

Module title Verification of Safe and Secure Systems Using Formal Specification			
Module code Tbd.	Level Bachelor (B.Sc.)	ECTS credits 5	Duration 2 weeks block course
Module instructor Mairead Meagher, Waterford Institute of Technology	Lecture type Lectures + Guided Tutorial Sessions	Prerequisite(s) Intermediate Mathematical ability	Grading Examination (50%) and specification (50%)
<p>Objectives Using mathematics, the student learns how to precisely specify computer systems. This exposes the student to rigorous and critical thinking skills. This module will also help the student to prioritise needs in systems, e.g. correctness, usability so that appropriate methodologies are chosen. An overview of the formal life cycle is presented.</p> <p>On completion of the course the students will be able to:</p> <ul style="list-style-type: none"> - <i>Knowledge & Understanding:</i> Chose when formal methods are applicable in software development. Read and write formal specifications and then explain those clearly using informal means. - <i>Skills & Abilities:</i> Apply the mathematics underlying the formal specification language, Write consistent specifications, and be able to explain why they are consistent. Formally specify part of a real world system (e.g. substantial student project) with appropriate narrative text. - <i>Judgement & Approach:</i> Examine a complex system, distil an understanding of it into an abstracted view, and model this view using appropriate abstract data models and mathematical description. <p>The course will consist of a series of lectures interspersed with guided tutorials. The tutorials will apply the techniques introduced in the lectures.</p> <p>Having practiced the techniques on small examples, students will be asked to take a part of a project they have worked on / are working on and specify an appropriate part of the system using the Z specification language. This will constitute the single assignment for the module.</p>			
<p>Content</p> <ul style="list-style-type: none"> • Introduction to Formal Methods • Mathematics of formal specification • Formal Specification notation (state based e.g. Z, B Notation) • Modelling using notation, writing operations using notation 			
<p>Textbook/teaching material</p> <ul style="list-style-type: none"> • http://formalmethods.wikia.com/wiki/ • Course notes 			

Note: this is not the official course descriptor according to the "Studien- und Prüfungsordnung" (SPO)