Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU 4035	CMPU 3037				10	8
Module Title	Information Systems Engineering					

Information Systems Engineering

School Responsible:	School of Computing

Module Overview:

This module deepens and expands the learner's knowledge and understanding of the design, development, testing, and maintenance of information systems. This includes an advanced study of the software engineering lifecycle and process management, requirements elicitation, project management, validation and verification, configuration management, quality assurance, security engineering and risk management.

The aims of this module are to:

- Develop the learner's ability to select, design and/or implement appropriate information systems for a specific organisational context.
- Provide the learner with the ability to design and implement an appropriate process for the implementation of an information systems solution, incorporating all the required stages from requirements elicitation to testing and deployment.
- Provide the learner with the know-how and skill to be able to make an evaluation of the risk considerations for information systems engineering, incorporating the study of quality assurance, security engineering and risk management.

Learning Outcomes (LO):	
On Completion of this module, the learner will be able to	
1	Identify and critically evaluate the various software process models and development methodologies.
2	Compare and contrast different approaches to systems development.
3	Demonstrate a practical knowledge of the various techniques of the development of a software system through a development lifecycle.
4	Demonstrate a practical knowledge of requirements engineering and architectural design.
5	Evaluate and develop appropriate verification, validation and testing strategies.
6	Evaluate the challenges and approaches to user interface design.

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7	Demonstrate a comprehensive knowledge of support activities such as project management, validation and verification, configuration management, quality assurance.
8	Demonstrate a comprehensive knowledge of security engineering and risk management.

Indicative Syllabus:

- Process models and their importance: Comparison of models and approaches; Choosing the process model
- Software development life cycle: A comprehensive review of each traditional life cycle phase as part of
  system engineering, including requirements analysis and specification, design, implementation, validation and verification, installation and maintenance; and each object oriented life cycle phase including inception, elaboration, construction and transition, project management, covering concepts, different techniques used and issues involved in each phase. Comparison of life cycle phases in different process models.

- System engineering: requirements engineering, system models, development methods and techniques; system architecture and development issues.
- Configuration management: Configuration identification, the configuration management process, version control, change control, defect tracking, configuration management software tools. Verification, validation and testing: the review process, the testing process, test strategies, system testing, model testing, testing tools, the management of testing.
- Quality assurance and process improvement: Software quality assurance, quality factors, software reviews, software process metrics, software process assessment techniques, process improvement methods, standards used in process improvement e.g. the ISO quality standards.
- Risk management: Software risks; risk identification; risk mitigation, monitoring and management.
- Security engineering: Data security, security concepts, security risk management, design for security.

Learning and Teaching Methods:

The course delivery involves a combination of lectures and labs which may incorporate the use of blended learning techniques as appropriate throughout the delivery.

Total Teaching Contact Hours	39
Total Self-Directed Learning Hours	161

Module Delivery Duration:

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This module is delivered over one semester

Assessment		
Assessment Type	**Weighting (%)**	**LO Assessment (No.)**
Final Exam	70%	1-8
In class examination	30%	1-8
Module Specific Assessment Arrangements (if applicable)		
(a) Derogations from General Assessment Regulations		
(b) Module Assessment Thresholds		
(c) Special Repeat Assessment Arrangements		

Essential Reading: (author, date, title, publisher)

Sommerville I., (2016), Software Engineering, 10th Edition, Addison Wesley.

Pressman R., (2015), Software Engineering: A Practitioner's Approach, 8th Ed. McGraw-Hill.

Supplemental Reading

Relevant supplemental references will be indicated during the teaching of the module.

Web references, journals and other

Relevant web references and journals will be indicated during the teaching of the module.

Version No:		**Amended By**	
Commencement Date		**Associated Programme Codes**	

Modules that are to be offered as Stand-Alone CPD Programmes must have an NFQ level assigned

*Details of the assessment schedule should be contained in the student handbook for the programme stage.

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Date of Academic Council approval ……

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