

# **Advanced Software Engineering (ASE) modules for Negotiated Learning Students 2025/26**

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# Advanced Software Engineering (ASE) modules

We run a Taught Masters programme in Advanced Software Engineering for experienced software developers.

The ASE modules are available to NL students as well (if certain eligibility criteria are met).

For 2025/26, three ASE modules are running:

COMP40730 (High Performance Computing) **Autumn 2025**

COMP40040 (Agent-Oriented Software) **Spring 2026**

COMP40080 (Knowledge-based Techniques for Industrial Systems) **Spring 2026**

All are **10 credit** modules, and they run **online**.

# ASE Prerequisites

ASE modules are geared at experienced software developers.

In exceptional circumstances, NL students may be able to select a number of modules from the ASE programme. Students must have a **minimum of 2 years experience in a professional software engineering environment\* after their university degree** to be eligible for these modules, and must be approved by the ASE Director.

\*Important: you need 2+ years of **software engineering** experience, not just time spent working in a software/IT company.

If you want to take an ASE module, email me your request with details of how you meet the above criteria:

[Liam.Murphy@ucd.ie](mailto:Liam.Murphy@ucd.ie)

# ASE modules: Online Delivery

All ASE modules run **online only**.

The details will vary from module to module, but online delivery will **typically** be structured as follows:

- \* The material is offered online as a number of packages.
- \* Each package may comprise lecture slides, study material, a video or audio of the lecturer presenting an overview of the material, and assignment work.
- \* A Teaching Assistant (or the Lecturer) is available throughout the module to answer questions regarding assignment work, either on a group chat or email.
- \* Regular online Q&A sessions are provided.

# COMP40730 High Performance Computing

The aim of this module is to introduce students to the design and development of parallel programs for different parallel architectures. There is a particular emphasis on practical implementation of shared-memory parallel algorithms and message-passing parallel algorithms.

The module covers the following architectures:

- Vector and superscalar processors (vectorization technique, array libraries);
- Shared-memory multiprocessors, such as multicores (multithreading: OpenMP and Pthreads);
- Distributed-memory architectures, such as clusters (MPI).

Main languages and technologies used: C, Pthreads, OpenMP, MPI

**Module Coordinator:** Alexey Lastovetsky

[Alexey.Lastovetsky@ucd.ie](mailto:Alexey.Lastovetsky@ucd.ie)

# COMP40040 Agent-Oriented Software

This module gives an introduction to Agent-Oriented Software Engineering. It covers the tools and techniques of agent-oriented systems, including practical experience with applying these techniques to modern research-led problems using state-of-the-art agent programming platforms.

This module covers:

- Introduction to main concepts underpinning Multi-Agent Systems;
- Software Development using Agent Programming Languages;
- Agent-Oriented Software Engineering methodologies.

Knowledge of Java is useful.

**Module Coordinator:** Rem Collier

[Rem.Collier@ucd.ie](mailto:Rem.Collier@ucd.ie)

# COMP40080 Knowledge-based Techniques for Industrial Systems

This module focuses on a variety of knowledge-based techniques with an emphasis on their practical application.

The topics to be covered include:

- Levels of organisation: data, information, knowledge
- declarative versus procedural knowledge
- the history of knowledge representation
- XML, XMLS
- RDF, RDFS
- OWL and other Semantic Web technologies

Module is evaluated by project (build your own ontology) rather than by written examination.

**Module Coordinator:** Tony Veale

[Tony.Veale@ucd.ie](mailto:Tony.Veale@ucd.ie)

# I want to take an ASE module! What do I do?

1. Assess the prerequisites. If you don't have at least two years of **software engineering** experience in a company, there is little point in applying.
2. Discuss with your NL Advisor.
3. Email the NL Administrator, copying the ASE Director (Liam Murphy).
4. If you get a positive response, add this module to your Module Registration Form and send this to the NL Administrator.

Deadline to apply: The sooner the better, but no later than Sunday 07/09/2025