



Space Risk and Disaster Reduction MSc

2019/20 entry

www.ucl.ac.uk/rdr/

RDR

UCL Institute for Risk
and Disaster Reduction

Department of Space
and Climate Physics

*Artists impression of space weather impact
on satellites, image: ESA - Pierre Carril*

Space Risk and Disaster Reduction MSc

In an increasingly technological and globally connected world, risks to space-based communications systems and critical infrastructure are emerging threats to national security and businesses. In a programme that unites emergency response, disaster risk reduction and space technology, you will learn about satellite technology, mission design, hazards and vulnerabilities unique to outer space, disaster response, and the monitoring of hazards on Earth from outer space.

Programme themes

Hazards of Outer Space

- Space weather, radiation, debris
- Emerging risks and the future of disaster monitoring

Satellite Design and Operations in Space

Learn how to design and operate a satellite from the largest university space science department in the UK

Understanding Vulnerability

From fragility curves describing damage to buildings to social vulnerability of individuals and society

Quantifying Risk

- What is risk and how to we measure it?
- Components of risk: exposure, hazard, vulnerability

Multidisciplinary Holistic Approaches

- Integrating scientific knowledge into disaster risk reduction research, policy and practice
- Communicating with stakeholders

Managing Disasters

- How to apply plans to manage real emergencies

Teaching and learning

Learn from world-class researchers and professionals delivering the programme through a combination of lectures, class discussions, problem-solving exercises, practicals, field trips, directed reading, student-led dialogue, and a practitioner-led real-time disaster scenario event.

Assessment is by individual and group presentations, coursework, written examinations and a research project.



Why study at UCL?

UCL is one of the world's leading universities, regularly featuring in the top 10 in global rankings.

The **Institute for Risk and Disaster Reduction (IRDR)**, leads multidisciplinary research, knowledge exchange and advanced teaching across UCL.. As a student, you will be encouraged to join our active seminar series, high-profile public discussion meetings and the networking events we host.

The **Department of Space and Climate Physics (SCP)**, with its Mullard Space Science Laboratory (MSSL), is one of the largest space science labs in the world. It has led and participated in more than 35 satellite missions. MSSL scientists and engineers work together to produce instruments at the forefront of research.

London is one of the world's great cosmopolitan cities. It is an international hub for global finance and risk management, NGOs, and engineering consultancies. The IRDR nurtures networks across London, and beyond.

"London itself is an unparalleled breeding ground of ideas for anyone interested in research" (MSc student 2015/16).



Careers

Whether you wish to start a new career in risk and disaster reduction or you already have experience we are here to support you. With an MSc in Risk, Disaster and Resilience you will have excellent academic credibility coupled with practical and analytical skills.

We run an annual *Careers and Opportunities Forum* which offers expert and targeted advice, and hosts stalls from a range of employers and headhunters in the field of risk and disaster reduction. Our graduates are highly sought-after in the following sectors: insurance, risk management, satellite industry, data science, NGOs, government agencies, finance, consultancy and academic research.

Some career destinations of recent IRDR graduates:

- Disaster Risk Management Consultant, World Bank
- Project Officer, Global Risk Forum Davos
- Global Engagement Fellow, Interpeace
- Civil Contingencies Coordinator, UK Local Government
- Project Officer, Cairo Local Government
- Reinsurance Claims Management Executive AXA Global Re, Paris
- Business Continuity Consultant, Arup
- Business Continuity & Resilience Consultant, PwC
- Space Engineering, Airbus
- Space Engineering, AstroSat

Programme Structure

Modes of study: Full time: 1 year. Part time: 2 years

Students take eight taught modules and an independent research project.

A Postgraduate Diploma comprising eight taught modules can be taken full-time or part-time over two years.

For further information see www.ucl.ac.uk/rdr/



Degree Programme Modules

All optional modules are subject to availability and particular modules may not be possible in any given year

Six compulsory taught modules (15 credits each)

1 Integrating Science into Risk and Disaster Reduction		2 Emergency and Crisis Management	
Quantitative risk assessment	Risk transfer & communication	Command procedures	Warning and evacuation
3 The Variable Sun: Space Weather and You		4 Space Science, Environment and Satellite Missions	
Satellite vulnerability	Risks to critical infrastructure	Launch, orbits & propulsion	Mission planning, operations
5 Space Systems Engineering		6 Practice and Appraisal of Research	
Systems lifecycle	Project management	Qualitative research methods	Project design & management

Two optional taught modules (15 credits each) from

Non-IRDR optional modules are marked with an asterisk ()*

1 Space-based Communications Systems		2 Space Instrumentation and Applications	
Ground stations, data handling and link design	Telecoms infrastructure, Iridium, applications	Spacecraft as observation platforms	Spacecraft-environment interactions
3 Mechanical Design of Spacecraft		4 Spacecraft Design - Electronic Sub-systems	
Design considerations	Mechanical and thermal engineering	Power conditioning	Signal conversion
5 Catastrophe Risk Modelling		6 Digital Health: Epidemics and Emergencies	
Probabilistic modelling	Hazard & physical vulnerability	Early warning & response	Surveillance systems
7 Gender, Disaster and Conflict		8 Business Continuity Management and Organisational Resilience	
Gender responsiveness	Structural vulnerabilities	Managing operations	Supply chain disruptions
9 Risk Analysis for Disaster Science		10 Natural and Anthropogenic Hazards and Vulnerability	
Earthquake science	Statistical geophysics	Scientific causes	Social & economic vulnerability
11 Emergency and Crisis Planning		12 Data Analysis and Interpretation	
Methodology and techniques	Policy and legal contexts	Statistical methods	R & GIS
13 Global Monitoring and Security *		14 Decision and Risk (Statistics) *	
Global Earth Observation Systems / GMES	Societal benefits of space observation	Statistical treatment of risk	Bayesian decision making
15 Principles and Practice of Remote Sensing *			
Geometric principles	Radiometric principles		

Independent project (60 credits)

The independent research project culminates in a 10,000 to 12,000 word dissertation and poster presentation. Projects may be laboratory, field, theory or modelling based and can be conducted in collaboration with external industry, international research organizations or NGO partners.

Field studies and group working

Current field visits include: the Thames Barrier and disaster management; Cambridge flood hazard; a disaster scenario exercise with NGO Rescue Global; the Blacknest Seismological Observatory; the Met Office; Southwest England for integrated group projects covering hazard mapping, vulnerability assessment, and critical infrastructure assessment, with Hinkley Point nuclear power station as an example.

IRDR Programmes:

Risk, Disaster and Resilience
MSc

Risk and Disaster Science
MSc

Risk and Disaster Science
MSc Management Pathway

**Space Risks and Disaster
Reduction MSc**

Risk and Disaster Reduction
MRes

Risk and Disaster Reduction
PhD

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Web: www.ucl.ac.uk/rdr

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MSc Space Risk and Disaster Reduction Key information

Programme starts

September 2019

Modes and duration

Full time: 1 year

Part time: 2 years

Tuition fees (2019/20)

UK/EU: £10,150 (FT) £5,100 (PT)

Overseas: £24,250 (FT) £ 12,110 (PT)

Scholarships

UCL offers a selection of scholarships for supporting postgraduate studies. Details of funding opportunities can be found at: www.ucl.ac.uk/scholarships. Further advice and programme-specific scholarships information can be obtained from the Masters Programmes section of the IRDR website.

Application dates

Open: 15 October 2018 Close: 26 July 2019

Note on fees: The tuition fees shown are for the year indicated above. Fees for subsequent years may increase or otherwise vary. Further information on fee status, fee increases and the fee schedule can be viewed on the UCL Current Students website.

Entry requirements

Normally a minimum of an upper second-class UK Bachelor's degree in a relevant science discipline, engineering or mathematics, or an equivalent overseas qualification.

Mathematics requirements

Mathematical methods taken in science or engineering degrees is sufficient (Enquire if in doubt).

English language requirements

If your education has not been conducted in the English language, you will be expected to demonstrate evidence of an adequate level of English proficiency.

The English language level for this programme is: **Good**
Further information can be found on our website.

International students

Country-specific information, including details of when UCL representatives are visiting your part of the world, can be obtained from the UCL International Students website.



Credit: Nevalenx