

Rayat Shikshan Sanstha's  
Yashavantrao Chavan Institute of Science Satara  
Department of Computer Science

## Syllabus for Bachelor of Science Part-III

**STRUCTURE OF COURSE :**

**1. FIFTH SEMESTER—(NO.OF PAPERS – 4)**

### Sem-V

Sr. No.	SUBJECT TITLE	Theory				Practical		
		PAPER NO and Paper Code	No. of lectures per week	Credits		No. of lectures Per week	Credits	
1	Computer Science	Paper-IX: BCST501	12	8	Practical Paper V & VI (BCSP 508,BCSP 509)	20	8	
		Paper-X: BCST502						
		Paper-XI: BCST503						
		Paper-XII: BCST50X (Elective:BCST504/505 /506)						
		SECCCST507	01	01		SECCCSP510	02	01
		AECCCST	03	02		-	-	-

**STRUCTURE AND TITLES OF PAPER OF B.Sc. COURSE:**

**B.Sc. III Semester V**

**Paper IX : BCST501:** Software Engineering

**Paper X: BCST502:** Introduction to .NET using C#

**Paper XI : BCST503:** Advanced JAVA Programming

**Paper XII : BCST50X: Elective**

**Elective : BCST50X**

1. **BCST504 :**IOT
2. **BCST505:** Python Programming
3. **BCST506:** Multimedia Computing

**Practical Paper-V:BCSP508:** Software Engineering and Introduction to .NET using C#

**Practical Paper-VI:BCSP509:** Advanced JAVA Programming& P-XII

**SECCCST507: Numerical Skill:** Programming with SCILAB

**SECCCSP510:** Programming with SCILAB LAB

**AECCCST :** English

2. **SIXTH SEMESTER—(NO.OF PAPERS - 4)**

**Sem-VI**

Sr. No.	SUBJECT TITLE	Theory				Practical		
		PAPER NO and Paper Code	No. of lectures per week	Credits		No. of lectures Per week	Credits	
1	Computer Science	Paper-XIII: BCST601	12	8	Practical Paper VII & VIII (BCSP 608,BCSP 609)	20	8	
		Paper-XIV: BCST602						
		Paper-XV: BCST603						
		Paper-XVI: BCST60X (Elective:BCST604/605 /606)						
		SECCCST607	01	01		SECCCSP610	02	01
		AECCCST	03	02		-	-	-

**STRUCTURE AND TITLES OF PAPER OF B.Sc. COURSE:**

**B.Sc. III Semester VI**

**Paper XIII : BCST601:** E – Commerce

**Paper XIV: BCST602:** Advanced C# Programming

**Paper XV : BCST603:** Computer Graphics

**Paper XVI : BCST60X: Elective**

**Elective : BCST50X**

1. **BCST604 :** Artificial Intelligence(AI)
2. **BCST605:** Web technology
3. **BCST606:** Software Project Management

**Practical Paper-V: BCSP608:** E – Commerce and Advanced C# Programming

**Practical Paper-VI: BCSP609:** Computer Graphics & P-XVI

**SECCCST607:** Entrepreneurship Development Program

**SECCCSP610:** Industrial Project

**AECCCST:**English

**BCST/Pxyz:**

B: B.Sc.

CS: Computer Science

T: Theory

P: Practical

x: Semester I to VI

yz: 01 to 10

**SECC:** Skill Enhancement Compulsory Course

**AECC:** Ability Enhancement Compulsory Course

**B.Sc. Part III :Computer Science**

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**Semester –V**

**Theory: Paper IX : BCST501: Software Engineering**

**Learning Objective:**

1. Be successful professionals in the field with solid fundamental knowledge of software engineering
2. Utilize and exhibit strong communication and interpersonal skills, as well as professional and ethical principles when functioning as members and leaders of multi-disciplinary teams
3. Apply their foundations in software engineering.
4. To adapt to readily changing environments using the appropriate theory, principles and processes

**Unit I:Introduction**

**(10)**

The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented), Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI).

**Unit II: Software Process and requirements**

**(10)**

Introduction ,S/W Engineering Paradigm , , System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.Functional and non-functional , user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document. Analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary.

**Unit III: Design Concepts and Principles**

**(12)**

Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system.

**Unit IV: Testing and Trends in Software Engineering**

**(13)**

Taxonomy of software testing, levels, test activities, types of s/w test, black box testing, testing boundary conditions, structural testing, mechanisms, regression testing, testing in the large. S/W testing strategies, strategic approach and issues, Black-Box Testing, White-Box Testing and their type, Basis Path Testing, unit testing, integration testing, validation testing, system testing and debugging.Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools.

**Books Recommended:**

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
4. James F Peters and WitoldPedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
5. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

6. Pfleeger, "Software Engineering", Pearson Education India, New Delhi, 1999.  
Carlo Ghezzi, Mehdi Jazayari and Dino Mandrioli, "Fundamentals of Software Engineering",  
Prentice Hall of India, New Delhi, 1991.

**Learning Outcomes:**

**Unit I:** Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle

**Unit II:** Work as an individual and as part of a multidisciplinary team to develop and deliver quality software .

**Unit III:** An ability to work in one or more significant application domains.

**Unit IV:** Demonstrate an ability to use the techniques and tools necessary for practice.

## Theory: Paper X: BCST502: Introduction to .NET using C#

### Learning Objective(s)

1. Students will gain the ability to implement the algorithms in C#.net, VB.net and ASP.net.
2. To provide the knowledge of Dot Net Frameworks along with C#.
3. To analyze object-oriented paradigm in the C # programming language.
4. To understand different windows based applications using standard controls and components.

### Unit I: .NET Architecture

(12)

Block diagram of .net framework, The Common Language Runtime, Advantages of Managed Code, A Closer Look at Intermediate Language & Assemblies, Support for Object Orientation and Interfaces, Distinct Value and Reference Types, Strong Data Typing, Garbage Collection

### Unit II: C# Basics

(12)

Getting Started with Introducing C#, Inside a C# Program, Compiling and Running the Program, Variables, Data Types, Flow Control, Enumerations, Namespaces, The using Statement, Namespace Aliases, The Main() Method, Multiple Main() Methods, defining & using functions & its scope, Passing Arguments to Main(), Parameter passing technique, Console I/O, Classes and Structs, Class Members, Data Members, Function Members, read-only Fields, properties and indexer, The Object Class, System.Object Methods, The ToString() Method, Delegates, Types of Delegates, Events, The Receiver's View of Events, Generating Events.

### Unit III: Inheritance and Polymorphism

(11)

Introduction-Types of Inheritance, Implementation Inheritance, Abstract Classes and Functions Sealed Classes and Functions, Constructors in Derived Classes, Interfaces, Defining and Implementing Interfaces, Derived Interfaces, Polymorphism, Method overloading, Operator overloading

### Unit IV: Windows base application

(10)

Creating a Windows Form Application, Standard Controls and Components, Properties and Events of the controls, Forms, Form Class, Multiple Document Interface (MDI), Custom Controls (user Controls)

### Recommended Text and Reference books:

1. Beginning Visual C#, Wrox Publication
2. Professional C# – Wrox Publication by Simon Robinson, Christain Nagel, Karli Watson, Jay Glynn, Morgan Skinner, Bill Evjen.
3. Inside C#, by Tom Archer ISBN: 0735612889 Microsoft Press © 2001, 403 pages  
Beginning ASP.NET 3.5, Wrox Publication
4. Programming ASP.NET 3.5 by Jesse Liberty, Dan Maharry, Dan Hurwitz, O'Reilly
5. ADO.NET Examples and Best Practices for C# Programmers, By Peter D. Blackburn Apress
6. Database Programming with C#, By Carsten Thomsen, Apress
7. Visual studio 2010 - A beginners guide - Joseph Mayo
8. Jeffrey R. Shapiro "The Complete Reference Visual Basic .NET" Tata Mcgraw Hill (2002 Edition).
9. Pro ASP.NET 4 in C# 2010, MacDonald and Freeman
10. Visual Studio 2010 and .NET 4 Six-in-One (Wrox Programmer to Programmer)

### Learning Outcomes:

**Unit I:** Student will be able to use the features of Dot Net Framework along with the features of C#

**Unit II:** Develop correct, well-documented programs using the C# programming language .

**Unit III:** Learn to develop object-oriented programs using C# classes and objects.

**Unit IV:** Learn to use Windows Forms and WPF to create GUI-based programs.

## Theory: Paper XI : BCST503: Advanced JAVA Programming

### LearningObjective:

1. To obtain the basic knowledge of object oriented programming, concepts of basic JAVA ,advanced JAVA and Server side scripting(JSP).
2. Student will be able to develop distributed business applications, develop web pages using advanced server-side programming through servlets and Java server pages.
3. To develop error-free, well-documented Java programs; test Java servlets while developing Java programs which incorporate advanced graphic functions.
4. Learn how to write, test, and debug advanced-level Object-Oriented programs using Java.

### UNIT I: Graphics Programming Using Swing

(12)

Working with 2D Basic Shapes,UsingColor,UsingFont,Displaying Images, Swing-1 Concept, MVC architecture,2 Component of swing: JFrame,JComponent,JLabel, JTextfields,JCheckbox, JPanel, JRadiobuttons, JTabbedPane,JButton, JTree,JTable, Jmenu,Difference between AWT and Swing.

### Unit II: AWT and Event Handling

(12)

AWT classes, Windows Fundamental: Component,Container, Panel, Window, Frame, Canvas, Working with graphics:drawing lines, rectangles, and circles. Event Handling: Event model,action event class, mouse event class, key event class, Listener interfaces: Action Listener, Mouse Listener, KeyListener,MouseEventListener.

### Unit III: Servlet and JSP

(10)

Introduction of servlet, Life cycle of servlet, Session, cookies,servlet jdbc connection. Components of JSP: Directives, Tags, Scripting elements,simple application using JSP.

### Unit IV: JDBC

(11)

JDBC Introduction, JDBC Architecture, Types of JDBC Drivers,The Connectivity Model, The java.sql package, Navigating the ResultSet object's contents, Manipulating records of a ResultSet object through User Interface , The JDBC Exception classes, Database connectivity, Data Manipulation (using Prepared Statements, Joins, Transactions, StoredProcedures), Data navigation.

### Text Book:

1. E. Balagurusamy“Programming with Java – A Primer”, TMH Publ,2nd Edition,2000.
2. Patrick Naughton and Herbert Scheldt “The Complete Reference Java 2”, 3rd Edition, TMH Publ, 2000.

### Reference book:

1. Jim Keogh, J2EE (Complete Reference)–TMH.
2. Kathy Sierra & Bert Bates, ”Head First Ejb”, O'REILLY publications.
3. Java server programming (J2EE 1.4) Black Book, ,2007, Kogent Solutions Inc.
4. Kathy Sierra & Bert Bates, “Head First Servlets &Jsp” by O'REILLY publications.
5. P.Naughton and H.Schildt, ”Java 2(Complete Reference)” by fourth Edition.

### Learning Outcomes:

**Unit I:** To learn how to design a graphical user interface (GUI) with Java Swing.To understand how to design GUI components with the Java Swing API.

**Unit II:** To learn how to use event handling in Java applications. To understand how to draw various shapes using AWT Components.

**Unit III:** To learn how to Develop JSP applications using JSP Tags, JSP Scriptlets and JSP Application Models. To understand how to work servlet.

**Unit IV:** To learn how to develop solid Java applications using Java Data Base Connectivity (JDBC) to interact with relational databases and how to do fundamental database activities utilizing JDBC (Java Database Connectivity) API.

**Theory: Paper XII: Elective  
BCST504: IOT**

**Learning Objectives**

1. To learn basics of Introduction to IoT.
2. To Understand state of Art -IoT Architecture & Market perspective model.
3. To Develop a grasp of the Android OS architecture and Understand the application development lifecycle
4. To Familiarize with Android's APIs for data storage, retrieval, user preferences, files and content providers

**Unit -I:Introduction to IoT Architecture (11)**

Introduction to IoT: - Definition and Characteristics.Web of Things V/s Internet of Things: -Two pillars of the web, architecture standardization for WoT, Platform middleware for IoT, Unified multitier WoT architecture, WoT portals and Business Intelligence.M2M to IoT: M2M Communication, Trends in Information and Communication Technology, Implications for IoT, IoT Architecture:Building architecture, Main design principles and needed capabilities, An IoT architectural overview.IoT Reference Model:IoT domain model.

**Unit - II: Android Development Environment (14)**

What is mobile Application Programming,Architecture and working of Android, What is Android, Future of Android,Tools and about Android SDK, Installing Java, Eclipse, and Android, Android Software Development Kit for Eclipse, Android Development Tool: Android Tools for Eclipse, AVDs: Smartphone Emulators, Image Editing. Android Software Development- Platform: Understanding Java SE and the Dalvik Virtual Machine, Directory Structure of an Android Project, Common Default Resources Folders, The Values Folder, Leveraging Android XML, Screen Sizes, Launching Your Application: The AndroidManifest.xml File, Creating Your First Android Application.

**Unit III:Handling User Interface(UI) Events (10)**

Introducing the Drawables, Implementing Images, Core Drawable Subclasses, Using Bitmap,PNG, JPEG and GIF Images in Android, Creating Animation in Android,An Overview of UI Events in Android, Listening for and Handling Events , Handling UI Events via the View Class, Event Callback Methods,Handling Click Events, Touchscreen Events, Keyboard Events, Context Menus, Controlling the Focus.

**Unit IV: Content Providers (10)**

An Overview of Android Content Providers, Defining a Content Provider, Working with a Database. Intents and Intent Filters: Intent, Implicit Intents and Explicit Intents, Intents with Activities, Intents with Broadcast Receivers.

**TEXT BOOKS:**

1. Internet of Things: Converging Technologies for smart Environments and IntegratedEcosystems, Dr. OvidiuVermesan, Dr. Peter Friess, River Publication.
2. From Machine to Machine to the Internet of Things: Introduction to a new Age ofIntelligence, Jan Hollar, VlasiosTsiasis Mulligan, Stefan Avesand, StamisKarnouskos,David Boyle, 1st Edition, Academic Press 2014.

**Recommended Books:**

1. The Internet of Things: An Overview, Understanding the issues and Challenges ofMore Connected World, Internet Society October 2015.
2. Designing the Internet of Things, Adrian McEwen, HakimCassimally.
3. Architecting the Internet of Things, Dieter Uckelmann, Mark Harrison, FlorianMichahelles, Springer 2011.

4. Beginning Android 4, OnurCinar ,Apress Publication
5. Professional Android 4 Application Development, Reto Meier, Wrox
6. Beginning iOS 6 Development: Exploring the iOS SDK, David Mark, Apress
7. Beginning Windows 8 Application Development, IstvánNovák, Zoltan Arvai,GyörgyBalássy and David Fulop
8. Professional Windows 8 Programming: Application Development with C# and XML,Allen Sanders and Kevin Ashley, Wrox Publication
9. Programming with Mobile Applications: Android, iOS, and Windows Phone 10,Thomas Duffy, Course Technology, Cengage Learning 2013

**Learning Outcomes:**

**Unit I :** Identify and design the new models for market strategic interaction

**Unit II :** Build and deploy his/ her Android application.

**Unit III :** Students understand the operation of the application, application lifecycle, configuration files, intents, and activities.

**Unit IV :** Students also develop a working knowledge of the custom UI elements and positioning.



**Theory: Paper XII: Elective  
BCST505: Python Programming**

**Learning Objectives:**

1. To acquire programming skills in core Python.
2. To acquire Object Oriented Skills in Python
3. To develop the skill of designing Graphical user Interfaces in Python
4. To inculcate Problem solving and programming capability.

**Unit -I: Overview of Programming (10)**

Structure of a Python Program, Elements of Python, Hello world application, Interpreters, modules, and a more interesting program, Variables, Names and Assignment, Types Input and Output Statements.

**Unit - II: Introduction to Python (13)**

Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

**Unit-III: Creating Python Programs and Structures (12)**

Control statements (Looping- while Loop, for Loop, Loop Control, Conditional Statement- if...else, Difference between break, continue and pass). Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.

**Unit-IV: Introduction to Advanced Python (10)**

Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming.

**Recommended Books:**

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation [www.python.org](http://www.python.org) 2010
3. Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist : learning with Python, Freely available online. 2012
4. <http://docs.python.org/3/tutorial/index.html>
5. <http://interactivepython.org/courselib/static/pythonds>
6. <http://www.ibiblio.org/g2swap/byteofpython/read/>

**Learning Outcomes:**

**Unit I:** Understand why Python is a useful scripting language for developers.

**Unit II:** Learnt how to design and program Python applications.

**Unit III:** Explain basic principles of Python programming language

**Unit IV:** Implementing database and GUI applications.

**Theory: Paper XII: Elective  
BCST506: Multimedia Computing**

**Learning Objectives:**

1. To demonstrate how still images, sound, and video can be digitized on the computer.
2. The students in this course will create their own multimedia programs using software tools.
3. The students will formulate a working definition of interactive multimedia.
4. To demonstrate competence in using the authoring multimedia program

**Unit-I Overview of multimedia computing**

**(08)**

Definitions, terms, terminologies, characteristics and requirements of different media; components of multimedia systems.

**Unit-II visual and audio system**

**(12)**

Human's visual and audio system Characteristics of human visual system, light and visible light; human retina structure and functions; non-perceptual uniform color models and perceptual uniform color models; Characteristics of human's audio system, frequency response and magnitude range.

**Unit-III Data Representation And Analysis**

**(14)**

Multimedia data representation and analysis Representation of sound/audio, image and video; speech generation, analysis and software; image analysis, display, and printing, coding And Compression Techniques -Multimedia coding and compression Coding requirements; compression principles; entropy and hybrid coding; compression standards: JPEG, MPEG, and etc. Multimedia technology development Multimedia history, technology development, challenging problem, research difficulty, multimedia industry

**Unit-IV Animation:**

**(11)**

The power of motion – Principles of Animation – Animation by computer – Making animations that work. Video : Using Video – How video works – Analog Display Standards – Digital Display standards – Digital Video – Video Recording and Tape formats – Shooting and Editing Video – Optimizing Video files

**Text Book:**

1. Tay Vaughan, Multimedia: Making it work, Tata McGraw Hill Edition, VII Edition, 2009.

**Reference Books:**

1. Z.N. Li and M.S. Drew, Fundamentals of Multimedia. Prentice Hall, 2003.
2. K. Jeffay and H. Zhang, Readings in Multimedia Computing and Networking. Morgan Kaufmann, 2002
3. Ranjan Parekh, Principles of Multimedia, Tata McGraw-Hill Education, 2013.
4. Ralf Steinmetz, Klara Nahrstedt, Multimedia Computing, Communications & Applications, Pearson Education, First Edition.

**Learning Outcomes:**

**Unit I :** understand the characteristics of different media, multimedia data, data formats;

**Unit II :** understand the characteristics of human's visual system; understand the characteristics of human's audio system;

**Unit III :** understand different compression principles; understand different compression techniques; be able to design and develop multimedia systems according to the requirements of multimedia applications.

**Unit IV:** Be able to design and implement media applications; Attributes for all-roundedness and to learn independently and search for the information required in solving problems

## Sem-V: Numerical Skills

### SECCCST507: Programming with SCILAB

#### Learning Objectives:

1. Understand the fundamentals of Digital Image Processing.
2. Analyze features of MATLAB as a programming tool.
3. Use of Image Compression and Segmentation.
4. choosing and evaluating the solutions for different technique problems.

#### Unit I- Introduction to Programming

(5L)

Definition, need, and types of programming languages and their selection criterion, Introduction to SCILAB (Features, capabilities and applications) and development environment, Program execution process and format. Concept and examples of built-in functions and the concept of toolboxes, Variables and constants: Definition, naming (identifiers or labels for different entities), initialization and accessing of variables. Constants and their representation, Data types-classification, memory requirement, range of values, usage and type specifiers.

#### Unit II- Control structure

(5L)

Branching: Conditional (if, if-else, nested and ladder if-else, switch constructs) and unconditional (break, continue and go to statements), Looping: Entry controlled (for and while),

#### Unit III- Graph Plots:

(5L)

Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save, Statements-tokens and expressions, Standard input and output statements and plot functions, Escape characters.

#### Unit IV- Arrays/Matrices and strings Functions

(5L)

Definition, declaration, initialization (static and run-time or dynamic) and arrays, matrices and strings, Accessing of strings, array and matrices elements and relevant operations, Comparison of built-in, library and user-defined functions.

#### Recommended Books:

1. M.Affouf, SCILAB by Example , CreateSpace Independent Publishing Platform,2012
2. H. Ramchandran, A.S. Nair, SCILAB , S.Chand, 2011
3. MATLAB and its Applications in Engineering, RajkumarBansal, Pearson Publishers, ISBN-10: 8131716813, 2009.
4. SCILAB(a Free Software to Matlab),Er. HemaRamachandran and Dr. Achutsankar Nair, S. Chand Publishers, ISBN-10: 8121939704,2011
5. <http://in.mathworks.com/>
6. <https://www.scilab.org/resources/documentation/tutorials>

#### Learning Outcomes:

1. Understand the main features of the SCILAB program development environment to enable their usage in the higher learning.
2. Implement simple mathematical functions/equations in numerical computing environment such as SCILAB.
3. Interpret and visualize simple mathematical functions and operations thereon using plots/display.
4. Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using SCILAB tools.

## Practical Paper No.V

### BCSP508: Lab Course - Software Engineering and Introduction to .NET using C# Lab

#### Learning Objectives:

1. You will broaden your knowledge of software engineering.
2. You will learn Software testing algorithms and programs.
3. To provide the knowledge of Dot Net Frameworks along with C#
4. To analyze object-oriented paradigm in the C # programming language

#### Part A: Software Engineering Lab

#### Sample Projects

1. DTC Route Information: Online information about the bus routes and their frequency and fares
2. Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
3. Patient Appointment and Prescription Management System
4. Organized Retail Shopping Management Software
5. Parking Allocation System
6. Wholesale Management System

#### Roadmap of Experiment:

1. Practical Title
  - Problem Statement,
  - Process Model
2. Requirement Analysis
  - Creating a Data Flow
  - Data Dictionary,
  - Use Cases
3. Project Management
  - Computing FP
  - Effort
  - Schedule, Risk Table, Timeline chart
4. Design Engineering
  - Architectural Design
  - Data Design, Component Level Design
5. Testing
  - Basis Path Testing

## Part B: Introduction to .NET using C# Lab

### Exercise:

1. Write a menu driven of a]Face value b]Armstrong c]Palindrome.
2. Write a program that implements the following string operations  
a] substring b]split c]replace d]insert e]padleft.
3. Write a program to overload method.
4. Write a program for destructor and static constructor.
5. Write a program for static class and partial class.
6. Write a program for static property and indexer.
7. Write a program to implement inheritance.
8. Write a program on nesting of a namespace.
9. Write a program to overloading operator.
10. Write a program for delegate.
11. Write a program that implement interface.
12. Write a program creating files & directories & display the following attribute-1]Name 2]Size  
3]Get creation time by using windows application.

### Learning Outcomes:

1. To learn how to design and program Python applications.
2. Implement database and GUI applications.
3. Student will be able to use the features of Dot Net Framework along with the features of C#
4. Develop correct, well-documented programs using the C# programming language .

## Practical Paper No.VI

**BCSP509: Lab Course-** Advanced Java Programming and IOT/ Python / Multimedia Computing

### Learning Objectives: -

1. To learn how to design a graphical user interface (GUI) with Java Swing and AWT.
2. Develop application using JSP and Servlet.
3. Develop a grasp of the Android OS architecture and understand the application development lifecycle.
4. Familiarize with Android's APIs for data storage, retrieval, user preferences, files and content providers.

### Part-A

#### Advanced Java Programming Lab

##### Exercise No.1 Programs on AWT, Swing and Database

1. Program on Swing
2. Program on AWT
3. Program on Database Connection

##### Exercise No.2 Programs on JDBC, Jsp and Cookie & Session

1. Program on cookie and Session
2. Program on Servlet JDBC
3. Simple application using JSP.

##### Exercise No.3 Programs on Servlet and SQL

1. Write a java program to implement the SQL login ID commands using JDBC.
2. Write a program to demonstrate the concept of SQL exception, SQL warning.
3. Write a program to create a servlet to read the parameters

##### Exercise No.4 Programs on SQL commands and JDBC Connection

1. Write a java program to implement the List.
2. Write a java program to implement the SQL commands using JDBC
3. Write a program to illustrate the use of JDBC connection

### Elective

#### BCST504: IoT

### Part-B

1. To develop an application that uses GUI Components, Fonts and Colors.
2. To develop an application that uses Layout Managers and Event Listeners.
3. To develop a native calculator application.
4. To develop an application that makes use of database.
5. To develop a native application that uses GPS location information.
6. To implement an application that writes data to the SD card.
7. To develop an application that draws basic graphical primitives on the screen.
8. To develop an application that makes use of RSS Feed.
9. To implement an application that implements multithreading.
10. To implement an application that creates an alert upon receiving a message.
11. To implement an application that creates alarm clock.

### Learning Outcomes:

1. To design and develop web applications to establish a JDBC connection between database and applications.
2. To learn to access database through Java programs, using Java Data Base Connectivity.
3. To learn create dynamic web pages, using Servlets and JSP.
4. Build and deploy his/ her Android application.

**OR**  
**Elective**  
**BCST505: Python Programming**  
**Part B:**

**Software Lab using Python:**

**Section: I ( Simple programs)**

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user.
3. Write a menu-driven program, using user-defined functions
  - i. To find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
  - ii. WAP to display the first n terms of Fibonacci series.
  - iii. WAP to find factorial of the given number.
  - iv. WAP to find sum of the following series for n terms:  $1 - 2/2! + 3/3! - \dots - n/n!$
  - v. WAP to calculate the sum and product of two compatible matrices.

**Section: II (Visual Python):**

*All the programs should be written using user defined functions, wherever possible.*

1. Write a menu-driven program to create mathematical 3D objects
  - I. curve
  - II. sphere
  - III. cone
  - IV. arrow
  - V. ring
  - VI. Cylinder.
2. WAP to read n integers and display them as a histogram.
3. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
4. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according
5. to the formula  $m=60/(t+2)$ , where t is the time in hours. Sketch a graph for t vs. m, where  $t \geq 0$ .
6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:  $P(t) = (15000(1+t))/(15+ e)$   
where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.
7. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
  - I. velocity wrt time ( $v=u+at$ )
  - II. distance wrt time ( $s=u*t+0.5*a*t*t$ )
  - III. distance wrt velocity ( $s=(v*v-u*u)/2*a$ )

**OR**  
**Elective**  
**BCST506: Multimedia Computing**  
**Part-B**

**Learning Objectives:-**

1. To demonstrate how still images, sound, and video can be digitized on the computer.
2. Create their own multimedia programs using software tools.
3. Formulate a working definition of interactive multimedia.
4. To demonstrate competence in using the authoring multimedia program

**List of Practical**

1. Create Rain Drops using Multimedia Tools
2. Create Sun Flower using Multimedia Tools.
3. Create Logo using Multimedia Tools.
4. Create an advertisement banner in Multimedia Tools.
5. Create See thru text using Multimedia Tools.
6. Create Marriage Invitation using Multimedia Tools.
7. Using Multimedia Tools -
  - i. create a growing plant animation using key frames
  - ii. Using Multimedia Tools create web site with rollover button.
8. Create an animation using shape tweening.
9. Create an animated web site.
10. Create a presentation for a college function.

**Learning Outcomes:**

1. To understand the characteristics of different media.
2. Understand the representations of different multimedia data; understand different data formats.
3. Be able to take into considerations in multimedia system designs.
4. To understand the characteristics of human's visual system and human's audio system;



## Sem-V: Numerical Skill

### SECCCSP510: Lab Course - Programming with SCILAB lab

#### Learning Objectives:

1. Understand the fundamentals of Digital Image Processing.
2. Analyze features of MATLAB as a programming tool.
3. Use of Image Compression and Segmentation.
4. choosing and evaluating the solutions for different technique problems.

#### Software Lab Based on SCILAB:

1. Display your country name.
2. Compute the area and circumference of a circle given the radius.
3. Compute simple interest given the interest rate, principal and duration.
4. Compute compound interest given the interest rate, principal, compounding nature and duration.
5. Solve-
  - a) Factorial of a single digit number.
  - b) Swap contents of two variables without using intermediate variables.
  - c) Absolute value of a number.
  - d) Largest of three numbers.
  - e) Logarithm of a number.
6.  $Y = \sin(\theta_1 + \theta_2) + \cos(\theta_1 - \theta_2)$  given  $\theta_1$  and  $\theta_2$  in degrees.
7. Average of N numbers read through keyboard (at run-time).
8. Average of the numbers in 3x4 matrix.
9. Plot discharging voltage across capacitor.
10. Analyze the program

Given the program or block of program (Matlab or Scilab), analyze the program and estimate/predict/record the output or error as the case may be. Instruct the student to justify the answer/output.

[For e.g.,  $A=246$ ;  $B=-90$ ;  $C=A+B*(10/A)+100$ ; `sprintf('%f', C)`; in Matlab] Such analysis should be carried out for all the concepts covered in this course.

#### Recommended Books:

1. M.Affouf, SCILAB by Example , CreateSpace Independent Publishing Platform,2012
2. H. Ramchandran, A.S. Nair, SCILAB , S.Chand, 2011
3. MATLAB and its Applications in Engineering, RajkumarBansal, Pearson Publishers, ISBN-10: 8131716813, 2009.
4. SCILAB(a Free Software to Matlab),Er. HemaRamachandran and Dr. Achutsankar Nair, S. Chand Publishers, ISBN-10: 8121939704,2011
5. <http://in.mathworks.com/>
6. <https://www.scilab.org/resources/documentation/tutorials>

#### Learning Outcomes:

1. Understand the main features of the SCILAB program development environment to enable their usage in the higher learning.
2. Implement simple mathematical functions/equations in numerical computing environment such as SCILAB.
3. Interpret and visualize simple mathematical functions and operations thereon using plots/display.
4. Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using SCILAB tools.

## Semester –VI

Sr. No.	SUBJECT TITLE	Theory				Practical	
		PAPER NO and Paper Code	No. of lectures per week	Credits		No. of lectures Per week	Credits
1	Computer Science	Paper-XIII: BCST601	12	8	Practical Paper VII & VIII (BCSP 608,BCSP 609)	20	8
		Paper-XIV: BCST602					
		Paper-XV: BCST603					
		Paper-XVI: BCST60X (Elective:BCST604/605 /606)					
		SECCCST607	01	01	SECCCSP610	02	01
		AECCCST	03	02	-	-	-

### STRUCTURE AND TITLES OF PAPER OF B.Sc. COURSE:

#### B.Sc. III Semester VI

**Paper XIII : BCST601:** E – Commerce

**Paper XIV: BCST602:** Advanced C# Programming

**Paper XV : BCST603:** Computer Graphics

**Paper XVI : BCST60X: Elective**

**Elective : BCST50X**

1. **BCST604 :** Artificial Intelligence(AI)
2. **BCST605:** Web technology
3. **BCST606:** Software Project Management

**Practical Paper-V: BCSP608:** E – Commerce and Advanced C# Programming

**Practical Paper-VI: BCSP609:** Computer Graphics & P-XVI

**SECCCST607:** Entrepreneurship Development Program

**SECCCSP610:** Industrial Project

**AECCCST:** English

**Semester VI**  
**Theory: Paper XIII: BCST601: E – Commerce**

**Learning Objectives**

1. To understand the complexity of e-commerce and its many facts.
2. To explore how e-business and e-commerce fit together.
3. To recognize the benefits and limitations of e-commerce.
4. To identify the main barriers to the growth and development of e-commerce in organisations.

**Unit -I: An introduction to Electronic commerce (10)**

What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

**Unit - II: Internet Security (12)**

Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime( Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus( How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorization and Authentication, Firewall, Digital Signature( How it Works)

**Unit-III :Electronic Data Exchange (12)**

Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash

**Unit IV: Planning for Electronic Commerce (11)**

Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites, **Internet Marketing:** The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

**Recommended Books**

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and DebjaniNag , E- Commerce , 2005.
3. Gray P. Schneider , Electronic commerce, International Student Edition, 2011,
4. HENRY CHAN, RAYMOND LEE, THARAM DILLON, ELIZABETH CHANG E-COMMERCE, FUNDAMENTALS AND APPLICATIONS, Wiely Student Edition, 2011

**Learning Outcomes:**

**Unit I :** Gain a comprehensive understanding of the E-Commerce landscape, current and emerging business models, and the technology and infrastructure underpinnings of the business.

**Unit II:** Develop an understanding on how internet can help business grow .

**Unit III:** Able to understand on the importance of security, privacy, and ethical issues as they relate to E-Commerce.

**Unit IV:** Will be able to Recognize the impact of Information and Communication technologies, especially of the Internet in business operations

## **Theory: Paper XIV :BCST602: Advanced C# Programming**

### **Learning Objective:**

1. To Streamline data-centric applications with C# extended features and the Entity Framework
2. To Integrate Microsoft Core with .NET Framework applications for high-performance data access.
3. To analyze the various stages in the processing of web forms and different types of controls.
4. To implement and deploy the website.

### **Unit I: Exception Handling and Threading (10)**

Try, catch, throw, finally, Nested try, Custom exception, What is threading?, Applications with Multiple ,Threads, Thread Priorities, Synchronization

### **Unit II: File I/O and Streams (12)**

Working with Drives, Directories, and Files, The DriveInfoClass, The Directory and DirectoryInfo ,Classes, File and FileInfo, Working with Paths, File and Directory Properties, Attributes, and Access, Control, Lists, Reading and Writing Files, Streams, Readers and Writers, Compressing Streams.

### **Unit III: ASP.NET (12)**

Building a Web Application, Examples Using Standard Controls, Using HTML Controls, Validating Form Input Controls using Validation Controls, Understanding Applications and State, Applying Styles, Themes, and Skins, Creating a Layout Using Master Pages, Binding to Databases using Controls, Creating a Site Navigation Hierarchy, Navigation Controls , Membership and Role Management, Login Controls, Securing Applications Caching For Performance, Working with XML, Using Crystal Reports in Web Forms.

### **Unit IV: DBMS (11)**

Databases: Introduction, Data Management with ADO.net, Using SQL to work with database, retrieving and manipulating data with SQL, working with ADO.NET, ADO.NET architecture, introduction to MVC architecture, deploying the web site.

### **Recommended Text and Reference books:**

1. Beginning Visual C#, Wrox Publication
2. Professional C# – Wrox Publication by Simon Robinson, Christain Nagel, Karli Watson, Jay Glynn, Morgan Skinner, Bill Evjen.
3. Inside C#, by Tom Archer ISBN: 0735612889 Microsoft Press Â© 2001, 403 pages  
Beginning ASP.NET 3.5, Wrox Publication
4. Programming ASP.NET 3.5 by Jesse Liberty, Dan Maharry, Dan Hurwitz, O'Reilly
5. ADO.NET Examples and Best Practices for C# Programmers, By Peter D. Blackburn Apress
6. Database Programming with C#, By Carsten Thomsen, Apress
7. Visual studio 2010 - A beginners guide - Joseph Mayo
8. Jeffrey R. Shapiro "The Complete Reference Visual Basic .NET" Tata Mcgraw Hill (2002 Edition).
9. Pro ASP.NET 4 in C# 2010, MacDonal and Freeman
10. Visual Studio 2010 and .NET 4 Six-in-One (Wrox Programmer to Programmer)

### **Learning Outcomes:**

**Unit I:** Understand the useful and advanced concepts in C# like multithreading, error handling, reflection etc.

**Unit II:** Understand the new features that are unique to C# such as properties, indexers, delegates, events and namespaces.

**Unit III:** Understand the features of ASP.NET version 2.0 and the various stages in the processing of web forms and different types of controls such as server controls, web controls, HTML controls, validation controls, user control and data binding controls

**Unit IV:** Understand how ADO.NET is used in web development using ASP.NET and the concept of files and how database connection is established.

## Theory: Paper XV: BCST603: Computer Graphics

### Learning Objectives:

1. To understand the basics of various input and output computer graphics.
2. To make the student present the content graphically.
3. To Gain knowledge about graphics hardware and software.
4. To understand Various 2D and 3D objects transformation techniques

### Unit-I Basic of Computer Graphics

(12)

Overview of Computer Graphics, Computer Graphics Application and Software, Description of some graphics devices, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor, LCD displays.

### Unit-II Graphics Primitive

(10)

Graphics programming, initializing the graphics, Graphical functions, simple Programs Point Plotting Techniques, Qualities of good line drawing algorithms, The Digital Differential Analyzer (DDA), Bresenham's Algorithm, Generation of Circles.

### Unit-III Two-Dimensional and Three-Dimensional Transformations

(13)

Introduction of Transformations, Types, Transformations and Matrices, Transformation Conventions, Homogeneous Coordinates and Matrix Representation of 2D and 3D Transformations, Translations, Rotation, Reflection, Scaling, Shearing. Combined Transformation, Transformation of Points.

### Unit-IV Clipping Techniques and OpenGL

(10)

Clipping, Need for Clipping, Types of Clipping, Point Clipping, Line Clipping, Text Clipping, Mid Point Subdivision Line Clipping Algorithm, Drawing Polygon, Introduction to OpenGL, Features in OpenGL, OpenGL operations, Abstractions in OpenGL – GL, GLU & GLUT, 3D viewing pipeline, viewing matrix specifications, a few examples and demos of OpenGL programs.

### Reference Books:

1. Computer Graphics, D.HearnAndP.Baker - Pearson Education - C Version
2. Computer Graphics, with OpenGL Hearn and Baker, - Pearson
3. Computer Graphics, Sinha &Udai, - TMH
4. Computer Graphics, Foley and van Dam - Person Education
5. F. S. Hill Jr., Computer Graphics using OpenGL, Pearson Education, 2003.

### Learning Outcomes:

**Unit I :** To understand the various computer graphics, graphics devices. Able to learn about graphics techniques and graphics displays.

**Unit II :** To understand the graphics programs and implementation, graphics functions and how to apply it. Able to learn about drawing various shape using graphics.

**Unit III :** To understand 2D and 3D viewing technologies, Various 2D and 3D objects transformation techniques. To understand programming using 2D and 3D transformation.

**Unit IV:** To understand clipping techniques and drawing various shape using it. To able to learn OpenGL, its operations and programming using OpenGL.

**Theory: Paper XVI: Elective  
BCST604: Artificial Intelligence (AI)**

**Learning Objectives**

1. To create appreciation and understanding of both the achievements of AI and the theory underlying those achievements.
2. To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
3. To review the different stages of development of the AI field from human like behavior to Rational Agents.
4. To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.

**Unit -I: Introduction (11)**

Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment

**Unit - II: Problem Solving and Searching Techniques (12)**

Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A\* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

**Unit - III: Internet Security (10)**

Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs. Programming in Logic (PROLOG)

**Unit-IV: Dealing with Uncertainty and Inconsistencies (12)**

Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations. Understanding Natural Languages: Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

**Recommended Books:**

1. DAN.W. Patterson, Introduction to A.I and Expert Systems – PHI, 2007.
2. Russell & Norvig, Artificial Intelligence-A Modern Approach, LPE, Pearson Prentice Hall, 2nd edition, 2005.
3. Rich & Knight, Artificial Intelligence – Tata McGraw Hill, 2nd edition, 1991.
4. W.F. Clocksin and Mellish, Programming in PROLOG, Narosa Publishing House, 3rd edition, 2001.
5. Ivan Bratko, Prolog Programming for Artificial Intelligence, Addison-Wesley, Pearson Education, 3rd edition, 2000.

**Learning Outcomes:**

**Unit I:** Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.

**Unit II:** Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.

**Unit III:** Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing

**Unit IV:** Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.

**Theory: Paper XVI: Elective  
BCST605: Web Technology**

**Learning Objective(s)**

1. Student will be familiar with client server architecture.
2. Able to develop a web application using java technologies
3. Students will gain the skills and project-based experience needed for entry into web application and development careers.
4. Learning different web related technologies currently used.

**Unit I: Web Essentials**

**(10)**

Introduction ,Web Essentials: Clients, Servers, Communication, Basic Internet Protocols, HTTP Request Message, HTTP Response Message, HTTPS protocol, Web Clients, Generations of web applications

**Unit II: Introduction to Client-Side Programming**

**(12)**

Introduction to JavaScript, Basic Syntax, Variables and Data Types, Statements, Operators, literals, functions. JavaScript Objects–properties, references, methods, constructors, Arrays, other built-in objects, Debugging JavaScript, Introduction to Host Objects, Document Object Model (DOM), Document tree, DOM event handling, jquery, YUI Library

**Unit III: Server-Side Programming**

**(12)**

Java servlet: architecture, life cycle. The Client Request – form data, request headers. The Server Response- HTTP Status Codes, HTTP Response Headers. Sessions, Cookies, URL Rewriting, Concurrency in servlets, Separating Programming and Presentation: Java server pages, Basic JSP, JavaBeans Classes and JSP, JSF, Java Database Connectivity (JDBC), PHP

**Unit IV: Representing Web Data**

**(11)**

XML–Namespaces, AJAX–Overview, basics, toolkits, security, DOM based XML processing, XSL, XPath, XSLT, Content Management Frameworks (Drupal, Joomla, etc.) Web configuration security: Apache Security, Nginx Security, jBoss Remote Command Execution , Tomcat Remote Command Execution , HTTP Parameter Pollution

**Text Books:**

1. Jeffrey C. Jackson, "Web Technologies : A Computer Science Perspective", Pearson Education, 2nd edition,
2. Hanqing Wu, Liz Zhao "Web Security: A WhiteHat Perspective" CRC press

**References:**

1. Marty Hall, Larry Brown, "Core Web Programming", Pearson Education, 2nd Edition, 2001.
2. Robert. W. Sebesta, "Programming the World Wide Web", Pearson Education, 4th Edition, 2007.
3. H.M. Deitel, P.J. Deitel and A.B. Goldberg, "Internet & World Wide Web How To Program", Pearson Education, 3rd Edition, 2006.

**Learning Outcomes:**

**Unit I:** Understand the fundamental of web protocols.

**Unit II:** Learning different web related technologies currently used.

**Unit III:** Studying data handling in web systems.

**Unit IV:** Analyzing wide range of web security vulnerabilities and issues.

**Theory: Paper XVI: Elective  
BCST606: Software Project Management**

**Learning Objectives:**

1. Understand the fundamental principles of Software Project management.
2. Grasp good knowledge of responsibilities of project manager and how to handle these.
3. Be familiar with the different methods and techniques used for project management.
4. To learn Software Metrics and Quality Standards.

**Unit I: Introduction to Project Management and Components (12)**

What is Project? What is Project management? Project phases and project life cycle, organizational structure, Qualities of Project Manager. Project Management Components- Project Integration Management-Project plan development and execution, change controls, configuration management.

**Unit II: Scope, Time and Cost Management (10)**

Scope Management-Strategic planning ,scopeplanning,definition ,verification and control. Time management- Activity planning, schedule development and control. Cost Management- Cost estimation and Control.

**Unit III: Quality and Risk Management (11)**

Quality Management -Quality planning and assurance. Human Resource Management- Organizational planning , staff acquisition. Communication Management-Information distribution , reporting. Risk Management-Risk identification, Quantification and control. Procurement Management- Solicitation, contract administration.

**Unit IV: Software Metrics and Quality Standards (12)**

Software Metrics- The scope of software metrics, software metrics data collection, analyzing software data, measuring size, structure, external attributes. Software Reliability- Measurement and prediction, resource measurement, productivity, teams and tools. Planning a measurement program. What is metrics plan?: Developing goals, questions and metrics. Where and When: Mapping measures to activities. How: Measurement tools. Who: Measurers , analyst, tools revision plans. Quality Standards – CMM, PSP/TSP

**References**

1. Information Technology Project Management, 6th Edition Kathy Schwalbe
2. Software Metrics: A rigorous and Practical Approach by Norman E. Fenton and Shari Lawrence Pfleeger, International Thomson Computer Press
3. Software Engineering: A Practioner's Approach by Roger S. Pressman
4. Practical Software Metrics for Project Management and Process Improvement Robert B. Grady, Prentice hall,

**Learning Outcome:**

**Unit I:** Understand the fundamental principles of Software Project management & will also have a good knowledge of responsibilities of project manager and how to handle these.

**Unit II :** Be familiar with the different methods and techniques used for project management.

**Unit III:** good knowledge of the issues and challenges faced while doing the Software project Management and will also be able to understand why majority of the software projects fails and how that failure probability can be reduced effectively.

**Unit IV:** Will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques



**Semester VI**  
**SECCCST607: Entrepreneurship Development**

**Learning Objectives:**

1. To study the product design and development process
2. Identification of opportunities for development
3. To learn the mechanism of finance and fund raising
4. To understand the importance of marketing for better business opportunities

**Unit I: Entrepreneurship, Creativity & Opportunities**

**05**

Concept, Classification & Characteristics of Entrepreneur, Creativity and Risk taking, Risk Situation, Types of risk & risk takers, Business Reforms, Process of Liberalization, Reform Policies, Impact of Liberalization, Emerging high growth areas, Business Idea Methods and techniques to generate business idea, Transforming Ideas into opportunities transformation involves, Assessment of idea & Feasibility of opportunity SWOT Analysis

**Unit II: Information and Support Systems**

**05**

Information needed and Their Sources: Information related to project, Information related to support system, Information related to procedures and formalities, Support Systems Small Scale Business Planning, Requirements, Govt. & Institutional Agencies, Formalities Statutory Requirements and Agencies. **Market Assessment**- Marketing - Concept and Importance Market Identification, Survey Key components Market Assessment

**Unit III: Business Finance & Accounts**

**05**

**Business Finance**- Cost of Project Sources of Finance Assessment of working capital Product costing Profitability Break Even Analysis Financial Ratios and Significance **Business Account**- Accounting Principles, Methodology Book Keeping Financial Statements Concept of Audit. **Business Plan** Business plan steps involved from concept to commissioning, Activity Recourses, Time, Cost **Project Report** Meaning and Importance, Components of project report/profile (Give list), Project Appraisal: 1) Meaning and definition 2) Technical, Economic feasibility 3) Cost benefit Analysis

**Unit IV: Enterprise Management and Modern Trends**

**05**

**Enterprise Management**- Essential roles of Entrepreneur in managing enterprise Product Cycle: Concept and importance Probable Causes of Sickness Quality Assurance: Importance of Quality, Importance of testing E-Commerce: Concept and Process **Electronics Entrepreneur**- Assess yourself-are you an entrepreneur? Prepare project report for electronics and study its feasibility.

**Learning Outcomes:**

1. Able to identify feasibility of product design and development
2. Able to get the idea about IP rights
3. Avail the financial and marketing skill
4. Able to prepare the proposal for small scale industry.

**• Recommended Books:**

1. R. G. Kaduskar, V. B. Baru. Electronic Product Design. Second edition Wiley India
2. Alpana Trehan. Entrepreneurship. Wiley India
3. G. N. Pandey. A complete guide to successful Entrepreneurship, Vika

**Semester VI**  
**Practical Paper No.VII**

**BCSP608: Lab Course - E-Commerce and Advanced C# Programming Lab**

**Learning Objectives:**

1. Learn to design web page using html.
2. Develop familiarity with the **JavaScript** language.
3. To develop, implement and creating Applications with C#.
4. To develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web

**Part A:**  
**E-Commerce Lab**

**Exercise No.1 Programs on Html**

1. Write a HTML program to design a form which should allow to enter your personal data.  
( Hint: make use of text field, password field, e-mail, lists, radio buttons, checkboxes, submit button)
2. Write html code to generate following output.
  - Coffee
  - Tea
    - Black Tea
    - Green Tea
  - Milk.
3. Write a HTML code to generate following output

Name :	<input type="text"/>
Password	<input type="password"/>
Confirm Password	<input type="password"/>
City	<input type="text" value="Select City"/>
Gender	<input type="radio"/> Male <input type="radio"/> Female
Gmail	<input type="text"/>
<input type="submit" value="Submit"/>	

**Exercise No.2 CSS and JavaScript**

1. Design a CSS to create menu.
2. Design a webpage i.e. Bio data using CSS.
3. Write a program to create table and list using CSS.
4. Design a home page using javascript.

**Exercise No.3 Programs on ASP and XML**

- 1 .Create a web page and display data from database.
- 2 . Create a simple XML document to display address book.

**Learning Outcomes:-**

1. Able to learn how to build real world creative and modern website .
2. Creating ASP.Net applications using standard .net controls.
- 3.will learn the basics and history of XML and how to write your own XML documents.
4. You will learn how to make your pages dynamic based upon user interaction.

**Part B:**  
**Advanced C# Programming**

1. Write a program for thread.
2. Write a program for Reading/Writing file by using byte stream class.
3. Write a program for copy one file to another file.
4. Write a program for Random file.
5. Simple application using web controls
  - a) Finding factorial Value
  - b) Money Conversion
  - c) Quadratic Equation
  - d) Temperature Conversion
  - e) Login control
6. Calendar control
  - a) Display messages in a calendar control
  - b) Display vacation in a calendar control
  - c) Selected day in a calendar control using style
7. Treeview control
  - a) Treeview control and datalist
  - b) Treeview operations
8. Use of Validation controls.
9. Simple Applications using database
  - a) Create a web page for student and display their records using insert, delete, update, show operation.
  - b) Report creation using crystal report
10. Web application using controls
  - a) Creating Master page with Multi-form web applications.

**Learning Outcomes:**

1. Can produce the requirements and use cases the client wants for the software being produced.
2. Participate in drawing up the project plan. The plan will include at least extent and work assessments of the project, the schedule, available resources, and risk management can model and specify the requirements of mid-range software and their architecture.
3. To understand and be able to explain Security in the .NET framework and Deployment in the .NET.
4. To develop Assemblies and Deployment in .NET, Mobile Application Development.

**Semester VI**  
**Practical Paper No.VIII**

**BCST609: Lab course** –Computer Graphics and Artificial Intelligence(AI)/ Web Technology  
/Software Project management Lab

**Learning Objectives:-**

1. The learning objectives of this course are:
2. To learn how to use graphics commands and Functions in graphics.
3. To implementation 2D and 3D transformation
4. Develop OpenGL programming in graphics.

**Part A :**

**Computer Graphics lab**

**Exercise No.1** Programs on Graphics Basics

1. Introduction to various graphics commands.
2. Develop the DDA Line drawing algorithm

**Exercise No.2** Programs on Operations and Functions

1. Draw basic graphics construction
2. Functions in Graphics.

**Exercise No.3** Programs on 2D and 3D Transformation

1. Translation, Rotation, and Scaling using Composite Transformation
2. Implement Standard Perspective Projection in 3-Dimensions.

**Exercise No.4** Programs on Clipping and OpenGL

- 1.To implement Point Clipping.
2. To implement OpenGL programming.

**Learning Outcomes:**

1. To understand basic graphics command.
2. To learn various functions and basic operations
3. To understand implementation of 2D and 3D Transformation.
4. Able to understand different clipping methods .
5. To capable of using OpenGL to create interactive computer graphics.

**Elective**

**BCST604: Artificial Intelligence Lab**

**Part B:**

**Learning Objectives:**

1. Interpret PROLOG programs.
2. write PROLOG programs to solve a variety of problems.
3. use PROLOG as an effective AI programming tool.
4. develop and test Prolog programs using a suitable Prolog interpreter.

**Lab Exercise :**

1. Write a prolog program to calculate the sum of two numbers.
2. Write a prolog program to find the maximum of two numbers.
3. Write a prolog program to calculate the factorial of a given number.
4. Write a prolog program to calculate the nth Fibonacci number
5. Write a prolog program, insert\_nth(item, n, into\_list, result) that asserts that result is the list into\_list with item inserted as the n'th element into every list at all levels.
6. Write a Prolog program to remove the Nth item from a list.
7. Write a Prolog program, remove\_nth(Before, After) that asserts the After list is the Before list with the removal of every n'th item from every list at all levels.
8. Write a Prolog program to implement append for two lists.
9. Write a Prolog program to implement palindrome(List).

**Learning Outcomes:-**

1. This Prolog practical offers you the opportunity to familiarize yourself with the basic principles of the programming language Prolog.
2. About the role and place of Prolog in the area of Artificial Intelligence (AI), and in programming-language research more in general
3. Able to learn the basic principles of Prolog by doing a number of exercises.
4. To develop a Prolog program on our own.

[OR]

**Elective**

**BCST605: Web Technology Lab**

**Part B:**

**Learning Objective(s)**

1. Student will be familiar with client server architecture and able to develop a web application using java technologies
2. Students will gain the skills and project-based experience needed for entry into web application and development careers.

**Lab:**

1. Create Application form using various text formats.
2. Create YCIS COLLEGE website using HTML tags.
3. Create calculator format using java script.
4. Create Login format using arrays
5. Add a simple script using Click event
6. Create Employee details using schemas.
7. Create Payroll system using XSL.
8. Change the color of the old image to new image and apply filter effects.
9. Working with different layers.
10. Creating a banner – Typography.
11. Draw an image in flash.
12. Animation with different layers with adding sounds

**Course Outcomes:**

1. Understand the fundamental of web protocols.
2. Learning different web related technologies currently used.
3. Studying data handling in web systems.
4. Analyzes the nature of web and application level security and describes how to solve problems on a practical basis.

**[OR]**  
**Elective**  
**BCST606: Software Project Management**  
**Part-B**

**Learning Objectives:**

1. Understand the fundamental principles of Software Project management.
2. Grasp good knowledge of responsibilities of project manager and how to handle these.
3. Be familiar with the different methods and techniques used for project management.
4. To learn Software Metrics and Quality Standards.

**Lab:-**

1. For Internal Evaluation group-wise case study is compulsory.
  - i. Abnormal Psychology
  - ii. Accounting
  - iii. Advanced Algorithms
  - iv. Advanced Computational Complexity
  - v. Advanced Computer Architecture
  - vi. Advanced Computer Programming
  - vii. Advanced Operating Systems
2. List the problems you experienced when you carried out a recent IT-related assignment. Try to put these problems into some order of magnitude. For each problem, consider whether there was some way in which the problem could have been reduced by better organization and planning by yourself.
3. Identify the main types of personnel employed in an information systems department. For each stage of a typical IS development project, list the types of personnel who are likely to be involved.
4. A public library department is considering the implementation of a computer-based system to help administer book loans at libraries. Identify the stakeholders in such a project. What might be the objectives of such a project and how might the success of the project be measured in practical terms?

**Learning Outcome:**

1. Understand the fundamental principles of Software Project management & will also have a good knowledge of responsibilities of project manager and how to handle these.
2. Be familiar with the different methods and techniques used for project management.
3. good knowledge of the issues and challenges faced while doing the Software project Management and will also be able to understand why majority of the software projects fails and how that failure probability can be reduced effectively.
4. Will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques

**SECCCSP610: Industrial Project**

**Course Work: 25**

Industrial Visits and report writing, Preparation of entrepreneurship Proposal and Presentation.

**Nature of Question Paper:**

1. **ISE-I** : Marks =10: Unit 1 and 2 : Multiple Choice questions : Online Examination: ( 1X10)
2. **ISE-II**: Marks =10: Unit 1,2 and3: Descriptive short questions (2X5)
3. **ESE**: Marks =50:  
Unit 1 to 4:  
Q.1. Define the following terms (5 X2=10)  
Q.2. Attempt any two out of three (2X10=20)  
Q.3. Attempt any four out of six( 4X5=20)

(ISE- Internal Semester Examination, ESE – End Semester Examination)

Dr. A.P.Torane  
Chairman  
**B.O.S. (Computer Science)**