

# Applied & Computational Mathematics

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)



Discover how Applied and Computational Mathematics is fundamental in providing uniquely powerful ways to describe, analyse and advance the physical and life sciences, engineering, technology, business and finance



Applied and Computational Mathematics gave the perfect balance between physical problems, maths problems and programming. You also learn how to apply these methods to real life physical systems. As well as being interesting, one of the great things about studying a subject that you like so much is that you get to meet a lot of other people who share your passion for the subject.



Shane Walsh, Student

## Sample pathway for a degree in Applied & Computational Mathematics \*

### YEAR 1 ENGAGE WITH THE PRINCIPLES

<b>APPLIED &amp; COMPUTATIONAL MATHEMATICS</b> <i>Topics include:</i> <ul style="list-style-type: none"> <li>- Applied Mathematics: Mechanics and Methods</li> <li>- Applications of Differential Equations</li> </ul>	<b>MATHEMATICS</b> <i>Topics include:</i> <ul style="list-style-type: none"> <li>- Calculus in the Mathematical and Physical Sciences</li> <li>- Mathematical Analysis</li> <li>- Linear Algebra in the Mathematical and Physical Sciences</li> </ul>	<ul style="list-style-type: none"> <li>- Mathematical Modelling in the Sciences</li> <li>- Introduction to Statistical Modelling</li> <li>- Two Elective modules</li> <li>- One Small-Group Project</li> </ul>
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### YEAR 2 CHOOSE YOUR SUBJECTS

<b>APPLIED &amp; COMPUTATIONAL MATHEMATICS</b> <i>Topics include:</i> <ul style="list-style-type: none"> <li>- Computational Science</li> <li>- Vector Integral and Differential Calculus</li> <li>- Oscillations in Mechanical Systems</li> <li>- Classical Mechanics and Special Relativity</li> </ul>	<b>MATHEMATICS</b> <i>Topics include:</i> <ul style="list-style-type: none"> <li>- Linear Algebra 2</li> <li>- Groups, Rings &amp; Fields</li> <li>- Calculus of Several Variables</li> </ul>	<ul style="list-style-type: none"> <li>- Two Elective modules</li> </ul>
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### YEAR 3 FOCUS ON YOUR CHOSEN SUBJECT

<b>APPLIED &amp; COMPUTATIONAL MATHEMATICS</b> – <i>Topics include:</i>		
<ul style="list-style-type: none"> <li>- Analytic Mechanics</li> <li>- Dynamical Systems</li> <li>- Functions of One Complex Variable</li> <li>- Partial Differential Equations</li> </ul>	<ul style="list-style-type: none"> <li>- Advanced Mathematical Methods</li> <li>- Foundations of Fluid Mechanics</li> <li>- Foundations of Quantum Mechanics</li> <li>- Advanced Computational Science</li> </ul>	<ul style="list-style-type: none"> <li>- Two Elective modules</li> </ul>

### YEAR 4 REFINE YOUR KNOWLEDGE

<b>APPLIED &amp; COMPUTATIONAL MATHEMATICS</b> – <i>Topics include:</i>		
<ul style="list-style-type: none"> <li>- Differential Geometry</li> <li>- General Relativity and Cosmology</li> <li>- Relativistic Quantum Mechanics</li> </ul>	<ul style="list-style-type: none"> <li>- Electrodynamics and Gauge Theory</li> <li>- Environmental Fluid Mechanics</li> <li>- Research Project</li> </ul>	<ul style="list-style-type: none"> <li>- Stochastic Methods</li> <li>- Functional Analysis</li> </ul>

## BSc (Honours) Applied & Computational Mathematics

MSc (Taught)	PhD	Industry	Conversion Courses
<ul style="list-style-type: none"> <li>- MSc Mathematical Sciences</li> <li>- MSc Climate Change: Science and Impacts</li> <li>- MSc Applied Mathematics and Theoretical Physics</li> <li>- MSc Computational Physics</li> </ul>	<p>Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as:</p> <ul style="list-style-type: none"> <li>- Meteorology and Climate</li> <li>- Mathematical Biology</li> <li>- Fluid Mechanics</li> <li>- Integrable Systems</li> <li>- General Relativity</li> <li>- Simulation Science</li> </ul>	<p>A wide variety of career opportunities are open with new application areas discovered constantly.</p> <p>Technology areas include:</p> <ul style="list-style-type: none"> <li>- Data Analytics</li> <li>- Finance</li> <li>- Energy</li> <li>- Environment</li> <li>- Communication</li> <li>- Computing</li> </ul>	<ul style="list-style-type: none"> <li>- Professional Master of Education (PME)</li> <li>- Graduate Engineering</li> <li>- Masters in Management</li> </ul>

\*See page 42 for more information on subject choices. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

