Programmers Toolbox, XHTML: Origin and Evolution of HTML and XHTML; Basic Syntax; Standard XHTML Document Structure; Basic Text Markup.			<b>8 Hours</b>
<b>Module – 2</b>			
<b>Basics of XHTML</b> Images, Hypertext Links, Lists, Tables, Forms, Frames, Syntactic Differences between HTML and XHTML.  CSS: Introduction, Levels of Style Sheets, Style Specification Formats, Selector Forms, Property Value Forms, Font Properties, List properties, Color, Alignment of Text, The Box Model, Background Images, The <span> and <div> tags, Conflict Resolution.			<b>12Hours</b>
<b>Module – 3</b>			
<b>JavaScript:</b> Overview of JavaScript, Object Orientation and JavaScript, General Syntactic Characteristics, Primitives, Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions, Errors in scripts; examples.			<b>8Hours</b>
<b>Module –4</b>			
<b>JavaScript and HTML Documents:</b> The JavaScript Execution Environment, The Document Object Model, Element Access in JavaScript, Events and Event Handling, Handling Events from the Body Elements, Button Elements and Textbox and Password Elements, The DOM-2 Event Model, The Navigator Object, DOM Tree Traversal and Modification.			<b>8Hours</b>
<b>Module –5</b>			
<b>Dynamic documents with JavaScript:</b> Introduction, Positioning Elements, Absolute Positioning, Relative Positioning, Static Positioning, Moving Elements, Element Visibility, Changing Colors & Fonts, Changing Colors, Changing Fonts, Dynamic Contents, Stacking Elements, Locating the Mouse Cursor, Reacting to the Mouse Click, Slow Movement of Elements, Dragging & Dropping Elements.			<b>6Hours</b>

<b>Course outcomes: The students should be able to:</b> <ul style="list-style-type: none"> <li>• Adapt HTML and CSS syntax and semantics to build web pages.</li> <li>• Construct and visually format tables and forms using HTML and CSS</li> <li>• Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.</li> <li>• Appraise the principles of object oriented development using PHP</li> <li>• Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.</li> </ul>
<b>Question paper pattern:</b>
<b>Text Books:</b>
1. Programming the World Wide Web-Robert W. Sebesta, 4th Edition, Pearson Education, 2008. 2. Programming the World Wide Web, 7th edition, Robert W.Sebesta , Pearson Education, ISBN-

9789332518827

**Reference Books:**

1. Internet and World Wide Web –How to program by Dietel and Nieto Pearson Education Asia.
2. The complete Reference Java 2 Third Edition by Patrick Naughton and Herbert Schildt.
3. Java Server Pages by Hans Bergstan.

<b>Introduction to Python Programming Laboratory</b>			
<b>SEMESTER – I</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Basics of Python programming</li> <li>• Decision Making and Functions in Python</li> <li>• Install and run the Python interpreter</li> <li>• Create and execute Python programs</li> <li>• Understand the concepts of file I/O</li> <li>• Be able to read data from a text file using Python</li> </ul>			
<b>Descriptions (if any)</b>			
<b>Laboratory Experiments:</b>			
1. A) Write a program to check whether the given year is leap year or not. B) Write a program to determine whether the entered character is Vowel or not			
2. A) Write a program to read a number and calculate the sum of its digits (Eg. Input number= 123 sum=6). B) Write a program to calculate GCD of two numbers.			
3. Write a program to perform Addition, Subtraction, Multiplication, and Division and modulo operations on two integer numbers (Read the input from keyboard).			
4. Write a program to read three integer numbers from keyboard and find the largest among three numbers.			
5. Write a python program to find a key element using Binary Search algorithm			
6. Develop a program to find a reverse of a positive integer and check for palindrome or not. Display appropriate message.			
7. Write a program to count the number of digits, uppercase characters, lowercase characters and special characters in a given string.			
8. Write a program to remove all duplicates from the list			
9. Write a program that creates a list of 10 random integers. Then create ODD list and EVEN list that has all odd and even values in the list respectively.			
10. Write a program that has dictionary of names of students and a list of their marks in four subjects. Create another dictionary from this dictionary that has name of the student and their total marks. Find out topper and his/her score.			
<b>Study Experiment / Project:</b>			
NIL			
<b>Course outcomes: The students should be able to:</b>			
<ul style="list-style-type: none"> <li>• The course is designed to provide an introduction to the Python programming language. The focus of the course is to provide students with an introduction to programming, I/O, and visualization using the Python programming language.</li> </ul>			
<b>Conduction of Practical Examination:</b>			
<ul style="list-style-type: none"> <li>• All laboratory experiments are to be included for practical examination.</li> <li>• Students are allowed to pick two experiments from the lot.</li> <li>• Strictly follow the instructions as printed on the cover page of answer script</li> <li>• Marks distribution: Procedure + Conduction + Viva:</li> </ul>			
<b>Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.</b>			

<b>Introduction to Internet Programming Laboratory</b>			
<b>SEMESTER – I</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<b>Course objectives:</b> This course will enable students to			
<ul style="list-style-type: none"> <li>• To acquire knowledge and Skills for creation of Web Site considering both client- and server-side Programming.</li> <li>• To create Web application using tools and techniques used in industry.</li> <li>• To be well versed with XML and web services Technologies.</li> <li>• To be familiarized with open source Frameworks for web development.</li> </ul>			
<b>Descriptions (if any)</b>			
<b>Laboratory Experiments:</b>			
1. Design a page having suitable background colour and text colour with title “My First Web Page” using all the attributes of the Font tag.			
2. Create a HTML document giving details of your [Name, Age], [Address, Phone] and [Register Number, Class] aligned in proper order using alignment attributes of Paragraph tag.			
3. Write HTML code to design a page containing some text in a paragraph by giving suitable heading style.			
4. Create a page to show different character formatting (B, I, U, SUB, SUP) tags. viz : log b m p = p logb m			
5. Write HTML code to create a Web Page that contains an Image at its centre			
6. Create a web page with an appropriate image towards the left hand side of the page, when user clicks on the image another web page should open.			
7. Create web Pages using Anchor tag with its attributes for external links.			
8. Create a web page for internal links; when the user clicks on different links on the web page it should go to the appropriate locations/sections in the same page.			
9. Write a HTML code to create a web page with pink colour background and display moving message in red colour.			
10. Create a web page, showing an ordered list of all Firstsemester courses (Subjects).			
11. Create a web page, showing an unordered list of names of all the B.Voc Programmers (Branches) in your institution.			
12. Create a HTML document containing a nested list showing a content page of any book.			
13. Create a web page using Embedded CSS and multimedia.			
14. Mini Project: Develop a static website consisting of minimum five web pages using any open source Editor like Bluefish, etc.			
<b>Study Experiment / Project:</b>			
<b>NIL</b>			
<b>Course outcomes: The students should be able to:</b>			
<ul style="list-style-type: none"> <li>• Design a basic web site using HTML and CSS to demonstrate responsive web design.</li> <li>• Implement Static or dynamic web pages with validation using JavaScript objects by applying different event handling mechanism.</li> </ul>			
<b>Conduction of Practical Examination:</b>			
<ul style="list-style-type: none"> <li>• All laboratory experiments are to be included for practical examination.</li> <li>• Students are allowed to pick two experiments from the lot.</li> <li>• Strictly follow the instructions as printed on the cover page of answer script</li> <li>• Marks distribution: Procedure + Conduction + Viva:</li> </ul>			
<b>Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.</b>			

<b>Introduction to Tutorial and Practical's Laboratory</b>			
<b>SEMESTER – I</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <p>Will learn and understand the Basics of Computers and apply the application tools like word processor, spread sheet and presentation.</p>			
<b>Descriptions (if any)</b>			
<b>Laboratory Experiments:</b>			
<p><b>Lab 1: Computer hardware and software: Understand and identify the models, components of a computer along with its connections, operating system concepts along with internet operation.</b></p> <p>Identify and understand the models of Computers, Identify and understand front panel switches and back panel connections of a Computer system, Identify and understand the physical components of a Computer, Conduct computer system connection and understand the booting process, Study and Practice of Basic DOS Commands, Familiarization of GUI based Operating System Environment, Practice creating Icons and Folders, Creating/Opening of file, Editing and saving the document, Copy, Cut and Paste operations, built-in utilities of OS like – Text Editors, Paint, Calculator etc. ,Practice browsing of different sites using Search Engine, Practice Creating E-Mail accounts, Sending, Receiving of E-Mails.</p> <ol style="list-style-type: none"> <li>1. Identify and understand the models of Computers, Identify and understand front panel switches and back panel connections of a Computer system, Identify and understand the physical components of a Computer.</li> <li>2. Conduct computer system connection and understand the booting process.</li> <li>3. Study and Practice of Basic DOS Commands.</li> <li>4. Familiarization of GUI based Operating System Environment.</li> <li>5. Practice creating Icons and Folders, Creating/Opening of file, Editing and saving the document, Copy, Cut and Paste operations, built-in utilities of OS like – Text Editors, Paint, Calculator, etc.</li> <li>6. Practice browsing of different sites using Search Engine. Practice Creating E-Mail accounts, Sending, Receiving of E-Mails</li> </ol>			
<p><b>Lab 2: Demonstrate skills using word processor</b></p> <p>Create a Business Letter and Personal Letter, Create a Company Letter head, Create a Simple Newsletter with minimum three columns. Insert a Clip Art in the Newsletter, Create a Resume for a Job Application, Create the Cover Page of a Project Report (use Word Art, insert Picture Image), Prepare the class time table of your class.</p> <ol style="list-style-type: none"> <li>1. Create a Business Letter and Personal Letter.</li> <li>2. Create a Company Letter head.</li> <li>3. Create a Simple Newsletter with minimum three columns. Insert a Clip Art in the Newsletter.</li> <li>4. Create a Resume for a Job Application.</li> <li>5. Create the Cover Page of a Project Report (use Word Art, insert Picture Image). Prepare the class time table of your class.</li> </ol>			
<p><b>Lab 3: Demonstrate skills using spreadsheet presentation</b></p> <ol style="list-style-type: none"> <li>1. Create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.</li> </ol>			

<ol style="list-style-type: none"> <li>2. You have a monthly income of Rs.11000. Your monthly expenditures are: Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month).</li> <li>3. Create a worksheet containing the Pay details (containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF, PT, Insurance, Gross and Net salary) of the Employees using Formulas.</li> <li>4. Create a Simple Bar Chart to highlight the sales of a company for three different periods.</li> <li>5. Create a Pie Chart for a sample data and give legends.</li> </ol>
<p><b>Lab 4: Demonstrate skills using presentation</b></p> <ol style="list-style-type: none"> <li>1. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.</li> <li>2. Create a presentation about a Book containing Title, Author, Publisher and Contents.</li> <li>3. Create an automated (with timings &amp; animation) Presentation with five slides about different Models of Computers. Use Presentation tool.</li> </ol>
<p><b>Study Experiment / Project:</b></p> <p style="text-align: center;">NIL</p>
<p><b>Course outcomes: The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Understand and identify the models, components of a computer along with its connections, operating system concepts along with internet operation</li> <li>• Demonstrate skills using word processor</li> <li>• Demonstrate skills using spreadsheet presentation</li> <li>• Demonstrate skills using presentation</li> </ul>
<p><b>Conduction of Practical Examination:</b></p> <ul style="list-style-type: none"> <li>• All laboratory experiments are to be included for practical examination.</li> <li>• Students are allowed to pick two experiments from the lot.</li> <li>• Strictly follow the instructions as printed on the cover page of answer script</li> <li>• Marks distribution: Procedure + Conduction + Viva:</li> </ul> <p><b>Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.</b></p>
<p><b>References:</b></p> <ul style="list-style-type: none"> <li>• Computer Fundamentals Concepts, Systems, Application, D.P.Nagapal, S.Chand Publication, RP-2014, ISBN: 81-219-2388-3</li> <li>• <a href="http://www.tutorialsforopenoffice.org/">http://www.tutorialsforopenoffice.org/</a></li> <li>• <a href="http://www.libreoffice.org/get-help/documentation/">http://www.libreoffice.org/get-help/documentation/</a></li> </ul>
<p><b>Software Tools:</b></p> <ul style="list-style-type: none"> <li>• Any open source tool or equivalent proprietary tools.</li> </ul>



<b>Introduction to Web Programming Using XML, PHP and Bootstrap</b>			
<b>SEMESTER – II</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
<b>CREDITS – 02</b>			
<b>Course objectives:</b> This course will enable students to			
<ul style="list-style-type: none"> <li>• To study the concepts of web application development such as XHTML, XML, PHP, Java web software, and Database access through JDBC and PHP.</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<b>Introduction to XML:</b> Introduction, The Syntax of XML, XML Document Structure, Document Type Definitions, Declaring Elements, Declaring Attributes, Declaring Entities, A Sample DTD, Internal & External DTDs, Namespaces, XML Schema, Schemas Fundamentals, Defining the Schema, Defining the Schema Instances, An Overview of Data types, Simple Types, Complex Types, Displaying Raw XML Documents, Displaying XML Documents with CSS.			<b>8 Hours</b>
<b>Module – 2</b>			
<b>Introduction to PHP:</b> Origins and Uses of PHP, Overview of PHP, General Syntactic Characteristics, Primitives, Operations and Expressions, Variables, Integer Type, Double Type, String Type, Boolean Type, Arithmetic Operations & Expressions, String Operations, Scalar Type conversions, Output, Control statements, Relational Operators, Boolean Operators, Selection Statements, Loop statements, An Example, Arrays, Array Creation, Accessing array Elements, Functions for Dealing with Arrays, Sequential Access to Array Elements, Sorting Arrays, Functions, General Characteristics of Functions, Parameters, The scope of Variables, The Lifetime of Variables, Pattern Matching, Form Handling, Files, Opening and Closing Files, Reading from a File, Writing to a File, Locking Files, Cookies, Introduction to Cookies, PHP Support for Cookies, Session Tracking.			<b>10Hours</b>
<b>Module – 3</b>			
<b>Database access through the Web:</b> Database Access with PHP & MySQL, Potential Problems with Special Characters, Connecting to MySQL & Selecting the Database, Requesting MySQL Operations, A PHP/ MySQL Examples, Database Access with JDBC & MySQL, JDBC & MySQL, Metadata, Examples.			<b>6Hours</b>
<b>Module –4</b>			
<b>Java Web Software:</b> Introduction to Servlets, Overview, Details, Servlet Containers, The NetBeans IDE, Storing information on Clients, Cookies, Servlet support for Cookies, Examples, JavaServer Pages(JSP), Motivation for JSP, JSP Documents, The Expression Language, The JSTL control action elements, JavaBeans, Model-View-Controller Application Architecture, JavaServer Faces, The tag libraries, JSF event handling, An example application.			<b>10Hours</b>
<b>Module –5</b>			
Bootstrap: -Introduction to Bootstrap, Bootstrap Grid, - Bootstrap Components, Bootstrap Plug-Ins, Using the above topics Develop Responsive, mobile first projects on the web.			<b>6Hours</b>

<b>Course outcomes: The students should be able to:</b>
<ul style="list-style-type: none"> <li>• Discuss the fundamentals of web and concept of XHTML.</li> <li>• Describe different concepts of JavaScript and XHTML documents and Construct dynamic documents with JavaScript.</li> <li>• Describe XML using the user defined tags, DTD, Namespaces and Schemas with simple programs</li> <li>• Discuss the concepts of PHP with associated programs</li> <li>• Discuss different ways to access the database through the web using examples. Discuss various server based software using different technologies.</li> </ul>
<b>Question paper pattern:</b>

**Text Books:**

1. Programming the World Wide Web, 7th edition, Robert W. Sebesta , Pearson Education, ISBN-9789332518827

**Reference Books:**

1. <http://www.tutorialspoint.com/>
2. <http://www.w3schools.com/>
3. Web Programming – Building Internet Applications, 3rd edition, Chris Bates, Wiley publisher
4. Web Technologies— HTML, JavaScript, PHP, java, JSP, ASP.Net, XML & Ajax – Black Book, Wiley, ISBN : 978-81-7722-997-4
5. PHP A Beginner's Guide --- Vikram Vaswami , TMH publishers. ISBN: 13:978-007-014069-1

<b>Database Management Systems</b>			
<b>SEMESTER – II</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	52	Exam Hours	03
<b>CREDITS – 02</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Provide a strong foundation in database concepts, technology, and practice.</li> <li>• Practice SQL programming through a variety of database problems.</li> <li>• Demonstrate the use of concurrency and transactions in database</li> <li>• Design and build database applications for real world problems.</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<p><b>Databases and Data Base Users:</b> Introduction, An Example, Characteristics of the database approach, Actors on the scene, Workers behind the scene, Advantages of using the DBMS Approach, A Brief History of Database Applications, When Not to use a DBMS Database System Concepts and Architecture - Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client /Server Architectures for DBMSs, Classification of database Management System.</p>			<b>8 Hours</b>
<b>Module – 2</b>			
<p><b>Data Modelling Using the Entity-Relationship(ER) Model:</b> Using High-Level Conceptual Data Models for Database Design, An example Database Application, Entity Types, Entity Sets, attributes and keys, Relation Types, Relationship Sets, roles and structural constraints, Weak Entity Types, Refining the ER Design for the Company Database, ER Diagrams, naming, conventions and design issues, Relationship Types of Degree Higher Than Two.</p>			<b>8Hours</b>
<b>Module – 3</b>			
<p>Relational Data Model and Relational Data Base Constraints: Relational Model concepts, Relational Model Constraints and relational database schemas, Update Operation, Transaction and Dealing with constraints violations.</p>			<b>8Hours</b>
<b>Module –4</b>			
<p>Schema Definition, constraints, queries and views: SQL Data Definition and data types, Specifying constraints in SQL, Schema Change statement in SQL, Basic queries in SQL, More Complex SQL queries, INSERT, DELETE and UPDATE statements in SQL, Specifying constraints and Assertions and Triggers, Views(Virtual Tables) in SQL</p>			<b>10Hours</b>
<b>Module –5</b>			
<p>Functional Dependencies and normalization for relational databases: Informal Design guidelines for relation schemas, Functional dependencies, Normal forms based on primary keys, General Definition of second and third normal forms, Boyce-codd Normal form.</p>			<b>8Hours</b>
<b>Module-6</b>			
<p>Fundamentals of Data Base Transaction Processing: Introduction to transaction processing, transaction and system concepts, desirable properties of transactions. NoSQL – Introduction, Distributed Systems, Advantages &amp; Disadvantages of Distributed Computing, Scalability, What is NoSQL? Why NoSQL? RDBMS vs. NoSQL, Brief history of NoSQL, CAP theorem (Brewer’s Theorem), NoSQL pros/cons, NoSQL Categories, Production deployment.</p>			<b>10Hours</b>

<p><b>Course outcomes: The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.</li> <li>• Use Structured Query Language (SQL) for database manipulation.</li> <li>• Design and build simple database systems</li> <li>• Develop application to interact with databases.</li> </ul>
<p><b>Question paper pattern:</b></p>

**Text Books:**

1. Fundamentals of Database Systems, Sixth edition, 2014, Ramez Elmasri, Shamkan B. Navathe, Pearson Education, ISBN- 9788131792476
2. <http://www.w3resource.com/mongodb/nosql.php> --for NoSQL - UNIT VI

**Reference Books:**

1. Fundamentals of Database Management Systems, Mark L. Gillenson, 2009, Wiley India
2. Database Management Systems – Raghu Ramakrishnan and Johannes Gehrke – 3rd Edition, McGraw-Hill, 2003
3. DBMS a practical approach, by E R Rajiv Chopra, S Chand publications.
4. <http://elearning.vtu.ac.in/10CS54.html>
5. <http://www.tutorialspoint.com/dbms/>
6. <http://www.indiabix.com/technical/dbms-basics/>
7. <http://beginner-sql-tutorial.com/sql.htm>

<b>Introduction to Web Programming Laboratory Using XML, PHP and Bootstrap</b>			
<b>SEMESTER – II</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<b>Course objectives:</b> This course will enable students to			
<ul style="list-style-type: none"> <li>• To study the concepts of web application development such as XHTML, XML, PHP, Java web software, and Database access through JDBC and PHP.</li> </ul>			
<b>Descriptions (if any)</b>			
<b>Laboratory Experiments:</b>			
<p>1. Design an XML document to store information about patients in a hospital. Information about patients must include name (in 3 parts, first name, middle name, last name), social security number (SSN), age, room number, primary insurance company – including member identification number, group number and address – secondary insurance company (in the same sub parts as for the primary insurance company), known medical problems, and known drug allergies. Both attributes and nested tags must be included. Make up sample data of at least 4 patients. Create a CSS style sheet for the above XML document and use it to create a display of that document.</p>			
<p>2. Create the XSLT style sheet to format all the patient elements of the XML, document of exercise 3 and use it to create a display of whole element.</p>			
<p>3. Write an XHTML document to include an anchor tag, that calls a PHP document also write the called PHP document which returns a randomly chosen greeting from a list of five different greetings. The greetings must be stored as constant strings in the script. A random number between 0 and 4 can be computed with these line. #set the seed for mtrand with the number of microseconds #since the last full second of the clock mt_strand((double) microtime() * 1000000); \$number=mtrand(0,4); #computes a random integer 0-4</p> <p style="padding-left: 40px;">Write the PHP script for above to count the number of visitors and display that number for each visitor. Hint: Use a file to store current count.</p>			
<p>4. Write the XHTML code using JavaScript Object Notation (JSON) to create the form with the following capabilities</p> <p style="padding-left: 40px;">A text widget to collect the users name</p> <p style="padding-left: 80px;">A) Four check boxes, one each for the following items</p> <p style="padding-left: 120px;">i) Four 100 watt light bulbs for Rs. 20=39</p> <p style="padding-left: 120px;">ii) Eight 100 watt light bulbs for Rs 40=20</p> <p style="padding-left: 120px;">iii) Four 100 watt long life light bulbs for Rs. 30=95</p> <p style="padding-left: 120px;">iv) Eight 100 watt long life light bulbs for Rs 70=49</p> <p style="padding-left: 80px;">B) A collection of 3 radio buttons that are labeled as follows</p> <p style="padding-left: 120px;">i) Visa</p> <p style="padding-left: 120px;">ii) Master Card</p> <p style="padding-left: 120px;">iii) Discover</p> <p style="padding-left: 40px;">Write a PHP script that computes the total cost of the ordered light bulbs for the above program after adding 13.5% VAT. The program must inform the buyer of exactly what was ordered in table.</p>			
<p>5. Write a XHTML code to provide a form that collects names and telephone numbers. The phone numbers must be in the format ddd-ddd-dddd. Write a PHP script that checks the submitted telephone number to be sure that it confirms to the required format and then returns a response that indicates whether the number was correct.</p>			
<p>6. Write the XHTML code using JavaScript Object Notation (JSON) to accept from the user name, phone no, mail-id, stored in database. Retrieve same information from database using a separate PHP script.</p>			
<p>7. Write a servlet that returns a randomly chosen greeting from a list of five different greetings. The</p>			

greeting must be stored as constant strings in the program.
8. Write a servlet for the XHTML code of exercise 6 that computes the total cost of ordered light bulbs after adding 2% sales tax. The servlet must inform the buyer of exactly what was ordered in table.
9. Write and test a JSP document that displays the form of exercise 6 and produces the same response document as exercise 10.
10. Write a markup document to create a form that collects favorites popular songs, including the name of the song, the composer and the performing artist or group. This document must call a servlet when the form is submitted and another servlet to request a current list of survey results.
11. Create a simple Java web application using Servlet and JDBC.
12. Open Ended exercise- Mini project using Responsive Web page Design. Not for exam, but compulsory to be included in record.
13. Open Ended exercise - Mini project Develop Responsive, mobile first projects on the web using Bootstrap. Not for exam, but compulsory to be included in record
<b>Study Experiment / Project:</b>
NIL
<b>Course outcomes: The students should be able to:</b>
<ul style="list-style-type: none"> <li>• Describe XML using the user defined tags, DTD, Namespaces and Schemas with simple programs.</li> <li>• Discuss the concepts of PHP with associated programs</li> <li>• Discuss different ways to access the database through the web using examples.</li> <li>• Discuss various server based software using different technologies.</li> </ul>
<b>Conduction of Practical Examination:</b>
<ul style="list-style-type: none"> <li>• All laboratory experiments are to be included for practical examination.</li> <li>• Students are allowed to pick two experiments from the lot.</li> <li>• Strictly follow the instructions as printed on the cover page of answer script</li> <li>• Marks distribution: Procedure + Conduction + Viva:60 + 60 +10 (120)</li> </ul> <p><b>Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.</b></p>

<b>Database Management Systems Laboratory</b>			
<b>SEMESTER – II</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ol style="list-style-type: none"> <li>1. Foundation knowledge in database concepts, technology and practice to groom students into well-informed database application developers.</li> <li>2. Strong practice in SQL programming through a variety of database problems.</li> <li>3. Develop database applications using front-end tools and back-end DBMS</li> </ol>			
<b>Descriptions (if any)</b>			
<p><b>Laboratory Experiments:</b></p> <p><b>PART-A: SQL Programming (Max. Exam Marks. 70)</b></p> <ol style="list-style-type: none"> <li>1. Design, develop, and implement the specified queries for the following problems using Oracle, MySQL, MS SQL Server, or any other DBMS under LINUX/Windows environment.</li> <li>2. Create Schema and insert at least 5 records for each table. Add appropriate database constraints.</li> </ol> <p><b>PART-B: Mini Project (Max. Exam Marks. 50)</b></p> <ol style="list-style-type: none"> <li>1. Use Java, C#, PHP, Python, or any other similar front-end tool. All applications must be demonstrated on desktop/laptop as a stand-alone or web based application (Mobile apps on Android/IOS are not permitted.)</li> </ol>			
<p><b>Lab 1: Consider the following schema for a Library Database:</b></p> <p style="margin-left: 40px;"><b>BOOK</b> (Book_id, Title, Publisher_Name, Pub_Year)  <b>BOOK_AUTHORS</b> (Book_id, Author_Name)  <b>PUBLISHER</b> (Name, Address, Phone)  <b>BOOK_COPIES</b> (Book_id, Branch_id, No-of_Copies)  <b>BOOK_LENDING</b> (Book_id, Branch_id, Card_No, Date_Out, Due_Date)  <b>LIBRARY_BRANCH</b> (Branch_id, Branch_Name, Address)</p> <p style="margin-left: 40px;"><b>Write SQL queries to:</b></p> <ol style="list-style-type: none"> <li>1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc.</li> <li>2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2019 to Jun 2020</li> <li>3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.</li> <li>4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.</li> <li>5. Create a view of all books and its number of copies that are currently available in the Library.</li> </ol>			
<p><b>Lab 2: Consider the following schema for Order Database:</b></p> <p style="margin-left: 40px;"><b>SALESMAN</b> (Salesman_id, Name, City, Commission)  <b>CUSTOMER</b> (Customer_id, Cust_Name, City, Grade, Salesman_id)  <b>ORDERS</b> (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)</p> <p style="margin-left: 40px;"><b>Write SQL queries to:</b></p> <ol style="list-style-type: none"> <li>1. Count the customers with grades above Bangalore’s average.</li> <li>2. Find the name and numbers of all salesmen who had more than one customer.</li> <li>3. List all salesmen and indicate those who have and don’t have customers in their cities (Use UNION operation.)</li> <li>4. Create a view that finds the salesman who has the customer with the highest order of a day.</li> <li>5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be</li> </ol>			

deleted.

**Lab 3: Consider the schema for Movie Database:**

**ACTOR** (Act\_id, Act\_Name, Act\_Gender)  
**DIRECTOR** (Dir\_id, Dir\_Name, Dir\_Phone)  
**MOVIES** (Mov\_id, Mov\_Title, Mov\_Year, Mov\_Lang, Dir\_id)  
**MOVIE\_CAST** (Act\_id, Mov\_id, Role) **RATING** (Mov\_id, Rev\_Stars)

**Write SQL queries to:**

1. List the titles of all movies directed by 'Hitchcock'.
2. Find the movie names where one or more actors acted in two or more movies.
3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
5. Update rating of all movies directed by 'Steven Spielberg' to 5.

**Lab 4: Consider the schema for College Database:**

**STUDENT** (USN, SName, Address, Phone, Gender)  
**SEMSEC** (SSID, Sem, Sec)  
**CLASS** (USN, SSID)  
**SUBJECT** (Subcode, Title, Sem, Credits)  
**IAMARKS** (USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)

**Write SQL queries to:**

1. List all the student details studying in fourth semester 'C' section.
2. Compute the total number of male and female students in each semester and in each section.
3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.
4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
5. Categorize students based on the following criterion: If FinalIA = 17 to 20 then CAT = 'Outstanding' If FinalIA = 12 to 16 then CAT = 'Average' If FinalIA < 12 then CAT = 'Weak' Give these details only for 8th semester A, B, and C section students.

**Lab 5: Consider the schema for Company Database:**

**EMPLOYEE** (SSN, Name, Address, Sex, Salary, SuperSSN, DNo)  
**DEPARTMENT** (DNo, DName, MgrSSN, MgrStartDate)  
**DLOCATION** (DNo, DLoc)  
**PROJECT** (PNo, PName, PLocation, DNo)  
**WORKS\_ON** (SSN, PNo, Hours)

**Write SQL queries to:**

1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.



2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department
4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator). For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6,00,000.

**Study Experiment / Project:**

NIL

**Course outcomes: The students should be able to:**

1. Create, Update and query on the database.
2. Demonstrate the working of different concepts of DBMS
3. Implement, analyze and evaluate the project developed for an application.

**Conduction of Practical Examination:**

1. All laboratory experiments from part A are to be included for practical examination.
2. Mini project has to be evaluated for 50 Marks.
3. Report should be prepared in a standard format prescribed for project work.
4. Students are allowed to pick one experiment from the lot.
5. Strictly follow the instructions as printed on the cover page of answer script.
6. Marks distribution:
  - a) Part A: Procedure + Conduction + Viva:
  - b) Part B: Demonstration + Report + Viva voce
  - c) Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

<b>Power Pivot and Power BI Laboratory</b>			
<b>SEMESTER – II</b>			
Subject Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 02</b>			
<b>Course objectives:</b> This course will enable students to			
<b>Module – 1</b>			<b>Teaching Hours</b>
Introduction to power pivot and power BI family, Loading Data into power pivot			<b>8 Hours</b>
<b>Module – 2</b>			
Introduction to Power BI			<b>8Hours</b>
<b>Module – 3</b>			
Thinking of Multiple tables			<b>8Hours</b>
<b>Module –4</b>			
Introduction to calculated columns, Introduction to DAX measures, The golden rules of DAX measures, The new DAX functions and variables			<b>10Hours</b>
<b>Module –5</b>			
Mini Project should to created by using any of the two above labs			<b>8Hours</b>

<b>Course outcomes: The students should be able to:</b>
<ul style="list-style-type: none"> <li>• Demonstrate skills using Excel</li> <li>• Demonstrate skills using DAX Expressions</li> <li>• Demonstrate skills using presentation of Power BI Tool</li> </ul>
<b>Question paper pattern:</b>
<b>Text Books:</b>
<ul style="list-style-type: none"> <li>• Power Pivot and Power BI by Rob Collie &amp; Avi Singh, ISBN: 978-1-61547-039-6 Print, 978-1-61547-226-0 PDF, 978-1-61547-349-6 ePub, 978-1-61547-126-3 Mobi LCCN: 2015940638</li> </ul>
<b>Reference Books:</b>
<ul style="list-style-type: none"> <li>• <a href="http://www.w3resource.com/">http://www.w3resource.com/</a></li> <li>• <a href="http://www.tutorialspoint.com">http://www.tutorialspoint.com</a></li> </ul>

<b>Python for Data Science SEMESTER – III</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	53	Exam Hours	03
<b>CREDITS – 02</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Explore Python language fundamentals, including basic syntax, variables, and types</li> <li>• Create and manipulate regular Python lists</li> <li>• Use functions and import packages</li> <li>• Build Numpy arrays, and perform interesting calculations</li> <li>• Create and customize plots on real data</li> <li>• Supercharge your scripts with control flow, and get to know the Pandas DataFrame</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<p><b>Classes and Objects</b></p> <p>Classes and objects, Inheritance, Exception Handling.</p>			<b>12Hours</b>
<b>Module – 2</b>			
<p><b>Using Numpy</b></p> <p>Basics of NumPy-Computation on NumPy-Aggregations-Computation on Arrays Comparisons, Masks and Boolean Arrays-Fancy Indexing-Sorting Arrays-Structured Data: NumPy’s Structured Array.</p>			<b>15Hours</b>
<b>Module – 3</b>			
<p><b>Data Manipulation with Pandas</b></p> <p>Introduction to Pandas Objects-Data indexing and Selection-Operating on Data in Pandas-Handling Missing Data-Hierarchical Indexing - Combining Data Sets</p> <p>Text Book 1</p>			<b>13Hours</b>
<b>Module –4</b>			
<p><b>Visualization and Matplotlib</b></p> <p>Basic functions of matplotlib-Simple Line Plot, Scatter Plot-Density and Contour Plots- Histograms, Binnings and Density-Customizing Plot Legends, Colour Bars-Three- Dimensional Plotting in Matplotlib.</p>			<b>13Hours</b>

<p><b>Course outcomes:</b> The students should be able to:</p> <ul style="list-style-type: none"> <li>• Advanced concepts of Python like writing Python scripts.</li> <li>• Sequence and file operations in Python.</li> <li>• will use libraries like pandas, numpy, matplotlib, scikit, and master the concepts like Python machine learning, scripts, and sequence.</li> </ul>
<p><b>Question paper pattern:</b></p>
<p><b>Text Books:</b></p> <p>1. Jake VanderPlas ,Python Data Science Handbook - Essential Tools for Working with Data,</p>

O'ReilyMedia,Inc, 2016

2. Zhang. Y ,An Introduction to Python and Computer Programming, Springer Publications,2016.
3. ReemaThareja, Python Programming using Problem Solving Approach, OXFORD University Press.

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**Reference Books:**

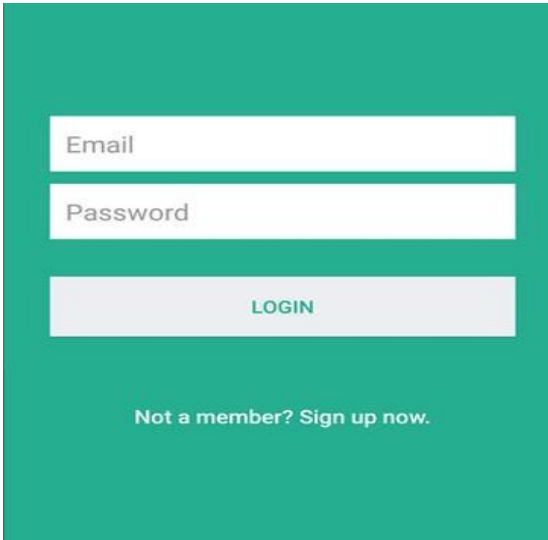
1. Joel Grus ,Data Science from Scratch First Principles with Python, O'Reilly Media,2016
2. T.R.Padmanabhan, Programming with Python,Springer Publications,2016DBMS a practical approach , by E R Rajiv Chopra, S Chand publications.

<b>Mobile Application Development SEMESTER – III</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
<b>CREDITS – 02</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ol style="list-style-type: none"> <li>1. Learn to setup Android application development environment</li> <li>2. Illustrate user interfaces for interacting with apps and triggering actions</li> <li>3. Interpret tasks used in handling multiple activities</li> <li>4. Identify options to save persistent application data</li> <li>5. Appraise the role of security and performance in Android applications</li> </ol>			
<b>Module – 1</b>			<b>Teaching Hours</b>
Get started, Build your first app, Activities, Testing, debugging and using support libraries			<b>8Hours</b>
<b>Module – 2</b>			<b>8Hours</b>
User Interaction, Delightful user experience, Testing your UI			<b>8Hours</b>
<b>Module – 3</b>			<b>8Hours</b>
Background Tasks, Triggering, scheduling and optimizing background tasks			<b>8Hours</b>
<b>Module –4</b>			<b>8Hours</b>
All about data, Preferences and Settings, Storing data using SQLite, Sharing data with content providers, Loading data using Loaders			<b>8Hours</b>
<b>Module – 5</b>			<b>8Hours</b>
Permissions, Performance and Security, Firebase and AdMob, Publish			<b>8Hours</b>

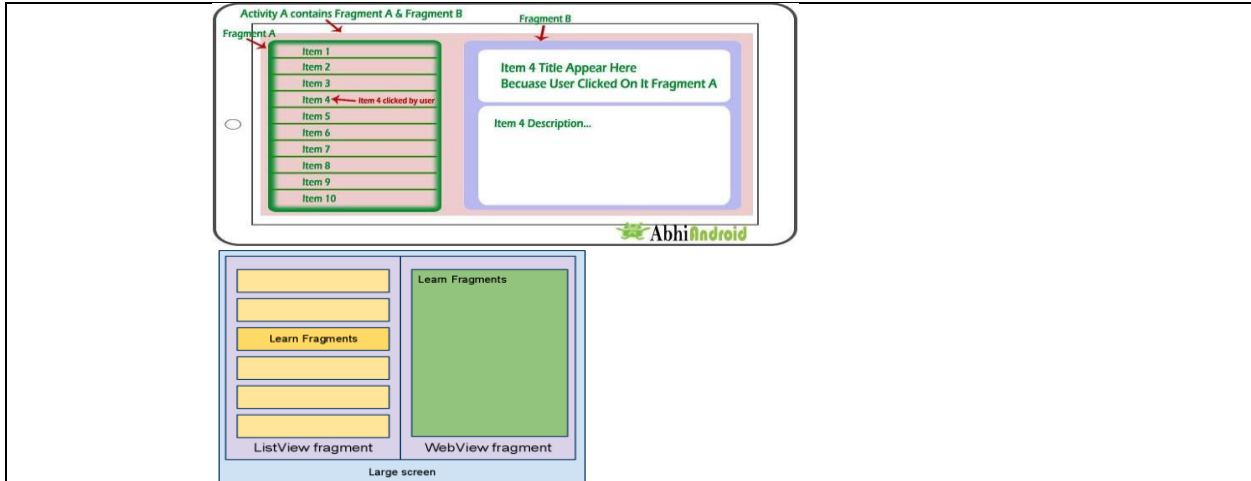
<p><b>Course outcomes: The students should be able to:</b></p> <ol style="list-style-type: none"> <li>1. Create, test and debug Android application by setting up Android development environment</li> <li>2. Implement adaptive, responsive user interfaces that work across a wide range of devices.</li> <li>3. Infer long running tasks and background work in Android applications</li> <li>4. Demonstrate methods in storing, sharing and retrieving data in Android applications</li> <li>5. Analyze performance of android applications and understand the role of permissions and security</li> <li>6. Describe the steps involved in publishing Android application to share with the world</li> </ol>
<p><b>Question paper pattern:</b></p>
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Google Developer Training Team, 2017. <a href="https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details">https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details</a> (Download pdf file from the above link) Reference Books:</li> </ol>
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Erik Hellman, “Android Programming – Pushing the Limits”, 1st Edition, Wiley India Pvt Ltd, 2014.</li> <li>2. Dawn Griffiths and David Griffiths, “Head First Android Development”, 1st Edition, O’Reilly SPD Publishers, 2015.</li> <li>3. J F DiMarzio, “Beginning Android Programming with Android Studio”, 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580</li> <li>4. Anubhav Pradhan, Anil V Deshpande, “ Composing Mobile Apps” using Android, Wiley 2014, ISBN: 978-81-265-4660-2</li> </ol>

<b>Python for Data Science Laboratory SEMESTER – III</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Explore Python language fundamentals, including basic syntax, variables, and types</li> <li>• Create and manipulate regular Python lists</li> <li>• Use functions and import packages</li> <li>• Build Numpy arrays, and perform interesting calculations</li> <li>• Create and customize plots on real data</li> </ul> <p>Supercharge your scripts with control flow, and get to know the Pandas Data Frame.</p>			
<b>Descriptions (if any)</b>			
<b>Laboratory Experiments:</b>			
1. Write a program that has a class student that stores roll number, name and marks (in three subjects) of the students. Display the information (roll number, name, and total marks) stored about the student.			
2. Write a program that has classes such as Student, Course, and Department. Enroll a student in a course of a particular department			
3. A) Write a 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. B) Write a program that prompts the user to enter a number. If the number is Positive or Zero print it. Otherwise raise an exception.			
4. Write a NumPy program to compute sum of all elements, sum of each column and sum of each row of a given array.			
5. Write a program to preprocess the data using Numpy and sklearn.preprocessing packages.			
6. Write program to do the followings: A) create data frame df consisting 10 rows and 4 columns of randomly generated numbers between 1 to 100 B) Create a new column such that, each row contains the row number of nearest row-record by Euclidean distance.			
7. Use Automobile dataset, write program to answer the following questions: A) Clean the data and update the CSV file. B) Find the most expensive car. C) Find each company's highest price car.			
8. Use Companies sales dataset, write program to answer the following questions: A) Read Total profit of all months and show it using a lineplot. B) Read all product sales data and show it using a multiline plot. C) Calculate total sale data for last year for each product and show it using a Pie chart			
9. Use SAHeart dataset, write program to answer the below questions: A) Draw a Bar plot to show the number of person having CHD or not in comparison to they having family history of the disease or not. B) Find out the number of CHD cases in different age categories. Do a Bar Plot and sort them in the order of age groups.			
10. Use Iris data set, write program to answer the following questions: A) Find the mean, median, standard deviation of iris's sepal length (1st Column). B) Create a normalized form of iris's sepal length whose values range exactly between 0 and 1 so that the minimum has value 0 and maximum has value 1. C) Find the number and position of missing values in iris's sepal length (1st column)			

<b>Study Experiment / Project:</b>
<b>NIL</b>
<b>Course outcomes: The students should be able to:</b>
<ul style="list-style-type: none"><li>• Advanced concepts of Python like writing Python scripts.</li><li>• Sequence and file operations in Python.</li><li>• will use libraries like pandas, numpy, matplotlib, scikit, and master the concepts like Python machine learning, scripts, and sequence.</li></ul>
<b>Conduction of Practical Examination:</b>
<ul style="list-style-type: none"><li>• All laboratory experiments are to be included for practical examination.</li><li>• Students are allowed to pick two experiments from the lot.</li><li>• Strictly follow the instructions as printed on the cover page of answer script</li><li>• Marks distribution: Procedure + Conduction + Viva:</li></ul> <p><b>Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.</b></p>

<b>Mobile Application Development Laboratory</b>			
<b>SEMESTER – III</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Learn to setup Android application development environment</li> <li>• Illustrate user interfaces for interacting with apps and triggering actions</li> <li>• Interpret tasks used in handling multiple activities</li> <li>• Identify options to save persistent application data</li> <li>• Appraise the role of security and performance in Android applications</li> </ul>			
<b>Descriptions (if any)</b>			
<b>Laboratory Experiments:</b>			
<p><b>1. Introduction to Android</b> Install Android Studio and build simple Hello World application.</p>			
<p><b>2. Activities, Fragments and Intents</b> Design Login Activity shown below</p> <div style="text-align: center;">  </div> <p>Create application to display details of selected list item on second activity (Use Fragmentation).</p>			





Create first activity to accept information like first name, last name, date of birth, email-id and display all information on second activity when user click on submit button.

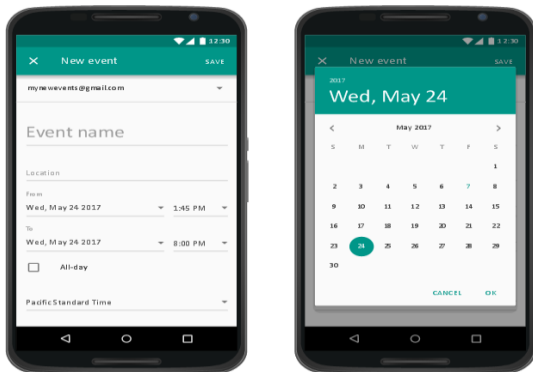
### 3. Android User Interface and Event Handling

- Create the simple calculator shown below. Also, perform appropriate operations.
- Create application to calculate GPA.
- Create chat application.



### 4. Designing Your User Interface with Views

- Create a custom "Contact" layout to hold multiple pieces of information, including: Photo, Name, Contact Number, E-mail id.
- Create application to demonstrate date and time picker.



<p><b>5. Displaying Pictures and Menus</b></p> <ul style="list-style-type: none"> <li>• Construct an app that toggles a light bulb on and off when the user clicks on toggle button.</li> <li>• Create gallery application to display all images date wise (Use Grid View).</li> </ul>
<p><b>6. Databases – SQLite</b></p> <ul style="list-style-type: none"> <li>• Create login activity (refer Assignment 2 Example 1). If Email and password matches with database display “login successful” message else display error message.</li> <li>• Construct a simple notes list that lets the user add new notes but not edit them. Demonstrates the basics of List Activity. Use a SQLite database to store the notes.</li> <li>• Create tables: Course (id, name, and instructor) and Student (id, name). Course and Student have a many to many relationship.</li> </ul> <p>Create a GUI based system for performing the following operations on the tables:</p> <ul style="list-style-type: none"> <li>• Course: Add Course, View All students of a specific course</li> <li>• Student: Add Student, Delete Student, View All students, Search student.</li> </ul>
<p><b>7. Messaging and E-mail</b></p> <ul style="list-style-type: none"> <li>• Create application to send and receive messages.</li> <li>• Create application to send email with validation.</li> <li>• Create application to send email with attachment</li> </ul>
<p><b>8. Location-Based Services and Google Map</b></p> <ul style="list-style-type: none"> <li>• Write a program to find the current location of an Android device and display details of the place like Street name, city with Geocoding.</li> <li>• Write a program to track android device using Google Maps.</li> <li>• Write a program to draw path along a route in Google map.</li> </ul>
<p><b>Study Experiment / Project:</b></p> <p style="text-align: center;"><b>NIL</b></p>
<p><b>Course outcomes: The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Create, test and debug Android application by setting up Android development environment</li> <li>• Implement adaptive, responsive user interfaces that work across a wide range of devices.</li> <li>• Infer long running tasks and background work in Android applications</li> <li>• Demonstrate methods in storing, sharing and retrieving data in Android applications</li> <li>• Analyze performance of android applications and understand the role of permissions and security</li> <li>• Describe the steps involved in publishing Android application to share with the world</li> </ul>
<p><b>Conduction of Practical Examination:</b></p> <ul style="list-style-type: none"> <li>• All laboratory experiments are to be included for practical examination.</li> <li>• Students are allowed to pick two experiments from the lot.</li> <li>• Strictly follow the instructions as printed on the cover page of answer script</li> <li>• Marks distribution: Procedure + Conduction + Viva:</li> </ul> <p><b>Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.</b></p>

<b>Data Warehousing and Software Testing</b>			
<b>SEMESTER – IV</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
<b>CREDITS – 02</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining.</li> <li>• Learn how to analyze the data, identify the problems, and choose the relevant models to apply.</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<p><b>Data Warehousing &amp; modeling:</b> Basic Concepts: Data Warehousing: A multitier Architecture, Data warehouse models: Enterprise warehouse, Data mart and virtual warehouse, Extraction, Transformation and loading, Data Cube: A multidimensional data model, Stars, Snowflakes and Fact constellations: Schemas for multidimensional Data models, Dimensions: The role of concept Hierarchies, Measures: Their Categorization and computation, Typical OLAP Operations.</p>			<b>8Hours</b>
<b>Module – 2</b>			
<p><b>Data warehouse implementation &amp; Data mining:</b> Efficient Data Cube computation: An overview, Indexing OLAP Data: Bitmap index and join index, Efficient processing of OLAP Queries, OLAP server Architecture ROLAP versus MOLAP Versus HOLAP. : Introduction: What is data mining, Challenges, Data Mining Tasks, Data: Types of Data, Data Quality, Data Preprocessing, Measures of Similarity and Dissimilarity.</p>			<b>8Hours</b>
<b>Module – 3</b>			
<p><b>Basics of Software Testing:</b> Basic definitions, Software Quality , Requirements, Behavior and Correctness, Correctness versus Reliability, Testing and Debugging, Test cases, Insights from a Venn diagram, Identifying test cases, Test-generation Strategies, Test Metrics, Error and fault taxonomies , Levels of testing, Testing and Verification, Static Testing.</p>			<b>8Hours</b>
<b>Module –4</b>			
<p><b>Test Execution:</b> 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.</p> <p><b>Planning and Monitoring the Process:</b> Quality and process, Test and analysis strategies and plans, Risk planning, monitoring the process, Improving the process, the quality team.</p>			<b>8Hours</b>
<b>Module-5</b>			
<p><b>Integration and Component-Based Software Testing:</b> 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.</p> <p><b>Levels of Testing, Integration Testing:</b> 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>			<b>8Hours</b>
<b>Course outcomes: The students should be able to:</b>			
<ul style="list-style-type: none"> <li>• Identify data mining problems and implement the data warehouse.</li> <li>• Write association rules for a given data pattern.</li> <li>• Choose between classification and clustering solution</li> </ul>			
<b>Question paper pattern:</b>			
<b>Text Books:</b>			

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Pearson, First impression,2014.
2. Jiawei Han, Micheline Kamber, Jian Pei: Data Mining -Concepts and Techniques, 3rd Edition, Morgan Kaufmann Publisher, 2012.
3. Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2008.
4. 2. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and Techniques, Wiley India, 2009.
5. 3. Aditya P Mathur: Foundations of Software Testing, Pearson Education, 2008

**Reference Books:**

1. Sam Anahory, Dennis Murray: Data Warehousing in the Real World, Pearson,Tenth Impression,2012.
2. Michael.J.Berry,Gordon.S.Linoff: Mastering Data Mining , Wiley Edition, second edition,2012.
3. Software testing Principles and Practices – Gopalswamy Ramesh, Srinivasan Desikan, 2 nd Edition, Pearson, 2007.
4. Software Testing – Ron Patton, 2nd edition, Pearson Education, 2004.
5. The Craft of Software Testing – Brian Marrick, Pearson Education, 1995.
6. Anirban Basu, Software Quality Assurance, Testing and Metrics, PHI, 2015 5. Naresh Chauhan, Software Testing, Oxford University press.

<b>Computer Graphics and Visualization</b>			
<b>SEMESTER – IV</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
<b>CREDITS – 02</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Explain hardware, software and OpenGL Graphics Primitives.</li> <li>• Illustrate interactive computer graphic using the OpenGL.</li> <li>• Design and implementation of algorithms for 2D graphics Primitives and attributes.</li> <li>• Demonstrate Geometric transformations, viewing on both 2D and 3D objects.</li> <li>• Infer the representation of curves, surfaces, Color and Illumination models</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<p><b>Overview: Computer Graphics and OpenGL:</b> Computer Graphics:Basics of computer graphics, Application of Computer Graphics, Video Display Devices: Random Scan and Raster Scan displays, color CRT monitors, Flat panel displays. Raster-scan systems: video controller, raster scan Display processor, graphics workstations and viewing systems, Input devices, graphics networks, graphics on the internet, graphics software. OpenGL: Introduction to OpenGL ,coordinate reference frames, specifying two-dimensional world coordinate reference frames in OpenGL, OpenGL point functions, OpenGL line functions, point attributes, line attributes, curve attributes, OpenGL point attribute functions, OpenGL line attribute functions, Line drawing algorithms(DDA, Bresenham’s), circle generation algorithms (Bresenham’s).</p>			<b>10Hours</b>
<b>Module – 2</b>			
<p><b>Fill area Primitives, 2D Geometric Transformations and 2D viewing:</b> Fill area Primitives: Polygon fill-areas, OpenGL polygon fill area functions, fill area attributes, general scan line polygon fill algorithm, OpenGL fill-area attribute functions. 2DGeometric Transformations: Basic 2D Geometric Transformations, matrix representations and homogeneous coordinates. Inverse transformations, 2DComposite transformations, other 2D transformations, raster methods for geometric transformations, OpenGL raster transformations, OpenGL geometric transformations function, 2D viewing: 2D viewing pipeline, OpenGL 2D viewing functions.</p>			<b>10Hours</b>
<b>Module – 3</b>			
<p><b>Clipping,3D Geometric Transformations, Color and Illumination Models:</b> Clipping: clipping window, normalization and viewport transformations, clipping algorithms,2D point clipping, 2D line clipping algorithms: cohen-sutherland line clipping only -polygon fill area clipping: Sutherland-Hodgeman polygon clipping algorithm only.3DGeometric Transformations: 3D translation, rotation, scaling, composite 3D transformations, other 3D transformations, affine transformations, OpenGL geometric transformations functions. Color Models: Properties of light, color models, RGB and CMY color models. Illumination Models: Light sources, basic illumination models-Ambient light, diffuse reflection, specular and phong model, Corresponding openGL functions.</p>			<b>10Hours</b>
<b>Module –4</b>			
<p><b>3D Viewing and Visible Surface Detection:</b> 3DViewing:3D viewing concepts, 3D viewing pipeline, 3D viewing coordinate parameters , Transformation from world to viewing coordinates, Projection transformation, orthogonal projections, perspective projections, The viewport transformation and 3D screen coordinates. OpenGL 3D viewing functions. Visible Surface Detection Methods: Classification of visible surface Detection algorithms, back face detection, depth buffer method and OpenGL visibility detection functions.</p>			<b>10Hours</b>
<b>Module-5</b>			
<p><b>Input&amp; interaction, Curves and Computer Animation:</b> Input and Interaction: Input devices, clients and servers, Display Lists, Display Lists and Modelling, Programming Event Driven Input, Menus Picking, Building Interactive Models, Animating Interactive programs, Design of Interactive programs, Logic operations .Curved surfaces, quadric surfaces, OpenGL Quadric-Surface and Cubic-Surface Functions, Bezier Spline Curves, Bezier surfaces, OpenGL curve functions. Corresponding openGL functions.</p>			<b>10Hours</b>

**Course outcomes: The students should be able to:**

- Design and implement algorithms for 2D graphics primitives and attributes.
- Illustrate Geometric transformations on both 2D and 3D objects.
- Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.
- Decide suitable hardware and software for developing graphics packages using OpenGL

**Question paper pattern:**

**Text Books:**

- Donald Hearn & Pauline Baker: Computer Graphics with OpenGL Version,3rd / 4th Edition, Pearson Education,2011 2.
- Edward Angel: Interactive Computer Graphics- A Top Down approach with OpenGL, 5th edition. Pearson Education, 2008

**Reference Books:**

- James D Foley, Andries Van Dam, Steven K Feiner, John F Huges Computer graphics with OpenGL: pearson education .
- Xiang, Plastock : Computer Graphics , sham's outline series, 2nd edition, TMG.
- Kelvin Sung, Peter Shirley, steven Baer : Interactive Computer Graphics, concepts and applications, Cengage Learning.
- M M Raiker, Computer Graphics using OpenGL, Filip learning/Elsevier.

<b>Computer Graphics Laboratory with Mini Project</b>			
<b>SEMESTER – IV</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Demonstrate simple algorithms using OpenGL Graphics Primitives and attributes.</li> <li>• Implementation of line drawing and clipping algorithms using OpenGL functions</li> <li>• Design and implementation of algorithms Geometric transformations on both 2D and 3D objects.</li> </ul>			
<b>Descriptions (if any)</b>			
<b>Laboratory Experiments:</b>			
<b>Part-A</b>			
<b>Design, develop, and implement the following programs using OpenGL API</b>			
1. Implement Brenham's line drawing algorithm for all types of slope.			
2. Create and rotate a triangle about the origin and a fixed point.			
3. Draw a colour cube and spin it using OpenGL transformation matrices.			
4. Draw a color cube and allow the user to move the camera suitably to experiment with perspective viewing.			
5. Clip a lines using Cohen-Sutherland algorithm.			
6. To draw a simple shaded scene consisting of a tea pot on a table. Define suitably the position and properties of the light source along with the properties of the surfaces of the solid object used in the scene.			
7. Design, develop and implement recursively subdivide a tetrahedron to form 3D sierpinski gasket. The number of recursive steps is to be specified by the user.			
8. Develop a menu driven program to animate a flag using Bezier Curve algorithm			
9. Develop a menu driven program to fill the polygon using scan line algorithm.			
<b>Project:</b>			
PART –B (MINI-PROJECT): Student should develop mini project on the topics mentioned below or similar applications using Open GL API. Consider all types of attributes like color, thickness, styles, font, background, speed etc., while doing mini project.			
<b>(During the practical exam: the students should demonstrate and answer Viva-Voce) Sample Topics: Simulation of concepts of OS, Data structures, algorithms etc.</b>			
<b>Study Experiment / Project:</b>			
<b>NIL</b>			
<b>Course outcomes: The students should be able to:</b>			
<ul style="list-style-type: none"> <li>• Apply the concepts of computer graphics</li> <li>• Implement computer graphics applications using OpenGL</li> <li>• Animate real world problems using OpenGL</li> </ul>			
<b>Conduction of Practical Examination:</b>			
<b>Reference books:</b>			
<ul style="list-style-type: none"> <li>• Donald Hearn &amp; Pauline Baker: Computer Graphics-OpenGL Version,3rd Edition, Pearson Education,2011</li> <li>• Edward Angel: Interactive computer graphics- A Top Down approach with OpenGL, 5th edition. Pearson Education, 2011</li> <li>• M M Raikar, Computer Graphics using OpenGL, Fillip Learning / Elsevier, Bangalore / New Delhi (2013)</li> </ul>			

<b>Dot Net Framework for Application Development</b>			
<b>SEMESTER – V</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
<b>CREDITS – 02</b>			
<b>Course objectives:</b> This course will enable students to <ul style="list-style-type: none"> <li>• Inspect Visual Studio programming environment and toolset designed to build applications for Microsoft Windows</li> <li>• Understand Object Oriented Programming concepts in C# programming language.</li> <li>• Interpret Interfaces and define custom interfaces for application.</li> <li>• Build custom collections and generics in C# • Construct events and query data using query expressions</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<b>Introducing Microsoft Visual C# and Microsoft Visual Studio 2015:</b> Welcome to C#, Working with variables, operators and expressions, Writing methods and applying scope, Using decision statements, Using compound assignment and iteration statements, Managing errors and exceptions			<b>8Hours</b>
<b>Module – 2</b>			
Understanding the C# object model: Creating and Managing classes and objects, Understanding values and references, Creating value types with enumerations and structures, Using arrays.			<b>8Hours</b>
<b>Module – 3</b>			
Understanding parameter arrays, Working with inheritance, Creating interfaces and defining abstract classes, Using garbage collection and resource management.			<b>8Hours</b>
<b>Module –4</b>			
Defining Extensible Types with C#: Implementing properties to access fields, Using indexers, Introducing generics, Using collections.			<b>8Hours</b>
<b>Module-5</b>			
Enumerating Collections, Decoupling application logic and handling events, Querying in-memory data by using query expressions, Operator overloading.			<b>8Hours</b>
<b>Course outcomes: The students should be able to:</b> <ul style="list-style-type: none"> <li>• Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#</li> <li>• Demonstrate Object Oriented Programming concepts in C# programming language</li> <li>• Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.</li> <li>• Illustrate the use of generics and collections in C#</li> <li>• Compose queries to query in-memory data and define own operator behaviour</li> </ul>			
<b>Question paper pattern:</b>			
<b>Text Books:</b>			
<ul style="list-style-type: none"> <li>• John Sharp, Microsoft Visual C# Step by Step, 8th Edition, PHI Learning Pvt. Ltd. 2016</li> </ul>			
<b>Reference Books:</b>			
<ul style="list-style-type: none"> <li>• Christian Nagel, “C# 6 and .NET Core 1.0”, 1st Edition, Wiley India Pvt Ltd, 2016. Andrew Stellman and Jennifer Greene, “Head First C#”, 3rd Edition, O’Reilly Publications, 2013.</li> <li>• Mark Michaelis, “Essential C# 6.0”, 5th Edition, Pearson Education India, 2016.</li> <li>• Andrew Troelsen, “Prof C# 5.0 and the .NET 4.5 Framework”, 6th Edition, Apress and Dreamtech Press, 2012.</li> </ul>			



<b>Machine Learning with Python</b>			
<b>SEMESTER – V</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	47	Exam Hours	03
<b>CREDITS – 02</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Conceptualization and summarization of big data and machine learning,</li> <li>• Trivial data versus big data,</li> <li>• Big data computing technologies,</li> <li>• Machine learning techniques, and scaling up machine learning approaches.</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<p><b>Introduction:</b> Well posed learning problems, Designing a Learning system, Perspective and Issues in Machine Learning. Concept Learning: Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.</p>			<b>10Hours</b>
<b>Module – 2</b>			
<p><b>Linear Regression:</b> Simple Linear Regression, steps in building a Regression model, Building Simple Linear Regression Model, Model Diagnostics, Multiple Linear Regression.</p>			<b>12Hours</b>
<b>Module – 3</b>			
<p><b>Classification:</b> Classification Overview, Binary Logistic Regression, Credit Classification, Gain Chart and Lift Chart, Classification tree.</p> <p><b>Bayesian Learning:</b> Introduction, Bayes theorem, Bayes theorem and concept learning.</p>			<b>15Hours</b>
<b>Module –4</b>			
<p><b>Advanced Machine Learning:</b> Gradient Descent Algorithm, Scikit-Learn Library for Machine Learning.</p> <p><b>Clustering:</b> Finding similarity distance, K-Means Clustering, Creating Product Segments using Clustering, Hierarchical Clustering.</p>			<b>15Hours</b>
<b>Course outcomes: The students should be able to:</b>			
<ul style="list-style-type: none"> <li>• Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications.</li> <li>• Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.</li> <li>• Ability to solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues.</li> <li>• Ability to understand and apply scaling up machine learning techniques and associated computing techniques and technologies.</li> <li>• Ability to recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.</li> <li>• Ability to integrate machine learning libraries and mathematical and statistical tools with modern technologies like hadoop and mapreduce.</li> </ul>			
<b>Question paper pattern:</b>			
<b>Text Books:</b>			
<ul style="list-style-type: none"> <li>• Tom M. Mitchell, Machine Learning, India Edition 2013, McGraw Hill Education.</li> <li>• Manaranjan Pradhan, U Dinesh Kumar, Machine Learning using Python, Wiley Publication.</li> </ul>			
<b>Reference Books:</b>			

- Trevor Hastie, Robert Tibshirani, Jerome Friedman, h The Elements of Statistical Learning, 2nd edition, springer series in statistics.
- EthemAlpaydın, Introduction to machine learning, second edition, MIT press.

<b>Machine Learning Using Python Laboratory</b>			
<b>SEMESTER – V</b>			
Laboratory Code		IA Marks	30
Number of Lecture Hours/Week	06	Exam Marks	120
Total Number of Lecture Hours	96	Exam Hours	03
<b>CREDITS – 03</b>			
<b>Course objectives:</b> This course will enable students to			
<ul style="list-style-type: none"> <li>• The objectives of the course “<b>Machine Learning and Data Mining</b>” is to introduce students to state-of-the-art methods and modern programming tools for data analysis.</li> </ul>			
<b>Descriptions (if any)</b>			
<b>Laboratory Experiments:</b>			
<p>1. Fashion Trends Online (FTO) is an e-commerce company that sells women apparel. It is observed that 10% of their customers return the items purchased by them for many reasons (such as size, color and material mismatch). On a specific day 20 customers purchased items from FTO. Write program to answer the following:</p> <ul style="list-style-type: none"> <li>A) Probability that exactly five customers will return the items.</li> <li>B) Probability that a maximum of five customers will return the items.</li> <li>C) Probability that more than five customers will return the items purchased by them.</li> <li>D) Average number of customers who are likely to return the items and the variance and the standard deviation of the number of returns.</li> </ul>			
<p>2. The number of calls arriving at a call center follows a passion distribution at 10 calls per hour. Write program to answer the following.</p> <ul style="list-style-type: none"> <li>A) Calculate the probability that the number of calls will be maximum five.</li> <li>B) Calculate the probability that the number of calls over a 3 hour period will exceed 30.</li> </ul>			
<p>3. As per survey of pesticides among 1000 farmers in grape farming for around 10 acres of grape farmland, it was found that the grape farmers spray 38 liters of pesticides in a week on an average with the corresponding standard deviation of 5 liters. Assume that the pesticide spray per week follows a normal distribution. Write program to answer the following questions:</p> <ul style="list-style-type: none"> <li>A) What proportion of the farmers is spraying more than 50 liters of pesticide in a week?</li> <li>B) What proportion of the farmers is spraying less than 10 liters?</li> <li>C) What proportion of the farmers is spraying between 30 liters and 60 liters?</li> </ul>			
<p>4. Implement and demonstrate the <b>FIND-S algorithm</b> for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a CSV file.</p>			
<p>5. For a given set of training data examples stored in a .CSV file, implement and demonstrate the <b>Candidate-Elimination algorithm</b> to output a description of the set of all hypotheses consistent with the training examples.</p>			
<p>6. Design a program to implement the <b>Simple Linear Regression Model</b> for a sample training data set stored as a CSV file.</p>			
<p>7. Design a program to implement the <b>Multi Linear Regression Model</b> for a sample training data set stored as a CSV file.</p>			
<p>8. Design a program to implement the <b>Bayesian classifier</b> for a sample training data set stored as a CSV file.</p>			
<p>9. Write a program to implement the <b>Gradient Descent</b> algorithm for predicting future sales using the dataset Advertising.csv.</p>			
<p>10. Design a program to implement the <b>K-Means Clustering</b> for a sample training data set stored as a CSV file.</p>			
<b>Study Experiment / Project:</b>			
NIL			
<b>Course outcomes: The students should be able to:</b>			
<ul style="list-style-type: none"> <li>• understand complexity of Machine Learning algorithms and their limitations;</li> <li>• understand modern notions in data analysis oriented computing;</li> <li>• Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;</li> </ul>			

- Be capable of performing distributed computations;
- Be capable of performing experiments in Machine Learning using real-world data.

**Conduction of Practical Examination:**

- All laboratory experiments are to be included for practical examination.
- Students are allowed to pick two experiments from the lot.
- Strictly follow the instructions as printed on the cover page of answer script
- Marks distribution: Procedure + Conduction + Viva:

**Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.**

<b>Hadoop and Big Data Analytics</b>			
<b>SEMESTER – V</b>			
Subject Code		IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
<b>CREDITS – 02</b>			
<p><b>Course objectives:</b> This course will enable students to</p> <ul style="list-style-type: none"> <li>• Understand Hadoop Distributed File system and examine MapReduce Programming</li> <li>• Explore Hadoop tools and manage Hadoop with Ambari</li> <li>• Appraise the role of Business intelligence and its applications across industries</li> <li>• Assess core data mining techniques for data analytics</li> <li>• Identify various Text Mining techniques</li> </ul>			
<b>Module – 1</b>			<b>Teaching Hours</b>
<p><b>Introduction:</b> Hadoop Distributed File System Basics, Running Example Programs and Benchmarks, Hadoop MapReduce Framework, MapReduce Programming</p>			<b>10Hours</b>
<b>Module – 2</b>			
Essential Hadoop Tools, Hadoop YARN Applications, Managing Hadoop with Apache Ambari, Basic Hadoop Administration Procedures			<b>10Hours</b>
<b>Module – 3</b>			
Business Intelligence Concepts and Application, Data Warehousing, Data Mining, Data Visualization.			<b>10Hours</b>
<b>Module –4</b>			
Decision Trees, Regression, Artificial Neural Networks, Cluster Analysis, Association Rule Mining			<b>10Hours</b>
<b>Module –5</b>			
Text Mining, Naïve-Bayes Analysis, Support Vector Machines, Web Mining, Social Network Analysis			<b>10Hours</b>
<p><b>Course outcomes: The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Master the concepts of HDFS and MapReduce framework</li> <li>• Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration</li> <li>• Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making</li> <li>• Infer the importance of core data mining techniques for data analytics</li> <li>• Compare and contrast different Text Mining Techniques</li> </ul>			
<b>Question paper pattern:</b>			
<b>Text Books:</b>			
<ul style="list-style-type: none"> <li>• Douglas Eadline,"Hadoop 2 Quick-Start Guide: Learn the Essentials of Big Data Computing in the Apache Hadoop 2 Ecosystem", 1 st Edition, Pearson Education, 2016. ISBN-13: 978-9332570351</li> <li>• Anil Maheshwari, “Data Analytics”, 1st Edition, McGraw Hill Education, 2017. ISBN-13: 978-9352604180</li> </ul>			
<b>Reference Books:</b>			
<ul style="list-style-type: none"> <li>• Tom White, “Hadoop: The Definitive Guide”, 4 Edition, O’Reilly Media,</li> <li>• Boris Lublinsky, Kevin T.Smith, Alexey Yakubovich,"Professional Hadoop Solutions", 1st Edition, Wrox Press, 2014ISBN-13: 978-8126551071</li> <li>• Eric Sammer,"Hadoop Operations: A Guide for Developers and Administrators",1 st Edition, O'Reilly Media, 2012.ISBN-13: 978-9350239261</li> </ul>			

<b>Final Internship / Project</b>						
<b>SEMESTER – VI</b>						
Subject Code		IA Marks	170			
Number of Lecture Hours/Week		Exam Marks	680			
Total Number of Lecture Hours		Exam Hours	03			
<b>CREDITS – 02</b>						
<b>Course objectives:</b>						
<b>Course outcomes: The students should be able to:</b>						
<b>Question paper pattern:</b>						
Subject Code / Phases	Subject Title / Project Title	<b>Marks</b>				
		IA	IA Obtained	Term End Exam Obtained		Total
<b>Phase-I</b>	<b>Project</b>	<b>50</b>	<b>?</b>	<b>680</b>	<b>?</b>	<b>?/850</b>
<b>Phase-II</b>		<b>50</b>	<b>?</b>			
<b>Phase-III</b>		<b>70</b>	<b>?</b>			
<b>Total</b>		<b>170</b>	<b>?</b>			