



University College Dublin  
Ireland's Global University

## MSc Applied Mathematics & Theoretical Physics (1 Year Full Time)

The Applied Mathematics and Theoretical Physics specialisation offers broad opportunities for future employment in research, development, predictive modelling and risk assessment and informatics-related industry sectors.

At UCD, this MSc Programme is developed in close connection with the Simulation Science and Computational Physics specialties, offering students both a robust training in computational methods on top of the solid theoretical and mathematical foundation. Our Applied Mathematics and Theoretical Physics MSc is

aimed at students with a strong background in Physics, Mathematics or a related Natural Science, who wish to learn state-of-the-art mathematical models and methods, applied to quantitative analysis of a broad range of physical phenomena.

Students will be exposed to state-of-the-art concepts in fields as diverse as continuum mechanics, hydrodynamics, mathematical biology, waves, non-linear dynamics, numerical analysis, advanced mathematical methods, modern mathematical physics and complex systems theory.

### Key Fact

Students will have access to courses aligned to a nationally unique range of research expertise across a broad range of Applied Mathematics and Theoretical Physics fields, including Fluid Dynamics, General Relativity, Quantum Field Theory, Climate Modelling, Turbulence, Condensed Matter Theory and Theoretical Astrophysics.

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## Why study at UCD?



### Tradition

Established 1854, with 160 years of teaching & research excellence



### Global profile

UCD is ranked in the top 1% of higher education institutions worldwide



### Global community

Over 6,000 international students from over 120 countries study at UCD



### Global careers

Degrees with high employability; dedicated careers support; 1 year stay-back visa



### Safety

Modern parkland campus with 24 hour security, minutes from Dublin city centre

## Course Content and Structure

90 credits  
taught masters

45 credits  
taught modules

OR

60 credits  
taught modules

45 credits  
research project

30 credits  
research project

Modules will be decided upon agreement with the Programme Director, indicative modules available include:

- General Relativity and Cosmology
- Quantum Theory of Condensed Matter
- Theoretical Astrophysics
- Advanced Statistical Physics
- Quantum Field Theory
- High Energy Particle Physics
- General Relativity and Black Holes
- Numerical Algorithms
- Dynamical Systems
- Electrodynamics and Gauge Theory
- Relativistic Quantum Mechanics
- Environmental Fluids
- Differential Geometry



Modules and topics shown are subject to change and are not guaranteed by UCD.

## Career Opportunities

The programme prepares you for a career in industry or for further PhD research. Career opportunities are broad, including the financial, predictive modelling and risk assessment, telecommunications, data mining and analysis, IT consulting and green technologies industry sectors, both in Ireland and internationally. It is also a stepping stone to PhD research in the areas of theoretical and computational physics, nanotechnology and nanoscience. Recent and prospective employers include Deloitte & Touche, Murex Inc., Intel, Pfizer, Merck, Philips, Tullow Oil, the University of Edinburgh, Imperial College London, and National Institutes of Health, USA.



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## Fees and Scholarships

Tuition fee information is available on [www.ucd.ie/fees](http://www.ucd.ie/fees). Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit [www.ucd.ie/international/scholarships](http://www.ucd.ie/international/scholarships) for further information.

## Entry Requirements

- This programme is intended for applicants who have a strong background in physics, chemistry, engineering, material sciences or a related discipline with a significant physics content. An upper second class honours or international equivalent is required. In special circumstances, students with a strong physics background and 2.2 class honours may be accepted.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

## Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at [www.ucd.ie/residences/](http://www.ucd.ie/residences/). For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit [www.ucd.ie/residences/accommodation-booking-support/](http://www.ucd.ie/residences/accommodation-booking-support/) for further details.

## Staff Profile

### Dr Vladimir Lobaskin, UCD School of Physics & UCD Institute for Discovery



The research projects in Dr Lobaskin's group at UCD are in the area of theory and simulation of nanostructured biosystems. His main scientific contributions are related to structure and interactions in charged colloidal dispersions, colloidal dynamics, mechanics of biomolecules, and flocking of active particles. He contributed to the development of multiscale simulation techniques and computational packages for soft matter research: MOLSIM and ESPResSo. The UCD Institute for Discovery is a dynamic interdisciplinary research community advancing scientific knowledge by extracting value from data that will provide insight and innovations to help major national and global challenges through mathematics and computational modelling.

## Staff Profile

### Professor Adrian Ottewill, UCD School of Mathematics and Statistics & UCD Institute for Discovery



Adrian Ottewill is UCD Professor of Mathematical Physics, with research interests in general relativity (gravitational entropy, detection of gravitational radiation) and quantum field theory in curved space-time (Hawking evaporation of black holes, quantum mechanical origin of structure in the universe). Professor Ottewill is a Principal Investigator in the UCD Institute for Discovery.

## Additional Course Delivery Options

- MSc Applied Mathematics and Theoretical Physics (Negotiated Learning) 2 Year Part-time
- Graduate Certificate Physics (Negotiated Learning) Part-time with no research project component
- Graduate Diploma Physics (Negotiated Learning) Part-time with no research project component

## Related Masters Programmes of Interest

- MSc Nanotechnology
- MSc NanoBio Science
- MSc Computational Physics
- MSc Space Science & Technology
- MSc Mathematical Science
- MSc Climate Change: Science and Impacts

## EU Enquiries

Dr Vladimir Lobaskin ✉: [vladimir.lobaskin@ucd.ie](mailto:vladimir.lobaskin@ucd.ie)

☎: +353 1 716 2432 [www.ucd.ie/courses/msc-appliedmaths-theoreticalphysics](http://www.ucd.ie/courses/msc-appliedmaths-theoreticalphysics)

UCD School of Physics, University College Dublin, Belfield, Dublin 4.

## Non-EU Enquiries

✉: [internationaladmissions@ucd.ie](mailto:internationaladmissions@ucd.ie)

[www.ucd.ie/international](http://www.ucd.ie/international)