

2024 / 25

School of Science and Computing

☎ +353 (0)51 302037

✉ Eleanor.Reade@setu.ie

🌐 www.wit.ie/schools/science_computing



**SE
TU**

Ollscoil
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an Oirdheiscirt

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Module Descriptor

Agile Software Development (Computing and Mathematics)

Agile Software Development (A13557)

Short Title: Agile Software Development
Department: Computing and Mathematics
Credits: 10

Level: Postgraduate

Description of Module / Aims

This module will address a subset of the tools and technologies required to support the development of reliable, efficient and scalable software services. The focus is on use of Agile Development methods requiring test-driven developed and regular automated software builds. The aim is to assemble a toolkit of modern tools that enable the set-up of a software development process where this structure is automated by the tools. This course is designed to be very practical serving as a support to software development for the dissertation. Students taking this module should have strong object-oriented programming and design skills (e.g. be graduate of a BSc(Hons) or BEng involving significant programming experience) with a moderate understanding of computer architecture, operating systems and distributed computing.

Programmes

stage/semester/status		
COMP-0055	MSc in Computer Science (Enterprise Software Systems) (WD_KCESS_R)	1 / 0 / E
COMP-0055	MSc in Computing (Information Systems Processes) (WD_KISYP_R)	1 / 0 / E

Indicative Content

- Introduction to Agile Development e.g. object oriented programming review; agile practices; SOLID principles
- Test Driven Development (TDD) e.g. Principles of testing; unit testing; integration testing; performance testing; TDD patterns
- Developer Operations e.g. principles of automated build management and continuous integration
- Frameworks e.g. Web App Frameworks; Model-View-Controller; Reactive Patterns; RESTful APIs; Serialization and Parsing (such as XML, JSON, YAML)

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Construct applications using development methodologies.
2. Distinguish between various approaches to test driven development and apply these in a consistent manner.
3. Appraise the key tools in the modern agile tool chain coupled with the principles behind them.
4. Integrate effective design principles into the architecture of agile applications.
5. Develop a simple client/server application using standard RESTful APIs and demonstrate Test Driven Development techniques in this context.

Learning and Teaching Methods

- This module will be presented by a combination of lectures and computer-based practicals whilst capitalising on a web-enhanced learning environment.
- The lectures will be used to introduce new topics and their related concepts.
- A cooperative learning/peer tutoring approach (i.e. problem solving / class discussion) will be adopted during sessions.
- Self-directed learning will be encouraged throughout the duration of the module.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	24
Practical	24	24
Independent Learning	222	222

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	40%	1,2,3
Assignment	60%	2,3,4,5

Assessment Criteria

- <40%: Inability to comprehend and use agile development techniques to both support and manage medium scale software development projects. Unable to implement applications applying TDD principles.
- 40%–59%: Able to comprehend and use agile development techniques to a moderate degree to both support and manage medium scale software development projects. Able to implement a substantial application and test it using effective TDD approaches.
- 60%–69%: Able to comprehend and apply varying agile development techniques to a high degree to both support and manage medium scale software development projects. Able to implement a complex application using RESTful APIs and test it using very effective TDD approaches.
- 70%–100%: All of the above to an excellent level. Demonstrates advanced utilisation of agile development techniques to excellently support and seamlessly manage medium scale software development projects. Ability to implement a very complex application using RESTful APIs and automate the testing using superior TDD approaches.

Supplementary Material(s)

- Bloch, J. *Effective Java*. NJ: Addison-Wesley, 2008.
- Duvall, P.M. and S. Matyas. *Continuous Integration – improving software quality and reducing risk*. NJ: Pearson Education Inc, 2007.
- Hunt, A. and D. Thomas. *The Pragmatic Programmer: from journeyman to master*. Massachusetts: Addison-Wesley, 1999.
- Langr, J., A. Hunt and D. Thomas. *Pragmatic Unit Testing in Java 8 with JUnit*. NY: The Pragmatic Bookshelf, 2015.
- Martin, R.C. *The Clean Coder: A Code of Conduct for Professional Programmers*. 1st Edition. New York: Prentice Hall, 2011.
- Martin, R.C. and M. Martin. *Agile Principles, Patterns, and Practices in C#*. NJ: Pearson Education, 2007.
- Swicegood, T. *Pragmatic Version control using Git*. NY: The Pragmatic Bookshelf, 2008.
- Waldo, J. *Java – the good parts*. NY: O'Reilly, 2010.

Requested Resources

- Computer Lab: BYOD Lab