

**Yashvantrao Chavan Institute of Science Satara  
Department of Computer Science**

**Syllabus for Bachelor of Science Part-I**

**1. TITLE : COMPUTER SCIENCE**

**2. YEAR OF IMPLEMENTATION:** New Syllabi for the B.Sc. I Computer Science will be implemented from June 2018 onwards.

**3. PREAMBLE:**

Bachelor of Science is an integrated academic degree in the faculty of Science. The revision of existing syllabus of Computer Science subject in Science Faculty is essential. This is a humble endeavor to initiate the process towards an era of knowledge. The students from Science faculty should also be competent for this change in the technology. In this year, a student will be able to handle computers, develop the programs in languages and other peripherals with confidence. In the subject, the student will also get a basic and proper knowledge in the field of Programming skills.

**4. GENERAL OBJECTIVES OF THE COURSE:**

- 1) To learn basics of Computer, hardware, software, networking.
- 2) To inculcate the software development attitude and generate interest in the field of Technology.
- 3) To develop programming skills, management skills, writing skills, Project Analysis skill among students.
- 4) To inculcate research attitude among students.

**5. DURATION:**

- The course shall be a full time course.
- The duration of course shall be of Three years.

**6. PATTERN :** Semester (CBCS)

**7. MEDIUM OF INSTRUCTION :** ENGLISH

**8. STRUCTURE OF COURSE:**

**1. FIRST SEMESTER—(NO.OF COURSES2)**

**Sem-I**

Sr. No.	SUBJECT TITLE	Theory				Practical	
		COURSE NO and Course Code	No. of lectures per Week	Credits		No. of lectures Per week	Credits
1	Computer Science	Course-I: BCST101	5	4	Practical Course – I : BCSP103	4	2
		Course-II: BCST102					

## 2. SECOND SEMESTER—(NO.OF COURSES2)

### Sem-II

Sr. No.	SUBJECT TITLE	Theory			Practical		
		COURSE NO and Course Code	No. of lectures Per week	Credits	No. of lectures Per week	Credits	
1	Computer Science	Course-III: BCST201	5	4	Practical Course – II : BCSP203	4	2
		Course-IV: BCST202					

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

#### B.Sc. I Semester I

**Course I :** C Programming - I

**Course II :** Database Management Systems

**Practical Course-I :** C Programming – I and Database Management Systems

#### B.Sc. I Semester II

**Course III :** C Programming - II

**Course IV :** Relational Database Management Systems

**Practical Course-II :** C Programming – II and Relational Database Management Systems

### 4. OTHER FEATURES :

#### A) LIBRARY :

1. Let Us C – YashwantKanetkar ,BPB Publications, Edition 15
2. Programming in ANSI C , E. Balagurusamy McGraw Hill Education Edition 6
3. Programming in C – Schuam outline Series
4. The C Programming Language – Brian Kernighan and Dennis Ritchie , Pearson Education India , Edition 2
5. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
6. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
7. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
8. SQL,PL/SQL The Programming Language of ORACLE – Ivan Bayross. BPB Publication 4<sup>th</sup> Edition .

#### B) SPECIFIC EQUIPMENTS :

Computers, Laptops, Printers, Scanners, LCD Projectors, E- Podium, Smart Board, Document Camera Visualizer

#### C) LABORATORY EQUIPMENTS :

**Softwares :** Microsoft Office, Microsoft SQL Server, ORACLE, Microsoft Visual Studio, UBUNTU 16.04 : 64 bit, Wamp server

**Hardwares:** Computers, Laptops, Printers, Scanners, LCD Projectors, E- Podium, Smart Board, Document Camera Visualizer

**Semester -I Theory:BCST101: Course I: C Programming I**

**Learning Objectives:**

1. To impart adequate knowledge on the need of programming languages.
2. To evaluate the need of problem solving techniques.
3. To develop programming skills using the fundamentals and basics of C Language.
4. To learn to write algorithms and flowchart of programs in C and to solve the problems.

**Unit I : Introduction to 'C' language (12L)**

Problem Solving definition, Step involving in problem solving, Algorithm, Characteristics, Flowcharts, Definition, Symbol, features. History of 'C' language, Structure of 'C' programs, 'C' Tokens, Character set and keywords, Constant and its type, Variable and its type Data types, Operators and its types, Precedence rules, Input/output using standard functions.

**Unit II : Branching and Looping (8L)**

Conditional branching, if, if else, else if ladder, switch, Nested statements. Looping – for, while, do-while statements. Unconditional control statements- goto, break and continue.

**Unit III : Functions (8L)**

Definition, types & parts of functions, Local and global variable, Library functions and User defined functions, Passing arguments to a function, return statement, recursion, Scope and lifetime of variables, Storage classes-Auto, Extern, Register, Static.

**Unit IV: Arrays (8L)**

Array definition and declaration, initialization of arrays, types of arrays, String handling functions, Arrays and functions.

**Recommended Books: (Unit wise)**

1. Let Us C – Yashwant Kanetkar ,BPB Publications, Edition 15 (Unit I – (Pg. 1-18), Unit III –(Pg. 135-151),Unit IV – (Pg. 239-257))
2. Programming in ANSI C , E. Balagurusamy McGraw Hill Education Edition 6 (Unit I (Pg. 1-97,213-254) Unit II (Pg. 99-155),Unit III (Pg. 32 & 213-254), Unit IV – (Pg.159-187))
3. Programming in C – Schuam outline Series (Unit I (Pg. 2.1-4.40), Unit II (Pg. 6.1-6.65) ,Unit III (Pg.7.1-7.41),Unit IV (Pg.9.1- 9.47))
4. The C Programming Language – Brian Kernighan and Dennis Ritchie , Pearson Education India , Edition 2 (Unit II,III) Series (Unit II (Pg. 6.1-6.65) ,Unit III (Pg.7.1-7.41)

**Learning Outcomes:**

At the end of this course, students are able to:

1. Learn algorithm writing and flowchart drawing.
2. Understand the compilation process and execution of any C Program.
3. Write simple programs using C language and will help them to develop programming logic.
4. Understand the use of Arrays to solve in real life applications.

## **Theory : BCST102:Course II: Database Management Systems**

### **Learning Objectives:**

1. To learn fundamental concepts of data.
2. To evaluate principles of databases.
3. To create database management operation.
4. To adapt the concept of procedure oriented, object oriented programming languages, Database Management.

### **Unit I: Introduction to Database Management Systems (8L)**

Definition of Database, Characteristics of database approach, data models, Importance of data models, ER Model, Relational Model, Network Model, Hierarchical Model, Object Oriented Model, Concept of DBMS, DBMS architecture and data independence.

### **Unit II: Entity Relationship Modeling and Relational Data Model (9L)**

Entities, Attributes and Entity Sets, Relation and Relationships sets, Features of E-R Model Relational Model - Basic concepts, Types of constraints(relational constraints), DFD and its Types, ERD and types of relationship

### **Unit III: Relational Algebra and (Relational) Calculus (8L)**

Preliminaries, Relational algebra operators, Operations on Relational Algebra Select, Project, Union, Set different, Cartesian product, Rename, Operations on Relational Calculus:- Tuple Relational Calculus, Domain Relational Calculus

### **Unit IV: Basics of Structured Query Language (11L)**

Basic SQL Queries – DDL (Create, Alter, Drop ) Commands and DML (Insert, Update, Delete) Commands ,Select Statement, Constraints( Primary Key, Foreign Key, Unique Key, Null ,Check, Default, Super Key, Candidate Key), Datatypes , Operators, Functions.

### **Recommended Books: (Unit wise)**

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010 (Unit I (Pg. 29-85), Unit II (Pg.199-284))
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002. (Unit I (Pg. 3-45), Unit II (Pg.40-94),Unit III (Pg.100-126),Unit IV(Pg.130-167))
3. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010. (Unit I (Pg. 1-30), Unit II (Pg.27-81),Unit III (Pg.87-133),Unit IV(Pg.141-177) )
4. SQL,PL/SQL The Programming Language of ORACLE – Ivan Bayross. BPB publication 4<sup>th</sup>Edition . (Unit IV (Pg. 114-199))

### **Learning Outcomes:-**

At the end of this course, students are able to:

1. Understand basics of different database models for software development.
2. Identify the basic concepts and various data model used in database design
3. Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression for queries.
4. Identify the purpose of query processing and optimization and also demonstrate the basic of query evaluation.

**Practical-I**  
**BCSP103: Lab Course I (C Programming I and Database Management Systems)**

**Learning Objectives:**

1. To understand computer programming and its roles in problem solving.
2. To remember and develop well-structured programs using C language.
3. To develop programming skills using the fundamentals and basics of C Language.
4. To learn the student to write algorithms and flowchart of programs in C and to solve the problems.
5. To learn database management operation.

**Part A :**

**Exercise No. 1. Simple C Programs on Operators**

(Sample Programs)

1. Write a program to accept 5 subject marks and calculate total marks, percentage and grade of student.
2. Write program to perform arithmetic operations.

**Exercise No.2. Programs on Conditional Branching (If Else Statement , Nested If)**

(Sample Programs)

1. Write a program to input n numbers and find the Odd and Even numbers.
2. Write a program to check number is positive and negative.
3. Write a program to find an age of a person (Input birth date and today date).

**Exercise No.3. Programs on Looping( For , While , Do While ).**

(Sample Programs)

1. Write a program to find the sum of first n natural numbers.
2. Write a program to accept the range and generate Fibonacci Series.
3. Write a program to find prime numbers between given range.

**Exercise No.4. Programs on Functions.**

(Sample Programs)

1. Write a program to calculate sum of numbers using simple function.
2. Write a program to find prime number using function.
3. Write a program to calculate factorial of number using Recursion.

**Exercise No.5. Programs on Arrays.**

(Sample Programs)

1. Write a program to enter array elements and perform arithmetic operations
2. Write a program to sort the numbers in ascending and descending order using array.
3. Write a program to find the product of given two matrices.
4. Write a program to create a function to find the given number is Armstrong or not.

## **Part B :**

### **Exercise No.1 Programs on DDL and DML Commands**

(Sample Programs)

1. Create table Student, Teacher, Book\_dtls ,Product and perform all DDL and DML Commands.

### **Exercise No.2 Programs on Operators**

(Sample Programs)

1. Perform calculations on above created tables Condition specification using Boolean and comparison operators (and, or, not,=,<>,>,<,>=,<=)

### **Exercise No.3 Programs on Functions**

(Sample Programs)

Aggregate functions, String handling functions.

### **Exercise No.4 Programs on Constraints.**

(Sample Programs)

1. Create table and apply all constraints.
2. Create tables with relevant foreign key constraints
3. Populate the tables with data

### **Exercise No.5 Perform the following queries on the database :**

(Sample Programs)

1. Display all the details of all employees working in the company.
2. Display ssn, lname, fname, address of employees who work in department no 7.
3. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
4. Retrieve the name and salary of every employee
5. Retrieve all distinct salary values
6. Retrieve all employee names whose address is in 'Bellaire'
7. Retrieve all employees who were born during the 1950s
8. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)

### **Books Recommended:**

1. Let Us C – Yashwant Kanetkar ,BPB Publications, Edition 15
2. Programming in ANSI C , E. Balagurusamy McGraw Hill Education Edition 6
3. Programming in C – Schuam outline Series
4. The C Programming Language – Brian Kernighan and Dennis Ritchie , Pearson Education India , Edition 2
5. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010
6. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002
7. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
8. SQL,PL/SQL The Programming Language of ORACLE – Ivan Bayross. BPB publication 4<sup>th</sup> Edition .

## **Learning Outcomes:-**

At the end of this course, students are able to:

1. Student should learn which software's are available for C Programming and how to use the Editor for writing Program and how to execute it.
2. Student should write algorithms, flowcharts and programs on operators, Conditional Branching, Looping, Functions and Arrays.
3. Programming in C should increase the programming logic of Students.
4. Student should learn which software's are available for RDBMS and how to use the Editor for writing query and how to execute it.
5. Formulate query, using SQL, solutions to a broad range of query and data update problems.



**Semester -II**  
**Theory: BCST201 Course III: C Programming – II**

**Learning Objectives:**

1. To analyze a programming logic.
2. To learn advanced concepts of c language.
3. To develop skills for writing complex programs using ‘C’.
4. To understand and develop well-structured programs using C language

**Unit I: Pointers** **(12L)**

Understanding the pointers, Definition and declaration, Operations on pointer, Pointer initialization, Pointer and function, Pointer and array, Call by value and Call by reference, Pointer and Character Strings, Dynamic memory allocation and deallocation.

**Unit II: Structure and Union** **(10L)**

Definition and declaration, Structure initialization, Difference between structure and union, Array of structures, Arrays within Structures, structure and function, Nested structure, Pointer to structure, self-referential structure.

**Unit III: C Preprocessor** **(4L)**

Preprocessor directives – file inclusion, macro substitution – simple, nested, agumented.

**Unit IV: File Handling** **(10L)**

Defining and opening a file, File opening modes- read, write, append, Closing a file, Input/Output Operations on file, Random access to files, command line arguments.

**Recommended Books: (Unit wise)**

1. Let Us C – Yashwant Kanetkar ,BPB Publications, Edition 15 (Unit I (Pg. 157-168), Unit II (Pg.211-235),Unit III (Pg.323-326))
2. Programming in ANSI C , E. Balagurusamy McGraw Hill Education Edition 6 (Unit I (Pg. 280-307), Unit II (Pg.363-372),Unit III (Pg.257-276),Unit IV(Pg.309-327) )
3. Programming in C – Schuam outline Series (Unit I (Pg. 10.1-10.71), Unit III (Pg.11.1-11.78),Unit IV(Pg.12.1-12.37) )
4. The C Programming Language – Brian Kernighan and Dennis Ritchie , Pearson Education India , Edition 2 (Unit I (Pg. 93-122), Unit II (Pg.88-93) ,Unit IV (Pg.127-149) )

**Learning Outcomes:-**

At the end of this course, students are able to:

1. Ability to interpret the concept of pointers, declarations, initialization, operations on pointers and their usage.
2. Define union and enumeration user defined data types.
3. Understanding a functional hierarchical code organization.
4. Write simple programs to complex programs.

## Theory: BCST202 Course IV: Relational Database Management Systems

### Learning Objectives:

1. To remember the concept of normalization.
2. To learn the transaction processing.
3. To understand File Structure and Indexing.
4. To evaluate the knowledge of RDBMS into real life data and to learn the different types of SQL queries performed on data.

### Unit I: Database design

(6L)

Database Schema, Data Dictionary, ER and EER to relational mapping, functional dependencies -properties and types, Normalization (Upto BCNF)

### Unit II: File Structure and Indexing

(8L)

Definition of file, Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files( Primary index, secondary index, clustering index), Multilevel indexing using B and B+ trees.

### Unit III: Structured Query Language

(10L)

SQL Clauses (Order By, Group By, Having, Where) ,Concept of Subquery - rules, Subquery with select,insert ,update and delete statements),Join (Inner, Outer,Cross),View and types ,Indexing and types, PLSQL,Cursor and its types, Trigger and its types.

### Unit IV: Transaction management and Concurrency control

(12L)

Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks),Time stamping methods, optimistic methods, database recovery management. Recovery manager component – concept of log, recovery algorithms(deferred and immediate, shadow paging)Security ,security mechanisms – mandatory and discretionary.

### Recommended Books: (Unit wise)

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010. (Unit I (Pg.29-36,286-294), Unit II (Pg.583-668) ,Unit III(Pg.87-137),Unit IV (Pg.743-827 )
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002. (Unit I (Pg.605-639), Unit II (Pg.271-299) ,Unit IV (Pg.517-573)
3. A.Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010. ( Unit II (Pg.393-493) ,Unit IV (Pg.563-637 )
4. SQL,PL/SQL The Programming Language of ORACLE – Ivan Bayross. BPB publication 4<sup>th</sup>Edition. ( Unit I (Pg. 1-7))

### Learning Outcomes:-

At the end of this course, students are able to:

1. Students should understand concepts of database Schema, Normalization and relational mapping.
2. Understand database concepts and file structures and query language.
3. Write the SQL queries for joining tables, sub query, PL/SQL Programs, Cursor Triggers etc.
4. Evaluate the concept of Transaction management, deadlocks and concurrency control.

## Practical-II

### BCSP203:Lab Course II(C Programming – II and Relational Database Management Systems)

#### Learning Objectives:

1. To learn advanced concepts of c language.
2. To develop skills for writing complex programs using ‘C’.
3. To understand and develop well-structured programs using C language
4. To analyze concept of normalization, Transaction Processing and to learn File Structure and Indexing.
5. To design the different types of SQL queries performed on data.

#### Part A:

##### Exercise No.1 Programs on Pointers

(Sample Programs)

1. Write a program to create, initialize and access a pointer variable.
2. Write a program to swap two numbers using pointers.
3. Write a program to calculate Fibonacci series using pointers.

##### Exercise No.2 Programs on Structure and Union

(Sample Programs)

1. Create a structure program to input employee info(empno, name, salary) and display it on the screen.
2. Create a structure which stores item information and Calculate the amount using formula amount = price \* quantity.
3. Write a program to create a structure of marks of 3 subjects and total for three students. Find the total of each student.
4. Write a program to create union to input student info and display it.

##### Exercise No.3 Programs on Union

(Sample Programs)

1. Write a program to create union to input student info and display it.
2. Write a program to create union to input Employee info and display it.

##### Exercise No.4 Programs on C Preprocessor

(Sample Programs)

1. Write a C program to find current time using predefined macros
2. Write a C program to Calculate area of circle using #define preprocessor.

##### Exercise No.5 Programs on File Handling

(Sample Programs)

1. Write a program to read a file and count number of lines, number of characters and number of words in a given file.
2. Write a program which writes book information into disk file and display book information on the screen.

## **Part B:**

### **Exercise No.1. Programs on SQL Clauses**

(Sample Programs)

1. Create a table Employee, Department and apply order by , Group by, where ,having clause.

### **Exercise No.2 Programs on Sub query.**

(Sample Programs)

1. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
2. For each department, retrieve the department number, the number of employees in the department, and their average salary.
3. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
4. Change the location and controlling department number for all projects having more Than 5 employees to 'Bellaire' and 6 respectively.
5. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.

### **Exercise No.3 Programs on Join**

(Sample Programs)

1. Create a table student and subject and course and apply cross, equi/inner, outer (left, right) Join.
2. Create a table Employee, Product and perform join operation.

### **Exercise No.4 Programs on View**

(Sample Programs)

1. Create a table student, Book and Create view (Read Only View and Updatable View)

### **Exercise No.5 Programs on Index, PLSQL, Cursor and Trigger**

(Sample Programs on Index)

1. Create a table student, Book and Create all types of Indexes  
(Simple,Composite,Duplicate,Unique)

(Sample Programs on PL SQL)

1. Program to write PL SQL code to perform DML operation on table Area.
2. Program to write PLSQL code to calculate even odd number.
3. Program to write PLSQL code to calculate factorial of

number. (Sample Programs on cursor and trigger)

1. Create table Student and create cursor (implicit and explicit) on it.
2. Create trigger on table Employee.

### **Books Recommended :**

1. 1. Let Us C – YashwantKanetkar ,BPB Publications, Edition 15
2. 2. Programming in ANSI C , E. Balagurusamy McGraw Hill Education Edition 6
3. Programming in C – Schuam outline Series
4. 4. The C Programming Language – Brian Kernighan and Dennis Ritchie , Pearson Education India , Edition 2.
5. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010
6. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.

7. A.Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
8. SQL,PL/SQL The Programming Language of ORACLE – Ivan Bayross. BPB publication 4<sup>th</sup>Edition .

**Learning Outcomes:-**

At the end of this course, students are able to:

1. Solve programs on basics of pointer, Structure and Union, File Handling, C Preprocessor.
2. Due to program writing student will acquire the program writing skill, technical skill.
3. Programming in C should increase the file programming logic of Students.
4. Student should understand how to implement theoretical knowledge of SQL into SQL queries.
5. Student should write queries for any application software and able to handle database.
6. Due to query writing student will acquire the Relational Database Management skill, Concurrency Control mechanism.

## Syllabus for Bachelor of Science Part-II

### STRUCTURE OF COURSE :

#### 1. THIRD SEMESTER—(NO.OF COURSES2)

##### Sem-III

Sr. No.	SUBJECT TITLE	COURSE NO and Course Code	Theory			Practical	
			No. of lectures per week	Credits		No. of lectures Per week	Credits
1	Computer Science	Course-V: BCST301	6	4	Practical Course – III : BCSP303	8	4
		Course-VI: BCST302					

#### 2. FOURTH SEMESTER—(NO.OF COURSES- 2)

##### Sem-IV

Sr. No.	SUBJECT TITLE	COURSE NO and Course Code	Theory			Practical	
			No. of lectures Per week	Credits		No. of lectures Per week	Credits
1	Computer Science	Course-VII: BCST401	6	4	Practical Course – IV : BCSP403	8	4
		Course-VIII: BCST402					

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

#### B.Sc. II Semester III

**Course V : BCST301** :Data Communications and Computer Networks

**Course VI : BCST302**:Algorithms and Data Structures using C

**Practical Course-III: BCSP303**:Data Communications and Computer Networks and Algorithms and Data Structures using C

#### B.Sc. II Semester IV

**Course VII : BCST401**:Operating Systems

**Course VIII : BCST402**:Object Oriented Concepts using JAVA

**Practical Course-IV : BCSP403**:Operating Systems and Object Oriented Concepts

Using JAVA

## Syllabus for Bachelor of Science Part-III

### STRUCTURE OF COURSE :

#### 1. FIFTH SEMESTER—(NO.OF COURSES – 4)

#### Sem-V

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

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

#### B.Sc. III Semester V

**Course IX : BCST501:** Software Engineering

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

**Course XI : BCST503:** Advanced JAVA Programming

**Course XII : BCST50X: Elective**

**Elective : BCST50X**

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

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

**Practical Course-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 COURSES - 4)**

**Sem-VI**

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

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

**B.Sc. III Semester VI**

**Course XIII : BCST601:** E – Commerce

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

**Course XV : BCST603:** Computer Graphics

**Course XVI : BCST60X:** Elective

**Elective : BCST50X**

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

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

**Practical Course-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