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**SECOND SEMESTER 2020-21**  
**COURSE HANDOUT**

**Date: 18.01.2021**

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. Sundaresan Raman  
**Instructor(s)** : Dr. Sundaresan Raman ([sundaresan.raman@pilani.bits-pilani.ac.in](mailto:sundaresan.raman@pilani.bits-pilani.ac.in))  
**Tutorial/Practical Instructors:** Dr. Sundaresan Raman ([sundaresan.raman@pilani.bits-pilani.ac.in](mailto:sundaresan.raman@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.*



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**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	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	
07-09	Internal representation of data; IEEE floating point representation	R1: 2.7.2	
10-12	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.
13-16	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.
17-19	Functions and program structure; return types; scope rules; function arguments; call by value	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
20-26	Arrays; Pointers; call by reference; pointer arithmetic; arrays of pointers; string manipulation	T1: 6.1, 8.1-8.5	



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27-29	Multidimensional arrays; pointers vs. multidimensional Arrays;	T1:7.8-7.9, 13.7	functions.
30-33	Structures; type definitions, 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.
34-36	File handling, Recursion, Command Line Arguments	T1: 2.3, 11.1, 9.1-9.5 Class Notes	
37-40	Dynamic memory management; linked lists	T1: 13.1-13.4 Class Notes	

**6. Evaluation Scheme:**

Component	Duration	Weightage (%)	Date & Time	Remark
Mid-Semester Test	90 Min.	25	Tue 2 <sup>nd</sup> March 2021, 2:00 PM – 3.30 PM	
Comprehensive Examination	120 Min.	35	As per timetable	TBA
Quiz / Assignment / Project	--	30	TBA	
Class Participation and Initiative		10		As below

In-class quizzes will be held regularly throughout the semester. Giving these and showing active participation during the classes (say, by asking questions and responding to the instructor, interacting across the teams during team based activity) would count toward the **Class Participation and Initiative**.

**7. Chamber Consultation Hour:**

To be announced in the lecture sessions.

To contact the practical class instructors for consultation, you may send them an email.

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



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**9. Make-up Policy:** 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**