OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)
CBCS Pattern with Effect from the Academic Year 2019-2020

Structure of Curriculum

Course Title	Hours/Week		Credits
	Theory	**Practical**	
Semester –I			
Programming in C	4	3	4+1 = 5
Semester –II			
Programming in C++	4	3	4+1 = 5
Semester –III			
Data Structures using C++	4	3	4+1 = 5
Semester –IV			
Data Base Management Systems (DBMS)	4	3	4+1 = 5
Semester –V			
Programming in Java	4	3	4+1 = 5
Semester –VI			
Web Technologies	4	3	4+1 = 5

AECC		
	Hours/Week	Credits
Fundamentals of Computers	Theory 2	2
SEC		
Semester –III		
Communication Skills(or) Professional Skills (Sec –I)	2	2
Python –I (Sec –II)	2	2
Semester –IV		
Leadership & Management Skill (or) (Sec –III) Universal Human Values	2	2
Python –II (Sec –IV)	2	2
Generic Elective (GE)		
Information Technologies	4	4
Project/Optional		
Semester –VI		
PHP with MY SQL	Theory 3 Practical 3	3+1=4

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

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)
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, Multidimensional Arrays.

Unit – III

Functions: Concept of Function, Using Functions, Call-by-Value Vs Call-by-reference, Passing Arrays to Functions, Score 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.

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

OSMANIA UNIVERSITY
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B.Sc. (Computer Science)
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 (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 the 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.

OSMANIA UNIVERSITY
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B.Sc. (Computer Science)
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.
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, Class Hierarchies, Polymorphism-Function Overloading, Function Overriding 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, , Introduction to the STL.

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:
7. Object Oriented Programming with C++ Sixth edition, E.Balaguruswamy.
8. A Structured Approach Using C++ By B.A.Forouzan & Rf Gilberg (Thomson Business Information India)
9. Herbert Schilbt, C++ - The Complete Reference, TMH 2002
10. J.P. Cohoon and J.W. Davidson, C++ program design – An Introduction To Programming and Object Oriented Design.- MGH 1999.

OSMANIA UNIVERSITY
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B.Sc. (Computer Science)
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.
   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
   a. Default Constructor, Parameterized Constructor, Copy Constructor
   b. Define the constructor inside/outside of the class
   c. 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
   a. Function overloading
   b. 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.
    a. Virtual functions
    b. Pure virtual functions
13. Write a program to implement the virtual concepts for following concepts
    a. Constructor (not applied)
    b. 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
    a. Without template class and object

b. With template class and object

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SEMESTER – III
Data Structures using C++

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

Unit - I

Basic data Structure: Introduction to Data Structures, Types of Data Structures, and Introduction to Algorithms, Pseudo code, and Relationship among data, data structures, and algorithms, Implementation of data structures, Analysis of Algorithms.
Stacks: Concept of Stacks and Queues, Stacks, Stack Abstract Data Type, Representation of Stacks Using Sequential Organization (Arrays), Multiple Stacks, Applications of Stack, Expression Evaluation and Conversion, Polish notation and expression conversion, Processing of Function Calls, Reversing a String with a Stack, Recursion.

Unit - II

Recursion: Introduction, Recurrence, Use of Stack in Recursion, Variants of Recursion, Recursive Functions, Iteration versus Recursion.
Queues: Concept of Queues, Queue as Abstract Data Type, Realization of Queues Using Arrays, Circular Queue, Multi-queues, Dequeue, Priority Queue, Applications of Queues,
Linked Lists: Introduction, Linked List, Linked List Abstract Data Type, Linked List Variants, Doubly Linked List, Circular Linked List, Representation of Sparse Matrix Using Linked List, Linked Stack, Linked Queue.

Unit - III

Trees: Introduction, Types of Trees, Binary Tree, Binary Tree Abstract Data Type, Realization of a Binary Tree, Insertion of a Node in Binary Tree, Binary Tree Traversal, Other Tree Operations, Binary Search Tree, Threaded Binary Tree, Applications of Binary Trees.
Searching and Sorting: Search Techniques-Linear Search, Binary Search, Sorting Techniques-Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort, Comparison of All Sorting Methods, Search Trees: Symbol Table, Optimal Binary Search Tree, AVL Tree (Height-balanced Tree).

Unit - IV

Graphs: Introduction, Representation of Graphs, Graph Traversal – Depth First Search, Breadth First Search, Spanning Tree, Prim's Algorithm, Kruskal's Algorithm.
Hashing: Introduction, Key Terms and Issues, Hash Functions, Collision Resolution Strategies, Hash Table Overflow, Extendible Hashing
Heaps: Basic Concepts, Implementation of Heap, Heap as Abstract Data Type, Heap Sort, Heap
Applications.

Text books:

1. Varsha H. Patil "Data structures using C++" Oxford University press, 2012

2. M.T. Goodrich, R. Tamassia and D. Mount, Data Structures and Algorithms in C++, John Wiley and Sons, Inc., 2011.

References:

1. Adam Drozdek "Data structures and algorithm in C++" Second edition, 2001
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, Introduction to Algorithms, 2nd Ed., Prentice-Hall of India, 2006.
3. Robert L. Kruse and A.J. Ryba, Data Structures and Program Design in C++, Prentice Hall, Inc., NJ, 1998.
4. B. Stroupstrup, The C++ Programming Language, Addison Wesley, 2004
5. D.E. Knuth, Fundamental Algorithms (Vol. I), Addison Wesley, 1997

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B.Sc. (Computer Science)
SEMESTER – III
Data Structures using 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.
- 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 C++ programs to implement the following using an array
   a) Stack ADT   b) Queue ADT
2. Write a C++ program to implement Circular queue using array.
3. Write C++ programs to implement the following using a single linked list.
   a) Stack ADT   b) Queue ADT
4. Write a C++ program to implement Circular queue using Single linked list.
5. Write a C++ program to implement the double ended queue ADT using double linked list.
6. Write a C++ program to solve tower of Hanoi problem recursively
7. Write C++ program to perform the following operations:
   a) Insert an element into a binary search tree.
   b) Delete an element from binary search tree.
   c) Search for a key in a binary search tree.
8. Write C++ programs for the implementation tree traversal technique BFS.
9. Write a C++ program that uses recursive functions to traverse a binary search tree.
   a) Pre-order   b) In-order   c) Post-order
10. Write a C++ program to find height of a tree.
11 Write a C++ program to find MIN and MAX element of a BST.
12 Write a C++ program to find Inorder Successor of a given node.
13. Write C++ programs to perform the following operations on B-Trees and AVL Trees.
   a) Insertion   b) Deletion
14 Write C++ programs for sorting a given list of elements in ascending order using the following sorting methods.
   a) Quick sort   b) Merge sort
15. Write a C++ program to find optimal ordering of matrix multiplication.
16. Write a C++ program that uses dynamic programming algorithm to solve the optimal binary search tree problem
17. Write a C++ program to implement Hash Table
18. Write C++ programs to perform the following on Heap
   a) Build Heap   b) Insertion   c) Deletion
19. Write C++ programs to perform following operations on Skip List
   a) Insertion   b) Deletion
20. Write a C++ Program to Create a Graph using Adjacency Matrix Representation.
21. Write a C++ program to implement graph traversal techniques
   a) BFS   b) DFS
22. Write a C++ program to Heap sort using tree structure.

OSMANIA UNIVERSITY
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B.Sc. (Computer Science)
SEMESTER – IV
Data Base Management Systems

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

Unit - I

Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators.
Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Unit - II

Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design.
Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional- Dependency Theory, Decomposition Using Multivalued Dependencies, Normal Forms-2 NF, 3 NF, BCNF, The Database Design Methodology for Relational Databases.

Unit - III

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database.
Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.
Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries.

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.

Text book:

1. Silberschatz, H. Korth and S. Sudarshan, Database System Concepts, 6th Ed., Tata McGraw Hill, 2011
2. Thomas M. Connolly, Carolyn E. Begg, Database Systems–A Practical Approach to Design, Implementation, and Management (6e)

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SEMESTER – IV
Data Base Management 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.
- 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)

    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.

OSMANIA UNIVERSITY
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B.Sc. (Computer Science)
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. Sachin Malhotra, Saurabh Choudhary, 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. Horsttnann, Core Java Volume I –Fundamentals (10e)

OSMANIA UNIVERSITY
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B.Sc. (Computer Science)
SEMESTER – V
Programming in Java 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.
- 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 java program for the following matrix operations:
    a. Addition of two matrices
    b. Transpose of a matrix
11. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
12. Write a Java program for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
13. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
14. Write a java program to draw a line between two coordinates in a window.
15. Write a java program to display the following graphics in an applet window.
    a. Rectangles b. Circles
    c. Ellipses   d. Arcs e. Polygons
16. 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.
17. Write a program for the following string operations:

a. Compare two strings   b. concatenate two strings   c. Compute length of a
string

18. Create a class called Fraction that can be used to represent the ratio of two integers. Include
appropriate constructors and methods. If the denominator becomes zero, throw and handle
an exception.

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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, decision making, control structures, if… else statement, while, counter-controlled repetitions, switch statement, do… while statement, *break* and *continue* statements. Functions – program modules in JavaScript, programmer–defined functions, functions definition, scope rules, global functions, Recursion.

Unit – III

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. **JAVA SCRIPT OBJECTS** – introduction to object technology, Math Object, String Object, Date Object, Boolean and Number Object, document and window Objects, using cookies.

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 XMLHttpRequest object, XML and DOM, creating full scale Ajax-enabled application, Dojo Toolkit.

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 Science)
SEMESTER – VI
Web Technologies Lab
Practical   3 Hours/Week   1 Credit   Marks: 25

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

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. Computer Science
Semester-I
AECC

Fundamentals of Computers

Theory   **2 Hours/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:
 Reema Thareja, Fundamentals of Computers.

References:
1. V.Rajaraman, 6th Edition Fundamentals of Computers, Neeharika Adabala.
2. Anita Goel, Computer Fundamentals.

Course 1: Communication Skills

Context and Justification :

Communication plays an important role in shaping an individual's life, personal as well as professional. Also it is the backbone of any organisation/institution. Success in life to a considerable extent depends on effective communication skills. In today's world of computers and digital media, a strong communication skill base is essential for learners and for smooth functioning of an organisation.

Objectives :

This course has been developed with the following objectives:

1. Identify common communication problems that may be holding learners back
2. Identify what their non-verbal messages are communicating to others
3. Understand role of communication in teaching-learning process
4. Learning to communicate through the digital media
5. Understand the importance of empathetic listening
6. Explore communication beyond language.

Expected Outcome :

By the end of this program participants should have a clear understanding of what good communication skills are and what they can do to improve their abilities.

Credit: 02

Duration: 30 Hours

Number & Titles of Modules:

Total of 7 Modules

Module 1	Listening	4 Hours
Module 2	Speaking	6 Hours
Module 3	Reading	3 Hours
Module 4	Writing and different modes of writing	4 Hours
Module 5	Digital Literacy	4 Hours
Module 6	Effective use of Social Media	4 Hours
Module 7	Non-verbal communication	5 Hours

Module Outline :

Module 1: Listening   4 Hours

- Techniques of effective listening
- Listening and comprehension
- Probing questions
- Barriers to listening

Module 2: Speaking   6 Hours

- Pronunciation
- Enunciation
- Vocabulary
- Fluency
- Common Errors

Module 3: Reading   3 Hours

- Techniques of effective reading
- Gathering ideas and information from a given text
    i.   Identify the main claim of the text
    ii. Identify the purpose of the text
    iii. Identify the context of the text
    iv. Identify the concepts mentioned
- Evaluating these ideas and information
    i.   Identify the arguments employed in the text
    ii. Identify the theories employed or assumed in the text
- Interpret the text
    i.   To understand what a text says
    ii. To understand what a text does
    iii. To understand what a text means

Module 4: Writing and different modes of writing   4 Hours

- Clearly state the claims
- Avoid ambiguity, vagueness, unwanted generalisations and oversimplification of issues
- Provide background information
- Effectively argue the claim
- Provide evidence for the claims
- Use examples to explain concepts
- Follow convention
- Be properly sequenced
- Use proper signposting techniques
- Be well structured
    i.   Well-knit logical sequence
    ii. Narrative sequence
    iii. Category groupings

- Different modes of Writing   -
    i.   E-mails
    ii. Proposal writing for Higher Studies
    iii. Recording the proceedings of meetings
    iv. Any other mode of writing relevant for learners

Module 5: Digital Literacy   4 Hours

- Role of Digital literacy in professional life
- Trends and opportunities in using digital technology in workplace
- Internet Basics
- Introduction to MS Office tools
    i.   Paint
    ii. Office
    iii. Excel
    iv. Powerpoint

Module 6: Effective use of Social Media   4 Hours

- Introduction to social media websites
- Advantages of social media
- Ethics and etiquettes of social media
- How to use Google search better
- Effective ways of using Social Media
- Introduction to Digital Marketing

Module 7: Non-verbal communication   5 Hours

- Meaning of non-verbal communication
- Introduction to modes of non-verbal communication
- Breaking the misbeliefs
- Open and Closed Body language
- Eye Contact and Facial Expression
- Hand Gestures
- Do's and Don'ts
- Learning from experts
- Activities-Based Learning

Pedagogy : Instructor-Led Training, Supplemented by Online Platform (SWAYAM)

Materials : Teaching & Learning

Assessment : Paper-Based or Online Assessment

Bibliography &Suggested Reading including audio video material :

Books

- Sen Madhucchanda (2010), *An Introduction to Critical Thinking*, Pearson, Delhi
- Silvia P. J. (2007), *How to Read a Lot*, American Psychological Association, Washington DC

Course 2: Professional Skills

Context with Justification :

One of the significant outcomes of Higher Education is to prepare an individual for entering the job/employment market. Besides knowledge and skills required for a particular job/occupation, professional skills are also required for an individual to be gainfully employed for a successful and satisfied life. Professional skills are part of life skills. An individual should be able to demonstrate professional skills involving the use of intuitive, logical and critical thinking, communication and interpersonal skills, not limited to cognitive/creative skills. These skills, behaviour and quality of output enhance employability.

The career skills empower an individual with ability in preparing an appropriate resume, addressing the necessary gaps for facing interviews and actively and effectively participating in group discussion thereof, etc. It is also of significant importance that students /individuals possess the know- how to explore career opportunities for themselves, considering their innate strengths and weaknesses.

It is important that the students/individuals are well prepared to take on new challenges and opportunities. With the increasing use of technology in the way we live, learn and work, it is critical for students/individuals to be able to utilise basic computing concepts and also have and espouse excellent Team Skills. Collaborating and working together can assist in resolving complex problems, which allow/offer individuals an opportunity to articulate new ideas and perspectives. It further allows allow learner / individuals design, develop, problem solve and to adapt to situations based on their experience and skills.

Credit: 02

Duration:30 hours

The Course Professional Skills is divided into two parts:

    a)   Career Skills

    b)   Team Skills

A. Career Skills

Objectives :

The Objectives of the course are to help students/candidates:

1. Acquire career skills and fully pursue to partake in a successful career path

2. Prepare good resume, prepare for interviews and group discussions

3. Explore desired career opportunities in the employment market in consideration of an individual SWOT.

Expected Outcomes :

At the end of this course the students will be able to:

1. Prepare their resume in an appropriate template without grammatical and other errors and using proper syntax
2. Participate in a simulated interview
3. Actively participate in group discussions towards gainful employment
4. Capture a self - interview simulation video regarding the job role concerned
5. Enlist the common errors generally made by candidates in an interview
6. Perform appropriately and effectively in group discussions
7. Explore sources (online/offline) of career opportunities
8. Identify career opportunities in consideration of their own potential and aspirations
9. Use the necessary components required to prepare for a career in an identified occupation (as a case study).

Duration: 15 Hours

Number & Titles of Modules:

Module 1	**Resume Skills**	**3 Hours**
Module 2	**Interview Skills**	**5 Hours**
Module 3	**Group Discussion Skills**	**4 Hours**
Module 4	**Exploring Career Opportunities**	**3 Hours**

Module Outline :

Module 1: Resume Skills   **3 Hours**

    i.   **Resume Skills : Preparation and Presentation**

- Introduction of resume and its importance
- Difference between a CV, Resume and Bio data
- Essential components of a good resume

    ii. **Resume skills : common errors**

- Common errors people generally make in preparing their resume
- Prepare a good resume of her/his considering all essential components

Module 2: Interview Skills   **5 Hours**

    i.   **Interview Skills : Preparation and Presentation**

- Meaning and types of interview (F2F, telephonic, video, etc.)
- Dress Code, Background Research, Do's and Don'ts
- Situation, Task, Approach and Response (STAR Approach) for facing an interview
- Interview procedure (opening, listening skills, closure, etc.)
- Important questions generally asked in a job interview (open and closed ended questions)

    ii.   **Interview Skills : Simulation**
- Observation of exemplary interviews
- Comment critically on simulated interviews

    iii.   **Interview Skills : Common Errors**
- Discuss the common errors generally candidates make in interview
- Demonstrate an ideal interview

Module 3: Group Discussion Skills   4 Hours

- Meaning and methods of Group Discussion
- Procedure of Group Discussion
- Group Discussion- Simulation
- Group Discussion - Common Errors

Module 4: Exploring Career Opportunities   3 Hours

- Knowing yourself – personal characteristics
- Knowledge about the world of work, requirements of jobs including self-employment.
- Sources of career information
- Preparing for a career based on their potentials and availability of opportunities

Pedagogy

Pedagogy : Besides Face to Face lectures (theory would be limited only to 20% of the component and remaining 80% would be practical oriented), the focus would be primarily on blended /hybrid learning. This could include a flipped classroom approach that leverages project-based learning, demonstration, group discussion, simulations etc.

Materials

Materials : Audio video materials, Online Platform (SWAYAM), FutureSkills Platform, Used Cases & Case Studies etc.

Assessment: Online evaluation, demonstration, assignments

Assessment: Online evaluation, demonstration, assignments : Some components could be aligned to NOS (SSC/N9005) IT-ITeS Sector . The questions posed to the students would be a mix of MCQs, scenario-based, logical reasoning, comprehension, simulations, etc. Do check the assessment model and sample assessment at (http://nac.nasscom.in/)

Bibliography & Suggested Reading including audio video material :

Please check IT-ITeS Sector Skills Council readiness programs namely

- Foundation Skills In IT (FSIT) - Refer the websites like https://www.sscnasscom.com/ ssc-projects/capacity-building-and-development/training/fsit/ and
- Global Business Foundation Skills (GBFS) – Refer websites like https://www.sscnasscom. com/ssc-projects/capacity-building-and-development/training/gbfs/

B. Team Skills

Objectives :

The objectives of the course is to make learners:

1. Understand the significance of Team Skills and help them in acquiring them
2. To help them design, develop and adapt to situations as an individual and as a team.

Expected Outcomes :

By the end of this course the learners/candidates will be able to:

1. Use common technology messaging tools that are used in enterprises for flow of information and transition from command and control to informal communication during an online/offline team session

2. Actively use and operate online team communication tools: Webinar, Skype, Zoom, Google hangout etc

3. Appreciate and demonstrate Team Skills

4. Participate in a digital lifestyle conversant with computers, applications, Internet and nuances of cyber security

5. Explore (online) and identify career opportunities in consideration of their own potential and aspirations.

6. Discuss and articulate the key requirements of an entrepreneurial exercise

7. Empathise and trust colleagues for improving interpersonal relations

8. Engage in effective communication by respecting diversity and embracing good listening skills

9. Distinguish the guiding principles for communication in a diverse, smaller internal world

10. Practice interpersonal skills for better relations with seniors, juniors, peers and stakeholders

11. Project a good personal image and social etiquette so as to have a positive impact on building of one's chosen career

12. Generate, share and maximise new ideas with the concept of brainstorming and the documentation of key critical ideas/thoughts articulated and action points to be implemented with timelines in a team discussion (as MOM) in identified applicable templates.

Duration: 15 Hours

Number & Titles of Modules:

Module 1	**Presentation Skills**	**5 Hours**
Module 2	**Trust and Collaboration**	**2 Hour**
Module 3	**Listening as a Team Skill**	**2 hour**
Module 4	**Brainstorming**	**2 Hour**
Module 5	**Social and Cultural Etiquettes**	**2 Hour**
Module 6	**Internal Communication**	**2 Hour**

Module Outline :

Module 1: Presentation Skills   **5 Hours**

- Types of presentations
- Internal and external presentation
- Knowing the purpose
- Knowing the audience
- Opening and closing a presentation
- Using presentation tools
- Handling questions
- Presentation to heterogenic group
- Ways to improve presentation skills over time

Module 2: Trust and Collaboration   **2 Hours**

- Explain the importance of trust in creating a collaborative team
- Agree to Disagree and Disagree to Agree – Spirit of Team work
- Understanding fear of being judged and strategies to overcome fear

Module 3: Listening as a Team Skill   **2 Hours**

- Advantages of Effective Listening
- Listening as a team member and team leader. Use of active listening strategies to encourage sharing of ideas (full and undivided attention, no interruptions, no pre-think, use empathy, listen to tone and voice modulation, recapitulate points, etc.).

Module 4: Brainstorming   2 Hour

- Use of group and individual brainstorming techniques to promote idea generation.
- Learning and showcasing the principles of documentation of team session outcomes

Module 5: Social and Cultural Etiquette   2 Hour

- Need for etiquette (impression, image, earn respect, appreciation, etc)
- Aspects of social and cultural/corporate etiquette in promoting teamwork
- Importance of time, place, propriety and adaptability to diverse cultures

Module 6: Internal Communication   2 Hour

- Use of various channels of transmitting information including digital and physical, to team members.

Pedagogy : Besides Face to Face Lectures (as theory would be limited only to 20% of the component and remaining 80% would be practical oriented), the focus would be primarily on blended learning/hybrid learning. This could include a flipped classroom approach that leverage project based learning, demonstration, group discussion, simulation as well as coaching, seminars and tutorials.

Materials : Audio video materials, Online Platform (SWAYAM), Future Skills platform

Assessment: Written evaluation, demonstration, assignments:

Some components aligned to NOS (SSC/N9005) IT-ITeS . The questions posed to the students would be a mix of MCQs, Scenario-based, logical reasoning, comprehension, simulations, etc. Do check the assessment at website like (http://nac.nasscom.in/)

Bibliography & Suggested Reading including audio video material :

Please check IT-ITeS Sector Skills Council readiness program namely Global Business Foundation Skills (GBFS) in website (https://www.sscnasscom.com/ssc-projects/capacity-building-and-development/training/gbfs/),and Generic and the entrepreneurial NOS at NSQF Level 4 -7.

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

Theory	2 Hours/Week	2Credits

Unit – I

Introduction to Python Programming: How a Program Works, Using Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations (Operators. Type conversions, Expressions), More about Data Output. Decision Structures and Boolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables. Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

Unit – II

Functions: Introduction, Defining and Calling a Void Function, Designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions- Generating Random Numbers, Writing Our Own Value-Returning Functions, The math Module, Storing Functions in Modules. File and Exceptions: Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.

Text Book:

Tony Gaddis, Starting Out With Python (3e)

References:

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

Course 3: Leadership and Management Skills

Context with Justification :

Leaders are foundations of the society, who face and win against adversities and odds of life. Through their words and deeds, they show path to others and transform into inspirational role models, affecting social life vividly. In the current times of cut-throat competitions, disbelief in values, techno-centric complex lifestyles, there is a dire need to emphasise the 'human' agency in community living. This can be done by cultivating and nurturing the innate leadership skills of the youth so that they may transform these challenges into opportunities and become torch bearers of the future by developing creative solutions.

Objectives :

The Module is designed to:

> - Help students to develop essential skills to influence and motivate others
> - Inculcate emotional and social intelligence and integrative thinking for effective leadership
> - Create and maintain an effective and motivated team to work for the society
> - Nurture a creative and entrepreneurial mindset
> - Make students understand the personal values and apply ethical principles in professional and social contexts.

Expected Outcomes :

Upon completion of the course students will be able to:

1. Examine various leadership models and understand/assess their skills, strengths and abilities that affect their own leadership style and can create their leadership vision
2. Learn and demonstrate a set of practical skills such as time management, self management, handling conflicts, team leadership, etc.
3. Understand the basics of entrepreneurship and develop business plans
4. Apply the design thinking approach for leadership
5. Appreciate the importance of ethics and moral values for making of a balanced personality.

Credit: 02

Duration: 30 Hours

Number & Titles of Modules:

Module 1	Leadership Skills	6 Hours
Module 2	Managerial Skills	6 Hours
Module 3	Entrepreneurial Skills	6 Hours
Module 4	Innovative Leadership and Design Thinking	6 Hours
Module 5	Ethics and Integrity	6 Hours

Module Outline :

Module 1- Leadership Skills   6 Hours

   a. Understanding Leadership and its Importance
- What is leadership?
- Why Leadership required?
- Whom do you consider as an ideal leader?

   b. Traits and Models of Leadership
- Are leaders born or made?
- Key characteristics of an effective leader
- Leadership styles
- Perspectives of different leaders

   c. Basic Leadership Skills
- Motivation
- Team work
- Negotiation
- Networking

Module 2 - Managerial Skills   6 Hours

   a. Basic Managerial Skills
- Planning for effective management
- How to organise teams?
- Recruiting and retaining talent
- Delegation of tasks
- Learn to coordinate
- Conflict management

   b. Self Management Skills
- Understanding self concept
- Developing self-awareness
- Self-examination
- Self-regulation

Module 3 - Entrepreneurial Skills   6 Hours

   a. Basics of Entrepreneurship
- Meaning of entrepreneurship
- Classification and types of entrepreneurship
- Traits and competencies of entrepreneur

   b. Creating Business Plan
- Problem identification and idea generation
- Idea validation
- Pitch making

Module 4 - Innovative Leadership and Design Thinking   6 Hours

   a. Innovative Leadership
- Concept of emotional and social intelligence

- Synthesis of human and artificial intelligence
- Why does culture matter for today's global leaders

b. Design Thinking

- What is design thinking?
- Key elements of design thinking:
  - Discovery
  - Interpretation
  - Ideation
  - Experimentation
  - Evolution.
- How to transform challenges into opportunities?
- How to develop human-centric solutions for creating social good?

Module 5- Ethics and Integrity   6 Hours

a. Learning through Biographies

- What makes an individual great?
- Understanding the persona of a leader for deriving holistic inspiration
- Drawing insights for leadership
- How leaders sail through difficult situations?

b. Ethics and Conduct

- Importance of ethics
- Ethical decision making
- Personal and professional moral codes of conduct
- Creating a harmonious life

Pedagogy : Pedagogy for the modules is as follows:

1. Leadership Skills - Lectures (augmented with videos); role-plays for leadership models; team building games

2. Managerial Skills - Lectures (augmented with videos), case studies (AMUL, TESLA, Toyota, DMRC, Tata Group, Google, The Mumbai Dabbawala), SWOT analysis, Johari window

3. Entrepreneurial Skills - Lectures (augmented with videos), case studies and practicing business plans

4. Innovative Leadership and Design Thinking- Concept discussion through lecture and videos followed by role-plays and exercises for each set of intelligence, activities using 5 steps – discovery, interpretation, ideation, experimentation, and evolution (Ref.: Workbook of Design Thinking by IDEO)

5. Ethics and Integrity- Experiential learning through stories suggested list (Ahilya Bai, Holkar, Abdul Kalam, Raja Harishchandra, Mahatma Gandhi, Abraham Lincoln), audio visual augmented role plays and storytelling (leaders from varied fields like academics, corporate, social, sports, art, etc.)

Assessment : It can be combination of written evaluation and presentations, including simulations, case studies and business plan.

Bibliography and Suggested Readings :

Books

- Ashokan, M. S. (2015). *Karmayogi: A Bbiography of E. Sreedharan.* Penguin, UK.

- Brown, T. (2012). *Change by Design.* Harper Business

- Elkington, J., & Hartigan, P. (2008). *The Power of Unreasonable People: How Social Entrepreneurs Create Markets that Change the World.* Harvard Business Press.

- Goleman D. (1995). *Emotional Intelligence.* Bloomsbury Publishing India Private Limited

- Kalam A. A. (2003). *Ignited Minds: Unleashing the Power within India.* Penguin Books India

- Kelly T., Kelly D. (2014). *Creative Confidence: Unleashing the Creative Potential Within Us All.* William Collins

- Kurien V., & Salve G. (2012). *I Too Had a Dream.* Roli Books Private Limited

- Livermore D. A. (2010). *Leading with cultural intelligence: The New Secret to Success.* New York: American Management Association

- McCormack M. H. (1986). *What They Don't Teach You at Harvard Business School: Notes From A Street-Smart Executive.* RHUS

- O'Toole J. (2019) *The Enlightened Capitalists: Cautionary Tales of Business Pioneers Who Tried to Do Well by Doing Good.* Harpercollins

- Sinek S. (2009). *Start with Why: How Great Leaders Inspire Everyone to Take Action.* Penguin

- Sternberg R. J., Sternberg R. J., & Baltes P. B. (Eds.). (2004). *International Handbook of Intelligence.* Cambridge University Press.

E-Resources

- Fries, K. (2019). 8 Essential Qualities That Define Great Leadership. *Forbes.* Retrieved 2019-02-15 from https://www.forbes.com/sites/kimberlyfries/2018/02/08/8-essential-qualities-that-define-great-leadership/#452ecc963b63.

- How to Build Your Creative Confidence, Ted Talk by David Kelly - https://www.ted.com/talks/david_kelley_how_to_build_your_creative_confidence

- India's Hidden Hot Beds of Invention Ted Talk by Anil Gupta - https://www.ted.com/talks/anil_gupta_india_s_hidden_hotbeds_of_invention

- Knowledge@Wharton Interviews Former Indian President APJ Abdul Kalam - . "A Leader Should Know How to Manage Failure" https://www.youtube.com/watch?v=laGZaS4sdeU

- Martin, R. (2007). How Successful Leaders Think. *Harvard Business Review, 85*(6): 60.

- NPTEL Course on Leadership - https://nptel.ac.in/courses/122105021/9

Course 4: Universal Human Values

Context with Justification :

Human civilisation is known for the values that it cherishes and practices. Across various times and places, sages, saints and seers, drawing on their experience, developed practices that placed central importance on values, though the names used by them differed, as their languages varied but the spirit was same. Universal human values are values that human beings cherish and hold in common consciously and otherwise in most of the places and times and practice them.

Renunciation is the foundational value. Renunciation or greedlessness has two preconditions: love for all living beings and absence of selfishness. Renunciation is not self-directed but other-directed and is for life in all forms and shapes, for welfare of all. Renunciation begins when selfishness ends. Renunciation to run away from the problems of life is cowardice. Renunciation without action means parasitic life. Also, service can be practised only when renunciation with action begins. Unegoistical service is inconceivable without renunciation; and true service is possible only through love and compassion. Life and death are eternal truths, so is the truth as fact and truth as value. Truth exists between the two ends of life and death and is to be pursued.

Truth, Love, Peace, Non-Violence and **Righteous Conduct** are the Universal Human Values. Renunciation (sacrifice), Compassion and Service are also commonly acceptable human values, which at the operation level have been named differently as sincerity, honesty, righteousness, humility, gratitude, aspiration, prosperity, non-violence, trust, faith, forgiveness, mercy, peace and so on. These are needed for well-being of an individual, society and humanity and ultimately Peace in the world.

This course aims at making learners conscious about universal human values in an integral manner, without ignoring other aspects that are needed for learner's personality development.

Objectives :

The present course deals with meaning, purpose, and relevance of universal human values and how to inculcate and practice them consciously to be a good human being and realise one's potentials.

Learning outcomes :

By the end of the course the learners will be able to:

1. Know about universal human values and understand the importance of values in individual, social circles, career path, and national life.
2. Learn from case studies of lives of great and successful people who followed and practised human values and achieved self-actualisation.
3. Become conscious practitioners of human values.
4. Realise their potential as human beings and conduct themselves properly in the ways of the world.

Credit: 02
Duration: 30 Hours
Number & Titles of Modules:

Module 1: Love & Compassion	**5 Hours**
Module 2: Truth	**5 Hours**

Module 3: Non-Violence	**5 Hours**
Module 4: Righteousness	**5 Hours**
Module 5: Peace	**4 Hours**
Module 6: Service	**3 Hours**
Module 7: Renunciation (Sacrifice)	**3 Hours**

Module Outline :

Module 1: Love & Compassion   5 Hours

- Introduction: What is love? Forms of love—for self, parents, family, friend, spouse, community, nation, humanity and other beings, both for living and non-living
- Love and compassion and inter-relatedness
- Love, compassion, empathy, sympathy and non-violence
- Individuals who are remembered in history for practicing compassion and love.
- Narratives and anecdotes from history, literature including local folklore
- Practicing love and compassion: What will learners learn gain if they practice love and compassion? What will learners lose if they don't practice love and compassion?
- Sharing learner's individual and/or group experience(s)
- Simulated Situations
- Case studies

Module 2: Truth   5 Hours

- Introduction: What is truth? Universal truth, truth as value, truth as fact (veracity, sincerity, honesty among others)
- Individuals who are remembered in history for practicing this value
- Narratives and anecdotes from history, literature including local folklore
- Practicing Truth: What will learners learn/gain if they practice truth? What will learners lose if they don't practice it?
- Learners' individual and/or group experience(s)
- Simulated situations
- Case studies

Module 3: Non-Violence   5 Hours

- Introduction: What is non-violence? Its need. Love, compassion, empathy sympathy for others as pre-requisites for non-violence
- Ahimsa as non-violence and non-killing
- Individuals and organisations that are known for their commitment to non-violence
- Narratives and anecdotes about non-violence from history, and literature including local folklore
- Practicing non-violence: What will learners learn/gain if they practice non-violence? What will learners lose if they don't practice it?
- Sharing learner's individual and/or group experience(s) about non-violence
- Simulated situations
- Case studies

Module 4: Righteousness   **5 Hours**

- Introduction: What is righteousness?
- Righteousness and *dharma*, Righteousness and Propriety
- Individuals who are remembered in history for practicing righteousness
- Narratives and anecdotes from history, literature including local folklore
- Practicing righteousness: What will learners learn/gain if they practice righteousness? What will learners lose if they don't practice it?
- Sharing learners' individual and/or group experience(s)
- Simulated situations
- Case studies

Module 5: Peace   **4 hours**

- Introduction: What is peace? Its need, relation with harmony and balance
- Individuals and organisations that are known for their commitment to peace
- Narratives and Anecdotes about peace from history, and literature including local folklore
- Practicing peace: What will learners learn/gain if they practice peace? What will learners lose if they don't practice it?
- Sharing learner's individual and/or group experience(s) about peace
- Simulated situations
- Case studies

Module 5: Service   **3 Hours**

- Introduction: What is service? Forms of service, for self, parents, family, friend, spouse, community, nation, humanity and other beings—living and non-living, persons in distress or disaster.
- Individuals who are remembered in history for practicing this value.
- Narratives and anecdotes dealing with instances of service from history, literature including local folklore
- Practicing service: What will learners learn/gain gain if they practice service? What will learners lose if they don't practice it?
- Sharing learners' individual and/or group experience(s) regarding service
- Simulated situations
- Case studies

Module 6: Renunciation (Sacrifice)   **3 Hours**

- Introduction: What is renunciation? Renunciation and sacrifice. Self-restrain and Ways of overcoming greed. Renunciation with action as true renunciation
- Individuals who are remembered in history for practicing this value.
- Narratives and anecdotes from history and literature, including local folklore about individuals who are remembered for their sacrifice and renunciation.
- Practicing renunciation and sacrifice: What will learners learn/gain if they practice Renunciation and sacrifice? What will learners lose if they don't practice it?
- Sharing learners' individual and/or group experience(s)
- Simulated situations
- Case studies

ADDITIONAL PRACTICAL MODULES or OPERATIVE ELECTIVES:

NOTE: The faculty/institution may choose any/some of the following modules keeping in mind the level and specific needs of learners.

Module Outline :

MODULE A - Integral Human Well-Being   5 Hours

Importance of well-being, inter-relatedness of different kinds of well-being and definition of well-being (state of being comfortable, healthy, happy and equanimity)

Well-being and its Kinds

   (i)   Physical (physical strength and endurance)

   (ii)   Emotional (ability to respond to emotions and control them)

   (iii)   Aesthetic (faculty to see and appreciate beauty in all beings)

   (iv)   Intellectual (rational, logical well-being)

   (v)   Relational well-being (obligation to self, parents, family society, nation humanity and other beings in the universe; living with others with their acceptance)

   (vi)   Moral (difference between good and evil and practicing goodness; righteousness)

   (vii)   Spiritual (thinking beyond self and journey from senses to spiritual level)

Establish and recognise various states of well-being, embedded in different creatures, but consciously understood by humans

Identify the most pronounced emotions in the individual through given activities

Anecdotes/video/activity to help identify different well-beings

Discussion of related values to well-beings: Aesthetics, ethics, gratitude, forgiveness, and spiritual health i.e., thinking beyond senses and self and for the welfare of others

Importance and practice of well-being through case study/ activity

Ways to attain different kinds of well-being

Activities

MODULE B - Yoga & Pranayama   5 Hours

Importance of Yoga and Pranayama

   •   Yoga and pranayama for integral well-being and balance in life

   •   Yoga & Pranayama: Introduction

   •   Mind - Body – Intellect

   •   Difference between Yoga and Pranayama and their inter-relatedness.

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

Theory	2 Hours/Week	2Credits

Unit – I

Lists and Tuples: Sequences, Introduction to Lists, List slicing, Finding Items in Lists with the in Operator, List Methods and Useful Built-in Functions, Copying Lists, Processing Lists, Two-Dimensional Lists, Tuples. Strings: Basic String Operations, String Slicing, Testing, Searching, and Manipulating Strings. Dictionaries and Sets: Dictionaries, Sets, Serializing Objects.
Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

Unit – II

Object-Oriented Programming: Procedural and Object-Oriented Programming, Classes, Working with Instances, Techniques for Designing Classes, Inheritance, Polymorphism.
GUI Programming: Graphical User Interfaces, Using the tkinter Module, Display text with Label Widgets, Organizing Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons.

Text Book:

Tony Gaddis, Starting Out With Python (3e)

References:

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

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B.Sc. (Computer Science)
SEMESTER – IV
Information Technologies
(General Elective)

| **Theory** | **4 Hours/Week** | **4Credits** |

Unit – I

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.

Introduction to Emerging Computer Technologies: Distributed Networking, Peer-to-peer Computing, Grid Computing, Cloud Computing, Utility Computing, On-demand Computing, Wireless Network, Bluetooth, Artificial Intelligence.

Unit – II

Email, Functions of Email, Browser, Web Browser, Internet Service Providers.

Introduction to Information Security – Need for Information Security, Threats to Information Systems, Information Assurance, Cyber Security.

Introduction to Application Security and Counter Measures – Introduction to Application Security, Data Security Considerations, Security Technologies, Security Threats, Security Threats to E-Commerce, E-Cash and Electronic Payment System.

Text Books:

Dr. Surya Prakash T, Ritendra G, Praveen Kumar S, KLSI, Introduction to Information Security and Cyber Laws (Dreamtech Publication)

PHP with MY SQL
(PROJECT/Optional)

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

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 with HTML. 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, Creating Function, Reading Data in Web pages: setting up web pages to communicate with PHP, Handling Text Fields, Text Areas, Checkboxes, Radio Buttons, List Boxes, Password Controls, Image Maps, File Uploads, Buttons, and PHP Browser.

Unit – II

Object oriented programming: creating Classes and objects, setting access to properties and methods, constructors, destructors, Inheritance, overriding and overloading methods, auto loading classes. Advanced OOP: Static members and inheritance, Abstract classes, Interfaces, object iteration, comparing objects, class constants, final keyword, reflection.

File Handling: fopen, feof, fgets, closing a file, fgetc, file_get_contents, reading a file into an array with file, file_exists, filesize, fread, fscanf, parse_ini_file, stat, fseek, copy, unlink, fwrite, reading and writing binary files, appending a file, file_put_contents, locking files

Unit – III

Introducing Databases and SQL – Deciding How to Store Data, Understanding Relational Databases, Setting Up MySQL, A Quick Play with MySQL, Connecting MySQL from PHP. Retrieving Data from MySQL with PHP, Retrieving Data with SELECT, Creating a Member Record Viewer. Manipulating MySQL Data with PHP – Inserting, Updating, and Deleting Records, Building a Member Registration Application. Sessions, Cookies and FTP.

Text Books:

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.
2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.

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B.Sc. (Computer Science)
SEMESTER – VI
PHP with MY SQL 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.
- External Vice-Voce is compulsory.

1. Write a PHP script to display the Fibonacci sequence with HTML page.
2. Write a PHP script to create a chess board.
3. Write a PHP script using built-in string function like strstr(), strops(), substr_count(), etc...
4. Write a PHP script to transform a string to uppercase, lowercase letters, make a string's first Character uppercase.
5. Write a PHP script to count number of elements in an array and display a range of array elements.
6. Write a PHP script using a function to display the entered string in reverse.
7. Write a PHP script to demonstrate inheritance.
8. Write a PHP script to demonstrate the object overloading with _get(), _set(), and _call().
9. Write a PHP script to demonstrate the method overloading and method overriding mechanisms.
10. Write a PHP script to demonstrate the use of final classes and final methods.
11. Write a PHP script to demonstrate the use of interfaces.
12. Write a PHP script using constructors and destructors.
13. Write a PHP application to handling HTML forms with PHP script.
14. Write a PHP script to create a file, write data into file and display the file's data.
15. Write a PHP script to check and change file permissions, copying, renaming and deleting files.
16. Write a PHP application for connecting to MySQL and reading data from database table.
17. Write a PHP application for inserting, updating, deleting records in the database table.
18. Develop a PHP application for student registration form.
19. Develop a PHP application for creating, updating, reading and deleting the Student records from MYSQL Database.

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B.Sc. (Computer Science)
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

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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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3 Hours   Max Marks -60   Credits -4

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

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