

## Liverpool John Moores University

Title: PROGRAMMING CONCEPTS  
Status: Definitive  
Code: **4504ICBTEL** (127015)  
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering  
Teaching School/Faculty: ICBT, Colombo

Team	Leader
Alison Cotgrave	Y

**Academic Level:** FHEQ4      **Credit Value:** 15      **Total Delivered Hours:** 61  
**Total Learning Hours:** 150      **Private Study:** 89

### Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	30
Practical	15
Tutorial	9
Workshop	6

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Coursework (2500 words)	50	
Exam	AS2	Exam	50	1

### Aims

*This module aims to introduce the student to both the development of C programs on the windows platform using formal design methods and how to develop C programs to execute on a microcontroller to perform engineering applications that might otherwise be developed with digital hardware. This will start with an introduction to the C constructs, how and when to use them, with graded examples. Later the*

*student will be given engineering problems for which they will write C programs to solve.*

## **Learning Outcomes**

After completing the module the student should be able to:

- 1 Demonstrate an understanding of the Pseudo code, flow chart and state machines to generate the algorithm and break down the given specification into its key components.
- 2 Identify and apply key concepts of C programming including variable declaration, looping and jumping instructions.
- 3 Develop C programming for given engineering problem based on PC and Raspberry pi (or any microcontroller or microprocessor based platform).
- 4 Apply object oriented concepts to solve engineering problems by creating a PC based applications.

## **Learning Outcomes of Assessments**

The assessment item list is assessed via the learning outcomes listed:

Coursework	3	4
Exam	1	2

## **Outline Syllabus**

*Introduce the Pseudo code, flow chart and state machine to convert the specification in to algorithm or structured sequence of program instructions. Converting the algorithm into a C program using the C programming language syntax using decision making, repeating operations, C functions following both top down and bottom up design.*

*Introduction to basic programming using C language: Variables, loops, arrays pointers and other control structures.*

*Develop simple applications based on C programme by using PC based (mathematical calculation, sequence detector) and microcontroller (LED array, temperature controller) platform.*

*Introduce to Object Oriented Concepts : Encapsulation, Polymorphism, Inheritance, and apply to develop PC based graphical applications.*

## **Learning Activities**

Students will be supported in their learning, to achieve the above learning outcomes, in the following ways:

Programming technique and fundamentals acquired through lectures, and computer laboratory classes.

Basic sensors and actuator interface learn from seminars and workshop to develop microcontroller/microprocessor based application.

Engineering problem solving through microcontroller fundamental and programming platform from laboratory environment.

## **Notes**

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