



**'Educating the Nuclear
Leaders of Tomorrow'**

**MPhil Programme in Nuclear
Energy**

Nuclear Principles

Business Management

Industry Practice

**A one year full-time Masters qualification from the
University of Cambridge**

For more information email nuclear-mphil-enquiries@eng.cam.ac.uk

Engineering Judge Business School

Material Sciences Earth Sciences

Professor Dame Ann Dowling, FRS FREng, Head of the Department of Engineering welcomes the course:

"Nuclear Energy is now being recognised as an important contributor to low carbon energy needs in many countries around the world. The MPhil course draws on the knowledge and capability of the University to provide a broad and stimulating education for potential leaders in the resurgent nuclear industry.

I hope that this course will come to be seen as one of several timely and important contributions by the University of Cambridge to securing low carbon energy for the 21st century."



Opportunity in the Nuclear Renaissance

Do you want to be part of the renaissance in nuclear energy and help mitigate climate change in the UK and around the world?

If you have a good degree in engineering or a related science subject, the University of Cambridge can help you gain the knowledge and the skills to build your career in the nuclear and energy sectors.

The case for nuclear energy being made in many countries is based on the need for action on climate change, the requirements for energy security and the attraction of the predictable cost of nuclear generation.

In the UK, three groups of utilities are planning to invest collectively at least £30bn in new reactors over the next 15 years, which could supply 30% of UK electricity annual demand by 2030.

There is similar interest in many countries around the world with large programmes in the US, China and India and new nuclear being proposed in twenty countries across the developed and developing world.

As part of the of a University-wide Initiative in Energy, an **MPhil in Nuclear Energy** will be run from October, with the Cambridge Nuclear Energy Centre.

By combining nuclear technology with nuclear policy and business, the course is made highly relevant for the challenge of 21st century energy needs. It has the support of leading nuclear industry organisations.

Objectives of the Programme

The programme will provide:

- a thorough grounding in the engineering, scientific and safety aspects of nuclear power;
- a good understanding of nuclear technology policy together with relevant business and policy understanding;
- an appreciation of the wider policy contexts of electricity generation in the 21st century.

While the prime focus of the course is to equip students for roles in industry, within the flexible areas of the course there is a path leading towards research by preparing students for a PhD programme.



What is the MPhil?

The programme will provide:

- **knowledge and understanding** of nuclear technology, policy and allied business;
- **intellectual skills** to engage with the issues that the development and deployment of nuclear energy pose;
- **transferable skills** to work and progress in teams within and across the nuclear sector

About the Programme

A one-year intensive full time Masters with a research project and dissertation, starting in October 2011 comprising (see table below):

- Five **Core Technology** teaching modules;
- **Nuclear Technology Policy** teaching delivered by the Judge Business School;
- Supporting **business management** courses, plus a broad range of **elective technical** courses;
- Long **research project** and dissertation.

Core Topic	Scope
Reactor Physics	Core physics & shielding – steady state power & shapes, depletion control elements & use of poisons, core kinetics & system control.
Reactor Engineering & Heat Transfer	Coolant types, thermal cycles, heat transfer, thermal limits – reactor systems, their optimisation and operating characteristics including normal operation & how to address main types of fault condition.
Fuel Cycle, Waste & Decommissioning	Whole fuel cycle: mining to waste & how waste is managed, decommissioning principles.
Fuel & Reactor Materials	Fuel and reactor materials – including selection, safety and life issues – radiation behaviour & damage, structural integrity & fracture mechanics, EAC.
Safety & Advanced Systems	Safety philosophies, impact on design, justification approaches, control & reliability, advanced systems including Gen IV, Thorium & Fusion
Nuclear Technology Policy	Energy studies & climate change, economics of energy, nuclear politics, proliferation & physical security.

The details and timings of the components of the programme may vary from year to year.

Special Features

Nuclear Energy has a strong practical element allied to its engineering and scientific foundations. The course provides for this practical element by:

- Supplementing the teaching by University staff with leading practitioners with experience of industry such as: Rolls-Royce, TWI, UKAEA, Culham Centre for Fusion Energy, AWE & Atkins;
- Engagement with industry and external research through projects/dissertation, visits & use of simulators, sponsorship;
- Use of Cambridge's international and external research links with laboratories such as Battelle NW, MIT, KKK, CEA, NNL, and Imperial College's research reactor, Consort
- Distinguished lectures and seminars from external speakers;
- Experiments on a research reactor;
- Long project involving an industrial partner or national laboratory.





How to Apply

Career Destinations

The aim is for students completing the programme to gain roles as engineers or scientists in design, operations, regulation or investment in nuclear energy. A small number will also progress to PhD studies at Cambridge, or another University.

Enquiries:

E-mail course enquiries to:

nuclear-mphil-enquiries@eng.cam.ac.uk

Or telephone the Course Director,
Tony Roulstone

Tel: +44 (0)1223 765626

CNEC: Website:

www.cnec.group.cam.ac.uk

All applications for postgraduate study must be made through the Board of Graduate Studies.

Full information, including details of entrance requirements, descriptions of Colleges, fees, funding opportunities and a downloadable application pack, can be found at:

<http://www.admin.cam.ac.uk/offices/gradstud/>

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More details of the MPhil in Nuclear Energy programme are to be found at:

http://www-diva.eng.cam.ac.uk/mphil_nuclear/

Application Procedure

In order to be offered a place on this programme you need to be accepted by Cambridge University's Board of Graduate Studies and one of the Colleges.

This course has been designed to attract either top flight engineers who will have gained some work experience after graduating from their first degrees, or very able new graduates.

Applicants are required to have a first or upper second class UK honours degree in an engineering discipline, or a physical science discipline, or an equivalent from an overseas University.

Since all courses are delivered in English, applicants, for whom this is not their native language may be required to take a language proficiency test to satisfy the Board that they can read, write and speak English to the required standard.

