BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
AUGS/ AGSR Division

FIRST SEMESTER 2020-21
COURSE HANDOUT

Date: 17.08.2020

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

Course No : CS F111
Course Title : Computer Programming
Instructor-in-Charge : Dr. Pratik Narang
Instructor(s) : Dr. Pratik Narang (pratik.narang@pilani.bits-pilani.ac.in)
Tutorial/Practical Instructors: Dr. Pratik Narang (pratik.narang@pilani.bits-pilani.ac.in)

1. Course Description: The primary goals of the course are to introduce:

- Basic representation of data and how to process data using the representation inside a computer.
- Techniques for specifying data, operations on data, and problem solving using C programming language.
- Systematic techniques and approaches for constructing programs.

2. Scope and Objective of the Course: The course covers the following topics: Basic Model of a Computer; Problem Solving – Basic Computing Steps and Flow. Programming Constructs – Expressions, Statements, Conditionals, Iterators/Loops, Functions/Procedures; Data Types – Primitive Types, Tuples, Lists/Arrays, Pointers and Dynamically Allocated Data. Input output and Files.

3. Text Books: **T1**: Hanly, J.R. and E.B. Koffman. *Problem Solving and Program Design in C(7/e)*. Pearson Education, 2013.

4. Reference Books: R1: Patt, Yale. Introduction to Computing Systems: From bits & gates to C &beyond (2/e). McGraw Hill Education, 2017.
The authors take a bottom-up approach to introduce computers and computing.

R2: Forouzan, B.A. and Richard F. Gilberg . Computer science A structured programming approach using C (3/e). Cengage Learning, 2007.
The book gives a fairly comprehensive overview of C, with several example programs.

R3: Gottfried, B.S. and Jitender Chhabra. Programming with C (Schaum's Outlines Series, 3/e). McGraw Hill Education, 2017.
Another beginner's book on C programming, with lots of drill exercises and programs.

R4: Kernighan, B.W and Dennis Ritchie. The C Programming Language (2/e). Pearson Education India, 2015.
Considered the ultimate treatise on C, it conveys the philosophy and practice of C very tersely, but is pitched at an advanced beginner level.

R5: Das, S. Unix: Concepts and Applications (4/e). McGraw Hill Education, 2017.
Provides a great introduction to using Unix commands.

R6: Das, Sumitabha. Computer Fundamentals and C Programming. New Delhi, India: McGraw Hill Education. (2018)

5. Course Plan:

Module No.	Lecture Session	Reference	Learning outcomes
01	Introduction to Programming; need for programming; overview of computers and computing	T1: 1.1-1.3	Students can write simple C programs, compile and execute them in a Unix environment
02	Useful Unix commands for compiling and running programs	Class notes, R5	
03-04	How to express a problem using flowcharts, using prime number problem as an example	Class Notes	
05-06	A programming example using standard input and output	T1: 2.4; Class notes	
07-10	Internal representation of data; IEEE floating point representation	R1: 2.7.2	
11-13	Data Types; variable names; sizes, constants and declarations	T1: 2.1-2.2	Students can evaluate arithmetic expressions and specify the exact internal data representation.
14-17	Statements – if… else, if… else… if, switch Loops – while; do…while; for; break and continue	T1: 4.1-4.3, 4.7-4.8, 5.1-5.2, 5.4-5.8	Given an iterative or conditional, students would be able to use the loop constructs / if-else construct appropriately.
18-20	Functions and program structure; return types; scope rules; header files	T1: 3.1, 3.4-3.5, 6.1-6.4, 10.1-10.4	Given a complex problem statement, students will be able to logically break down into simpler modules involving pointers and arrays, and write a modular program using functions.
21-27	Pointers and function arguments; call by value; call by reference; pointer arithmetic; arrays of pointers; string manipulation	T1: 6.1, 8.1-8.5	
28-30	Multidimensional arrays; pointers vs. multidimensional Arrays	T1: 7.8-7.9, 13.7	

31-34	Structures, Array of Structures	T1: 10.1-10.4	Students will be able to create user-defined data types pertaining to a given problem, create and manipulate data structures using dynamic memory management, and handle text files.
35-38	File handling, Recursion, Command Line Arguments	T1: 2.3, 11.1, 9.1-9.5 Class Notes	
39-40	Dynamic memory management; linked lists	T1: 13.1-13.4 Class Notes	

6. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of component (Close Book/ Open Book)
Test 1	30 min	15	Sep10 – Sep 20	TBA
Test 2	30 min	15	Oct 9 – Oct 20	TBA
Test 3	30 min	15	Nov 10 – Nov 20	TBA
Practical Sessions	110 Min. weekly	20	Continuous	Open-book
Comprehensive Exam	120 min	35	8/12 AN	TBA

7. Chamber Consultation Hour: To be announced in the lecture sessions.

8. Notices: All announcements will be done through online platforms such as Nalanda or Microsoft Teams. More details shall be shared in the lecture sessions.

9. Make-up Policy: Make-ups for regular laboratory sessions and assessments held therein are not awarded. Make-ups are generally considered only for medical emergencies leading to hospitalization (or a personal emergency of similar nature). The decision by the Instructor-in-Charge regarding granting make-ups shall be final.

10. Note:

Award of grades would be guided in general by the histogram of marks. If a student does not give sufficient opportunity for being assessed, either by missing a component entirely or by not applying oneself to the task seriously, he/she may be awarded 'NC' report.

Instructor-in-charge
CS F111