

1. Dublin Institute of Technology

<i>Pre-Requisite Modules code(s)</i>	Co-Requisite Modules code(s)	ECTS Credits	Module Code	Module Title
		10	CMPU2016	Object Oriented Programming

8.2.6. Object-Oriented Programming

Module author: Programming and Algorithms Group

Module Description:

This module develops the students' programming and problem solving skills, progressing from procedural to object-oriented programming. Topics include the principles, practices, and applications of programming in object-oriented environment with applications to business and scientifically oriented problems. The techniques and language features of object-oriented design are implemented in programming projects. Emphasis is placed upon development of well-designed, efficient, maintainable object-oriented software.

Module aim:

The aim of this module is that the student become familiar with Object Oriented Programming concepts and implement these concepts in elementary object oriented programs.

Learning Outcomes:

On completion of this module, the learner will be able to:

- Demonstrate an understanding of the underlying principles and concepts of Object-Oriented Programming
- Use UML in the design of OOP programs
- Write programs using Object-Oriented programming language
- Extensively testing using debugging tools to remove runtime errors from a program
- Document an Object-Oriented program
- Demonstrate an understanding of the advanced principles and concepts of Object Oriented Programming
- Design and implement object oriented programs using advanced Object Oriented constructs and design patterns
- Persistent objects: Formatted file input and output, direct file input and output
- Construct Program Libraries.

Learning and Teaching Methods:

- Lectures with demonstrations, Tutorials and / or Laboratory practicals based on lectures and tutorials
- A Virtual Learning Environment (VLE) is used extensively in this module.

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Module content:

- Comparison of Procedural Programming with OOP
- Review of procedural programming. Problems with procedural programming and the need for OOP
- Object-Oriented Principles and Concepts
- Introduction to class diagrams and OOP concepts.
- Relationships, Inheritance, Multiple Inheritance, Abstract Classes.
- Object Oriented Programming Language Constructs
- Abstract data types, classes, objects, messages, Instance variables, methods, encapsulation, private and public access, class variables, constructors, class interface, class implementation.
- Classes and objects, private and public class members, constructors, initialisation list, static data members, overloading, inline, separation of interface and implementation.
- Function overloading. Operator overloading.
- Destructors.
- Virtual functions and friend functions.
- Composition.
- Inheritance: Types of Inheritance, Construction, Destruction, Multiple Inheritance.
- Polymorphism.
- Abstract Classes.
- String class and character arrays. Pointers and dynamic memory.
- Generic Types, Static and Dynamic Binding, Polymorphism, Overloading.
- Exception handling.
- Streams and files.
- Templates: functions and classes. Genericity.
- Collections frameworks.
- Program Libraries.
- Testing techniques for object oriented programs.
- Laboratory Work:
- Design, code and test a series of object-oriented programs to re-enforce lecture content.

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Module Assessment:

Assessment of the module is a combination of the following:

Continuous Assessment (60%):

- Individual assignments
- Lab tests
- On-line tests
- In-class written tests

Written examination (40%): One three hour, end of module examination.

Essential Reading:

Depending on the language used in this module, reading lists will be specified in advance of the start of the module.

Supplemental Reading:

Dependent on the language used in this module.

Further Details:

Maximum class size is expected to be 80, broken into groups for labs and tutorials, Semesters: 2
Contact hours per semester: Lectures: 2 hours Lab / Tutorial : 2 hours

Date of Academic Council approval