COURSE DETAILS

Course Code: F17GC
Full Course Title: Mathematics in Context
SCQF Level: 7
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL

Undergraduate: Yes  Postgraduate Taught: No  Postgraduate Research: No

COURSE AIMS

To develop students' problem-solving skills and confidence in concept formation and the application of mathematical ideas. The course is based on the presentation of realistic contexts for the development of mathematical models. The range of chosen contexts and the emergent models will allow students to work at differing levels of formality and abstraction so as to support mathematical development, with the scope to consider different modelling strategies and to reflect upon their development. The aim is to develop mathematical thinking beyond a range of seemingly arbitrary rules and procedures, so as to encourage the perception of connections between ideas, the applicability of ideas in new contexts, and the development of functional mathematical skills in real-world situations.

LEARNING OUTCOMES – SUBJECT MASTERY

By the end of the course, students should be able to:

- understand how realistic applications have a non-trivial complexity and require careful working
- understand how basic mathematics may be applied in applications, and carry out such applications
- appreciate that applications often require more than one area of mathematics or science

LEARNING OUTCOMES – PERSONAL ABILITIES

- Demonstrate the ability to learn independently
- Demonstrate knowledge of an area of mathematics.
- Manage time, work to deadlines and prioritise workloads

SYLLABUS

Mathematics is everywhere — it can be found in the natural and social sciences, in engineering, in administration, in economics. Many of the technical devices that we use everyday rely upon mathematical methods. A series of short case studies will present mathematical modelling in a range of contexts, emphasising the ideas underlying the model and its applicability. The case studies will be related to the following settings:
Games and competition: How can we determine the best outcomes in competitive scenarios? What does mathematical modelling tell us about well-known competitive games?

Communication and information: What's the mathematics behind comparison of data and efficient digital communication?

Dynamical systems: Dynamical systems change: can we predict the long-term outcomes, and what tools do we need?

Optimization: How can we optimize the outcome of a complex system that is operating under constraints?

Maths and the media: How is mathematics presented in the media? Does it help our understanding of mathematics itself, and of its applications in understanding the world in which we live?

### COURSE RELATIONSHIPS

N/A

### LOCATION AND ASSESSMENT METHODS

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