Title:	OO Analysis and Design APPROVED
Long Title:	OO Analysis and Design

Module Code:	SOFT7005	**Duration:**	1 Semester

Credits:	5
NFQ Level:	Intermediate
Field of Study:	Computer Software
Valid From:	Semester 1 - 2017/18 (September 2017)
Module Delivered in	4 programme(s)
Next Review Date:	November 2021
Module Coordinator:	Sean McSweeney
Module Author:	MARY DAVIN
Module Description:	Object-oriented analysis and design (OOAD) is a popular approach for analysing and designing an application to foster better stakeholder communication and product quality. In this module students will study Object-oriented modeling(OOM) techniques supported by the Unified Modeling Language(UML) framework and learn its application throughout the entire software development life cycle.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Differentiate between object-oriented analysis and design.
LO2	Create models for a software system using UML notation and an appropriate tool.
LO3	Apply design principles and patterns to design classes.
LO4	Reverse engineer code into software models at different levels of abstraction.

Pre-requisite learning

Module Recommendations
This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).

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Incompatible Modules
These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.

No incompatible modules listed

Co-requisite Modules

No Co-requisite modules listed

Requirements
This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.

No requirements listed

Module Content & Assessment

Indicative Content
Introduction to OO Analysis and Design. What is object orientation, why we use object orientation, classes , objects, abstraction, encapsulation.Software modelling, aims of modelling, principles of modelling ,overview UML. The object oriented analysis and design process. User Stories. Analysis and design artifacts.
Domain Modelling. What is a conceptual Model. Identifying classes and their relationships. Identify class responsibilities, CRC cards.
Domain Driven Design Domain-Driven Design basics.Discovering the domain and the Ubiquitous Language. Value objects, entities, aggregates,effective aggregate design, repositories, command pattern and factories.
Object-Oriented Design Principles. Introduction to Object-oriented design principles, cohesion and Coupling, GRASP design principles, SOLID principles.
Design Class Diagrams Inheritance, composition, situations when composition is favored over inheritance, delegation, shared members, derived attributes. Operation contracts .
Object-Oriented Design Patterns. What are design Patterns. Overview of a number of patterns such as Singleton,composite,Observe and Delegation.
Package, Component, and Deployment Diagrams. Modeling groups of elements - Package Diagrams, components,interfaces.
Package Principles. Packages, reuse-release principle,common closure principle, common reuse principle, acyclic dependencies.
Implementation. Mapping strategies used to map models to code and databases. Abstracting models from code.

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Course Work

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	The student would work through a number of small problems from analysis to design. They would also create models from an existing code base.	2,3,4	20.0	Week 6
Project	The students would work in a team on a project.The team would progressively build the object-oriented analysis and design artifacts for this project over a number of weeks.	2,3	30.0	Week 13

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	End of Semester Formal Examination.	1,2,3	50.0	End-of-Semester

Reassessment Requirement
Repeat examination *Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.*

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Presentation of indicative content.	2.0	Every Week	2.00
Lab	Lab to support learning outcomes.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Reading, writing and study.	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Workload: Part Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Presentation of indicative content.	2.0	Every Week	2.00
Lab	Lab to support learning outcomes.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Reading, writing and study	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

- Alan Dennis 2015, ***Systems Analysis and Design: An Object Oriented Approach with UML***, 5th Ed., John Wiley & Sons [ISBN: 9781118804674]

Supplementary Book Resources

- Simon Bennett,Steve McRobb,Ray Farmer 2010, ***Object-Oriented Systems Analysis and Design***, 4 Ed., McGraw-Hill Education [ISBN: 9780077125363]
- Matthias Noback 2015, ***Principles of Package Design: Preparing your code for reuse***, Matthias Noback; [ISBN: 9789082120141]
- Eric Evans 2003, ***Domain-Driven Design: Tackling Complexity in the Heart of Software***, 1 Ed., Addison-Wesley Professional [ISBN: 9780321125217]
- Eric Evans 2014, ***Domain-Driven Design Reference: Definitions and Pattern Summaries***, Dog Ear Publishing, LLC [ISBN: 9781457501197]
- Erich Gamma,Richard Helm,Ralph Johnson,John Vlissides 1994, ***Design Patterns: Elements of Reusable Object-Oriented Software***, Addison-Wesley Professional [ISBN: 9780201633610]
- Eric Freeman 2004, ***Head First Design Patterns: A Brain-Friendly Guide***, O'Reilly Media [ISBN: 9780596007126]
- Avinash C. Kak 2015, ***Designing with Objects: Object-Oriented Design Patterns Explained with Stories from Harry Potter***, Wiley [ISBN: 9781118581209]
- Craig Larman 2002, ***Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development***, 3 Ed., Prentice Hall [ISBN: 9780131489066]
- Robert C. Martin 2002, ***Agile Software Development, Principles, Patterns, and Practices***, Pearson [ISBN: 9780135974445]
- Brahma Dathan,Sarnath Ramnath 2015, ***Object-Oriented Analysis, Design and Implementation: An Integrated Approach (Undergraduate Topics in Computer Science)***, 2 Ed., Springer [ISBN: 9783319242781]

This module does not have any article/paper resources

Other Resources

- Website: ***Object Oriented Design Patterns***
  http://www.oodesign.com/
- Website: ***UML Resource center***
  http://www.uml.org
- Website: ***Domain Driven Design Community***
  http://domainlanguage.com/ddd/
- Website: ***Object Oriented Analysis & Design Tutorial***
  http://www.tutorialspoint.com/object_ori ented_analysis_design/

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_KSDEV_8	Bachelor of Science (Honours) in Software Development	4	Mandatory
CR_KDNET_8	Bachelor of Science (Honours) in Computer Systems	4	Mandatory
CR_KCOMP_7	Bachelor of Science in Software Development	4	Mandatory
CR_KCOME_6	Higher Certificate in Science in Software Development	4	Mandatory