





## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>					
<b>2. Course Name</b>	<b>Software Engineering</b>	<b>L</b>	<b>T</b>	<b>P</b>	
<b>3. Course Code</b>	13450501	<b>4</b>	<b>0</b>	<b>0</b>	
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even	Odd () (✓)	Either Sem () Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>					
<b>Lectures = 48</b>		<b>Tutorials = 0</b>		<b>Practical = 0</b>	
<b>8. Course Description</b>					
In this course, new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.					
<b>Learning objectives:</b>					
To Know the Basics of Software Architecture To Understand various phases of Software Development Cycle					
<b>9. Course Outcomes (COs):</b>					
3 Students will be able perform various life cycle activities like <b>Analysis</b> , Design, Implementation, Testing and Maintenance.					
Students will be able to know various processes used in all the phases of the product					
Students can apply the <b>knowledge</b> , techniques, and skills in the development of a software product.					
<b>10. Unit wise detailed content</b>					
<b>Unit-1</b>	<b>Number of lectures = 12</b>				
Software: Characteristics, Components, Applications, And Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts of Project Management, Role of Metrics & Measurements.					
<b>Unit – 2</b>	<b>Number of lectures = 12</b>				

Project Planning: Objectives, Decomposition techniques: S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Models: COCOMO Model, The S/W Equation, System Analysis: Principles of Structured Analysis, Requirement analysis, DFD, Entity Relationship diagram, Data dictionary.

<b>Unit – 3</b>	<b>Number of lectures = 12</b>
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Design: Objectives, Principles, Concepts, Design methodologies: Data design, Architectural design, procedural design, Object-oriented concepts

<b>Unit – 4</b>	<b>Number of lectures = 12</b>
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Testing fundamentals: Objectives, principles, Testability, Test cases: White box & Black box testing, Testing strategies: verification & validation, unit test, integration testing, validation testing, system testing.

**11. Brief Description of self-learning / E-learning component**

[https://elearning.sgtuniversity.ac.in/course-category/Software engineering](https://elearning.sgtuniversity.ac.in/course-category/Software%20engineering)

**12. Books Recommended**

**Text Books**

1. Software Engineering - A Practitioner's Approach, Roger S. Pressman, MGH, NEW DELHI., NEW DELHI. Publications, New Delhi.

**Reference Books**

1. Fundamentals of Software Engineering, Rajib Mall, PHI, New Delhi.
2. An Integrated Approach to Software Engineering by Pankaj Jalote, Narosa Publications, New Delhi.

## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>ESSENTIAL OF HADOOP</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>	13450502	<b>3</b>	<b>0</b>	<b>2</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>	Java	<b>6. Frequency (use tick marks)</b>	Even	Odd () (✓)	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 36</b>		<b>Tutorials = 0</b>		<b>Practical = 0</b>		
<b>8. Course Description</b>						
<p>The course begins with a brief introduction to the Hadoop Distributed File System and MapReduce, then covers several open source ecosystem tools, such as Apache Spark, Apache Drill, and Apache Flume. Finally, these tools are applied to real-world use cases. Ideal for business managers, students, developers, administrators, analysts or anyone interested in learning the fundamentals of transitioning from traditional data models to big data models.</p>						
<b>9. Learning objectives:</b>						
<ul style="list-style-type: none"> <li>• Provide the skills needed for building computer system for various applications in a career in Computer Science field.</li> <li>• Explain the characteristics of Big Data</li> <li>• Describe the basics of Hadoop and HDFS architecture</li> <li>• List the features and processes of MapReduce</li> <li>• Describe the basics of Pig</li> </ul>						
<b>10. Course Outcomes (COs):</b>						
<ul style="list-style-type: none"> <li>• Understanding of Big Data problems with easy to understand examples.</li> <li>• History and advent of Hadoop right from when Hadoop wasn't even named Hadoop.</li> <li>• What is Hadoop Magic which makes it so unique and powerful.</li> <li>• Understanding the difference between Data science and data engineering, which is one of the big confusions in selecting a carrier or understanding a job role.</li> <li>• And most importantly, demystifying Hadoop vendors like Cloudera, MapR and Hortonworks by understanding about them.</li> </ul>						
<b>11. Unit wise detailed content</b>						
<b>Unit-1</b>	<b>Number of lectures = 09</b>					
<b>Data structures in Java:</b>						
Linked List, Stacks, Queues, Sets, Maps; Generics: Generic classes and Type parameters, Implementing Generic Types, Generic Methods, Wrapper Classes, Concept of Serialization						
<b>Unit – 2</b>	<b>Number of lectures = 09</b>					
<b>Working with Big Data:</b>						

Google File System, Hadoop Distributed File System (HDFS) – Building blocks of Hadoop(Namenode, Datanode, Secondary Namenode, JobTracker, TaskTracker), Introducing and Configuring Hadoop cluster (Local,Pseudo-distributed mode, Fully Distributed mode), Configuring XML files.Writing MapReduce Programs:

<b>Unit – 3</b>	<b>Number of lectures = 09</b>	
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**Hadoop I/O:**  
 The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators

<b>Unit – 4</b>	<b>Number of lectures = 09</b>	
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**Hadoop Programming**  
 Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow, Working through the ABCs of Pig Latin, Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin

**12. Brief Description of self-learning / E-learning component**  
<https://elearning.sgtuniversity.ac.in/course-category/ESSENTIAL OF HADOOP>

**13. Books Recommended**

**Text Books**  
 Hadoop: The Definitive Guide by Tom White, 3rd Edition, O’reilly

**Reference Books**  
 Hadoop for Dummies by Dirk deRoos, Paul C.Zikopoulos, Roman B.Melnyk,Bruce Brown, Rafael Coss

Big Java 4th Edition, Cay Horstmann, Wiley John Wiley & Sons, INC

Hadoop: The Definitive Guide by Tom White, 3rd Edition, O’reilly Hadoop in Action by Chuck Lam, MANNING Publ.

## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>ESSENTIAL OF HADOOP LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>	13450507	<b>0</b>	<b>0</b>	<b>2</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>	Java	<b>6. Frequency (use tick marks)</b>	Even	Odd () (✓)	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 0</b>		<b>Tutorials = 0</b>		<b>Practical = 24</b>		
<b>8. Course Description</b>						
<p>The course begins with a brief introduction to the Hadoop Distributed File System and MapReduce, then covers several open source ecosystem tools, such as Apache Spark, Apache Drill, and Apache Flume. Finally, these tools are applied to real-world use cases. Ideal for business managers, students, developers, administrators, analysts or anyone interested in learning the fundamentals of transitioning from traditional data models to big data models.</p>						
<b>9. Learning objectives:</b>						
<ul style="list-style-type: none"> <li>• Provide the skills needed for building computer system for various applications in a career in Computer Science field.</li> <li>• Explain the characteristics of Big Data</li> <li>• Describe the basics of Hadoop and HDFS architecture</li> <li>• List the features and processes of MapReduce, Describe the basics of Pig</li> </ul>						
<b>10. Course Outcomes (COs):</b>						
<ul style="list-style-type: none"> <li>• Understanding of Big Data problems with easy to understand examples.</li> <li>• History and advent of Hadoop right from when Hadoop wasn't even named Hadoop.</li> <li>• What is Hadoop Magic which makes it so unique and powerful.</li> <li>• Understanding the difference between Data science and data engineering, which is one of the big confusions in selecting a carrier or understanding a job role.</li> <li>• And most importantly, demystifying Hadoop vendors like Cloudera, MapR and Hortonworks by understanding about them.</li> </ul>						
<b>11. List of Experiments</b>						
<ol style="list-style-type: none"> <li>1. Introduction to Hadoop</li> <li>2. Hadoop Distributed File System</li> <li>3. Hadoop Architecture</li> <li>4. MapReduce &amp; HDFS Hadoop Eco Systems</li> <li>5. Introduction to Pig</li> <li>6. Introduction to Hive</li> <li>7. Introduction to HBase</li> <li>8. Other eco system Map Hadoop Developer</li> <li>9. Moving the Data into Hadoop</li> <li>10. Moving The Data out from Hadoop</li> <li>11. Reading and Writing the files in HDFS using java program</li> <li>12. The Hadoop Java API for MapReduce o Mapper Class o Reducer Class o Driver Class</li> <li>13. Writing Basic MapReduce Program In java</li> </ol>						

14. Understanding the MapReduce Internal Components

15. Hbase MapReduce Program

**12. Brief Description of self-learning / E-learning component**

<https://www.vlab.co.in/>



## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>					
<b>2. Course Name</b>	<b>Web Programming</b>	<b>L</b>	<b>T</b>	<b>P</b>	
<b>3. Course Code</b>	13450503	<b>4</b>	<b>0</b>	<b>0</b>	
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even	Odd () (✓)	Either Sem () Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>					
<b>Lectures = 48</b>		<b>Tutorials = 0</b>		<b>Practical = 0</b>	
<b>8. Course Description</b>					
Skill development in web programming including mark-up and scripting languages. Introduction to structure and object oriented programming design. Course includes use of XHTML and JavaScript programming languages.					
<b>9. Learning objectives:</b>					
After going through this course a student should be able to:					
<ul style="list-style-type: none"> <li>• Use XHTML tags to create simple static web pages</li> <li>• format a simple Web page using Cascading Style sheets</li> <li>• state the concepts applicable to web programming; represent data over the Web using XML</li> <li>• appreciate the use of Rich Internet Applications, and perform server side scripting using Java Server Pages (JSP).</li> </ul>					
<b>10. Course Outcomes (COs):</b>					
<ul style="list-style-type: none"> <li>• 1. To get familiar with the concept of Search Engine Basics.</li> <li>• To gain knowledge of Rich Internet Application Technologies</li> <li>• To Learn Web Service Essentials</li> <li>• To learn different web programming languages</li> <li>• To be familiarized with Web Analytics 2.0 , Web 3.0 and Semantic web standards.</li> </ul>					
<b>11. Unit wise detailed content</b>					
<b>Unit-1</b>	<b>Number of lectures = 12</b>				
<p><b>Web 2.0 and XHTML :</b> What IsWeb 2.0? Introduction toWeb 2.0 terms: Search, Content Networks, Blogging, Social Networking, Social Media, Rich Internet Applications (RIAs), Web Services, Mashups, Widgets and Gadgets, Introduction to XHTML and WML, Syntactic Differences between</p>					

HTML and XHTML, Standard XHTML Document Structure, An example of XHTML covering Basic Syntax, Images, Hypertext Links, Lists and Tables, Creation of an XHTML Form, Internal Linking and Meta Elements.

**Using Style Sheets :** CSS: Inline Styles, Embedded Style Sheets, Linking External Style Sheets, Style Specification Formats Selector Forms, Colour, Property Value Forms, Font Properties, List Properties, Alignment of Text, The Box Model, Background Image ,The <span> and <div> Tags.

**Unit – 2**

**Number of lectures = 12**

**Introduction to XML :** XML Basics, XML Document Structure, XML Namespaces, Document Type Definitions, XML Schemas, Displaying XML Documents.

**Introduction to WAP and WML :** WAP and WML Basics, WML formatting and links, , WML variables, Example.

**Unit – 3**

**Number of lectures = 12**

**JSP – Basic :** Basic JSP Lifecycle, JSP Directives and Elements, Scriptlets, Expressions, Action Elements, Standard Actions, Comments and Template Data, JSP variables, The out Object, Request, response, sessions and application objects.

**JSP Application Development :** Example applications using JSP, What is JDBC? Need for JDBC, Database Drivers, Connection using JDBC API.

**Unit – 4**

**Number of lectures = 12**

**The Server Side Scripting :** Server side scripting and its need ,Two-Tier, Three-Tier, N-Tier and Enterprise Architecture, Various Languages/ Technologies for server scripting ,HTTP Methods (such as GET, POST, HEAD, and so on) , Purpose ,Technical characteristics, Method selection, Use of request and response primitives, Web container – Tomcat.

**12. Brief Description of self-learning / E-learning component**

[https://elearning.sgtuniversity.ac.in/course-category/Web Programming](https://elearning.sgtuniversity.ac.in/course-category/Web%20Programming)

**13. Books Recommended****Text Books**

Mastering HTML, CSS & Javascript Web Publishing by Lemay Laura

**Reference Books**

1. XHTML Black Book by Steven Holzner, 2000 .
2. CGI Programming on the World Wide Web. O'Reilly Associates.
3. Web Technologies By Achyut S Godbole , Atul Kahate, 2003, T.M.H.
4. Scott Guelich, Shishir Gundararam, Gunther Birzniek; CGI Programing with Perl 2/e O'Reilly.
5. Doug Tidwell, James Snell, Pavel Kulchenko; Programming Web services, O'Reilly
6. Intranets by James D.Cimino, 1997, Jaico Publ.
7. Internet and Web Technologies – Raj Kamal, 2002, T.M.H .

## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>Web Programming Lab</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>	13450506	<b>0</b>	<b>0</b>	<b>4</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even	Odd () (✓)	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 0</b>		<b>Tutorials = 0</b>		<b>Practical = 48</b>		
<b>8. Course Description</b> Skill development in web programming including mark-up and scripting languages. Introduction to structure and object oriented programming design. Course includes use of XHTML,XML,XHTML.						
<b>9. Learning objectives:</b>						
<ul style="list-style-type: none"> <li>• The course will give you a grounding in the nuts and bolts of the tags, script, and code that create web pages. It will not turn you into a programmer, but it will help you understand how the web and web pages work. This knowledge will allow you to build on the skills you will have and to understand the potentials and limitations placed on writing for web pages.</li> </ul>						
<b>10. Course Outcomes (COs):</b>						
<ul style="list-style-type: none"> <li>• write well-structured, easily maintained, standards-compliant, accessible HTML code.</li> <li>• write well-structured, easily maintained, standards-compliant CSS code to present HTML pages in different ways.</li> <li>• use JavaScript to add dynamic content to pages.</li> <li>• critique JavaScript code written by others, identifying examples of both good and bad practice.</li> </ul>						
<b>11. List of Experiments</b>						
Create a Web Page using basic tags in html 5						
Write a program to create all types of list in HTML						
Create a table using Html 5 and CSS						
Write a program using labels, radio buttons, and submit buttons						
Create a simple webpage using HTML						
Use frames to Include Images and Videos.						

Add a Cascading Style sheet for designing the web page.

List the features of at least 5 Web 2.0 technologies

How to make all fields of a form mandatory in java script

Create a registration form and validate it using java script

Write a program to maintain session in PHP

Perform data base connectivity in PHP

Create a dynamic web page using PHP

orweb browser display *About Us* option

gecreating style sheets for web pages

Design a web page with validation using JavaScript.

## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	IoT development application of Cloud	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>		<b>2</b>	<b>0</b>	<b>2</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even	Odd () (✓)	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
Lectures = 24		Tutorials = 0		Practical = 0		
<b>8. Course Description</b>						
<p>The <b>course</b> presents a top-down view of IoT development application of Cloud, from applications and administration to programming and infrastructure. Its main focus is on parallel programming techniques for IoT development application of Cloud and large scale distributed systems which form the <b>cloud</b> infrastructure.</p>						
<b>9. Learning objectives:</b>						
Design and develop elegant and flexible cloud software solutions.						
Manage and deploy a cloud based application.						
Research and critique a topic related to Software development in the cloud.						
Analyze a real world problem and develop a cloud based software solution.						
<b>10. Course Outcomes (COs):</b>						
<ul style="list-style-type: none"> <li>• IoT development application of Cloud explain the core issues of Cloud such as security, privacy, and interoperability.</li> <li>• IoT choose the appropriate technologies, algorithms, and approaches for the related issues.</li> <li>• IoT identify problems, and explain, analyze, and evaluate various IoT development applications and solutions.</li> </ul>						
<b>11. Unit wise detailed content</b>						
<b>Unit-1</b>	<b>Number of lectures = 06</b>					
<p>Cloud Based Applications: Introduction, Contrast traditional software development and development for the cloud. Public vs private cloud apps. Understanding Cloud ecosystems – what is SaaS/PaaS, popular APIs, mobile.</p>						

<b>Unit – 2</b>	<b>Number of lectures = 06</b>	
<p>Designing code for the Cloud: Class and Method design to make best use of the Cloud infrastructure;  Web Browsers and the Presentation Layer: Understanding Web browsers attributes and differences.  Building blocks of the presentation layer: HTML, HTML5, CSS, Silver light, and Flash.</p>		
<b>Unit – 3</b>	<b>Number of lectures = 06</b>	
<p>Web Development Techniques and Frameworks: Building Ajax controls, introduction to Javascript using JQuery, working with JSON, XML, REST. Application development Frameworks e.g. Ruby on Rails , .Net, Java API's or JSF; Deployment Environments – Platform As A Service (PAAS) ,Amazon, vmForce, Google App Engine, Azure, Heroku, AppForce</p>		
<b>Unit – 4</b>	<b>Number of lectures = 06</b>	
<p>Building an Application using the LAMP stack: Setting up a LAMP development environment. Building a simple Web app demonstrating an understanding of the presentation layer and connectivity with persistence.</p>		
<p><b>12. Brief Description of self-learning / E-learning component</b></p> <p><a href="https://elearning.sgtuniversity.ac.in/course-category/IoT">https://elearning.sgtuniversity.ac.in/course-category/IoT</a> development application of Cloud</p>		
<p><b>13. Books Recommended</b></p>		
<p><b>Text Books</b></p> <p>Chris Hay, Brian Prince, Azure in Action [ISBN: 978-1935182481]  Henry Li, Introducing Windows Azure [ISBN: 978-1-4302-2469-3]</p>		
<p><b>Reference Books</b></p> <p>Paul J. Deitel, Harvey M. Deitel 2008, Ajax, rich Internet applications, and web development for programmers, Prentice Hall Upper Saddle River, NJ [ISBN: 978-013-158738-0]</p>		

## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	IoT development application of Cloud Lab	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>		<b>0</b>	<b>0</b>	<b>2</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even	Odd () (✓)	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 0</b>		<b>Tutorials = 0</b>		<b>Practical = 24</b>		
<b>8. Course Description</b>						
In this , new Design and Development of application on Cloud Lab technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.						
<b>9. Learning objectives:</b>						
Design and develop elegant and flexible cloud software solutions.						
Manage and deploy a cloud based application.						
Research and critique a topic related to Software development in the cloud.						
Analyze a real world problem and develop a cloud based software solution.						
<b>10. Course Outcomes (COs):</b>						
<ul style="list-style-type: none"> <li>• IoT development application of Cloud explain the core issues of Cloud such as security, privacy, and interoperability.</li> <li>• IoT choose the appropriate technologies, algorithms, and approaches for the related issues.</li> <li>• IoT identify problems, and explain, analyze, and evaluate various IoT development applications and solutions.</li> </ul>						
<b>11. List of Experiments</b>						
Study how to manage cloud computing resources.						
Study about existing cloud characteristics and service models.						
Performance evaluation of services over cloud.						
Case Study: Google app engine and Microsoft azure.						
Setting up a LAMP development environment. Building a simple Web app demonstrating an understanding of the presentation layer and connectivity with persistence.						
Design, develop, test and deploy an application in the cloud using a development framework and deployment platform.						
Analyze a real world problem and develop a cloud/LAMP based software solution.						



Contrast software development in the web, cloud and others.

**12. Brief Description of self-learning / E-learning component**

<https://www.vlab.co.in/>

## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	Minor Project	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>	13450505	<b>0</b>	<b>0</b>	<b>4</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even	Odd () (✓)	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 0</b>		<b>Tutorials = 0</b>		<b>Practical = 48</b>		
<b>8. Course Description</b>						
The purpose of the Minor Project is for the students to apply theoretical knowledge acquired during the Data Science program to a project involving actual data in a realistic setting.						
<b>9. Learning objectives:</b>						
Capstone projects are generally designed to encourage students to think critically, solve challenging problems, and develop skills such as oral communication, public speaking, research skills, media literacy, teamwork, planning, self-sufficiency, or goal setting						
<b>10. Course Outcomes (COs):</b>						
Integration. Students have integrated and/or applied what they have learned in their general education and major/minor coursework (and co-curricular activities, as appropriate).						
<b>11. List of Experiments</b>						
<p>(GUIDELINES FOR MINOR PROJECT)</p> <p>The aim of the Minor Project(s) is to lay a foundation for Major Project to be carried out by the student during 6th Semester of BCA Programme.</p> <p>Each student should carry out Minor Project(s) using the software development tools/languages/technologies that they have learnt and/or have studied during the concerned semester.</p> <p>It should be compulsorily done by the student in-house under the supervision of the staff(s) assigned by Head of the Department/Director/Principal.</p> <p>The Minor Project(s) will be assessed by the concerned supervisor(s) and shall award marks out of 25 for each student as Internal Assessment.</p>						
<b>12. Brief Description of self-learning / E-learning component</b>						
<a href="https://capstones.utah.edu/capstone-learning-outcomes/">https://capstones.utah.edu/capstone-learning-outcomes/</a>						

## Semester V

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>SEMINAR</b>	<b>L</b>	<b>T</b>		<b>P</b>	
<b>3. Course Code</b>		<b>0</b>	<b>0</b>		<b>4</b>	
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even ( )	Odd (✓)	Either Sem ( )	Every Sem ( )
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 48</b>		<b>Tutorials = 0</b>		<b>Practical = 0</b>		
<b>8. Course Description</b>						
Industry Seminar Industry seminars are suggested to enable the students of BCA to appreciate the software development which are going on in industries in India. These seminars will help the students to face interviews with some confidence. The students should attend these and submit a report. The following points are listed to enable the college to organize these seminars.						

## Semester VI

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>					
<b>2. Course Name</b>	Artificial Intelligence	<b>L</b>	<b>T</b>	<b>P</b>	
<b>3. Course Code</b>	13450601	<b>4</b>	<b>0</b>	<b>0</b>	
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem () Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>					
Lectures = 48		Tutorials = 0		Practical = 0	
<b>8. Course Description</b>					
Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously.					
<b>9. Learning objectives:</b>					
AI must improve with the progression of time and technology.					
AI must evolve in a direction that the masses demand.					
AI must have a mechanism whereby it can be reliably patched/updated, once it has been installed on a user's PC.					
AI must be developed in a modular fashion, by different contributors, where modules can be removed, added, modified and interchanged where necessary.					
AI's 'consciousness' must be fully transferable from PC to PC, to home/building, to car/vehicle, to robot.					
<b>10. Course Outcomes (CO):</b>					
Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems. analyze the structures and algorithms of a selection of techniques related to searching, reasoning, machine learning, and language processing.					
<b>11. Unit wise detailed content</b>					
<b>Unit-1</b>	<b>Number of lectures = 12</b>				
Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success. Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem Heuristic search techniques :Generate and test, hill climbing, best first search technique, problem reduction, constraint					

satisfaction.

**Unit – 2**

**Number of lectures = 12**

Knowledge representation: Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation, Issues in knowledge representation Using Predicate Logic: Representing Simple Facts in logic, Representing instances and is a relationship, Computable function and predicate.

**Unit – 3**

**Number of lectures = 12**

Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. LISP and other AI Programming Language Natural language processing.

**Unit – 4**

**Number of lectures = 12**

Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing Learning: Introduction learning, Rote learning.

**12. Brief Description of self-learning / E-learning component**

[https://elearning.sgtuniversity.ac.in/course-category/Artificial Intelligence](https://elearning.sgtuniversity.ac.in/course-category/Artificial%20Intelligence)

**13. Books Recommended**

**Text Books**

D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 2019

**Reference Books**

Nils J Nilsson, "Artificial Intelligence -A new Synthesis" New Edition (2018), Harcourt Asia Ltd.

E. Rich and K. Knight, "Artificial intelligence", TMH, New Edition, 2019.

## Semester VI

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>Artificial Intelligence Lab</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>	13450604	<b>0</b>	<b>0</b>	<b>4</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 0</b>		<b>Tutorials = 0</b>		<b>Practical = 48</b>		
<b>8. Course Description</b>						
Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously.						
<b>9. Learning objectives:</b>						
AI must improve with the progression of time and technology.						
AI must evolve in a direction that the masses demand.						
AI must have a mechanism whereby it can be reliably patched/updated, once it has been installed on a user's PC.						
AI must be developed in a modular fashion, by different contributors, where modules can be removed, added, modified and interchanged where necessary.						
AI's 'consciousness' must be fully transferable from PC to PC, to home/building, to car/vehicle, to robot.						
<b>10. Course Outcomes (CO):</b>						
Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems. analyze the structures and algorithms of a selection of techniques related to searching, reasoning, machine learning, and language processing.						
<b>11. List of Experiments</b>						
List of programs to be developed using Prolog: Study of PROLOG. Write a program to solve 8 queens problem. Solve any problem using depth first search. Solve any problem using best first search. Solve 8-puzzle problem using best first search Solve Robot (traversal) problem using means End Analysis. Solve traveling salesman problem. Note: At least 5 to 10 more exercises to be given by the teacher concerned.						
<b>12. Brief Description of self-learning / E-learning component</b>						
<a href="https://www.vlab.co.in/">https://www.vlab.co.in/</a>						

## Semester VI

### BCA

<b>1. Name of the Department- Computer Science Engineering</b>						
<b>2. Course Name</b>	ARDBMS	<b>L</b>	<b>T</b>		<b>P</b>	
<b>3. Course Code</b>	13450602	<b>3</b>	<b>0</b>		<b>2</b>	
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>		<b>PE()</b>		<b>OE ()</b>
<b>5. Pre-requisite (if any)</b>	<b>Workshop Technology</b>	<b>6. Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 36</b>		<b>Tutorials = 0</b>		<b>Practical = 0</b>		
<b>8. Course Description</b>						
<p>The course, Database Management Systems, provides an introduction to the management of database systems. The course emphasizes the understanding of the fundamentals of relational systems including data models, database architectures, and database manipulations. The course also provides an understanding of new developments and trends such as Internet database environment and data warehousing. The course uses a problem-based approach to learning</p>						
<b>9. Learning objectives:</b>						
<ul style="list-style-type: none"> <li>• To understand the different issues involved in the design and implementation of a database system.</li> <li>• To study the physical and logical database designs, database modeling, relational, hierarchical, and network models</li> <li>• To understand and use data manipulation language to query, update, and manage a database</li> <li>• To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.</li> <li>• To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS</li> </ul>						
<b>10. Course Outcomes (COs):</b> On completion of the course,						
<ul style="list-style-type: none"> <li>• 1. For a given query write relational algebra expressions for that query and optimize the developed expressions</li> </ul>						
<ul style="list-style-type: none"> <li>• 2. For a given specification of the requirement design the databases using E-R method and normalization.</li> </ul>						
<ul style="list-style-type: none"> <li>• 3. For a given query optimize its execution using Query optimization algorithms</li> </ul>						

<b>11. Unit wise detailed content</b>		
<b>Unit-1</b>	<b>Number of lectures = 09</b>	
Introduction: Overview of Database Management System: Various views of data Models, Schemes and Introduction to database Languages & Environments, Advantages of DBMS over file processing systems, Responsibility of Database Administrator. Three level architecture of Database Systems: Introduction to client/Server architecture. Data Models: E-R Diagram (Entity Relationship), mapping Constraints, keys, Reduction of E-R diagram into tables.		
<b>Unit – 2</b>	<b>Number of lectures = 09</b>	
Network & Hierarchical Models, File Organization: Sequential File, index sequential files, direct files, Hashing, B-trees Index files, Inverted Lists, Relational Models, Relational Algebra & various operations (set operations, select, project, join, division), Order, Relational calculus: Domain, Tuple, Well Formed Formula, specification, quantifiers, Introduction to Query Language, QBE		
<b>Unit – 3</b>	<b>Number of lectures = 09</b>	
Integrity constrains, functional dependencies & Normalization, 1st, 2nd, 3rd and BCNF. Introduction to Distributed Data processing, Concurrency control: Transactions, Time stamping, Lock-based Protocols.		
<b>Unit – 4</b>	<b>Number of lectures = 09</b>	
Database recovery. Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models		
<b>12. Brief Description of self-learning / E-learning component</b> <a href="https://elearning.sgtuniversity.ac.in/course-category/ ARDBMS">https://elearning.sgtuniversity.ac.in/course-category/ ARDBMS</a>		
<b>13. Books Recommended</b>		
<b>Text book:</b>		
1. “Database System Concepts”, 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.		
<b>Reference books:</b>		
1 “Principles of Database and Knowledge – Base Systems”, Vol 1 by J. D. Ullman, Computer Science Press.		
2 “Fundamentals of Database Systems”, 5th Edition by R. Elmasri and S. Navathe, Pearson Education		
3 “Foundations of Databases”, Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley		



## Semester VI

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	<b>ARDBMS lab</b>	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>	13450605	<b>0</b>	<b>0</b>	<b>2</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 0</b>		<b>Tutorials = 0</b>	<b>Practical = 24</b>			
<b>8. Course Description</b>						
<b>9. Learning objectives:</b> To describe the basics of SQL and construct queries using SQL.						
<b>10. Course Outcomes (COs):</b>						
Upon completion of the course, the students acquire the knowledge to build the logic and develop a solution for a problem statements						
<b>11. List of Experiments</b>						
<ol style="list-style-type: none"> <li>1. Creating Database               <ol style="list-style-type: none"> <li>i. Creating a Database</li> <li>ii. Creating a Table</li> <li>iii. Specifying Relational Data Types</li> </ol> </li> <li>2. Table and Record Handling               <ol style="list-style-type: none"> <li>i. INSERT statement</li> <li>ii. Using SELECT and INSERT together</li> <li>iii. DELETE, UPDATE, TRUNCATE statements</li> <li>iv. DROP, ALTER statements</li> </ol> </li> <li>3. Indexes Create index, Drop Index and unique option</li> <li>4. Integrity Constraints Primary Key, Referential ,Domain and Check Constraints</li> <li>5. Retrieving Data from a Database               <ol style="list-style-type: none"> <li>i. The SELECT statement</li> <li>ii. Using the WHERE clause</li> <li>iii. Using Logical Operators in the WHERE clause</li> </ol> </li> <li>6. SQL functions</li> <li>7. Advanced SQL functions</li> <li>8. Using IN, BETWEEN, LIKE (pattern matching) operator</li> <li>9. GROUP BY and GROUP BY functions</li> <li>10. Sub queries, Basic, multiple column, sub queries with having, correlated sub queries</li> <li>11. Retrieving data from multiple columns Joining table (Inner Join, Outer Join, Equi Join, Non-Equi join) , Aliasing for table name</li> </ol>						

12. DCL statements

**12. Brief Description of self-learning / E-learning component**

<http://vlabs.iitb.ac.in/bootcamp/labs/dbms/exp8/exp/index.php>

## Semester VI

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	Enterprise Mobile Application Development	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>	13450603	<b>2</b>	<b>0</b>	<b>2</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 24</b>		<b>Tutorials = 0</b>		<b>Practical = 0</b>		
<b>8. Course Description</b>						
Enterprise mobile app development requires attention as well as mobile devices. Mobile Enterprise Application Platform tends to simplify the development process of enterprise software for employees who use various mobile devices. The main peculiarity of the MEAP platform is a cross-platform feature.						
<b>9. Learning objectives:</b>						
A mobile application provides a platform to companies by which they can get engaged with their customers in real-time.						
By developing a mobile app, you can give your customers simpler and more efficient platform to use your products or services..						
You can increase your business by promoting it by offering coupons						
Through a mobile app, a customer can order any of your product or service						
<b>10. Course Outcomes (COs):</b>						
Ability to apply general programming knowledge in the field of developing mobile applications.						
Understanding of the specific requirements, possibilities and challenges when developing for a mobile context.						
<b>11. Unit wise detailed content</b>						
<b>Unit-1</b>	<b>Number of lectures = 06</b>					

Mobile Device : Mobile Phone Evolution, Mobile Handset Characteristics, Bluetooth , Display, Keypad, Camera, Mobile Handset Categories, Handset Components, Handset Design, Handset hardware architecture, Elements inside a Mobile Handset, Hardware Architecture Evolution, Hardware architectural trends, CPU and Memory, Internal storage, Handset Power Oberoi

<b>Unit – 2</b>	<b>Number of lectures = 06</b>	
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Mobile Application Development - Mobile Application Development Paradigm, Mobile Programming Tools, Mobile Application Evolution, Thin Client, Fat Client, Future of Mobile App Development, Mobile Client Server App Architecture, Mobile App Programming in different languages, Mobile Programming best practices, Pros and Cons of Mobile Web App, SIM based Mobile App Development, SIM as a Platform, SIM as Service Differentiator.

<b>Unit – 3</b>	<b>Number of lectures = 06</b>	
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Web Application - World Wide Web, Web Application, Web Application Architecture, Web Server, Web Server Features, Web Application Server, Mobile Internet Access, Mobile Web browser Evolution, Mobile Web Development Approaches, Dynamic Content.

<b>Unit – 4</b>	<b>Number of lectures = 06</b>	
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Mobile Operating System --Introduction to Mobile Operating Systems and why they are needed, Open Platforms, Mobile OS Features, Symbian, BlackBerry, Android, iOS, Windows, Tizen, Ubuntu, etc.

**12. Brief Description of self-learning / E-learning component**  
  
[https://elearning.sgtuniversity.ac.in/course-category/Enterprise Mobile Application Development](https://elearning.sgtuniversity.ac.in/course-category/Enterprise%20Mobile%20Application%20Development)

**13. Books Recommended**

**Text Books**

1. Wireless and Mobile Network Architectures by Yi-Bang Lin and Imrich Chlamtac, Wiley-India, 2020.
2. Mobile Networks Architecture by Andre Perez, Wiley, March 2020.

**Reference Books**

1. Mobile Computing – Technology, Application & Service Creation by Asoke. K Talukder, Roopa R. Yavagal, Asoke K. Talukder, Tata McGraw-Hill, 2019

2. GSM - Architecture, Protocols and Services by Jörg Eberspächer, Hans-JoergV ögel, Christian Bettstetter, Christian Hartmann John Wiley & Sons, Dec-2018

## Semester VI

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>					
<b>2. Course Name</b>	Enterprise Mobile Application Development Lab	<b>L</b>	<b>T</b>	<b>P</b>	
<b>3. Course Code</b>	13450606	<b>0</b>	<b>0</b>	<b>2</b>	
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem () Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>					
<b>Lectures = 0</b>		<b>Tutorials = 0</b>		<b>Practical = 24</b>	
<b>8. Course Description</b>					
Enterprise mobile app development requires attention as well as mobile devices. Mobile Enterprise Application Platform tends to simplify the development process of enterprise software for employees who use various mobile devices. The main peculiarity of the MEAP platform is a cross-platform feature.					
<b>9. Learning objectives:</b>					
A mobile application provides a platform to companies by which they can get engaged with their customers in real-time.					
By developing a mobile app, you can give your customers simpler and more efficient platform to use your products or services..					
You can increase your business by promoting it by offering coupons					
Through a mobile app, a customer can order any of your product or service					
<b>10. Course Outcomes (COs):</b>					
Ability to apply general programming knowledge in the field of developing mobile applications.					
Understanding of the specific requirements, possibilities and challenges when developing for a mobile context.					
<b>11. List of Experiments</b>					
Note: Practical exercises will be done as per theory syllabus.					
<b>12. Brief Description of self-learning / E-learning component</b>					
<a href="https://www.vlab.co.in/">https://www.vlab.co.in/</a>					

## Semester VI

### BCA

<b>1. Name of the Department- Computer Science &amp; Engineering</b>						
<b>2. Course Name</b>	Major Project	<b>L</b>	<b>T</b>	<b>P</b>		
<b>3. Course Code</b>	13450607	<b>0</b>	<b>0</b>	<b>8</b>		
<b>4. Type of Course (use tick mark)</b>		<b>Core (✓)</b>	<b>PE()</b>		<b>OE ()</b>	
<b>5. Pre-requisite (if any)</b>		<b>6. Frequency (use tick marks)</b>	Even (✓)	Odd ()	Either Sem ()	Every Sem ()
<b>7. Total Number of Lectures, Tutorials, Practical (assuming 12 weeks of one semester)</b>						
<b>Lectures = 0</b>		<b>Tutorials = 0</b>		<b>Practical = 96</b>		
<b>8. Course Description</b>						
The purpose of the Major Project is for the students to apply theoretical knowledge acquired during the Data Science program to a project involving actual data in a realistic setting.						
<b>9. Learning objectives:</b>						
Capstone projects are generally designed to encourage students to think critically, solve challenging problems, and develop skills such as oral communication, public speaking, research skills, media literacy, teamwork, planning, self-sufficiency, or goal setting						
<b>10. Course Outcomes (COs):</b>						
Integration. Students have integrated and/or applied what they have learned in their general education and major/minor coursework (and co-curricular activities, as appropriate).						
<b>11. List of Experiments</b>						
(GUIDELINES FOR MAJOR PROJECT)						
The aim of the Major Project is to lay a foundation after 6th Semester of BCA Programme.						
Each student should carry out Major Project using the software development tools/languages/technologies that they have learnt and/or have studied during the concerned semester.						
It should be compulsorily done by the student in-house under the supervision of the staff(s) assigned by Head of the Department/Director/Principal.						
The Major Project will be assessed by the concerned supervisor(s) and shall award marks out of 25 for each student as Internal Assessment.						
<b>12. Brief Description of self-learning / E-learning component</b>						
<a href="https://capstones.utah.edu/capstone-learning-outcomes/">https://capstones.utah.edu/capstone-learning-outcomes/</a>						