# DEPARTMENT OF MECHANICAL ENGINEERING

# NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

| COURSE PLAN – PART I | | | |
|---|---|---|---|
| Name of the programme and specialization | B.Tech and Mechanical | | |
| Course Title | Basics of Programming (Theory and Lab) | | |
| Course Code | CSIR11 | No. of Credits | 3 |
| Course Code of Pre-requisite subject(s) | Nil | | |
| Session | August 2018 | Section (if, applicable) | B |
| Name of Faculty | Mr. Aravindh A | Department | CSE |
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| Name of Course Coordinator(s) (if, applicable) | | | |
| E-mail | | Telephone No. | |
| Course Type | ☑ Core course | ☐ Elective course | |

| Syllabus (approved in BoS) |
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**Basics of Programming (Theory)**

Introduction to computers – Computer Organization – Characteristics – Hardware and Software – Modes of operation – Types of programming languages – Developing a program.

Algorithms – Characteristics – Flowcharts - Principles of Structured programming – Sequential, selective structures - Repetitive structures –Bounded , Unbounded and Infinite iterations – Examples for each.

Introduction to C – C character set – Identifiers and Keywords – Datatypes – Constants – Variables – Declarations – Expressions – Statements – Symbolic constants – Operators– Library functions – Data input and output: Single character input and output – Entering input data – Writing output data – gets and puts functions. Control statements – Branching: if-else – Looping: while – do-while – for; Nested control structures – switch statement – break statement – continue statement – comma operator – goto statement.

Modular Programming – Functions and Procedures – Examples – Parameter passing methods.

Arrays – Defining an array – Processing an array – Multidimensional arrays-Pointers – Variable definitions and initialization – Pointer operators – Pointer expressions and arithmetic – Pointers and one-dimensional arrays- Functions – Defining a function – Accessing a function – Function prototypes – Passing arguments to a function –Passing arrays to a function – Passing pointers to a function – Recursion.

**Basics of Programming (Lab)**

1. Programs using sequence construct
2. Programs using selection construct
3. Programs using Iterative construct
4. Programs using nested for loops
5. Programs using functions with Pass by value
6. Programs using functions with Pass by reference
7. Programs using recursive functions
8. Programs using one dimensional Array
9. Programs using two dimensional Arrays
10. Programs using Pointers and functions
11. Programs using Pointers and Arrays

**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 simple logic.
➢ To understand the constructs of structured programming including conditionals and iterations.
➢ To understand the design of modular programming.

**COURSE OUTCOMES (CO)**

➢ Ability to write algorithms for problems.
➢ Ability to comprehend the syntax and semantics of C programming.
➢ Ability to code a given logic in C language for solving problems.

| Course Outcome (CO) | Aligned programme Outcome |
|---|---|
| Ability to write algorithms for problems | 1, 4 |
| Knowledge of the syntax and semantics of C programming language | 2, 3 |
| Ability to code a given logic in C language | 1, 2, 3, 4 |
| Knowledge in using C language for solving problems | 2, 3, 4, 8, 11, 12 |

## COURSE PLAN – PART II

**COURSE OVERVIEW**

The Basics of Programming course deals with the study of different sub component of computers and their characteristics. The design and development of algorithm 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 concept of modular programming will also be taught.

## COURSE TEACHING AND LEARNING ACTIVITIES

| S.No. | Week | Topic | Mode of Delivery |
|---|---|---|---|
| 1. | 1 | Introduction to computers – Computer Organization – Characteristics – Hardware and Software.<br>Lab session1 – Simple C programs. | Chalk and Talk |
| 2. | 2 | Modes of operation – Types of programming languages – Developing a program. Algorithms – Characteristics – Flowcharts –Principles of Structured programming.<br>Lab session2 – Programs using Sequential Structure. | Chalk and Talk |
| 3. | 3 | Sequential, selective structures – Repetitive structures – Bounded, Unbounded and Infinite iterations – Examples for each.<br>Lab session3 - Programs using Selective Structures. | Chalk and Talk |
| 4. | 4 | Introduction to C – C character set – Identifiers and Keywords – Data types – Constants.<br>Lab session4 - Programs using Iterative construct. | Chalk and Talk |
| 5. | 5 | Variables – Declarations– Expressions – Statements – Symbolic constants – Operators-Library functions.<br>Lab session 5 - Programs using Iterative construct. | Chalk and Talk |
| 6. | 6 | Data input and output: Single character input and output – Entering input data –Writing output data – gets and puts functions. Control statements – Branching: if-else – Looping: while – do-while – for; Nested control structures.<br>Lab session 6 - Programs using nested for loops. | Chalk and Talk |
| 7. | 7 | Switch statement – break statement – continue statement – comma operator – goto statement.<br>Lab session 7 - Programs using Unconditional Statement. | Chalk and Talk |
| 8. | 8 | Modular Programming – Functions and Procedures – Examples– Parameter passing methods.<br>Lab session 8 - Programs using functions with Pass by value, Programs Using Pass by Reference. | Chalk and Talk |

| 9. | 9 | Arrays –Defining an array –Processing an array–types of arrays.<br>Lab session 9 - Programs using Recursive Functions, Programs using One dimensional Array, Programs two dimension arrays. | Chalk and Talk |
|---|---|---|---|
| 10. | 10 | Defining a function –Accessing a function – Function prototypes –Passing arguments to a function –Passing arrays to a function – Passing pointers to a function – Recursion.<br>Lab session 10 - Programs using Pointers and Arrays. | Chalk and Talk |
| 11. | 11 | Pointer Variable definitions and initialization – Pointer operators – Pointer expressions and arithmetic<br>Lab session 11 - Programs using Pointers & functions. | Chalk and Talk |
| 12. | 12 | Pointers and one-dimensional arrays.<br>Lab session 12-Revision Lab | Chalk and Talk |

The assessment in this course has two components, viz., Theory and Practical. The assessment in Theory component has cycle test and final assessment whose details are given in the below table. The assessment in Theory will be done for a total of 70 marks. The assessment in Practical component has periodical record / observation evaluation and final assessment whose details are given in the below table. The assessment in Practical will be done for a total of 30 marks. The total marks for this course is 100.

**COURSE ASSESSMENT METHODS-THEORY (shall range from 4 to 6)**

| S.No. | Mode of Assessment | Week/Date | Duration | % Weightage |
|---|---|---|---|---|
| 1 | Cycle Test-1 | 1st week of Oct | 1 hour | 15% |
| 2 | Cycle Test-2 | 3rd week of Nov | 1 hour | 15% |
| CPA | Compensation Assessment* | 4th week of Nov | 1 hour | 15% |
| 3 | Final Assessment* Theory | 2nd week of Dec | 3 hours | 40% |
| | **TOTAL** | | | **70%** |

**COURSE ASSESSMENT METHODS-PRACTICAL**

| 4. | Observation / Record | Every Week | 1 hour 10 minutes | 10% |
|---|---|---|---|---|

| 5. | Final Assessment* Practical | 4th Week of Nov | 2 hours | 20% |
|---|---|---|---|---|
| | **TOTAL** | | | 30% |

*mandatory

**COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)**

1. Students' feedback through class committee meetings.
2. Feedback questionnaire from students – from MIS at the end of the semester.

**COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)**

**MODE OF CORRESPONDENCE (email/ phone etc)**
Mode of Correspondence through Phone.

**COMPENSATION ASSESSMENT POLICY**
In case of emergency, the student should submit compensatory assignments on submission of appropriate documents as proof. Compensatory assessments would be framed according to the time frame available and the assessment task missed by the students.

NDANCE POLICY (A uniform attendance policy as specified below shall be followed)

➢ **At least 75% attendance in each course is mandatory.**

➢ **A maximum of 10% shall be allowed under On Duty (OD) category.**

➢ Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

**ACADEMIC DISHONESTY & PLAGIARISM**

➢ Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.

➢ Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

➢ The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmers.

**ADDITIONAL INFORMATION**
The students can get their doubts clarified at any time with their faculty member.