Mandsaur University

Subject Name	L	T	P	Credits
Programming in C	3	1	4	6

Course Objectives:

- The course aims to provide exposure to problem-solving through programming.
- It aims to train the student to the basic concepts of the C-programming language.
- This course involves a lab component which is designed to give the student hands-on experience with the concepts.
- Illustrate the flowchart and design an algorithm for a given problem and to develop C programs using operators.
- Develop conditional and iterative statements to write C programs

Unit I

Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithms & flowcharts; Characteristics of a good program – accuracy, simplicity, robustness, portability, minimum resource & time requirement, modularization; Rules/conventions of coding, documentation, naming variables; Top down design; Bottom-up design.

Unit II

History of C; Structure of a C program, Data types; Constant & Variable; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case statement; Arrays; Formatted & unformatted I/O; Type modifiers & Storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

Unit III

Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, tail recursion, when to avoid recursion examples.

Unit IV

Special constructs – Break, continue, exit(), goto & labels; Pointers - &and * operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free(); String; Pointer to function, Function to parameter, Structure – basic, declaration, membership operator, pointer to structure, referential operator, self-referential structures, structure within structure, array in structure, array of structures; Union – basic, declaration; Enumerated data type; Typedef; Command line arguments.

Unit V

File handling and related functions; printf & scanf family; C preprocessor – basics, # Include, # define, # undef, conditional compilation directive like #if, #else, #endif, #ifdef and #ifndef; Variable argument list functions.

Reference Books:

1. Kerninghan & Richie: The C Programming language, PHI
2. Cooper Mullish: The Spirit of C, Jaico Publishing House, Delhi
3. Kanetkar Y: Let us C
4. Kanetkar Y: Pointers in C.

Course Outcomes

- Discuss the data types, character set, symbolic constant and storage Class
- Apply control structures, branching, Conditional and looping statements.
- Experiment with user defined functions and evaluate the various categories of functions
- Demonstrate the features of arrays and string handling functions.
- Make use of Pointers. Dynamic Memory Allocation and file management

List of Experiments

1. Write a program for simple arithmetic operations.
2. Write a program for finding greatest number among two numbers.
3. Write a program for the greatest number among the three numbers.
4. Write a program for finding an even or odd number.
5. Write a program for finding leap year.
6. Write a program to swap two numbers using a third variable.
7. Write a program to swap two numbers without third variable.
8. Write a program for printing of table which is given by the user.
9. Write a program for printing of table with valid condition.
10. Write a program to print in * in the pattern pyramid.
11. Write a program to print binary number (0, 1) in pyramid pattern.
12. Write a program to find the largest number among two numbers using ternary operator.
13. Write a program to check given number is prime or not.
14. Write a program to generate the Fibonacci series.
15. Write a program for finding sum & average of array element.
16. Write a program to calculate the area of giving the shapes: 1. Circle 2. Triangle 3. Rectangle 4. Square using switch case statement.
17. Write a program to swap two numbers using a third variable to function.
18. Write a program to swap two numbers without using a third variable to function.

19. Write a program for triangle to the given pattern

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

20. Write a program for pyramid to the given pattern

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

21. Write a program for finding reverse number which is given by the user?
22. Write a program for finding the sum of the given number?
23. Write a program to find even or odd number using functions?
24. Write a program to find largest and smallest element from an array?
25. Write a program for finding the sum of two matrices?
26. Write a program for finding the factorial number?
27. Write a program finding factorial using recursion?
28. Write a program finding power of a given number using recursion?
29. Write a program to print Fibonacci series using GOTO?
30. Write a program of special constructs using continue?
31. Write a program of special constructs using break?
32. Write a program to store information of student using structure?
33. Write a program to find the address of a variable using pointer variable?
34. Write a program finding power of a given number?
35. Write a program to connect two strings using string function?
36. Write a program to compare one string to another string using string function?
37. Write a program to calculate the length of string using string function?
38. Write a program to copy one string to another string using string function?
39. Write a program to copy one string to another string without string function?
40. Write a program to calculate the area of a circle using the macro function?
41. Write a program to include user defined header file in C Program.?

42. Write a program to check macros which is defined or not in the program?
43. Write a program to a read one character from the file using file function?
44. Write a program to a write one character to the file using file function?
45. Write a program to append one character to the file using file function?
46. Write a program to read numbers and characters from the file using file function?
47. Write a program to write numbers and characters to the file using file function?
48. Write a program to append numbers and characters to the file using file function?

Mandsaur University

Subject Name	L	T	P	Credits
Digital Electronics	3	1	-	4

Course objectives:

- To gain basic knowledge of digital electronics circuits and its levels.
- To understand and examine the structure of various number systems and its conversation.
- To learn about the basic requirements for a design application.
- To enable the students to understand, analyze and design various combinational and sequential circuits.
- To understand the logic functions, circuits, truth table and Boolean algebra expression.

Unit-I

Number systems Decimal, Binary, Octal and Hexadecimal numbers, Codes: ASCII code, Hamming Code , BCD code, Gray code, Error detection & Correcting code , Excess-3 code, Binary arithmetic, 1's Complement and 2's Complement, Data types.

Unit-II

Introduction to logic gates: AND,OR,NOT, Universal gates: NAND ,NOR ,Exclusive gates, Boolean algebra, Boolean Laws, Demorgan's theorem, Karnaugh map method: SOP & POS , Minterm, Maxterm, Cases with don't care terms.

Unit-III

Combinational circuits ,Half adder, Half subtractor, Full adder, Full subtractor circuits, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers, Program Control, Instruction Sequencing, Idea about Arithmetic circuits.

Unit-IV

Sequential Circuits, Flip-flops, Classification of flip flop RS, D, JK flip flops, Master Slave JK flip flop, Introduction to Shift Registers: SISO, SIPO, PIPO, PISO, **Counters:** Ripple counter, synchronous counter, modulus counter, presettable counter.

Unit-V

Introduction to various Semiconductors memories, RAM: SRAM, DRAM, MRAM and ROM and its type, Associative memory, Memory Hierarchy, Cache memory, Hit Ratio ,Mapping techniques.

Reference Books:

1. BARTEE, "Digital Computer Fundamental" TMH Publication
2. MALVINO, " Digital Computer Electronics" TMH Publication
3. MORRIS MANO, " Computer System Architecture" PHI Publication

Course Outcomes:

- Students will be able to understand the basics of the number system and to solve binary arithmetic.
- Students will identify the gates, Boolean laws and theorems, and make use of K-Map.
- Students will learn about combinational circuits.
- Students will be able to explain the function of the data processing circuit, flip-flops.
- Students will able to compare and analyze Semiconductors memories.

Subject Name	L	T	P	Credit
Computer Graphics	3	1	4	6

Course Objectives

- To understand the basics of computer graphics, different display devices and applications of computer graphics.
- To learn about algorithmic development of graphics primitives like: point, line, circle, ellipse etc.
- To impart knowledge of 2D and 3D transformations on graphics objects.
- To familiarize with 2D Viewing and different clipping methods.
- To give a broad view of Projection and its types

Unit-I

Computer Graphics: definition, classification & Applications, Display devices, refreshing, flickering, interlacing, resolution, Hard copy devices. Interactive Input devices, display processor,

Unit-II

Introduction to multimedia, multimedia components, multimedia hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia tools, presentations tools, Authoring tools, presentations.

Unit-III

Scan Conversion Techniques,Line drawing; various algorithms and their comparison, circle generation- Bresenham's,mid point circle drawing algorithm. Polygon Area filling algorithms, Scan line algorithm, boundary fill flood fill algorithm.

Unit-IV

2D & 3DCo-ordinate system, Translation, Rotation, Scaling, Reflection,sheering,Inverse transformation, Composite transformation, world coordinate system, screen coordinate system; parallel and perspective projection, Representation of 3D object on 2D screen.

Unit-V

line clipping algorithm; Cohen Sutherland, polygon clipping; Sutherland hodgman algorithm,Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading ray tracing, color models like RGB, YIQ,CMY,HSV etc.

Reference Books:

1. Donald Hearn & M. Pauline Baker : Computer Graphics, Second Edition Prentice Hall India.
2. Prabhat k Andleigh, Kiran Thakral "Multimedia System Design", PH.!

3. Rogers D.F. – Procedural Elements for Computer Graphics McGraw Hill

Course Outcomes:

- Knowledge of working of display systems.
- Skill to execute various Scan Conversion algorithms in laboratory so as to draw Graphics primitives.
- Familiarization with 2D and 3D graphics.
- Develop creativity to create 2D objects.
- Ability to implement 2D geometric transformations on computer system

List of Experiments

1. Study about computer graphics library and draw a hut by using it.
2. Write a program to implement DDA line generation algorithm.
3. Write a program to implement Bresenham's line generation algorithm.
4. Write a program to implement midpoint circle generation algorithm.
5. Write a program to implement Bresenham's circle generation algorithm.
6. Write a program to implement Boundary fill algorithm.
7. Write a program to implement Flood fill algorithm
8. Write a program for translation of a triangle using 2d transformation.
9. Write a program for rotating a triangle using 2d transformation.
10. Write a program for Scaling of a triangle using 2d transformation.
11. Write a program for reflection of triangle using 2d transformation.
12. Write a program to Implement Composite 2d Transformations
13. Write a program for rotating a triangle using 3d transformation.
14. Write a program for Scaling of a triangle using 3d transformation.
15. Write a program for reflection of triangle using 3d transformation.
16. Write a program for animation (moving object).
17. Write a program for parallel projection.
18. Write a program for perspective projection.
19. Study about ray tracing.

Mandsaur University

Subject Name	L	T	P	Credit
Advanced Python	3	1	-	4

Course Objectives:

- Basics of Python programming.
- Decision Making and Functions in Python.
- Object Oriented Programming using Python.
- Files Handling in Python.
- To introduce data analytics.

UNIT-I

Object oriented programming and classes in Python - creating classes, instance objects, accessing members, Data hiding (the double underscore prefix), Built-in class attributes, Garbage collection: the constructor, Overloading methods and operators, Inheritance-implementing a subclass, overriding methods.

UNIT-II

Creating files, Operations on files (open, close, read, write), File object attributes, file positions, Listing Files in a Directory, Testing File Types, Removing Files and Directories, Copying and Renaming Files, Creating and Moving to Directories, Working with CSV files and CSV Module.

UNIT-III

Exceptions: try Statement, Exception Propagation, Except Clause, Try, Finally Clause, User Defined Exception, The raise statement.
Multithreading: Introduction, starting a thread, threading module, Synchronizing threads, Multithreaded Priority Queue.

UNIT-IV

Introduction to MySQL, PYMYSQL Connections, using connect, cursor, execute & close functions, reading single & multiple results of query execution, executing different types of statements, understanding exceptions in database connectivity.

UNIT-V

Pandas : Introduction to Pandas, History, Advantages, Series, DataFrame, Using multilevel series, Grouping, aggregating, Merge Data Frames, Generate summary tables, Group data into logical pieces, Manipulate dates, Creating metrics for analysis, Data wrangling, Merging and joining, dataset- Loan Prediction Problem, Data Mugging using Pandas, Building a Predictive Model.

Reference Books:

1. Python Essential by David M. Beazly.

2. Python Pocket by Mark Lutz.

3. Barry, Paul, Head First Python, 2nd Edition.

4. Python: The Complete Reference.

5. pandas: powerful Python data analysis toolkit by Wes McKinney and the Pandas Development Team

6. Python for Data Analysis, 2nd Editionby Wes McKinney

Course Outcomes:

- Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
- Implement application using list, set operation and using python.
- Apply Object Oriented Programming using Python.
- Understand and summarize different File handling operations.
- Perform data analytics using pandas.

Mandsaur University

Subject Name	L	T	P	Credit
Advanced Python Lab	-	-	4	2

List of Experiments

1. Importing and exporting data between pandas and MySQL database.Write a program to convert temperature from Fahrenheit to Celsius depending upon user choice.
2. Write a program to use dictionary and its functions in python.
3. Write a program to check whether given no is prime or not.
4. Write a program to implement list and use its methods.
5. Write a program to implement tuple and use its methods.
6. Write a program to import module and use it.
7. Write a user defined function to implement factorial of a given no.
8. Write a program to show the use of anonymous functions.
9. Write a program to calculate area of rectangle and circle using class.
10. Write a program to implement single level inheritance.
11. Write a program to overriding method.
12. Write a program to implement double underscore methods.
13. Write a program to implement Exception Handling.
14. Write a program for user defined exception.
15. Write a program to copy a file.
16. Write a program to count no. of words in a file.
17. Write a program to connect with database and perform insert operation.
18. Write a program to perform select operation on database.
19. Write a program to perform delete operation on database.
20. Write a program to perform update operation on database.
21. Write a program to implement multithreading.
22. Write a program to synchronize threads.
23. Create a data frame based on ecommerce data and generate descriptive statistics (mean, median, mode, quartile, and variance).
24. Create a data frame for examination result and display row labels, column labels data types of each column and the dimensions.
25. Accessing data from a Pandas Data Frame

26. Accessing Data Frames Element through Slicing.
27. Write a program to implement loan perdition model.
28. Write a program to implement movie recommendation system.
29. Data Frame operations: Aggregation, group by, Sorting, Deleting and Renaming Index, Pivoting.
30. Filter out rows based on different criteria such as duplicate rows. Find the sum of each column, or find the column with the lowest mean.
31. Locate the 3 largest values in a data frame.
32. Subtract the mean of a row from each element of the row in a Data Frame.
33. Replace all negative values in a data frame with a 0.
34. Replace all missing values in a data frame with a 999.
35. Importing and exporting data between pandas and CSV file.
36.