

4.3. Programme structure

The programmes TU078, TU079, TU080 are single-stage, 60 ECTS programmes. ECTS denotes European Credit Transfer and Accumulation System and is a measurement of the student workload associated with a module. It is used within TU Dublin to denote the learning credits associated with any module. A total of 5 ECTS is equivalent to a student study workload of 100 hours. These hours are a combination of contact with lecturers (through lectures, tutorials, practical sessions, laboratory sessions and group study sessions) which may use remote learning pedagogies and self-study. Contact may include elements of online learning.

The programmes are part-time and is in modular form over two years. Each year consists of four modules – Part A or Part B – and the delivery of these parts alternates annually. Students enter the programmes in September and the order that modules are studied (i.e. Part A followed by Part B or Part B followed by Part A) depends upon the year of entry.

Lectures and tutorials will be delivered online, as a mixture of both synchronous events and asynchronous events, via tailored recordings. The timetable for the delivery of modules is available via the online student timetable system. Synchronous lectures and tutorials are typically delivered in the evening (6.30pm – 9.30pm) two nights per week over two academic semesters. Enriching and enhancing the learning experience for students and offering the opportunity to meet and discuss topics face-to-face with the lecturers and fellow students, there will be three *in-person* tutorial/laboratory evenings per semester *onsite* on our purpose-built campus in Grangegorman, Dublin. While students will be encouraged to attend these sessions, they will be given in a Hyflex modality: there will be a live broadcast and recordings available for those unable to attend.

Continuous assessments during the semester will be online or take-home work but mandatory, **end-of-semester final examinations will be in-person and onsite at TU Dublin, Grangegorman.**

In order to fully engage with the programme, a student will need a strong, dependable broadband connection and a good quality laptop/tablet with a microphone and a camera.

Below is a summary of the modules, including their learning and assessment requirements, for each programme. The detailed syllabus for all modules are given in the Syllabus section. (CA indicates Continuous Assessment component.) Part A was delivered in 2021/22; Part B delivered in 2022/23; etc.

4.3.1. TU078

List of modules for TU078 Higher Certificate Mathematics

Module	Title	ECTS
MATH2835	Discrete Mathematics I	7.5
MATH2836	Discrete Mathematics II	7.5
MATH2833	Geometry	7.5
MATH2831	Linear Algebra II	7.5
MATH2827	Calculus II	7.5
MATH2834	Real Analysis	7.5
MATH2837	Statistics I: Probability and Statistical Inference	7.5
MATH2838	Numerical Methods & Algorithms	7.5

Part A and Part B combinations of modules for an academic year

Part A	Semester 1	Discrete Mathematics I
	Semester 1	Linear Algebra II
	Semester 2	Discrete Mathematics II
	Semester 2	Geometry
Part B	Semester 1	Calculus II
	Semester 1	Numerical Methods & Algorithms
	Semester 2	Real Analysis
	Semester 2	Statistics I: Probability and Statistical Inference

Description of module workload and Assessment

Module		Lecture (hrs)	Tutorial/ Lab (hrs)	Self-study (hrs)	Total (hrs)	Assessment
MATH2835	Discrete Mathematics I	26	13	111	150	2hr Exam (70%) CA(30%)
MATH2836	Discrete Mathematics II	26	13	111	150	2hr Exam (70%) CA(30%)
MATH2831	Linear Algebra II	26	13	111	150	2hr Exam (70%) CA (30%)
MATH2833	Geometry	26	13	111	150	2hr Exam (70%) CA (30%)
MATH2832	Calculus II	26	13	111	150	2hr Exam (70%) CA (30%)
MATH2834	Real Analysis	26	13	111	150	2hr Exam (70%) CA (30%)
MATH2837	Statistics 1	26	13	111	150	2hr Exam (70%) CA (30%)
MATH2838	Numerical Methods & Algorithms	26	13	111	150	2hr Exam (70%) CA (30%)

4.3.2. TU079

List of modules for TU079 BSc Ordinary Mathematics

Module	Title	ECTS
MATH3833	Linear Algebra with Applications	7.5
MATH3834	Modern Algebra with Applications	7.5
MATH3837	Mechanics with Modelling	7.5
MATH3838	Statistics 2	7.5
MATH3831	Mathematical Methods 1	7.5
MATH3832	Vector Calculus	7.5
MATH3836	Numerical Methods 2	7.5
MATH3835	Numerical Analysis for Differential Equations	7.5

Part A and Part B combinations of modules for an academic year

Part A	Semester 1	Mathematical Methods 1
	Semester 1	Numerical Methods 2
	Semester 2	Vector Calculus
	Semester 2	Numerical Analysis for Differential Equations
Part B	Semester 1	Linear Algebra with Applications
	Semester 1	Statistics 2
	Semester 2	Modern Algebra with Applications
	Semester 2	Mechanics with Modelling

Description of module workload and Assessment

Module		Lecture (hrs)	Tutorial/ Lab (hrs)	Self-study (hrs)	Total (hrs)	Assessment
MATH3833	Linear Algebra with Applications	26	13	111	150	2hr Exam (70%) CA(30%)
MATH3834	Modern Algebra with Applications	26	13	111	150	2hr Exam (70%) CA(30%)
MATH3838	Statistics 2	26	13	111	150	2hr Exam (70%) CA (30%)
MATH3837	Mechanics with Mathematical Modelling	26	13	111	150	2hr Exam (70%) CA (30%)
MATH3831	Mathematical Methods 1	26	13	111	150	2hr Exam (70%) CA (30%)
MATH3823	Vector Calculus	26	13	111	150	2hr Exam (70%) CA (30%)
MATH3836	Numerical Methods 2	26	13	111	150	2hr Exam (70%) CA (30%)
MATH3835	Numerical Analysis for Differential Equations	26	13	111	150	2hr Exam (70%) CA (30%)

4.3.3. TU080

List of modules for TU080 BSc Honours Mathematics

(NB not all modules may be offered in any given year)

Module	Title	ECTS
MATH4841	Complex Analysis	7.5
MATH4842	Mathematical Methods II	7.5
MATH4843	Topics in Analysis 1	7.5
MATH4844	Topics in Analysis 2	7.5
MATH4845	Group Theory	7.5
MATH4846	Ring Theory with Applications	7.5
MATH4847	Linear Programming	7.5
MATH4848	Queueing Theory & Stochastic Processing	7.5
MATH4849	Quantum Theory 1	7.5
MATH4850	Quantum Theory 2	7.5
MATH4851	Financial Mathematics 1	7.5
MATH4852	Financial Mathematics 2	7.5
MATH4853	Introduction to Partial Differential Equations	7.5
MATH4854	Partial Differential Equations & Numerical Methods 2	7.5

Part A and Part B combinations of modules for an academic year

Part A	Semester 1	Complex Analysis
	Semester 1	Topics in Analysis 1
	Semester 2	Mathematical Methods II
	Semester 2	Topics in Analysis 2
Part B	Students choose four optional modules (two each semester) from a selection of modules offered from the list below	
	Semester 1	<i>Two modules chosen from:</i>
		Group Theory
		Financial Mathematics 1
		Introduction to Partial Differential Equations
		Queueing Theory & Stochastic Processing
		Quantum Theory 1
	Semester 2	<i>Two modules chosen from:</i>
		Quantum Theory 2 (Sem 2)
		Ring Theory with Applications (Sem 2)
		Financial Mathematics 2 (Sem 2)
		PDE's & Numerical Methods 2 (Sem 2)
		Linear Programming (Sem 2)

(NB not all modules may be offered in any given year)

Description of module workload and Assessment

Module		Lecture (hrs)	Tutorial/ Lab (hrs)	Self-study (hrs)	Total (hrs)	Assessment
MATH4842	Mathematical Methods II	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4841	Complex Analysis	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4843	Topics in Analysis 1	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4844	Topics in Analysis 2	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4845	Group Theory	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4846	Ring Theory with Applications	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4847	Linear Programming	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4848	Queueing Theory & Stochastic Processing	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4849	Quantum Theory 1	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4850	Quantum Theory 2	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4851	Financial Mathematics 1	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4852	Financial Mathematics 2	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4853	Introduction to PDE's	26	13	111	150	2hr Exam (75%) CA(25%)
MATH4854	PDE's & Numerical Methods 2	26	13	111	150	2hr Exam (75%) CA(25%)