

**Mahatma Gandhi University**  
**Faculty of Science**  
**B.Sc. (Computer Applications)**  
**CBCS Pattern With effect from the Academic Year 2019-2020**

Code	Course Title	Course Type	HpW	Credits
<b>Semester -I</b>				
BS106	Programming in C	DSC-3A	4T + 3P = 7	4 + 1 = 5
<b>Semester -II</b>				
BS206	Programming in C++	DSC-3B	4T + 3P = 7	4 + 1 = 5
<b>AECC</b>				
BS107	Fundamentals of Computers	AECC	2T	2
<b>Semester -III</b>				
BS301	Python –1	SEC-1	2T	2
BS302	Sci Lab –1	SEC-2	2T	2
BS306	Relational Data Base Management Systems	DSC-3C	4T + 3P = 7	4 + 1 = 5
<b>Semester -IV</b>				
BS401	Python –2	SEC-3	2T	2
BS402	Sci Lab –2	SEC-4	2T	2
BS406	Multi Media Systems	DSC-3D	4T + 3P = 7	4 + 1 = 5
<b>Semester -V</b>				
BS501	Information Technologies	GE	4T	4
BS502	Programming in Java	DSE-3E	4T + 3P = 7	4 + 1 = 5
<b>Semester -VI</b>				
BS605	Web Technologies	DSE-3F	4T + 3P = 7	4 + 1 = 5
<b>Project/Optional</b>				
BS601	Information Security and Cyber Laws	PO	3T + 3P = 3	3 + 1 = 4
Total Number of Credits				48

**B.Sc. (Computer Applications)  
SEMESTER – I**

**DSC-3A**

**Programming in C**

**BS106**

Theory

4 Hours/Week 4 Credit

Internal marks = 20

External Marks = 80

**Unit – I**

Computer Fundamentals: Introduction of Computers, Classification of Computers, Anatomy of a Computer, Memory Hierarchy, Introduction to OS, Operational Overview of a CPU.

Program Fundamentals: Generation and Classification of Programming Languages, Compiling, Interpreting, Loading, Linking of a Program, Developing Program, Software Development.

Algorithms: Definitions, Different Ways of Stating Algorithms (Step-form, Pseudo-code, Flowchart), Strategy for Designing Algorithms, Structured Programming Concept.

Basics of C: Overview of C, Developing Programs in C, Parts of Simple C Program, Structure of a C Program, Comments, Program Statements, C Tokens, Keywords, Identifiers, Data Types, Variables, Constants, Operators and Expressions, Expression Evaluation–precedence and associativity, Type Conversions.

**Unit – II**

Input-Output: Non-formatted and Formatted Input and Output Functions, Escape Sequences,

Control Statements: Selection Statements – if, if-else, nested if, nested if-else, comma operator, conditional operator, switch; Iterative Statements–while, for, do-while; Special Control Statement–goto, break, continue, return, exit.

Arrays and Strings: One-dimensional Arrays, Character Arrays, Functions from ctype.h, string.h,

**Unit – III**

Functions: Concept of Function, Using Functions, Call-by-Value Vs Call-by-reference, Passing Arrays to Functions, Scope of Variables, Storage Classes, Inline Functions, and Recursion.

Pointers: Introduction, Address of Operator (&), Pointer, Uses of Pointers, Arrays and Pointers, Pointers and Strings, Dynamic Memory Allocation.

**Unit – IV**

User-defined Data Types: Declaring a Structure (Union) and its members, Initialization Structure (Union), Accessing members of a Structure (Union), Structures verses Unions, Enumeration Types.

Files: Introduction, Using Files in C, Working with Text Files and Binary Files, Other File Management Functions.

**Textbook:** Pradip Dey, Manas Ghosh, Computer Fundamentals and Programming in C (2e)

**References:**

1. Ivor Horton, Beginning C
2. Ashok Kamthane, Programming in C
3. Herbert Schildt, The Complete Reference C
4. Paul Deitel, Harvey Deitel, C How to Program
5. Byron S. Gottfried, Theory and Problems of Programming with C
6. Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language
7. B. A. Forouzan, R. F. Gilberg, A Structured Programming Approach Using C

**B.Sc (Computer Applications)  
SEMESTER – I**

**Programming in C Lab**

**BS106**

Practical

3 Hours/Week

1 Credit

Marks: 25

**Note:**

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
  - Faculty must take care about UG Standard Programs.
  - In the external lab examination student has to execute two programs with compilation and deployment steps are necessary. Write the Pseudo Code and draw Flow Chart for the programs.
  - Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows10.
  - External Vice-Voce is compulsory.
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1. Write a program to find the largest two numbers using if and conditional operator.
  2. Write a program to calculate arithmetic operations of two numbers using switch.
  3. Write a program to print the reverse of a given number.
  4. Write a program to print whether the given number is a prime or not.
  5. Write a program to find largest and smallest elements in a given list of numbers
  6. Write a program to find the sum of two matrices
  7. Write a program to find the product of two matrices.
  8. Write a program to print reverse of the string
  9. Write a program to find the factorial of a Positive integer Using iteration and recursion
  10. Write a program to find the GCD of two positive integers using iteration and recursion.
  11. Write a program to demonstrate the call by value and the call by reference concepts.
  12. Write a program to illustrate the use of Enumeration data type.
  13. Write a program to illustrate the use of structure concept.
  14. Write a program to illustrate the use of union concept.
  15. Write a program to write content into a file and display contents of a file
  16. Write a program to copy content of one file into another file and display the content of new file.

**B.Sc. (Computer Applications)**

**SEMESTER – II**

**DSC-3B**

**Programming in C++**

**BS206**

Theory

4 Hours/Week 4 Credit

Internal marks = 20

External Marks= 80

**Unit – I**

Introduction to C++: Applications, Example Programs, Tokens, Data Types, Operators, Expressions, Control Structures, Arrays, Strings, Pointers, Searching and Sorting Arrays.

Functions: Introduction, Prototype, Passing Data by Value, Reference Variables, Using Reference Variables as Parameters, Inline Functions, Default Arguments, Overloading Functions, Passing Arrays to Functions.

**Unit – II**

Object Oriented Programming: Procedural and Object-Oriented Programming, Terminology, Benefits, OOP Languages, and OOP Applications.

Classes: Introduction, Defining an Instance of a Class, Why Have Private Members? Separating Class Specification from Implementation, Inline Member Functions, Constructors, Passing Arguments to Constructors, Destructors, Overloading Constructors, Private Member Functions, Arrays of Objects, Instance and Static Members, Friends of Classes, Member-wise Assignment, Copy Constructors, Operator Overloading.

**Unit – III**

Inheritance: Introduction, Protected Members and Class Access, Base Class Access Specification, Constructors and Destructors in Base and Derived Classes, Redefining Base Class Functions, Polymorphism and Virtual Member Functions, Abstract Base Classes and Pure Virtual Functions, Multiple Inheritance.

C++ Streams: Stream Classes, Unformatted I/O Operations, Formatted I/O Operations.

**Unit – IV**

Exceptions: Introduction, Throwing an Exception, Handling an Exception, Object-Oriented Exception Handling with Classes, Multiple Exceptions, Extracting Data from the Exception Class, Re-throwing an Exception.

Templates: Function Templates–Introduction, Function Templates with Multiple Type, Overloading with Function Templates, Class Templates – Introduction, Defining Objects of the Class Template, Class Templates and Inheritance.

**Textbook:** Tony Gaddis, Starting out with C++: from control structures through objects (7e)

**References:**

1. B. Lippman, C++ Primer
2. Bruce Eckel, Thinking in C++
3. K.R. Venugopal, Mastering C++
4. Herbert Schildt, C++: The Complete Reference
5. Bjarne Stroustrup, The C++ Programming Language
6. Sourav Sahay, Object Oriented Programming with C++ TEXT BOOK:

**B.Sc. (Computer Applications)**

**SEMESTER – II**

**Programming in C++ Lab**

**BS206**

Practical

3 Hours/Week

1 Credit

Marks: 25

**Note:**

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
  - Faculty must take care about UG Standard Programs.
  - In the external lab examination student has to execute two programs with compilation and deployment steps are necessary. Write the Pseudo Code and draw Flow Chart for the programs.
  - Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows10.
  - External Vice-Voce is compulsory.
1. Write a program to print the sum of digits of a given number
  2. Write a program to check whether the given number is Armstrong or not
  3. Write a program to check whether the given string is Palindrome or not
  4. Write a program to read student name, roll no, marks and display the same using class and object
  5. Write a program to find area of a rectangle, circle, and square using class and object
  6. Write a program to implement inline function inside and outside of a class for
    - a. Finding the area of a square
    - b. Finding the area of a cube
  7. Write a program to implement friend function and friend class
  8. Write a program to implement constructor and destructor with in a class
  9. Write a program to demonstrate hierarchical inheritance.
  10. Write a program to demonstrate multiple inheritances.
  11. Write a program to demonstrate the constructor overloading.
  12. Write a program to demonstrate static polymorphism
  13. Write a program to demonstrate dynamic polymorphism.
  14. Write a program to implement polymorphism using pure virtual functions
  15. Write a program to demonstrate the function templates and class templates
  16. Write a program to demonstrate exception handling using try, catch and finally.

**B.Sc. Computer Applications**

**Semester-I**

**AECC**

**Fundamentals of Computers**

**BS107**

**Theory**

**2Hours/Week**

**2Credits**

**Unit-I**

Introduction to Computers: what is a computer, characteristics of Computers, Generations of Computers, Classifications of Computers, Basic Computer organization, Applications of Computers. Input and Output Devices: Input devices, Output devices, Softcopy devices, Hard copy devices. Computer Memory and Processors: Introduction, Memory Hierarchy, Processor, Registers, Cache memory, primary memory, secondary storage devices, magnetic tapes, floppy disks, hard disks, optical drives, USB flash drivers, Memory cards, Mass storage devices, Basic processors architecture.

**Unit-II**

Number System and Computer Codes: Binary number system, working with binary numbers, octal number system, hexadecimal number system, working with fractions, signed number representation in binary form, BCD code, other codes. Boolean algebra and logic gates: Boolean algebra, Venn diagrams, representation of Boolean functions, logic gates, logic diagrams and Boolean expressions using karnaugh map. Computer Software: Introduction to computer software, classification of computer software, system software, application software, firmware, middleware, acquiring computer software, design and implementation of correct, efficient and maintainable programs.

**Text Book:** ReemaThareja, Fundamentals of Computers.

**References:**

1. V.Rajaraman, 6<sup>th</sup> Edition Fundamentals of Computers, NeeharikaAdabala.
2. Anita Goel, Computer Fundamentals.

**B.Sc. Computer Applications**

**SEMESTER – III**

**SEC – 1**

**Python – 1**

**BS301**

**Theory**

**2Hours/Week**

**2Credits**

**Unit – I**

Introduction to Python Programming: How a Program Works, Using Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations (Operators. Type conversions, Expressions), More about Data Output.

Decision Structures and Boolean Logic: if, if-else, if- elif -else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables.

Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

**Unit – II**

Functions: Introduction, Defining and Calling a Void Function, Designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions- Generating Random Numbers, Writing Our Own Value-Returning Functions, The math Module, Storing Functions in Modules.

File and Exceptions: Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.

**Text Book:** Tony Gaddis, *Starting Out With Python(3e)*

**References**

1. Kenneth A. Lambert, *Fundamentals of Python*
2. Clinton W. Brownley, *Foundations for Analytics with Python*
3. James Payne, *Beginning Python using Python 2.6 and Python 3*
4. Charles Dierach, *Introduction to Computer Science using Python*
5. Paul Gries, *Practical Programming: An Introduction to Computer Science using Python 3*

**B.Sc. Computer Applications**

**SEMESTER – III**

**SEC – 2**

**Sci Lab – 1**

**BS302**

**Theory**

**2Hours/Week**

**2Credits**

**Unit – I**

Introduction to Scilab – what is scilab, downloading & installing scilab, a quick taste of scilab. The Scilab Environment – manipulating the command line, working directory, comments, variables in memory, recording sessions, the scilab menu bar, demos.

Scalars & Vectors – introduction, initializing vectors in scilab, mathematical operations on vectors, relational operations on vectors, logical operations on vectors, built-in logical functions.

**Unit – II**

Elementary mathematical functions mathematical functions on scalars, complex numbers, trigonometric functions.

Matrices – introduction, arithmetic operators for matrices, basic matrix processing. Polynomials – introduction, creating polynomials, basic polynomial commands.

**Text Book:**

Er. HemaRamachandran, Dr.Achuthsankar S. Nair, Computer SCILAB–A Free Software to MATLAB

**References:**

Digite, Introduction to Scilab  
Digite, Optimization in Scilab  
Scilab Enterprises, Scilab for Very Beginners  
Digite, Introduction to Discrete Probabilities with Scilab



**B.Sc. (Computer Applications)****SEMESTER – III****DSC-3C****Relational Data base Management Systems****BS306**

Theory

4 Hours/Week 4 Credit

Internal marks = 20

External Marks = 80

**Unit-I**

Basic Concepts: Database Management System, File based system, Advantages of DBMS over file based system, Database Approach, Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Need for three level architecture, Physical DBMS Architecture, Database Administrator (DBA) Functions & Role, Data files indices and Data Dictionary, Types of Database.

Relational and ER Models: Data Models, Relational Model, Domains, Tuple and Relation, Super keys, Candidate keys, Primary keys and foreign key for the Relations, Relational Constraints, Domain Constraint, Key Constraint, Integrity Constraint, Update Operations and Dealing with Constraint Violations, Relational Operations, Entity Relationship (ER) Model, Entities, Attributes, Relationships, More about Entities and Relationships, Defining Relationship for College Database, E-R Diagram, Conversion of E-R Diagram to Relational Database.

**Unit-II**

Database Integrity And Normalisation: Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems – Single Valued Dependencies – Normalisation, Rules of Data Normalization, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce Codd Normal Form, Attribute Preservation, Lossless, join Decomposition Dependency Preservation.

File Organization: Physical Database Design Issues, Storage of Database on Hard Disks, File Organization and Its Types, Heap files (Unordered files), Sequential File Organization – Indexed (Indexed Sequential) File Organization, Hashed File Organization, Types of Indexes, Index and Tree Structure.

**Unit-III**

Structures Query Language (SQL): Meaning – SQL commands, Data Definition Language, Data Manipulation Language – Data Control Language, Transaction Control Language Queries using Order by, Where, Group by, Nested Queries. Joins – Views – Sequences, Indexes and Synonyms, Table Handling.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries.

**Unit-IV**

Transactions and Concurrency Management: Transactions, Concurrent Transactions, Locking Protocol, Serializable Schedules – Locks Two Phase Locking (2PL), Deadlock and its Prevention, Optimistic Concurrency Control.

Database Recovery and Security: Database Recovery meaning, Kinds of failures – Failure Controlling methods, Database errors, Backup & Recovery Techniques, Security & Integrity.

**Text Book:** Database Systems: R.Elmasri& S.B. Navathe, Pearson.

**References:**

1. Introduction to Database Management System: ISRD Group, McGraw Hill.
2. Database Management System: R.Ramakrishnan&J.Gehrke, McGraw Hill.
3. Modern Database Management: J.A.Hoffer, V.Rames&H.Topi, Pearson.

**B.Sc. (Computer Applications)  
SEMESTER – III**

**Relational Data base Management Systems Lab**

**BS306**

Practical

3 Hours/Week

1 Credit

Marks: 25

**Note:**

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
  - In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
  - External Vice-Voce is compulsory.
1. Create a database having two tables with the specified fields, to computerize a library system of a University College.  
Library Books (Accession number, Title, Author, Department, PurchaseDate, Price), Issued Books (Accession number, Borrower)
    - a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
    - b) Delete the record of book titled “Database System Concepts”.
    - c) Change the Department of the book titled “Discrete Maths” to “CS”.
    - d) List all books that belong to “CS” department.
    - e) List all books that belong to “CS” department and are written by author “Navathe”.
    - f) List all computer (Department=”CS”) that have been issued.
    - g) List all books which have a price less than 500 or purchased between “01/01/1999” and “01/01/2004”.
  2. Create a database having three tables to store the details of students of Computer Department in your college.  
Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phone number)  
Paper Details (Paper code, Name of the Paper)  
Student’s Academic and Attendance details (College roll number, Paper Code, Attendance, Marks in home examination).
    - a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
    - b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper2.
    - c) List all students who live in “Warangal” and have marks greater than 60 in paper1.
    - d) Find the total attendance and total marks obtained by each student.
    - e) List the name of student who has got the highest marks in paper2.
  3. Create the following tables and answer the queries given below:  
Customer (CustID, email, Name, Phone, ReferrerID)  
Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo)  
BicycleModel(ModelNo, Manufacturer, Style) Service  
(StartDate, BicycleID, EndDate)

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
- b) List all the customers who have the bicycles manufactured by manufacturer “Honda”.
- c) List the bicycles purchased by the customers who have been referred by Customer “C1”.
- d) List the manufacturer of red colored bicycles.
- e) List the models of the bicycles given for service.

4. Create the following tables, enter at least 5 records in each table and answer the queries given below.

Employee (Person\_Name, Street, City)

Works (Person\_Name, Company\_Name, Salary) Company (Company\_Name, City )

Manages (Person\_Name, Manager\_Name )

- a) Identify primary and foreign keys.
- b) Alter table employee, add a column “email” of type varchar(20).
- c) Find the name of all managers who work for both Samba Bank and NCB Bank.
- d) Find the names, street address and cities of residence and salary of all employees who work for “Samba Bank” and earn more than \$10,000.
- e) Find the names of all employees who live in the same city as the company for which they work.
- f) Find the highest salary, lowest salary and average salary paid by each company.
- g) Find the sum of salary and number of employees in each company.
- h) Find the name of the company that pays highest salary.

5. Create the following tables, enter at least 5 records in each table and answer the queries given below.

Suppliers (SNo, Sname, Status, SCity)

Parts (PNo, Pname, Colour, Weight, City) Project (JNo, Jname, Jcity)

Shipment (Sno, Pno, Jno, Qunatity)

- a) Identify primary and foreign keys.
- b) Get supplier numbers for suppliers in Paris with status>20.
- c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
- d) Get suppliers names for suppliers who do not supply part P2.
- e) For each shipment get full shipment details, including total shipment weights.
- f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.
- g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.
- h) Get the names of cities that store more than five red parts.
- i) Get full details of parts supplied by a supplier in Hyderabad.
- j) Get part numbers for part supplied by a supplier in Warangal to a project in Chennai.
- k) Get the total number of project supplied by a supplier (say, S1).
- l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).

6. Write a PL/SQL Program to demonstrate Procedure.
7. Write a PL/SQL Program to demonstrate Function.

8. Write a PL/SQL program to Handle Exceptions.
9. Write a PL/SQL Program to perform a set of DML Operations.
10. Create a View using PL/SQL program.
11. Write a PL/SQL Program on Statement Level Trigger.
12. Write a PL/SQL Program on Row Level Trigger.

**B.Sc. Computer Applications**

**SEMESTER – IV**

**Python – 2**

**BS401**

**SEC – 3**

**Theory**

**2 Hours/Week**

**2Credits**

**Unit – I**

Lists and Tuples: Sequences, Introduction to Lists, List slicing, Finding Items in Lists with the in Operator, List Methods and Useful Built-in Functions, Copying Lists, Processing Lists, Two-Dimensional Lists, Tuples. Strings: Basic String Operations, String Slicing, Testing, Searching, and Manipulating Strings.

Dictionaries and Sets: Dictionaries, Sets, Serializing Objects.

Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

**Unit – II**

Object-Oriented Programming: Procedural and Object-Oriented Programming, Classes, Working with Instances, Techniques for Designing Classes, Inheritance, Polymorphism.

GUI Programming: Graphical User Interfaces, Using the tkinter Module, Display text with Label Widgets, Organizing Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons.

**Text** Tony Gaddis, *Starting Out With Python(3e)*

**References**

1. Kenneth A. Lambert, *Fundamentals of Python*
2. Clinton W. Brownley, *Foundations for Analytics with Python*
3. James Payne, *Beginning Python using Python 2.6 and Python 3*
4. Charles Dierach, *Introduction to Computer Science using Python*
5. Paul Gries, *Practical Programming: An Introduction to Computer Science using Python 3*

<b>SEC – 4</b>	<b>B.Sc. Computer Applications</b>	
	<b>SEMESTER – IV</b>	
	<b>Sci Lab – 2</b>	<b>BS402</b>
<b>Theory</b>	<b>2Hours/Week</b>	<b>2Credits</b>

### **Unit – I**

Programming in scilab – introduction, variables & variable names, assignment statements, arithmetic, relational, logical operators, input & output, flow control/branching/conditional statements, break and continue, handling matrices with loops.

Menus and Dialog Boxes – introduction, a simple menu example, scilab window with greetings menu added, executing submenus from command line, linking menus to scilab code from external files, entering data through dialog boxes

### **Unit – II**

Graphic Output – introduction, 2d plotting, function versions for graphic commands, 3d plotting, other graphic primitives.

String Handling Functions – symbolic processing in scilab, creation of a linear combination of arguments, string to ASCII conversion, creation of a string of blank characters, conversion of a string to uppercase and lowercase, string matching, string concatenation, reversing a string, replacement of a string by another, length of a string, type checking.

### **Text Book:**

1. Er. HemaRamachandran, Dr.Achuthsankar S. Nair, Computer SCILAB–A Free Software to MATLAB
2. Sci lab a Beginners Apporach by Anil kumarVarma

### **References:**

1. Digite, Introduction to ScilabDigite, Optimization in ScilabScilab Enterprises, Scilab for Very Beginners Digite, Introduction to Discrete Probabilities with Scilab

<b>DSC-3D</b>	<b>B.Sc. (Computer Applications)</b>	<b>BS406</b>
	<b>SEMESTER – IV</b>	
	<b>Multi Media Systems</b>	
<b>Theory</b>	<b>4 Hours/Week 4 Credit</b>	<b>Internal marks = 20</b>
		<b>External Marks = 80</b>

### **Unit - I**

Multimedia: Introduction, Definitions, Where to Use Multimedia- Multimedia in Business, Schools, Home, Public Places, Virtual Reality; Delivering Multimedia.

Text: Meaning, Fonts and Faces, Using Text in Multimedia, Computers and Text, Font Editing and Design Tools, Hypermedia and Hypertext.

Images: Before You Start to Create, Making Still Images, Color.

### **Unit - II**

Sound: The Power of Sound, Digital Audio, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Audio File Formats, Adding Sound to Your Multimedia Project.

Animation: The Power of Motion, Principles of Animation, Animation by Computer, Making Animations.

Video: Using Video, How Video Works and Is Displayed, Digital Video Containers, Obtaining Video Clips, Shooting and Editing Video.

### **Unit - III**

Making Multimedia: The Stages of a Multimedia Project, the Intangibles, Hardware, Software, Authoring Systems

Designing and producing: designing the structure, designing the user interface, a multimedia design case history, producing.

### **Unit - IV**

The Internet and Multimedia: Internet History, Internetworking, Multimedia on the Web.

Designing for the World Wide Web: Developing for the Web, Text for the Web, Images for the Web, Sound for the Web, Animation for the Web, Video for the Web.

Delivering: Testing, Preparing for Delivery, Delivering on CD-ROM, DVD and World Wide Web, Wrapping.

### **Text Book:**

1. Tay Vaughan, "Multimedia: Making it work", TMH, Eighth edition.

### **References:**

1. Ralf Steinmetz and KlaraNaharstedt, "Multimedia: Computing, Communications Applications", Pearson.
2. Keyes, "Multimedia Handbook", TMH.
3. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI.
4. Spoken Tutorial on "GIMP" as E-resource for Learning:-<http://spoken-tutorial.org>
5. Spoken Tutorial on "Blender" as E-resource for Learning:-<http://spoken-tutorial.org>

**B.Sc. (Computer Applications)**

**SEMESTER – IV**

**Multi Media Systems Lab**

**BS406**

Practical

3 Hours/Week

1 Credit

Marks: 25

**Note:**

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
- Faculty must take care about UG Standard Programs.
- In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
- External Vice-Voce is compulsory.

**Example programs:**

Practical exercises based on concepts listed in theory using Presentation tools in office automation tool/ GIMP/Blender / Audacity/ Animation Tools/ Image Editors/ Video Editors.

Implement the followings using Blender -

1. Create an animation using the tools panel and the properties panel to draw the following – Line, Pen, oval, circle, rectangle, square, pencil, brush, lasso tool
2. Create an animation using text tool to set the font, size, color etc.
3. Create an animation using Free transform tool that should use followings-
4. Create an animation using layers having following features-  
Insert layer, Delete layer, guide layer, Mask layer.
5. Modify the document (changing background color etc.)Using the following  
tools Eraser tool  
Hand tool Ink  
bottle tool Zoom  
tool Paint Bucket  
tool Eyedropper  
tool
6. Create an animation for bus car race in which both starts from the same point and car wins the race.
7. Create an animation in which text Hello gets converted into GoodBye (using motion/shape tweening).
8. Create an animation having five images having fade-in fade-out effect.
9. Create an scene to show the sunrise (using multiple layers and motion tweening)
10. Create an animation to show the ripple effect.
11. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
12. Create an animation for bouncing ball (you may use motion guide layer).



**B.Sc. (Computer Applications)  
SEMESTER – V**

**GE****Information Technologies****BS501****Theory**

4Hours/Week

4 credits

**Unit - I**

Information Technology Basics – introduction, Need for Information Storage and Processing, Information Technology Components , Role of information Technology, Information Technology and the Internet .  
Emerging Trends in IT - Introduction , Electronic Commerce (E-Commerce), Electronic Data Interchange(EDI),  
Smart Cards , Mobile Communication, Internet Protocol TV.

**Unit - II**

Computer Software: Introduction, Classification of Computer Software, System Software, Applications Software, Firmware, Middleware, Acquiring Computer Software.  
Operating Systems: Introduction, Evolution of OS, Process Management, Memory Management, File Management, Device Management, Security Management, Command Interpreter, Windows, Linux.

**Unit - III**

Introduction to Algorithms and Programming Languages: Algorithm, Control Structures, Flowcharts, Pseudo code, Programming Languages, Generations of Programming Languages.  
Database Systems: File Oriented Approach, Database Oriented Approach, Database Views, Three-Schema Architecture, Database Models, Components of DBMS, Introduction of SQL Queries.

**Unit - IV**

Computer Networks: Introduction, Connection Media, Data Transmission Mode, Data Multiplexing, Data Switching, Network Topologies, Types of Networks, Networking Devices, OSI Model. The Internet: Internet Services, Types of Internet Connections, Internet Security.  
Emerging Computer Technologies: Distributed Networking, Peer-to-peer Computing, Grid Computing, Cloud Computing, Utility Computing, On0demand Computing, Wireless Network, Bluetooth, Artificial Intelligence.

**Text**

Wiley India Editorial Team, Fundamentals of Information Technology  
ReemaThareja, *Fundamentals of Computers*

**Reference s**

P. K. sinha, *Computer Fundamentals*  
Anita Goel, *Computer Fundamentals*  
V. Rajaraman, *Fundamentals of Computers*  
E. Balagurusamy, *Fundamentals of Computers*  
J. Glenn Brookshear, Dennis Brylow, *Computer Science An Overview*

<b>DSE-3E</b>	<b>B.Sc. (Computer Applications)</b>	<b>BS502</b>
	<b>SEMESTER – V</b>	
	<b>Programming in Java</b>	
<b>Theory</b>	<b>4 Hours/Week 4 Credit</b>	<b>Internal marks = 20</b>
		<b>External Marks = 80</b>

### **Unit - I**

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Structure of Java Program, Type Casting, Conditional Statements, Loops, Classes, Objects, Class Declaration, Creating Objects.

### **Unit - II**

Method Declaration and Invocation, Method Overloading, Constructors – Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects. Class Variables & Method-static Keyword, this Keyword, One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.

Inheritance: Introduction, Types of Inheritance, extends Keyword, Examples, Method Overriding, super, final Keyword, Abstract classes, Interfaces, Abstract Classes Verses Interfaces.

Packages: Creating and Using Packages, Access Protection, Wrapper Classes, String Class, StringBuffer Class.

### **Unit - III**

Exception: Introduction, Types, Exception Handling Techniques, User-Defined Exception.

Multithreading: Introduction, Main Thread and Creation of New Threads –By Inheriting the Thread Class or Implementing the Runnable Interface, Thread Lifecycle, Thread Priority and Synchronization.

Input/Output: Introduction, java.io Package, File Streams, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class, RandomAccessFile Class.

### **Unit - IV**

Applets: Introduction, Example, Life Cycle, Applet Class, Common Methods Used in Displaying the Output (Graphics Class).

Event Handling: Introduction, Types of Events, Example.

AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts.

Swings: Introduction, Differences between Swing and AWT, JFrame, JApplet, JPanel, Components in Swings, Layout Managers, JTable.

### **Text Book:**

1. SachinMalhotra, SaurabhChoudhary, Programming in Java (2e)

### **References:**

1. Bruce Eckel, Thinking in Java (4e)
2. Herbert Schildt, Java: The Complete Reference (9e)
3. Y. Daniel Liang, Introduction to Java Programming (10e)
4. Paul Deitel, Harvey Deitel, Java: How To Program (10e)
5. Cay S. Horstmann, Core Java Volume I –Fundamentals (10e)

**B.Sc. (Computer Applications)**

**SEMESTER – V**

**Programming in Java**

**BS502**

Practical

3 Hours/Week

1 Credit

Marks: 25

**Note:**

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
  - Faculty must take care about UG Standard Programs.
  - In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
  - External Vice-Voce is compulsory.
1. Write a program to find the largest of n natural numbers.
  2. Write a program to find whether a given number is prime or not.
  3. Write a menu driven program for following:
    - a. Display a Fibonacci series
    - b. Compute Factorial of a number
  4. Write a program to check whether a given number is odd or even.
  5. Write a program to check whether a given string is palindrome or not.
  6. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
  7. Write a program to create an array of 10 integers. Accept values from the user in that Array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
  8. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
  9. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
  10. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
  11. Write a Java program for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
  12. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
  13. Write a java program to draw a line between two coordinates in a window.
  14. Write a java program to display the following graphics in an applet window.
    - a. Rectangles
    - b. Circles
    - c. Ellipses
    - d. Arcs
    - e. Polygons
  15. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage () prints the information about the error occurring causes.
  16. Write a program for the following string operations:
    - a. Compare two strings
    - b. concatenate two strings
    - c. Compute length of a string

**B.Sc. (Computer Applications)**

**SEMESTER – VI**

**Web Technologies**

**DSE-3F**

**BS605**

Theory

4 Hours/Week 4 Credit

Internal marks = 20

External Marks = 80

**Unit – I**

Introduction To XHTML– Introduction, first HTML, Headings, Linking, Images, special characters and horizontal rules, Lists, Tables, Frames, Forms, internal linking, meta Elements.

Cascading Style Sheets – Introduction, Inline Styles, Embedded Style Sheets, Conflicting Styles, Linking external sheets, position Elements, box model and text flow, media types, building a CSS drop-down menu, user style sheets, CSS3.

**Unit – II**

Introduction To Java Scripting- introduction, simple program, prompt dialog and alert boxes, memory concepts, operators(arithmetic, relational, assignment, increment and decrement, logical), decision making, control structures, if... else statement, while, counter-controlled repetitions, switch statement, do... while statement, break and continue statements.

**Unit – III**

Functions – program modules in JavaScript, programmer–defined functions, functions definition, scope rules, global functions, Recursion. Arrays- introduction, declaring and allocating arrays, references and reference parameters, passing arrays to functions. Multidimensional arrays, Events – registering event handling, event onload, onmouseover, onmouseout, onfocus, onblur, onsubmit, onreset, event bubbling, more events.

**Unit – IV**

Java Script Objects – introduction to object technology, Math Object, String Object, Date Object, Boolean and Number Object, document and window Objects, using cookies.

XML - Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs), W3C XML Schema Documents, XML Vocabularies, Extensible Style sheet Language and XSL Transformations, Document Object Model (DOM).

**Text Book:**

1. Internet & World Wide Web: HOW TO PROGRAM- H. M. Deitel, P.J. Deitel, -Fourth Edition- Pearson edition.

**B.Sc. (Computer Applications)  
SEMESTER – VI**

**Web Technologies Lab**

**BS605**

Practical

3 Hours/Week

1 Credit

Marks: 25

**Note:**

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
  - Faculty must take care about UG Standard Programs.
  - In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
  - External Vice-Voce is compulsory.
1. Write a HTML program using basic text formatting tags, <p>, <br>, <pre>.
  2. Write a HTML program by using text formatting tags.
  3. Write a HTML program using presentational element tags <b>, <i>, <strike>, <sup>, <sub>, <big>, <small>, <hr>
  4. Write a HTML program using phrase element tags <blockquote>, <cite>, <abbr>, <acronym>, <kbd>, <address>
  5. Write a HTML program using different list types.
  6. Create a HTML page that displays ingredients and instructions to prepare a recipe.
  7. Write a HTML program using grouping elements <div> and <span>.
  8. Write a HTML Menu page for Example cafe site.
  9. Write a HTML program using images, audios, videos.
  10. Write a HTML program to create your time table.
  11. Write a HTML program to create a form using text inputs, password inputs, multiple line text input, buttons, check boxes, radio buttons, select boxes, file select boxes.
  12. Write a HTML program to create frames and links between frames.
  13. Write a HTML program to create different types of style sheets.
  14. Write a HTML program to create CSS on links, lists, tables and generated content.
  15. Write a HTML program to create your college web site using multi column layouts.
  16. Write a HTML program to create your college web site using for mobile device.
  17. Write a HTML program to create login form and verify username and password.
  18. Write a JavaScript program to calculate area of rectangle using function.
  19. Write a JavaScript program to wish good morning, good afternoon, good evening depending on the current time.
  20. Write a JavaScript program using switch case?
  21. Write a JavaScript program to print multiplication table of given number using loop.
  22. Write a JavaScript programs using any 5 events.
  23. Write a JavaScript program using JavaScript built in objects.
  24. Write a JavaScript program to create registration Form with Validations.
  25. Write a XML Program to represent Student Data using DTD.
  26. Write a XML Program to represent Data using XML Schema Definition.

<b>PO</b>	<b>B.Sc. Computer Applications</b> <b>SEMESTER – VI</b> <b>Information Security and Cyber Laws</b> <b>(Project/Optional)</b>	<b>BS601</b>
<b>Theory</b>	<b>3 Hours/Week 3 Credit</b>	<b>Internal marks = 15</b> <b>External Marks = 60</b>

### **Unit – I**

Introduction to Information System and Security: Computer Networks, Internet, Protocol, Network Core, Information System, Types of IS, Information Security, Need for Information Security, Information Assurance, Cyber security, Tools of the attacker, Scanning and spoofing, password cracking, malicious software, session hijacking.

### **Unit – II**

Introduction to Cryptography and Applications: Introduction to Application Security, Data Security Considerations, Security Technologies, Important terms, Threat, Flaw, vulnerability, Attack, Cipher, Private Key Cryptography, Substitution Cipher (Caesar), Transposition (Rail-Fence), Security Threats to E-Commerce, E-Cash and Electronic Payment System, Credit/Debit/Smart Cards, forensics, Digital Signature

### **Unit – III**

Introduction to Security Policies and Cyber Laws: Need for an Information Security Policy, Information Security Standards – ISO, Introducing Various Security Policies and Their Review Process, Introduction to Indian Cyber law, Objective and Scope of the IT Act, 2008, Intellectual Property Issues, Overview of Intellectual-Property- Related Legislation in India, Patent, Copyright, Software License

### **Text Book:**

1. Introduction to Information Security and Cyber laws by SuryaPrakashTripathi
2. Dr. Surya Prakash T, Ritendra G, Praveen Kumar S, KLSI, Introduction to information security and cyber laws (Dreamtech Publication)
3. S. Anderson, Ross, Security Engineering
4. G.R.F. Snyder, T. Pardoe, Network Security
5. Mark Stamp, Information Security: Principles and Practice
6. Basta, W.Halton, Computer Security: Concepts, Issues and Implementation
7. Mark S. Merkow, Jim Breithaupt, Information Security: Principles and Practice

**B.Sc. Computer Applications**  
**SEMESTER – VI**  
**Information Security and Cyber Laws Lab** **BS601**  
**(Project/Optional)**

**Project**

**3 Hours/Week**

**1 CreditsMarks: 25**

- In the external lab examination student has to execute the project with compilation and deployment steps are necessary.
  - External Vice-Voce is compulsory.
1. Demonstrate the use of Network tools: ping, ipconfig, ifconfig, tracert, arp, netstat, whois
  2. Use of Password cracking tools: John the Ripper, Ophcrack.
  3. Verify the strength of passwords using these tools.
  4. Perform encryption and decryption of Caesar cipher. Write a script for performing these operations.
  5. Perform encryption and decryption of a Rail fence cipher. Write a script for performing these operations.
  6. Demonstrate sending of a protected word document.
  7. Demonstrate sending of a digitally signed document.
  8. Demonstrate sending of a protected worksheet.

**UG (B.Sc.) Scheme of  
Examinations**  
**B.Sc. (Computer Applications)**  
**(CBCS 2019-2020)**

**Elaborations**

<b>Paper</b>	<b>Credits</b>	<b>Theory Exam</b>		<b>Practical Exam</b>
		<b>University Exam</b>	<b>Internal Exam</b>	
<b>DSC</b>	4+1	80 Marks	20 Marks	25 Marks
<b>DSE</b>	4+1	80 Marks	20 Marks	25 Marks
<b>SEC</b>	2	40 Marks	10 Marks	No Practical
<b>GE</b>	4	80 Marks	20 Marks	No Practical
<b>AECC</b>	2	40 Marks	10 Marks	No Practical
<b>P/O</b>	3+1	60 Marks	15 Marks	25 Practical

**DSC** – Discipline specific core course

**DSE** – Discipline specific elective course

**SEC** – Skill enhancement course

**GE** – Generic Elective

**AECC** - Ability Enhancement Compulsory

**P/O** -Project/Optional



**Model Question Paper**

3 Hours

Max Marks -80

Credits -4

**PART -A Answer any eight questions in part –A 8X4 M = 32 Marks**

UNIT- I 1  
2  
3

UNIT- II 4  
5  
6

UNIT- III 7  
8  
9

UNIT- IV 10  
11  
12

**Part – B**

**Answer all Questions 12MX4 = 48 Marks**

UNIT- I 13  
Or  
14

UNIT- II 15  
Or  
16

UNIT- III 17  
Or  
18

UNIT- IV 19  
Or  
20

## **B.Sc. (Computer Applications)**

### **Internal Exam (Theory)**

**Time:1Hr.**

**Maximum marks:20**

- Two internal exams (one at the middle of the semester and the other at the end) of one-hour duration are to be conducted carrying 15 markseach.
- Average of the scores of two exams should be taken intoaccount.
- Following is the examinationpattern.
  - 10 MCQs (multiple choice questions) of half markeach,
  - 10 FIBs (Fill in the Blanks) of half markeach
  - 5 SAQs (short answered questions) of one markeach
  - Totaling 15marks.
  - 5 marks meant for assignment.

**B.Sc. (Computer Applications)**

**Practical Question Paper**

3 Hours Max Marks -25

Credits -1

Answer any Two

6 X 2 = 12 MARKS

UNIT – I                    1 Program

UNIT- II                    1 Program

UNIT-III                    1 Program

UNIT-IV                    1 Program

Viva -    8 Marks

Record – 5 Marks

**B.Sc. (Computer Applications)**

**2 Credit (SEC) Paper**

**University Exam (Theory)**

**Time: 2Hrs.**

**Maximum marks: 40**

**Section – A (4 X 4M = 16 Marks )**

Answer any four of the following six questions. Each carries four marks.

- Q1. From Unit 1
- Q2. From Unit 1
- 3. From Unit 1
- Q4. From Unit 2
- Q5. From Unit 2
- 6. From Unit 2

**Section – B (2 X 12M = 24 Marks )**

Answer all the following two questions. Each carries fifteen marks.

- Q09. (a) or (b) from Unit 1
- Q10. (a) or (b) from Unit 2

**Internal Exam (Theory)**

**Time: 1/2Hr.**

**Maximum marks: 10**

- One internal exam at the end of the semester, of half an hour duration is to be conducted carrying 10 marks.
- Following is the examination pattern.
  - 10 MCQs (multiple choice questions) of one mark each, No assignment is required.

**University Exam(Theory)**

**Model Question Paper**

**for Semester VI (Project /optional)only**

3 Hours

Max Marks -60

Credits -3

**PART –A Answer any Six questions in part –A 6X4 M = 24Marks**

UNIT- I 1  
2  
3

UNIT- II 4  
5  
6

UNIT- III 7  
8  
9

**Part – B**

**Answer all Questions 12MX3 = 36 Marks**

UNIT- I 13  
Or  
14

UNIT- II 15  
Or  
16

UNIT- III 17  
Or  
18

**Internal Exam for Semester VI (Project /optional)(Theory)**

**Time:1Hr.**

**Maximum marks:15**

- Two internal exams (one at the middle of the semester and the other at the end) of one-hour duration are to be conducted carrying 15 marks each.
- Average of the scores of two exams should be taken into account.
- Following is the examination pattern.
  - 10 MCQs (multiple choice questions) of half mark each,
  - 10 FIBs (Fill in the Blanks) of half mark each
  - 5 SAQs (short answered questions) of one mark each
  - Totaling 15 marks.
  - No assignment required.

**B.Sc. (Computer Applications)**

**Practical Question Paper(Project /optional)**

3 Hours

Max Marks -25

Credits -1

Answer any Two

6 X 2 = 12 MARKS

UNIT – I 1 Program

UNIT- II 1 Program

UNIT-III 1 Program

UNIT-I or UNIT-II or UNIT-III 1 Program

Viva - 8 Marks

Record – 5 Marks

## MOOCs [Massive Online Open Courses] Free Resources

### E-Learning:

- NPTEL :nptel.ac.in [Core Subjects Certification]
- C++INSTITUTE :cppinstitute.org [C++ Certification]
- ORACLEEDUCATION :education.oracle.com [Java, DBMS Certification]
- BIG DATAUNIVERSITY :bigdatauniversity.com [Big Data Certification]
- COURSERA :coursera.org [Core Subjects Certification]
- CODEACADEMY :codecademy.com [Coding Certification]
- KHANACADEMY :khanacademy.org [Core Subjects Certification]
- PIXAR INABOX :khanacademy.org/partner-content/pixar
- VIDEOLECTURES :videlectures.net
- YOUTUBEEDU :plus.google.com/+YouTubeEDU/posts
- DISNEYRESEARCH :disneyresearch.com
- ALISON :alison.com [Core Subjects Certification]
- INTERNETARCHIVE :archive.org

### Freeware:

- SCILAB : scilab.org [MatLab Equivalent]
- GEOGEBRA :geogebra.org [Software for Class Room Teaching]

### Search Engine:

- WOLFRAMALPHA :wolframalpha.com [Computing Engine]
- CITESEER :citeseerx.ist.psu.edu [Searching Research Articles]
- DOAJ :doaj.org [Open Access to Journals]