

OSMANIA 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
SEMESTER - I				
BS106	Programming in C	DSC-3A	4T+3P=7	4 + 1 =5
SEMESTER - II				
BS206	Programming in C++	DSC-3B	4T+3P=7	4 + 1 =5
AECC				
BS107	Fundamentals of Computers	AECC	2T	2
SEMESTER -III				
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
SEMESTER -IV				
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
SEMESTER - V				
BS501	Information Technologies	GE	4T	4
BS505	Programming in Java	DSE-3E	4T+3P=7	4 + 1 =5
SEMESTER - VI				
BS605	Web Technologies	DSE-3F	4T+3P=7	4 + 1 =5
Project/Optional				
BS601	Information Security and Cyber Laws	PO	3T+3P=6	3 + 1 =4
Total Number of Credits				48

G. Kamala

Prof.G.Kamala
Chairperson Board of Studies in Computer Science, OU

CHAIRMAN
Board of Studies in Computer Science
Dept. of Mathematics
Osmania University, Hyd.

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Applications)
SEMESTER – I
Programming in C

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	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 versus 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

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Mehdipatnam, Hyderabad

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc (Computer Applications)
SEMESTER – I
Programming in C Lab

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 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.

OSMANIA UNIVERSITY
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B.Sc. (Computer Applications)
SEMESTER – II
Programming in C++

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	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:**

FACULTY OF SCIENCE
B.Sc. (Computer Applications)
SEMESTER – II
Programming in C++ Lab

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.

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OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. Computer Applications
Semester-I
AECC
Fundamentals of Computers

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, 6th Edition Fundamentals of Computers, NeeharikaAdabala.
2. Anita Goel, Computer Fundamentals.

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OSMANIA UNIVERSITY
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B.Sc. Computer Applications
SEMESTER – III
Python – I
(SEC – I)

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

References

1. Kenneth A. Lambert, *Fundamentals ofPython*
2. Clinton W. Brownley, *Foundations for Analytics withPython*
3. JamesPayne, *BeginningPythonusingPython2.6andPython3*
4. Charles Dierach, *Introduction to Computer Science usingPython*
5. PaulGries, *PracticalProgramming:AnIntroductiontoComputerScienceusingPython3*

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OSMANIA UNIVERSITY
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B.Sc. Computer Applications
SEMESTER – III
Sci Lab – I
(SEC – II)

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

OSMANIA UNIVERSITY
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B.Sc. (Computer Applications)
SEMESTER – III

Relational Data base Management Systems

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	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.

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SEMESTER – III

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Note:

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- 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.

LibraryBooks (Accession number, Title, Author, Department, PurchaseDate, Price),

IssuedBooks (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)

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- 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.

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OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. Computer Applications
SEMESTER – IV
Python – II
(SEC – III)

Theory

2Hours/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.

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*

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OSMANIA UNIVERSITY
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B.Sc. Computer Applications
SEMESTER – IV

Sci Lab – II
(SEC – IV)

Theory

2Hours/Week

2Credits

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

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OSMANIA UNIVERSITY
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B.Sc. (Computer Applications)
SEMESTER – IV
Multi Media Systems

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

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>

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OSMANIA UNIVERSITY
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B.Sc. (Computer Applications)
SEMESTER – IV
Multi Media Systems Lab

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-
 - Move Objects
 - Skew Objects
 - Stretch Objects
 - Rotate Objects
 - Stretch Objects while maintaining proportion
 - Rotate Objects after relocating the center dot
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).

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OSMANIA UNIVERSITY
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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, OnDemand 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*

G.Pulla Reddy Degree & PG College
Mehdipatnam, Hyderabad

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Applications)
SEMESTER – V
Programming in Java

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

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)

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OSMANIA UNIVERSITY

FACULTY OF SCIENCE
B.Sc. (Computer Applications)
SEMESTER – V

Programming in Java

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

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Applications)
SEMESTER – VI
Web Technologies

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	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.

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Applications)
SEMESTER – VI
Web Technologies Lab

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>,
, <pre>.
 2. Write a HTML program by using text formatting tags.
 3. Write a HTML program using presentational element tags , <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 .
 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.

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OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. Computer Applications
SEMESTER VI
Information Security and Cyber Laws
(Project/Optional)

Theory	3 Hours/Week	3 Credit	Internal marks = 15
Practical	3 Hours/Week	1 Credit	External Marks = 60

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

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OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. Computer Applications
SEMESTER – VI
Information Security and Cyber Laws Lab
(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.

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
UG (B.Sc.) Scheme of
Examinations
B.Sc. (Computer Applications)
(CBCS 2019-2020)

Elaborations

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

**OSMANIA UNIVERSITY
FACULTY OF SCIENCE
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.

**OSMANIA UNIVERSITY
FACULTY OF SCIENCE
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

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**OSMANIA UNIVERSITY
FACULTY OF SCIENCE
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
- Q3. From Unit 1
- Q4. From Unit 2
- Q5. From Unit 2
- Q6. From Unit 2

Section – B (2 X 12M = 24 Marks)

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

- Q9. (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.

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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 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.
 - No assignment required.

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
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 :videolectures.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]

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With Effect from the Academic Year 2019-2020

Syllabus for Computer ScienceProposed scheme for **B.Sc. Programme under Choice Based Credit System**

Code	Course Title	Course Type	HpW	Credits
SEMESTER - I				
BS106	Programming in C	DSC-3A	4T+3P=7	4 + 1 =5
SEMESTER - II				
BS206	Programming in C++	DSC-3B	4T+3P=7	4 + 1 =5
AECC				
BS107	Fundamentals of Computers	AECC	2T	2
SEMESTER -III				
BS301	Python - 1	SEC-1	2T	2
BS302	Operating Systems - 1	SEC-2	2T	2
BS306	Data Structures using C++	DSC-3C	4T+3P=7	4 + 1 =5
SEMESTER -IV				
BS401	Python - 2	SEC-3	2T	2
BS402	Operating Systems - 2	SEC-4	2T	2
BS406	Database Management Systems (DBMS)	DSC-3D	4T+3P=7	4 + 1 =5
SEMESTER - V				
BS501	Information Technologies	GE	4T	4
BS505	Programming in Java	DSE-3E	4T+3P=7	4 + 1 =5
SEMESTER - VI				
BS605	Web Technologies	DSE-3F	4T+3P=7	4 + 1 =5
Project/Optional				
BS601	PHP with MySQL	P/O	3T+3P=6	3 + 1 =4
Total Number of Credits				48

Prof.G.Kamala
Chairperson Board of Studies in Computer Science, **Board of Studies in Computer Science**
Dept. of Mathematics
Osmania University, Hyd.

Theory	4 Hours/Week	4credits
Practical	3 Hours/Week	1credit

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, TypeConversions.

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, Multidimensional Arrays.

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, Pointers to Pointers, Array of Pointers, Pointer to Array, 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), Array of Structures (Union), Structures verses Unions, Enumeration Types.

Files: Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Files of Records, Random Access to Files of Records, Other File Management Functions.

Text PradipDey, ManasGhosh, *Computer Fundamentals and Programming in C(2e)*

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

Practical

3 Hours/Week

1 credit

- 1 Write a program to find the largest two (three) numbers using if and conditional operator.
- 2 Write a program to print the reverse of a given number.
- 3 Write a program to print the prime number from 2 to n where n is given by user.
- 4 Write a program to find the roots of a quadratic equation using switch statement.
- 5 Write a program to print a triangle of stars as follows (take number of lines from user):

```

      *
     ***
    *****
   ********
  *********
 
```

- 6 Write a program to find largest and smallest elements in a given list of numbers.
- 7 Write a program to find the product of two matrices..
- 8 Write a program to find the GCD of two numbers using iteration and recursion.
- 9 Write a program to illustrate use of storage classes.
- 10 Write a program to demonstrate the call by value and the call by reference concepts.
- 11 Write a program that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
- 12 Write a program to illustrate use of data type enum.
- 13 Write a program to demonstrate use of string functions string.h header file.
- 14 Write a program that opens a file and counts the number of characters in a file.
- 15 Write a program to create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
- 16 Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.

Note : Write the Pseudo Code and draw Flow Chart for the above programs.

Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows 10.

DSC-3B**Programming in C++****BS206**

Theory	4 Hours/Week	4credits
Practical	3 Hours/Week	1credit

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.

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

Unit – II

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, Object Conversion, Aggregation.

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, Class Hierarchies, 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, Handling the `bad_alloc` 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, Introduction to the STL.

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

Reference s B. Lippman, *C++ Primer*
 Bruce Eckel, *Thinking in C++*
 K.R. Venugopal, *Mastering C++*
 Herbert Schildt, *C++: The Complete Reference*
 Bjarne Stroustrup, *The C++ Programming Language*
 Sourav Sahay, *Object Oriented Programming with C++*

C++Lab**BS206****Practical**

2 Hours/Week

1 credit

- 1 Write a program to.
 - a. Print the sum of digits of a given number.
 - b. Check whether the given number is Armstrong or not.
 - c. Print the prime number from 2 to n where n is a natural number given.
- 2 Write a program to find largest and smallest elements in a given list of numbers and sort the given list.
- 3 Write a program to read the student name, roll no, marks and display the same using class and object.
- 4 Write a program to implement the dynamic memory allocation and de-allocation using new and delete operators using class and object.
- 5 Write a program to find area of a rectangle, circle, and square using constructors.
- 6 Write a program to implement copy constructor.
- 7 Write a program using friend functions and friend class.
- 8 Write a program to implement constructors
 - Default Constructor, Parameterized Constructor, Copy Constructor
 - Define the constructor inside/outside of the class
 - Implement all three constructors within a single class as well as use multiple classes (individual classes)
- 9 Write a program to implement the following concepts using class and object
 - Function overloading
 - Operator overloading (unary/binary(+ and-))
- 10 Write a program to demonstrate single inheritance, multilevel inheritance and multiple inheritances.
- 11 Write a program to implement the overloaded constructors in inheritance.
- 12 Write a program to implement the polymorphism and the following concepts using class and object.
 - Virtual functions
 - Pure virtual functions
- 13 Write a program to implement the virtual concepts for the following concepts
 - Constructor (not applied)
 - Destructor (applied)
- 14 Write a program to demonstrate static polymorphism using method overloading.
- 15 Write a program to demonstrate dynamic polymorphism using method overriding and dynamic method dispatch.
- 16 Write a program to implement the template (generic) concepts
 - Without template class and object
 - With template class and object

Note : Write the Pseudo Code and draw Flow Chart for the above programs.

Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

AECC

Fundamentals of Computers

BS107

Theory

2 Hours/Week

2 credits

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, 6th Edition Fundamentals of Computers, NeeharikaAdabala.
2. Anita Goel, Computer Fundamentals.

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 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*

SEC-2[B]

Operating Systems-1

BS302

Theory

2 Hours/Week

2 credits

Unit – I

Introduction: Computer-System Architecture, Computing Environments.

Operating-System Structures: Operating-System Services, User Interface for Operating-System, System Calls, Types of System Calls, Operating System Structure.

Process Management: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication, Examples–Producer-Consumer Problem.

Process Synchronization: Critical-Section Problem, Peterson’s Solution, Synchronization, Semaphores, Monitors.

Unit – II

CPU Scheduling: Concepts, Scheduling Criteria, Scheduling Algorithms.

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Text

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, *Operating System Concepts (9e)*

Reference s

Naresh Chauhan, *Principles of Operating Systems*

Thomas W. Doeppner, *Operating Systems in Depth*

Andrew S. Tanenbaum, *Modern Operating Systems*

William Stallings, *Operating Systems – Internals and Design Principles*

Dhananjay M. Dhandhere, *Operating Systems – A Concept Based Approach*

DSC–3C

DataStructures

BS306

Theory	4 Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Fundamental Concepts: Introduction to Data Structures, Types of Data Structures, Introduction to Algorithm, Pseudo-code, Flow Chart, Analysis of Algorithms.

Linear Data Structure Using Arrays: 1-D Arrays, 2-D Arrays, N-D Arrays, Memory Representation and Address Calculation of 1-D, 2-D, N-D Arrays, Concept of Ordered List, String Manipulation, Pros and Cons of Arrays.

Stacks: Concept, Primitive Operations, Abstract Data Type, Representation Stacks Using Arrays, Prefix, Infix, Postfix Notations for Arithmetic Expression, Applications of Stacks– Converting Infix Expression to Postfix Expression, Evaluating the Postfix Expression, Checking Well-formed (Nested) Parenthesis, Processing of Function Calls, Reversing a String.

Unit – II

Recursion: Introduction, Recurrence, Use of Stack in Recursion, Variants of Recursion, Execution of Recursive Calls, Recursive Functions, Iteration versus Recursion.

Queues: Concept, Primitive Operations, Abstract Data Type, Representation Queues Using Arrays, Circular Queue, Double-Ended Queue, Applications of Queues.

Linked Lists: Introduction, Concept, Terminology, Primitive Operations-creating, inserting, deleting, traversing, Representation of Linked Lists, Linked List Abstract Data Type, Linked List Variants - Singly Linked List, Doubly Linked List, Linear and Circular Linked List, Representation Stacks and Queues Using Linked Singly Lists, Application of Linked List–GarbageCollection.

Unit – III

Trees: Introduction, Representation of a General Tree, Binary Tree Introduction, Binary Tree Abstract Data Type, Implementation of Binary Trees, Binary Tree Traversals – Preorder, Inorder, Postorder Traversals, Applications of Binary Trees Briefly.

Graphs: Introduction, Graph Abstract Data Type, Representation of Graphs, Graph Traversal – Depth-First Search, Breadth-First Search, Spanning Tree – Prim’s Algorithm, Kruskal’s Algorithm.

Hashing: Introduction, Hash Functions, Collision Resolution Strategies.

Unit – IV

Searching and Sorting: Sequential (Linear) Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, and Comparison of Sorting Techniques.

Heaps: Concept, Implementation, Abstract Data Type, Heap Sort.

Text Varsha H. Patil, *Data Structures Using C++*

References Nell Dale, *C++ Plus DataStructures*
 Seymour Lipschutz, *Data Structures (Revised 1e)*
 Adam Drozdek, *Data Structures and Algorithms in C++*
 Mark Allen Weiss, *Data structures and Algorithm Analysis in C++ (4e)*
 D.S. Malik, *C++ Programming: Program Design Including Data Structures (6e)*
 Michael Main, Walter Savitch, *Data Structures and Other Objects Using C++ (4e)*
 Michael T. Goodrich, R. Tamassia, David M. Mount, *Data Structures and Algorithms in C++*
 Yonghui Wu, Jiande Wang, *Data Structure Practise for Collegiate Programming Contests and Education*

Data Structures Lab

BS306

Practical

2 Hours/Week

1 credit

- 1 Write programs to implement the following using an array: a) Stack ADT b) Queue ADT.
- 2 Write a program to convert the given infix expression to postfix expression using stack.
- 3 Write a program to evaluate a postfix expression using stack.
- 4 Write a program to ensure the parentheses are nested correctly in an arithmetic expression.
- 5 Write a program to find following using Recursion
 - a) Factorial of +ve Integer
 - b) n^{th} term of the Fibonacci Sequence
 - c) GCD of two +ve integers
- 6 Write a program to create a single linked list and write functions to implement the following operations.
 - a) Insert an element at a specified position
 - b) Delete a specified element in the list
 - c) Search for an element and find its position in the list
 - d) Sort the elements in the list ascending order
- 7 Write a program to create a double linked list and write functions to implement the following operations.
 - a) Insert an element at a specified position
 - b) Delete a specified element in the list
 - c) Search for an element and find its position in the list
 - d) Sort the elements in the list ascending order
- 8 Write a program to create singular circular linked lists and function to implement the following operations.
 - a) Insert an element at a specified position
 - b) Delete a specified element in the list
 - c) Search for an element and find its position in the list
- 9 Write programs to implement the following using a single linked list:
 - a) Stack ADT
 - b) Queue ADT.
- 10 Write a program to implement Binary search technique using Iterative method and Recursive methods.
- 11 Write a program for sorting the given list numbers in ascending order using the following technique: Bubble sort and Selection sort
- 12 Write a program for sorting the given list numbers in ascending order using the following technique: Insertion sort and Quicksort
- 13 Write a program for sorting the given list numbers in ascending order using the following technique: Merge sort and Heapsort
- 14 Write a program to traverse a binary tree in following way.
 - a) Pre-order
 - b) In-order
 - c) Post-order
- 15 Write a program to the implementation graph traversals – BFS and DFS.
- 16 Write a program to find the minimum spanning tree for a weighted graph using
 - a) Prim's Algorithm
 - b) Kruskal's Algorithm.

Note : Write the Pseudo Code for the above programs.

Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

SEC-3

Python-2

BS401

Theory

2Hours/Week

2 credits

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*

SEC-4

Operating Systems-2

BS401

Theory	3Hours/Week	2credits
Practical	2 Hours/Week	1credit

Unit – I

Main Memory: Introduction, Swapping, Contiguous Memory Allocation, Segmentation, Paging.
Virtual Memory: Introduction, Demand Paging, Page Replacement, Allocation of Frames, Thrashing.
Mass-Storage Structure: Overview, Disk Scheduling, RAID Structure.
File Systems: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, Protection.

Unit – II

File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management. Recovery, Network File System.
Protection and Security: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Access Control, Revocation of Access Rights, The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, Firewalling to Protect Systems and Networks, Computer-Security Classifications. Case Study: Windows 7 and Linux System.

Text AbrahamSilberschatz,PeterBaerGalvin,GregGagne,*OperatingSystemConcepts(9e)*

Reference s NareshChauhan, *Principles of Operating Systems*
Thomas W. Doeppner, *Operating Systems in Depth*
Andrew S. Tanenbaum, *Modern Operating Systems*
William Stallings, *Operating Systems – Internals and Design Principles*
Dhananjay M. Dhandhere, *Operating Systems – A Concept Based Approach*

DSC–3D

Database Management Systems

BS406

Theory	4 Hours/Week	4 credits
Practical	2 Hours/Week	1 credit

Unit – I

Introduction to Databases: Introduction, Traditional File-Based Systems, Database Approach, Roles in the Database Environment, Advantages and Disadvantages of DBMSs, The Three-Level ANSI-SPARC Architecture, Database Languages, Data Models, Functions of a DBMS, Components of a DBMS.

Relational Model: Introduction, Terminology, Integrity Constraints, Views.

The Relational Algebra: Unary Operations, Set Operations, Join Operations, Division Operation, Aggregation and Grouping Operations.

Unit – II

SQL: Introduction, Data Manipulation–Simple Queries, Sorting Results, Using the SQL Aggregate Functions, Grouping Results, Sub-queries, ANY and ALL, Multi-table Queries, EXISTS and NOT EXIST, Combining Result Tables, Database Updates.

SQL: The ISO SQL Data Types, Integrity Enhancement Feature–Domain Constraints, Entity Integrity, Referential Integrity, General Constraints, Data Definition–Creating a Database, Creating a Table, Changing a Table Definition, Removing a Table, Creating an Index, Removing an Index, Views–Creating a View, Removing a View, View Resolution, Restrictions on Views, View Updatability, WITH CHECK OPTION, Advantages and Disadvantages of Views, View Materialization, Transactions, Discretionary Access Control–Granting Privileges to Other Users, Revoking Privileges from Users.

Advanced SQL: The SQL Programming Language–Declarations, Assignments, Control Statements, Exceptions, Cursors, Subprograms, Stored Procedures, Functions, and Packages, Triggers, Recursion.

Unit – III

Entity–Relationship Modeling: Entity Types, Relationship Types, Attributes, Keys, Strong and Weak Entity Types, Attributes on Relationships, Structural Constraints, Problems with ER Models–Fan Traps, Chasm Traps.

Enhanced Entity–Relationship Modeling: Specialization/Generalization, Aggregation, Composition.

Functional–Dependencies: Anomalies, Partial Functional Dependency, Transitive Functional Dependency, Multi Valued Dependency, Join Dependency.

Normalization: The Purpose of Normalization, How Normalization Supports Database Design, Data Redundancy and Update Anomalies, Functional Dependencies in brief, The Process of Normalization, 1NF, 2NF, 3NF, BCNF. The Database Design Methodology for Relational Databases(Appendix–D).

Unit – IV

Transaction Management: Transaction Support–Properties of Transactions, Database Architecture, Concurrency Control–The Need for Concurrency Control, Serializability and Recoverability, Locking Methods, Deadlock, Time Stamping Methods, Multi-version Timestamp Ordering, Optimistic Techniques, Granularity of Data Items, Database Recovery–The Need for Recovery, Transactions and Recovery, Recovery Facilities, Recovery Techniques, Nested Transaction Model.

Security: Database Security–Threats, Computer-Based Controls–Authorization, Access Controls, Views, Backup and Recovery, Integrity, Encryption, RAID.

Thomas M. Connolly, Carolyn E. Begg, *Database Systems–A Practical Approach to Design, Implementation, and Management (6e)*

Text

Reference s

Sharon Allen, Evan Terry, *Beginning Relational Data Modeling*
 Jeffrey A. Hoffer, V. Ramesh, HeikkiTopi, *Modern Database Management*
 Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*
 RamezElmasri, Shamkant B. Navathe, *Fundamentals of Database Systems*
 Abraham Silberchatz, Henry F. Korth, S. Sudarshan, *Database Systems: Concepts*
 C Coronel, S Morris, *Database Systems: Design, Implementation, and Management*

Database Management Systems Lab**BS406****Practical**

2 Hours/Week

1 credit

Consider the relational schema for part of the **Dream Home** case study is:

Branch (branchNo, street, city, postcode)

Staff (staffNo, fName, IName, position, sex, DOB, salary, branchNo)

Property For Rent (propertyNo, street, city, postcode, type, rooms, rent, ownerNo, staffNo, branchNo)

Client (clientNo, fName, IName, telNo, prefType, maxRent, eMail)

Private Owner (ownerNo, fName, IName, address, telNo, eMail, password)

Viewing (clientNo, propertyNo, viewDate, comment)

Registration (clientNo, branchNo, staffNo, dateJoined)

1. Create a database with name "DreamHome" and now create all the tables listed above with constraints.
2. Insert a new row into the table supplying data for all columns.
3. Modify data in the database using UPDATE
4. Delete data from the database using DELETE
5. Changing a table definition using ALTER
6. Removing a table using DROP
7. Removing rows in table using TRUNCATE
8. Create an index and removing an index
9. Practice other standard SQL commands for creating, modifying, displaying data of tables.
10. List full details of all staff.
11. List all staff with a salary greater than £10000.
12. List the property numbers of all properties that have been viewed.
13. Produce a list of salaries for all staff, showing only the staffNo, fName, IName, and salary details.
14. List all cities where there is either a branch office or a property for rent.
15. List all cities where there is a branch office but no properties for rent.
16. List all cities where there is both a branch office and at least one property for rent.
17. List the names and comments of all clients who have viewed a property for rent.
18. Produce a status report on property viewings.
19. List complete details of all staff who work at the branch in Glasgow.
20. List the addresses of all branch offices in London or Glasgow
21. List all staff with a salary between £20,000 and £30,000.
22. Identify all clients who have viewed all properties with three rooms.
23. How many properties cost more than £350 per month to rent?
24. How many different properties were viewed in May 2013?
25. Find the total number of Managers and the sum of their salaries.
26. Find the minimum, maximum, and average staff salary.
27. Find the number of staff working in each branch and the sum of their salaries.
28. List all managers and supervisors.
29. Find all owners with the string 'Glasgow' in their address.
30. List the details of all viewings on property PG4 where a comment has not been supplied.
31. Produce a list of salaries for all staff, arranged in descending order of salary.
32. Produce an abbreviated list of properties arranged in order of property type.
33. Find the number of staff working in each branch and the sum of their salaries.
34. For each branch office with more than one member of staff, find the number of staff working in each branch and the sum of their salaries.
35. List the staff who work in the branch at '163 MainSt'.
36. List all staff whose salary is greater than the average salary, and show by how much their salary is greater than the average.
37. List the properties that are handled by staff who work in the branch at '163 MainSt'.
38. Find all staff whose salary is larger than the salary of at least one member of staff at branch B003.
39. Find all staff whose salary is larger than the salary of every member of staff at branch B003
40. List the names of all clients who have viewed a property, along with any comments supplied.
41. For each branch office, list the staff numbers and names of staff who manage properties and the properties that they manage.
42. For each branch, list the staff numbers and names of staff who manage properties including the city in which the branch is located and the properties that the staff manage.

43. Find the number of properties handled by each staff member, along with the branch number of the member of staff.
44. List all branch offices and any properties that are in the same city.
45. List all properties and any branch offices that are in the same city.
46. List the branch offices and properties that are in the same city along with any unmatched branches or properties.
47. Find all staff who work in a London branch office.
48. Construct a list of all cities where there is either a branch office or a property.
49. Construct a list of all cities where there is both a branch office and a property.
50. Create a view so that the manager at branch B003 can see the details only for staff who work in his or her branch office.
51. Create a view of the staff details at branch B003 that excludes salary information, so that only managers can access the salary details for staff who work at their branch.
52. Create a view of staff who manage properties for rent, which includes the branch number they work at, their staff number, and the number of properties they manage.
53. Removing a view using DROP VIEW
54. Give the user with authorization identifier Manager all privileges on the Staff table.
55. Give users Personnel and Director the privileges SELECT and UPDATE on column salary of the Staff table.
56. Revoke the privilege SELECT on the Branch table from all users.
57. Revoke all privileges you have given to Director on the Staff table.
58. Demonstrate exceptions in PL/SQL
59. Demonstrate cursors in PL/SQL
60. Write PL/SQL queries to create procedures.
61. Write PL/SQL queries to create functions.
62. Write PL/SQL queries to create package.
63. Write PL/SQL queries to create triggers.
64. Write PL/SQL queries using recursion.

Consider the relational schema for part of the **Hotel** case study is:

Hotel (hotelNo, hotelName, city)

Room (roomNo, hotelNo, type, price)

Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)

Guest (guestNo, guestName, guestAddress)

65. Create a database with name "Hotel" and now create all the tables listed above with constraints.
66. Insert a new row into the table supplying data for all columns.
67. Modify data in the database using UPDATE
68. Delete data from the database using DELETE
69. Changing a table definition using ALTER
70. Removing a table using DROP
71. Removing rows in table using TRUNCATE
72. Practice other standard SQL commands for creating, modifying, displaying data of tables.
73. List full details of all hotels.
74. List full details of all hotels in London.
75. List the names and addresses of all guests living in London, alphabetically ordered by name.
76. List all double or family rooms with a price below £40.00 per night, in ascending order of price.
77. List the bookings for which no dateTo has been specified.
78. How many hotels are there?
79. What is the average price of a room?
80. What is the total revenue per night from all double rooms?
81. How many different guests have made bookings for August?
82. List the price and type of all rooms at the Grosvenor Hotel.
83. List all guests currently staying at the Grosvenor Hotel.
84. List the details of all rooms at the Grosvenor Hotel, including the name of the guest staying in the room.
85. What is the total income from bookings for the Grosvenor Hotel today?
86. List the rooms that are currently unoccupied at the Grosvenor Hotel.
87. What is the lost income from unoccupied rooms at the Grosvenor Hotel?
88. List the number of rooms in each hotel.
89. List the number of rooms in each hotel in London.
90. What is the average number of bookings for each hotel in August?
91. What is the most commonly booked room type for each hotel in London?
92. What is the lost income from unoccupied rooms at each hotel today?
93. Insert rows into each of these tables.

94. Update the price of all rooms by 5%.
95. Demonstrate that queries written using the UNION operator and same can be rewritten using the OR.
96. Apply the syntax for inserting data into a table.
97. Create a view containing the cheapest hotels in the world.
98. Create the Hotel table using the integrity enhancement features of SQL.
99. Create a database trigger for the following situations:
 - (a) The price of all double rooms must be greater than £100.
 - (b) The price of double rooms must be greater than the price of the highest single room.
 - (c) A booking cannot be for a hotel room that is already booked for any of the specified dates.
 - (d) A guest cannot make two bookings with overlapping dates.
 - (e) Maintain an audit table with the names and addresses of all guests who make bookings for hotels in London (do not store duplicate guest details).

Given relation schemas are

Sailors (sid : integer, sname : string, rating : integer, age : real)

Boats (bid : integer, bname : string, color : string)

Reserves (sid : integer, bid : integer, day : date)

100. Find the names and ages of all sailors.
101. Find all sailors with a rating above 7.
102. Find the names of sailors who have reserved boat 103.
103. Find the sids of sailors who have reserved a red boat.
104. Find the names of sailors who have reserved a red boat.
105. Find the colors of boats reserved by Lubber.
106. Find the names of sailors who have reserved at least one boat.
107. Find the names of sailors who have reserved at least two boats.
108. Compute increments for the ratings of persons who have sailed two different boats on the same day.
109. Find the ages of sailors whose name begins and ends with B and has at least three characters.
110. Find the names of sailors who have reserved a red or a green boat.
111. Find the names of sailors who have reserved a red and a green boat.
112. Find the sids of all sailors who have reserved red boats but not greenboats.
113. Find all sids of sailors who have a rating of 10 or have reserved boat 104.
114. Find the names of sailors who have not reserved a red boat.
115. Find sailors whose rating is better than some sailor called Horatio.
116. Find sailors whose rating is better than every sailor called Horatio.
117. Find the names of sailors who have reserved all boats.
118. Find the names of sailors who have reserved at least two boats.
119. Find the names of sailors who have reserved all boats called Interlake.
120. Find sailors who have reserved all redboats.
121. Find the sailor name, boat id, and reservation date for each reservation.
122. Find the sids of sailors with age over 20 who have not reserved a red boat.
123. Find the average age of all sailors.
124. Find the average age of sailors with a rating of 10.
125. Find the name and age of the oldest sailor.
126. Count the number of different sailor names.
127. Find the names of sailors who are older than the oldest sailor with a rating of 10.
128. Find the sailors with the highest rating.
129. Find the age of the youngest sailor for each rating level.
130. Find age of the youngest sailor who is eligible to vote for each rating level with at least 2 such sailors.
131. Find the average age of sailors for each rating level that has at least two sailors.
132. For each red boat, find the number of reservations for this boat.
133. Find the average age of sailors who are of voting age (i.e., at least 18 years old) for each rating level that has at least two sailors.
134. Delete the records of sailors who have rating 8 (deleting some rows in a table).
135. Loading data which is present in the text into the table.

Note Recommended to use open source database software like MySQL, MongoDB, PostgreSQL, etc...

: In practical examination, students have to

- Create database
- Create tables with their integrity constraints.
- Insert the data into tables and then execute the queries.
- Answer any six queries from ten queries given by the examiner.

**G.Pulla Reddy Degree & PG College
Mehdipatnam, Hyderabad**

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 ofComputers*

Reference s

P. K. sinha, *ComputerFundamentals*

Anita Goel, *ComputerFundamentals*

V. Rajaraman, *Fundamentals of Computers*

E. Balagurusamy, *Fundamentals of Computers*

J. Glenn Brookshear, Dennis Brylow, *Computer Science An Overview*

DSC–3E**Programming in Java****BS505**

Theory	4Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Type Conversion, Casting, Conditional Statements, Loops, Branching Mechanism, Classes, Objects, Class Declaration, Creating Objects, Method Declaration and Invocation, Method Overloading, Constructors–Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects, Class Variables & Methods-static Keyword, this Keyword.

Unit – II

One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.
Inheritance: Introduction, Types of Inheritance, extends Keyword, Examples, Method Overriding, super, final Keywords, Abstract classes, Interfaces, Abstract Classes Verses Interfaces. Packages–Creating and Using Packages, Access Protection, Wrapper Classes, String Class, StringBuffer Class. Exception: Introduction, Types, Exception Handling Techniques, User-Defined Exception.

Unit – III

Multithreading: Introduction, Main Thread, Creation of New Threads – By Inheriting the Thread Class or Implementing the Runnable Interface, Thread Lifecycle, Thread Priority, Synchronization.
Input/Output: Introduction, java.io Package, File Class, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class, RandomAccessFile Class.

Unit – IV

Event Handling: Introduction, Types of Events, Example. AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts. Swing: Introduction, Differences between Swing and AWT, JFrame, JApplet, JPanel, Components in Swings, Layout Managers, JTable, DialogBox.
Database Handling Using JDBC: Introduction, Types of JDBC Drivers, Load the Driver, Establish Connection, Create Statement, Execute Query, Iterate Resultset, Scrollable Resultset, Developing a JDBC Application.

Text Sachin Malhotra, Saurabh Choudhary, *Programming in Java (2e)*

Reference s Bruce Eckel, *Thinking in Java (4e)*
Herbert Schildt, *Java: The Complete Reference (9e)*
Y. Daniel Liang, *Introduction to Java Programming (10e)*
Paul Deitel, Harvey Deitel, *Java: How To Program (10e)*
Cay S. Horstmann, *Core Java Volume I – Fundamentals (10e)*
C. Thomas Wu, *An introduction to object-oriented programming with Java (5e)*
Tony Gaddis, *Starting Out with Java From Control Structures Through Objects (6e)*
Jeanne Boyarsky, Scott Selikoff, *OCA: Oracle Certified Associate Java SE 8 Programmer–I Study Guide*

JavaLab**BS505****Practical**

3 Hours/Week

1 credit

- Write java programs to find the following
- 1 a) largest of given three numbers b) reverses the digits of a number
c) given number is prime or not d) GCD of given two integers
 - 2 Write java programs that implement the following
a) default constructor b) parameterized constructor c) constructor overloading
 - 3 a) Write a java program to find the smallest of given list integers using array and scanner class.
b) Write a java program for multiplication of two matrices.
 - 4 a) Write a java program for demonstrating an inner class or nested class.
b) Write a java program to implement method overloading, method overriding, dynamic method dispatch
 - 5 Write a java program to implement single, multilevel, hierarchical, multiple, hybrid inheritances.
 - 6 Write java programs that demonstrate the use of abstract, this, super, static, final keywords
 - 7 a) Write a java program for creating a package and using a package.
b) Write a java program to demonstrate the use of wrapper classes.
 - 8 a) Write a java program using all five keywords of exception handling mechanism.
b) Write a java program for creating customized (user) exception
 - 9 a) Write a java program that checks whether a given string is a palindrome or not.
b) Write a java program for sorting a given list of names in ascending order.
 - 10 a) Write a java program to create a file, write the data and display the data.
b) Write a java program that reads a file name from user and displays its information.
 - 11 a) Write a java program for controlling main thread.
b) Write a java program for creating new thread by extending Thread class.
 - 12 a) Write a java program for creating new thread by implementing Runnable interface.
b) Write a java program for thread synchronization.
 - 13 a) Write a java program to create following AWT components: Button, Checkbox, Choice, and List.
b) Write java programs to create AWT application using containers and layouts.
 - 14 a) Write java programs to create a simple Applet and create swing based Applet.
b) Write a java program to handle different types of events in a swing application.
 - 15 Write java programs to create a swing application using swing components and layouts.
 - 16 Write a java program to store and retrieve data from database using JDBC.

Note
:

Write the program using simple text editors (not IDE), compile and run from command prompt.
Encourage students to develop small java applications using IDE, like giving as assignment.

Write a small java application using some features of java.

DSC–3F**WebTechnologies****BS605**

Theory	4Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Structuring Documents for the Web: Introducing HTML and XHTML, Basic Text Formatting, Presentational Elements, Phrase Elements, Lists, Editing Text, Core Elements and Attributes, Attribute Groups
 Links and Navigation: Basic Links, Creating Links with the <a> Element, Advanced E- mail Links.
 Images, Audio, and Video: Adding Images Using the Element, Using Images as Links Image Maps, Choosing the Right Image Format, Adding Flash, Video and Audio to your web pages.
 Tables: Introducing Tables, Grouping Section of a Table, Nested Tables, Accessing Tables
 Forms: Introducing Forms, Form Controls, Sending Form Data to the Server
 Frames: Introducing Frameset, <frame> Element, Creating Links Between Frames, Setting a Default Target Frame Using <base> Element, Nested Framesets, Inline or Floating Frames with <iframe>.

Unit – II

Cascading Style Sheets: Introducing CSS, Where you can Add CSS Rules.
 CSS Properties: Controlling Text, Text Formatting, Text Pseudo Classes, Selectors, Lengths, Introducing the Box Model.
 More Cascading Style Sheets: Links, Lists, Tables, Outlines, The :focus and :activate Pseudo classes Generated Content, Miscellaneous Properties, Additional Rules, Positioning and Layout with CSS
 Page Layout: Understating the Site’s Audience, Page Size, Designing Pages, Coding your Design, Developing for MobileDevices.
 Design Issues: Typography, Navigation, Tables, Forms.

Unit – III

Learning JavaScript: How to Add Script to Your Pages, the Document Object Model, Variables, Operators, Functions, Control Statements, Looping, Events, Built- In Objects,
 Working with JavaScript: Practical Tips for Writing Scripts, Form Validation, Form Enhancements, JavaScript Libraries.
 Putting Your site on the web: Meta tags, Testing your site, Talking the Leap to Live, Telling the World about your site, Understanding your visitors.

Unit – IV

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).
 Ajax-Enabled Rich Internet Applications: introduction, history of Ajax, traditional web applications Vs Ajax Applications, RIAs with Ajax, Ajax example using XML HttpRequest object, XML and DOM, creating full scale Ajax-enabled application, Dojo Toolkit.

Text Jon Duckett, *Beginning HTML, XHTML, CSS and JavaScript*

Reference s Chris Bates, *Web Programming*
 M. Srinivasan, *Web Technology: Theory and Practice*
 Achyut S. Godbole, AtulKahate, *Web Technologies*
 Kogent Learning Solutions Inc, *Web Technologies Black Book*
 Ralph Moseley and M. T. Savaliya, *Developing Web Applications*
 P.J. Deitel& H.M. Deitel, *Internet and World Wide Web How to program*

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WebTechnologiesLab**BS606****Practical**

2 Hours/Week

1 credit

- 1 a. Write a HTML program using basic text formatting tags, <h1>, <p>,
, <pre>.
b. Write a HTML page for Example Cafe using above text formatting tags.
- 2 a. Write a HTML program using presentational element tags , <i>, <strike>, <sup>, <sub>,
, <big>, <small>, <hr>
b. Write a HTML program using phrase element tags <blockquote>, <cite>, <abbr>, <acronym>, <code>, <address>
- 3 a. Write a HTML program using different list types.
b. Write a HTML page that displays ingredients and instructions to prepare a recipe.
- 4 a. Write a HTML program using grouping elements <div> and .
b. Write a HTML Menu page for Example cafe site.
- 5 a. Write a HTML program using images, audios, videos.
b. Write a HTML program to create your time table.
- 6 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.
- 7 Write a HTML program to create a frames and links between frames.
- 8 Write a HTML program to create different types of stylesheets.
- 9 Write a HTML program to create CSS on links, lists, tables and generated content.
- 10 Write a HTML program to create your college web site using multi column layouts.
- 11 Write a HTML program to create your college web site using for mobile device.
- 12 Write a HTML program to create login form and verify username and password using DOM
a. Write a JavaScript program to calculate area of rectangle using function.
b. Write a JavaScript program to wish good morning, good afternoon, good evening depending on the current time.
- 13 a. Write a JavaScript program using switch case?
b. Write a JavaScript program to print multiplication table of given number using loop.
- 14 a. Write a JavaScript programs using any 5 events.
b. Write a JavaScript program using JavaScript built in objects.
- 15 a. Write a JavaScript programs using any 5 events.
b. Write a JavaScript program using JavaScript built in objects.
- 16 Write a JavaScript program to create registration form and validate all fields using form validation
17. Write a XML Program to represent Student Data using DTD.
18. Write a XML Program to represent Data using XML Schema Definition.

Project/Optional

PHPwithMySQL

BS606

Theory	3Hours/Week	3credits
Practical	3 Hours/Week	1credit

Unit – I

Introducing PHP – What is PHP? Why use PHP? Evolution of PHP, Installing PHP, Other ways to run PHP, Creating your first script. PHP Language Basics – Using variables, Understanding Data Types, Operators and Expressions, Constants. Decisions and Loops – Making Decisions, Doing Repetitive Tasks with Looping, Mixing Decisions and Looping withHTML.

Strings – Creating and Accessing Strings, Searching Strings, Replacing Text with Strings, Dealing with Upper and Lowercase, Formatting Strings. Arrays – Creating Arrays, Accessing Array Elements, Looping Through Arrays with for-each, Working with Multidimensional Arrays, Manipulating Arrays.

Unit – II

Functions – What is a Function? Why Functions are useful? Calling Functions, Working with Variable Functions, Writing your own Functions, Working with References, Writing Recursive Functions.

Objects – Introduction OOP Concepts, Creating Classes and Objects in PHP, Creating and using Properties, Working with Methods, Object Overloading with _get(), _set() and _call(), Using Inheritance to Extend Power of Objects, Constructors and Destructors, Automatically Loading Class Files, Storing as Strings.

Handling HTML Forms with PHP – How HTML form works, Capturing Form Data with PHP, Dealing with Multi-Value Fields, Generating Web Forms with PHP, Storing PHP Variables in Forms, Creating File Upload Forms, Redirecting After a Form Submission.

Unit – III

Working with Files and Directories - Getting Information on Files, Opening and Closing Files, Reading and Writing to Files, Copying, Renaming, and Deleting Files, Working with Directories.

Introducing Databases and SQL – Deciding How to Store Data, Understanding Relational Databases, Setting Up MySQL, A Quick Play with MySQL, Connecting MySQL fromPHP.

Retrieving Data from MySQL with PHP – Setting Up the Book Club Database, Retrieving Data with SELECT, Creating a Member Record Viewer. Manipulating MySQL Data with PHP – Inserting, Updating, and Deleting Records, Building a Member Registration Application.

Text Matt Doyle, *Beginning PHP 5.3* (Wrox – WileyPublishing)

Reference s Ellie Quigley, *PHP and MySQL by Example*
 Joel Murach, Ray Harris, *Murach’s PHP and MySQL*
 Brett McLaughlin, *PHP & MySQL: The Missing Manual*
 Luke Welling, Laura Thomson, *PHP and MySQL Web Development*
 W. Jason Gilmore, *Beginning PHP and MySQL From Novice to Professional*
 Andrew Curioso, Ronald Bradford, Patrick Galbraith, *Expert PHP and MySQL*

PHP with MySQLLab

BS606

Practical

3 Hours/Week

1credit

- 1 a) Write a PHP script to find the factorial of a given number.
b) Write a PHP script to find the sum of digits of a given number.
- 2 a) Write a PHP script to find whether the given number is a prime or not.
b) Write a PHP script to demonstrate the use of break, continue statements using nested loops.
- 3 a) Write a PHP script to display the Fibonacci sequence with HTML page.
b) Write a PHP script to create a chessboard.
- 4 a) Write a PHP script using built-in string function like strpos(), strstr(), substr_count(), etc...
b) Write a PHP script to transform a string to uppercase, lowercase letters, make a string's first character uppercase.
- 5 a) Write a PHP script that inserts a new item in an array in any position.
b) Write a PHP function to check whether all array values are strings or not.
- 6 a) Write a PHP script to count number of elements in an array and display a range of array elements.
b) Write a PHP script to sort a multi-dimensional array set by a specific key.
- 7 a) Write a PHP script using a function to display the entered string in reverse.
b) Write a PHP script using function for sorting words in a block of text by length.
- 8 a) Write a PHP script for creating the Fibonacci sequence with recursive function.
b) Write a PHP script using pass by value and pass by reference mechanisms in passing arguments to functions.
- 9 a) Write a PHP script to demonstrate the defining and using object properties.
b) Write a PHP script to demonstrate the inheritance.
- 10 a) Write a PHP script to demonstrate the object overloading with _get(), _set(), and _call().
b) Write a PHP script to demonstrate the overloading property accesses with _get() and _set().
- 11 a) Write a PHP script to demonstrate the method overloading and method overriding mechanisms.
b) Write a PHP script to demonstrate the use of final classes and final methods.
- 12 a) Write a PHP script to demonstrate the use of interfaces.
b) Write a PHP script using constructors and destructors.
- 13 Write a PHP application to handling HTML forms with PHP script.
- 14 a) Write a PHP script to create a file, write data into file and display the file's data.
b) Write a PHP script to check and change file permissions, copying, renaming and deleting files.
- 15 a) Write a PHP application for connecting to MySQL and reading data from database table.
b) Write a PHP application for inserting, updating, deleting records in the database table.
- 16 Write a PHP application for student registration form.

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

Elaborations

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

4 Credit Core (DSC) Paper

University Exam (Theory)

Time: 3Hrs.

Maximum marks: 80

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

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4 Credit Core (DSC) Paper

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 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.
 - 5 marks meant for assignment.

University Exam (Practical)

Time: 2Hrs.

Maximum marks: 25

- The question paper is to be typeset with **four** programs with due weightage to **all the units** from the question bank provided in the syllabus.
- The candidates are to answer any **two** of them in the practical exam.
- Each question has to carry **six** marks totaling **12** marks.
- Viva – **8** marks
- Record – **5** marks

2 Credit (SEC) Paper

University Exam (Theory)

Time: 2Hrs.

Maximum marks: 40

Section – A (4X 4M = 16 Marks)

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

- Q1. From Unit 1
- Q2. From Unit 1
- Q3. From Unit 1
- Q4. From Unit 2
- Q5. From Unit 2
- Q6. From Unit 2

Section – B (2 X 12M = 24Marks)

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 10marks.
- Following is the examination pattern.
 - 10 MCQs (multiple choice questions) of one mark each,
No assignment is required.

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University Exam (Theory) for Sermester VI (Project/optional) only

3 Hours

Max Marks -60

Credits -3

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

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

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 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.
 - No assignment required.

**OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)**

Practical Question Paper(Project /optional)

3 HoursMax 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

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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]

Programming in C Semester -I

Theory	4 Hours/Week	4 credit
Practical	3 Hours/Week	1 credit

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, Multidimensional Arrays.

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, Pointers to Pointers, Array of Pointers, Pointer to Array, 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), Array of Structures (Union), Structures versus Unions, Enumeration Types.
Files: Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Files of Records, Random Access to Files of Records, Other File Management Functions.

Text Pradip Dey, Manas Ghosh, Computer Fundamentals and Programming in C (2e)

References **BOOKS**

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

C Lab Semester -I

Practical

3 Hours/Week

1 credit

- 1 Write a program to find the largest two (three) numbers using if and conditional operator.
- 2 Write a program to print the reverse of a given number.
- 3 Write a program to print the prime number from 2 to n where n is given by user.
- 4 Write a program to find the roots of a quadratic equation using switch statement.
- 5 Write a program to print a triangle of stars as follows (take number of lines from user):

```
      *
     ***
    *****
   *********
  ***********
```
- 6 Write a program to find largest and smallest elements in a given list of numbers.
- 7 Write a program to find the product of two matrices..
- 8 Write a program to find the GCD of two numbers using iteration and recursion.
- 9 Write a program to illustrate use of storage classes.
- 10 Write a program to demonstrate the call by value and the call by reference concepts.
- 11 Write a program that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
- 12 Write a program to illustrate use of data type enum.
- 13 Write a program to demonstrate use of string functions string.h header file.
- 14 Write a program that opens a file and counts the number of characters in a file.
- 15 Write a program to create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
- 16 Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.

Note Write the Pseudo Code and draw Flow Chart for the above programs.
Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows

10.

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Programming in C++ Semester -II

Theory	4 Hours/Week	4 credits
Practical	3 Hours/Week	1 credit

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

Unit – II

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, Object Conversion, Aggregation.

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, Class Hierarchies, 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, Handling the `bad_alloc` 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, Introduction to the STL.

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

References
B. Lippman, C++ Primer
Bruce Eckel, Thinking in C++
K.R. Venugopal, Mastering C++
Herbert Schildt, C++: The Complete Reference
Bjarne Stroustrup, The C++ Programming Language
Sourav Sahay, Object Oriented Programming with C++

C++ Lab Semester -II

Practical

3 Hours/Week

1 credit

- 1 Write a program to.
 - a. Print the sum of digits of a given number.
 - b. Check whether the given number is Armstrong or not
 - c. Print the prime number from 2 to n where n is natural number given.
- 2 Write a program to find largest and smallest elements in a given list of numbers and sort the given list.
- 3 Write a program to read the student name, roll no, marks and display the same using class and object.
- 4 Write a program to implement the dynamic memory allocation and de-allocation using new and delete operators using class and object.
- 5 Write a program to find area of a rectangle, circle, and square using constructors.
- 6 Write a program to implement copy constructor.
- 7 Write a program using friend functions and friend class.
- 8 Write a program to implement constructors
 - § Default Constructor, Parameterized Constructor, Copy Constructor
 - § Define the constructor inside/outside of the class
 - § Implement all three constructors within a single class as well as use multiple classes(individual classes)Write a program to implement the following concepts using class and object
 - § Function overloading
 - § Operator overloading (unary/binary(+ and -))Write a program to demonstrate single inheritance, multilevel inheritance and multiple inheritances.
Write a program to implement the overloaded constructors in inheritance.
Write a program to implement the polymorphism and the following concepts using class and object.
 - § Virtual functions
 - § Pure virtual functionsWrite a program to implement the virtual concepts for following concepts
 - § Constructor (not applied)
 - § Destructor (applied)Write a program to demonstrate static polymorphism using method overloading.
Write a program to demonstrate dynamic polymorphism using method overriding and dynamic method dispatch.
Write a program to implement the template (generic) concepts
 - § Without template class and object
 - § With template class and object

Write the Pseudo Code and draw Flow Chart for the above programs.

Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

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B.Sc. (Computer Science)

Model Question Paper

Credits -4

3 Hours

Max Marks -80

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

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B.Sc. (Computer Science)

Practical Question Paper

3 Hours

Credits -I

Max Marks -50

Answer any Two

15MX2 = 30 MARKS

UNIT – I	1 Program
UNIT- II	1 Program
UNIT-III	1 Program
UNIT -IV	1 Program

Viva - 10 Marks

Record – 10 Marks