COURSE DETAILS
Course Code: F21AS
Full Course Title: Advanced Software Engineering
SCQF Level: 11
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL
Undergraduate: No
Postgraduate Taught: Yes
Postgraduate Research: Yes

Additional Information:

COURSE AIMS
• To consolidate proficiency in imperative programming and software development
• To further develop object oriented programming and object oriented design methods
• To provide knowledge of simple data structures and algorithms
• To introduce concurrent programming techniques
• To instil understanding of the concepts and benefits of advanced software engineering methods
• To give further practical experience of the use of UML in software engineering
• To give practical experience of developing a substantial software engineering team project
• To enable the deployment of patterns in software engineering

LEARNING OUTCOMES – SUBJECT MASTERY
• Skill in the use of UML notation and translation of UML designs to working programs
• Understanding of basic data structures and algorithms and ability to critically evaluate their appropriateness and limitations for a range of moderately complex problems.
• Demonstration of skill in design and implementation of practical GUI based and threaded applications
• To demonstrate a critical understanding of modern software engineering practice and be able to evaluate the strengths and weaknesses of current software engineering methods and techniques
• To be able to choose appropriate metrics to measure software quality and quantity in a modern software engineering environment
• To be able to choose a suitable software development environment and development methodology for specific software development tasks and justify the choice

LEARNING OUTCOMES – PERSONAL ABILITIES
• Appreciation of use of methodology to ground system analysis, design and development
• Understanding of different programming paradigms and their inter-relation
• Practice in working in a group, choosing a methodology, reaching a consensus, and working with others to a deadline
• Taking responsibility for own work, taking responsibility in the development of resources, critical reflection on development process and work undertaken by self.
• Effective appreciation of professional standards in modern software engineering practice.
• Showing initiative, creativity and team working skills in collaborative software development

SYLLABUS
## F21AS Advanced Software Engineering

Data structures: stacks, queues, lists, priority queues, binary trees  
Algorithms: searching (linear and binary) and sorting  
Advanced object oriented design techniques  
Thread based programming: thread creation and interaction, shared variables and synchronisation  
Methodologies in software engineering practice; Unified Modelling Language; design patterns;  
Project planning and management in software engineering;  
Comparison of agile and plan driven approaches

Prerequisites: Knowledge of Java programming and software engineering at undergraduate level

### COURSE RELATIONSHIPS

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### LOCATION AND ASSESSMENT METHODS

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