

Composite Materials Technology

DESIGN, MANUFACTURE AND PERFORMANCE



MONDAY 1 APRIL TO FRIDAY 5 APRIL 2019

WHO SHOULD ATTEND?

The course is for engineers and scientists with some exposure to composite materials, and/or some working experience with composites, who wish to expand their understanding to include composite design issues and the science and technology of many important smart composite materials systems. It is also appropriate for new graduates in engineering or materials disciplines wishing to expand their knowledge. An ability to be able to deal with mathematics at A-level is desirable.

OUTLINE OF THE COURSE

The intention of this course is to present an overview of many important Design, Manufacture and Performance issues relevant to the use of composite materials in a wide range of applications. The Design lectures include essential considerations of composite design, an introduction to the use of finite element analysis and other design tools, as well as the importance of product standards.

The lectures on Manufacture range from principles of composite processing to the manufacture of large composite structures, and an introduction to recycling and green issues. Composite Performance includes non-destructive evaluation, fatigue and delamination issues, as well as repair issues with case

studies drawn from bridges, aircraft, pipework and pressure vessels. The course also has a significant practitioner contribution from enthusiastic but healthily sceptical engineers involved in the day-to-day practicalities of implementing and monitoring composite solutions within the civil infrastructure.

Design

- Review of basic composite mechanics
- Mechanical design criteria
- Failure criteria for design
- Composite design
- Principles of joining and repair
- Finite-element analysis: basic principles
- Finite-element analysis and composite materials
- Design tools and product standards

Manufacture

- Reinforcements and matrices
- Processing of composite materials
- Textile composites: manufacture and behaviour
- Manufacture of large composite structures
- Optical sensors for process monitoring
- An introduction to recycling, sustainability and green issues

Performance

- Fatigue and delamination issues for composite materials

- Non-destructive evaluation for composite structures
- Bridges, bridge strengthening and repair
- Repair case studies: aircraft, pipework, pressure vessels
- Optical sensors for strain and damage monitoring
- Commercial perspectives on implementing structural health monitoring: the example of optical systems
- Composites in the civil infrastructure: the practicalities
- Applications of composites in aerospace
- Composite usage in wind and tidal turbine blades

MSC IN ADVANCED MATERIALS

This short course is offered as a module in our part-time or full-time Modular MSc Programme in Advanced Materials. Further details of our programme can be found on our web pages:

surrey.ac.uk/postgraduate/advanced-materials-msc-2018

COURSE DIRECTORS

The joint Course Directors are Professors Stephen Ogin and Paul Smith.

Paul Smith
surrey.ac.uk/people/paul-smith

Stephen Ogin
surrey.ac.uk/people/stephen-ogin

These short courses have been approved for "Professional Development" by IOM3 (Institute of Materials, Minerals and Mining).

CENTRE FOR ENGINEERING MATERIALS

The course is delivered from the Centre for Engineering Materials, home to the biggest concentration of materials researchers at Surrey with interests spanning all materials groups from the nanoscale through to macroscopic engineering structures. Across the University there are over 50 academics, residing in six engineering/ physical science departments, for whom materials is a primary research interest:

surrey.ac.uk/centre-engineering-materials

The research, which is recognised as being internationally excellent, spans topics as diverse as the production of graphene through to the mechanical testing of metre long sections of Victorian water mains. Much of the work is underpinned by the University's world-leading capability in characterisation, which comprises both facilities and expertise. Further, Surrey has a history of working in partnership with industry and a proven track record in delivering academically acclaimed and industrially relevant postgraduate courses.

The University is also home to the thriving, much-admired Engineering and Physical Sciences Research Council (EPSRC) Centre for Doctoral Training in Micro and NanoMaterials and Technologies which was established in 2009, and subsequently refunded in 2014, with awards amounting to over £9 million from the EPSRC and sponsorship of engineering doctorate students from over forty companies, to date:

surrey.ac.uk/minmat

KEY POINTS

For course calendar and online registration:
surrey.ac.uk/department-mechanical-engineering-sciences/short-courses

If you have a question please call:
+44 (0)1483 686122

Courses run for one week from Monday morning to Friday afternoon.

Delegates may request a list of local accommodation



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The Institute of Materials,
Minerals and Mining

ACCREDITED PROGRAMME

Composite Materials Technology: Design, Manufacture and Performance is also part
of the Advanced Materials MSc programme which is accredited by IOM3

We've made all reasonable efforts to ensure that the information in this publication was correct at the time of going to print in September 2018, but we can't accept any liability for any inaccuracies in the information published, and the information might change from time to time without notice. For the latest and most up-to-date information, please visit our website at surrey.ac.uk