Department of Computer Applications
National Institute of Technology Tiruchirappalli

1. Course Outline

Course Title	Problem Solving and Programming		
Course Code	CA711		
Department	CA	**No. of Credits**	3
Pre-requisites Course Code	NIL	**Faculty Name**	Dr. Michael Arock Dr.S.Sangeetha
PAC chairperson	Dr.V.Gayathri		
E-mail	michael@nitt.edu sangeetha@nitt.edu	**Telephone No.**	0431-2503736 0431-2503743
Course Type	Core Course		

2. Course Overview

This course deals with the study of different hardware and software components of computers and their characteristics. It introduces structured and modular programming. The design and development of pseudo-code for solving scientific and real life problems will also be dealt with. Moreover, an introduction to C programming with emphasis on the various syntactic and semantic constructs such as I/O, branching, control structures, arrays, pointers, etc., will be dealt with. Further, the concepts of structures and files will also be taught.

3. Course Objectives

- To learn the fundamentals of computers
- To learn the problem solving techniques, writing algorithms, and procedures
- To learn the syntax and semantics for C programming language
- To develop the C code for a given logic
- To understand the constructs of structured programming including conditionals and iterations
- To understand the advanced concepts of structures and files

4. Course Outcomes (CO)

- Ability to write structured pseudo codes for a given problem
- Ability to write C programs for solving problems

	Ability to design programs for complex problems applying advanced concepts like arrays, structures, files and pointers

5. Course Outcome (CO)	Aligned Programme outcome(PO)					
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6
Ability to write structured pseudo codes for a given problem	S	B	M	S	B	B
Ability to write C programs for solving problems	S	M	S	M	S	M
Ability to design programs for complex problems applying advanced concepts like arrays, structures, files and pointers	S	S	B	S	B	B

S = 0.6   M = 0.4   B = 0.0

5. Course Outcome (CO)	Aligned Programme outcome(PO)					
	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
Ability to write structured pseudo codes for a given problem	S	B	M	S	B	M
Ability to write C programs for solving problems	S	M	M	S	M	B
Ability to design programs for complex problems applying advanced concepts like arrays, structures, files and pointers	S	S	S	B	B	B

6. Course Teaching and Learning Activities		
Week	Mode of Delivery	Topics covered
1.	Class-I	Introduction to computers – Computer Organization – Characteristics – Hardware and Software
	Class-II	Modes of operation, Types of programming languages – Developing a program.

Week	Mode of Delivery	Topics covered
	Class-III	Algorithms – Characteristics: Exercises Flowcharts: Exercises Principles of Structured programming
2.	Class-I	Sequential, selective structures: Exercises
	Class-II	Repetitive structures –Bounded , Unbounded and Infinite iterations: Exercises
	Class-III	Exercises; Introduction to writing a program in C Introduction to C – C character set – Identifiers and Keywords
	Class-IV	Introduction to writing a program in C (Contd),– Datatypes – Constants – Variables – Declarations
3.	Class-I	Expressions – Statements – Symbolic constants – Operators
	Class-II	Programs for Sequential Structures
	Class III	Sequential Structure
4.	Class-I	Library functions – Data input and output: Single character input and output – Entering input data – Writing output data – gets and puts functions.
	Class-II	Control statements – Branching: if-else
	Class III	Selective Structures
5.	Class-I	Looping: while – do-while – for; Nested control structures
	Class-II	Exercises on looping; switch statement – break statement – continue statement - Exercises
	Class III	Programs using Iterative construct Programs using nested for loops
6.	Class-I	comma operator – goto statement; Modular Programming – Functions and Procedures – Examples
	Class-II	Parameter passing methods - Exercise
	Class III	Programs using functions with Pass by value
7.	Class-I	Arrays – Defining an array – Processing an array (One Dimensional Array)
	Class-II	Multidimensional arrays - Exercises
	Class III	Programs Using Pass by Reference Programs using One dimensional Array
8.	Class-I	Pointer operators – Pointer expressions and arithmetic - Exercises
	Class-II	Pointers and one-dimensional arrays- Exercises
	Class III	Programs using two dimensional Arrays
9.	Class-I	Pointers and Functions – Defining a function – Accessing a function – Function prototypes
	Class-II	Passing arguments to a function –Passing arrays to a function
	Class III	Programs Using Recursive Functions
10.	Class-I	Passing pointers to a function - Exercises
	Class-II	Recursion- Exercises – Review of Unit V

Week	Mode of Delivery	Topics covered
	Class III	Programs using Pointers and functions Programs using Structures and files

7. Course Assessment Methods – Theory

Sl. No.	Mode of Assessment	Week/Date	Duration	Weightage (%)
1.	Cycle Test – 1	4th week	60 Mins	20
2.	Cycle Test – 2	8th week	60 Mins	20
3.	Assignment/Test	9th week	30 Mins	10
4.	End Semester Exam	-	180 Mins	50
			Total	100

8. Essential Readings (Textbooks, Reference books, Websites, Journals, etc.)

REFERENCES:

1. J.R. Hanly and E.B. Koffman, "Problem Solving and Program Design in C", 6th Edition, Pearson Education, 2009.
2. M.A. Vine, "C programming for the absolute beginner", 2nd Edition, Thomson Course Technology,2008.
3. B.A. Forouzan and R.F. Gilberg, "Computer Science: A Structured Programming Approach Using C", 3rd Edition, Thomson Course Technology, 2005
4. B. Gottfried, "Schaum's Outline of Programming with C", 3rd Edition, Tata McGraw Hill,2010.
5. B.W. Kerninghan, D.M. Ritchie, "The C Programming Language", 2nd Edition, PHI,1995

9. Course Exit Survey (mention the ways by which the feedback about the course is assessed and indicate the attainment level)

- The students through the class rep may give their feedback at any time to the course co-ordinator which will be duly addressed.
- The students may also give their feedback during Class Committee meeting.
- 'Course Outcome Survey' form will be distributed on the last working day to all the students and the feedback on various rubrics will be analyzed.
- The COs will be computed after arriving at the final marks.

10. Additional Course Information

- The students can get their doubts clarified at any time with their faculty member with prior appointment.

For Senate's Consideration

Course Faculty

(Dr.Michael Arock) (Dr.S.Sangeetha)

(Dr.V.Gayathri) **(Dr.A.Vadivel)**

Class Committee Chairperson HoD