Academic year
2025/26 entry

Cranfield University

Postgraduate master's courses in

Computational engineering sciences

Aerospace Computational Engineering MSc/PgDip/PgCert
Computational Fluid Dynamics MSc
Computational and Software Techniques in Engineering MSc

Cranfield University

Our reputation

We are the UK's only specialist postgraduate university in technology and management, with longstanding relationships with some of the most prestigious global companies. Our close collaboration with industry, and passion for the areas we operate in, will help your career.

Specialist postgraduate
A research-focused professional community.

We work with over
1,500
businesses and governments based in over **40 countries.**

Over £150m
of investment in new facilities over the past five years.

5,000+
postgraduate students from 100+ countries.

A network of
80,000+
alumni, from 170+ countries.

As we are postgraduate only, we are not listed in many league tables that help compare undergraduate universities.

What our alumni say

"I chose Cranfield as it is a prestigious university, and I chose this course as I wanted to study data science. My individual project was an internship at Teads, and focused on distributed training applied to deep learning. During my time at Cranfield, I took advantage of the sport, accommodation and library facilities. It was one of the best things about my time at Cranfield, to have a great room to stay in, a place to study and the facilities to practice sport."

Gerard Hugues,
Machine Learning Engineer, Teads,
(Computational and Software Techniques in Engineering MSc 2022)

Reasons to study **computational engineering sciences** with us

1. **Focused learning environment**
   Cranfield University encourages a mature, focused and stimulating learning environment, attracting a diverse international student body.

2. **Industry links**
   You will have regular contact with industry through group and individual project work as well as guest lectures from partner organisations.

3. **Learning from the best academics**
   We attract top-quality staff from across the world. This diverse mix of backgrounds creates a rich teaching and research environment.

4. **Excellent facilities**
   You will have access to state-of-the-art equipment, tools and research facilities, including the Cranfield high-performance computing facility, that makes available a CPU cluster of 1,500 CPUs, high-end scientific GPU nodes and accelerated remote visualisation capabilities.

5. **Networking opportunities**
   Our industrial advisory panel members are regular visitors to Cranfield and, for example, attend student project presentations. This provides an excellent opportunity for you to meet employers and forge valuable links and contacts for career development purposes.

6. **Opportunities for further study**
   Some of our graduates go on to study a PhD, often addressing specific, live topics agreed with employers or industry.

Top: Cloud computing service hub.

Courses

At Cranfield the research and world-leading expertise in large-scale parallel computing, modelling and simulation is being used to develop and improve energy efficiency in aerospace, transport and motorsport applications; improve building design and reduce heating energy efficiency and consumption.

Compulsory modules are listed in the order they are delivered. Elective modules are listed alphabetically.

Aerospace Computational Engineering

www.cranfield.ac.uk/AeroCompEng	Full-time/Part-time	MSc, PgDip, PgCert

Within the next five years, there will be a demand for engineers and leaders who will be using 100% digital techniques for aerospace applications, design and testing. This unique course covers a wide range of applications focused on aerospace computational aspects.

Compulsory modules

- Computational Methods (Integrated),
- C++ Programming (Integrated),
- Computational Aerodynamics,
- Validation and Verification for Aerospace Applications,
- Modelling Approaches for Aerospace Applications,
- Numerical Modelling for Compressible Flows,
- Computational Engineering Structures,
- CAD and Airframe Design.

Computational Fluid Dynamics

www.cranfield.ac.uk/CompFluidDynamics	Full-time/Part-time	MSc

There is an increasing global demand for computational fluid dynamics (CFD) specialists with practical and technical knowledge. This course, designed to reflect the wide applications of computational fluid dynamics, will enable you to gain the knowledge and appreciation necessary for a strong foundation in a career in this exciting engineering discipline.

You will learn to understand, write and apply CFD methods across a broad range of fields, from aerospace, multi-phase flow and heat transfer to microflows, bio-medical flows and fluid-structure interaction problems.

Compulsory modules

- Introduction to Fluid Mechanics and Heat Transfer,
- Numerical Methods and High Performance Computing,
- Grid Generation / CAD,
- Data Analysis and Uncertainty,
- Turbulence Modelling,
- Numerical Modelling for Compressible Flows,
- Numerical Modelling for Incompressible Flows.

Accredited by: Institution of Mechanical Engineers; Royal Aeronautical Society

The compulsory and (where applicable) elective modules offered for the 2024-25 academic year are shown to give you an indication of the current course content. To keep our courses relevant and up-to-date, relevant and for practical purposes, modules may be subject to change from cohort to cohort; please check our website for the latest information.

Computational and Software Techniques in Engineering

www.cranfield.ac.uk/CompSWTechEng	Full-time/Part-time	MSc

Engineering software development is one of the key areas in the information technology sector. This course with its blend of skills-based and subject-specific material, has the fundamental objective of equipping you with the generic hands-on skills and up-to-date knowledge adaptable to the wide variety of applications that this field addresses.

- **Computational Intelligence for Data Analytics** - focuses on the fundamentals of computationally- intelligent data handling algorithms and their application in disciplines needing fast and automated decision-making.
- **Computer and Machine Vision** - focuses on aerial and robotic vision-based systems and the theory and application of signal processing and computer vision algorithms.
- **Digital Engineering Design** - provides the skills necessary to develop and use core CAD and CAE solution software in diverse industrial settings.
- **Software Engineering for Technical Computing** - provides a unique insight into the development of computer applications across modern computing environments.

Accredited by: The Institution of Engineering and Technology

Modules

	CIDA	CMV	DES	SETC
Advanced Java and Advanced Python	√			
Computational Methods		√	√	√
C++ Programming	AO	AO	AO	AO
Machine Learning and Big Data	√			
Signal Analysis		√		
Digital Engineering and Product Design			√	
Requirements Analysis and System Design				√
Data Visualisation	√			
Digital Signal Processing		√		
Computational Optimisation Design			√	
Software Testing and Quality Assurance				√
High Performance Technical Computing	√			√
Image Processing and Analysis		√		
Geometric Modelling and Design			√	
Small Scale Parallel Programming	√			√
Computer Vision		√		
Computational Engineering Fluids			√	
Artificial Intelligence	√			
Management for Technology		√	√	
Visualisation				√
Applications in Computational Intelligence	√			
Machine Learning for Computer Vision		√		
Computational Engineering Structures			√	
Applications in Practical High-End Computing				√
Cloud Computing	√			√
Visualisation		√	√	
Applications of Computer Vision		√		
Applications of Computational Engineering Design			√	

AO = Attendance only

Course **structure**

Our specialist, sector-focused master's courses are set up and developed in close collaboration with industry partners, ensuring the content of our courses remains industry-relevant and employers are impressed with our graduates' business-readiness.

This diagram illustrates the standard course structure for our master's programmes. Please check your course structure online for more detailed information.

Taught programme

An intensive learning experience providing the knowledge you need to excel in your specialist field.

Group project

The ability to understand how your part of a project affects the whole, giving you **a head start for the world of work.**

Individual project

An opportunity to think and work in an original way. For example, this could be working on a project for a university partner, delving deeper into an area of specific interest or a real-world challenge in the sector you want to work in.

Industry **links**

Cranfield has unrivalled links with industry, and you will benefit from our extensive contacts and track record of close collaboration with decision-makers in your chosen sector.

These benefits range from the various high-profile guest speakers we are able to attract, to the ability to network with future employers at our group presentation days and careers fairs held on campus.

Industrial advisory panel

Our courses are directed by an industrial advisory panel who meet twice a year to ensure they provide the right mix of hands-on skills and up-to-date knowledge suitable for the wide variety of applications that this field addresses. Companies represented on the panel include Airbus, Autonomous Devices, AWE (Atomic Weapons Establishment), Black and Veatch Ltd, Rolls-Royce, Excelian, FactSet, Immense Simulations, L3Harris Technologies, Red Bull Advanced Technologies, Google and The Manufacturing Technology Centre.

A number of members also attend our annual student individual project poster presentations. This provides an ideal opportunity for you to network with employers.

Careers

Our alumni can be found around the world in leading roles. Here are a few examples of the roles our alumni have secured in recent years.

Read more on our website
www.cranfield.ac.uk/careers

Roles:

- Aerodynamics Engineer,
- Automation Developer,
- Computational Modelling Engineer,
- Software Development Engineer,
- Test and Reliability Engineer.

Companies:

- Airbus,
- Amazon,
- Etihad Airways,
- Google,
- Jaguar Land Rover,
- Rolls-Royce,
- Safran,
- Thales.

Academic **staff**

You will be taught by a wide range of subject specialists at Cranfield and from industry, who draw on their research and industrial expertise to provide stimulating and relevant input to your learning experience.

The list of academics below represents a small proportion of our staff; we also have a large number of highly-experienced guest lecturers.

Dr Seemal Asif,

Senior Lecturer in Artificial Intelligence and Robotics

www.cranfield.ac.uk/sasif

Seemal has over 11 years of experience in research development and delivery in the field of intelligent automation, robotics, machine learning and systems integration. This includes software engineering and control theory.

Professor Karl Jenkins,

Professor of Computational Engineering and Head of Centre for Computational Engineering Sciences

www.cranfield.ac.uk/kwjenkins

Karl has previously worked in industry, working on various commercial CFD codes and training engineers in their use. Karl leads research activity in computational engineering with particular expertise in high-fidelity simulations and modelling.

Dr Tom-Robin Teschner,

Senior Lecturer in Computational Fluid Dynamics

www.cranfield.ac.uk/tteschner

Tom's research interests include applied aircraft aerodynamics (laminar flow promoting designs, transition modelling), vehicle aerodynamics (high-performance vehicles), as well as algorithmic research to reduce computational costs of CFD solvers through hybrid CFD and deep-learning.

Dr Stuart Barnes,

Lecturer in Computational Intelligence and Data Analytics

www.cranfield.ac.uk/sbarnes

Stuart spent several years in industry as a software developer. His current interests include using optical flow in computer vision applications and the development of machine learning and artificial intelligence algorithms for data analysis.

Dr Irene Moulitsas,

Senior Lecturer in Scientific Computing

www.cranfield.ac.uk/imoulitsas

Irene's research focuses on developing novel algorithms for enabling the efficient execution of large scientific computations on parallel processing platforms. Irene was selected as a finalist for the 2021 Top 50 Women in Engineering in the UK award and she was the recipient of the 2024 MK STEM award.

Professor Yifan Zhao,

Professor of Data Science

www.cranfield.ac.uk/yzhao

Yifan has over 15 years experience on theory development of non-linear system identification of complex systems, correlation and causality, spatio-temporal systems, computer vision, and general image and signal processing.

Key facts and statistics

Course information

Full-time
One year.

Part-time
Up to three years. See the individual course webpage for more information about part-time study.

Start date
September or October.

Award
MSc/PgDip/PgCert.
Not all courses offer all awards, see course information for details of awards offered.

Fees
Please see the individual course pages on our website for full fee information and full-time or part-time options. Terms and conditions apply. See **www.cranfield.ac.uk/fees**

Cohort profile*

Geographic spread
13% UK.
87% International.

Average cohort age
20-29.

Average cohort size
29.

*These figures give an indication of the course make-up at registration across our Computational Engineering Sciences courses for the entry 2023-2024.

"I found out about Cranfield's Software Engineering for Technical Computing course through the ESTIA partnership and thought it would suit me well for my international certification.

A highlight from my time at Cranfield University has to be the quality of the teaching provided by the various lecturers and academics we had."

Lucas Pin-Belloc, Data Manager, FINDIT, (Computational and Software Techniques in Engineering MSc - Software Engineering for Technical Computing Option 2022)

Useful **information**

Financing your studies

Whether you are a UK-based or international student, we provide information, advice and a range of online tools to help you put together the funding package you need. Take a look at our funding finder which provides a searchable database of sources of financial support. We also offer bursaries for high quality applicants. Visit our website where we provide a range of additional sources of potential funding and helpful organisations and contacts for information, advice and guidance.

Learn more at **www.cranfield.ac.uk/funding**

More than a degree with the **Cranfield Enhance programme**

Cranfield graduates are valued for their distinctive skills and capabilities. We have developed these programmes to complement and enhance what you learn on your chosen qualification. On the Cranfield Enhance programme, you will be able to earn 'digital badges' in areas such as employability and entrepreneurship to showcase your new skills to prospective employers.

Read more at **www.cranfield.ac.uk/enhance**

Cranfield University has held a recognised partnership with the ESTIA Institute of Technology in Bidart, south-west France for over 30 years. ESTIA students attend the MSc in Computational and Software Techniques in Engineering and collaborate on research projects. The first group of ESTIA students attended Cranfield in 2000 and the number of students who have graduated totals over 725.

ESTIA
INSTITUTE OF TECHNOLOGY

Life at **Cranfield**

A welcoming, professional campus community.

Explore our University

You can personalise your virtual visit to our campus by choosing the subject area you are interested in on our interactive tool:

virtualexperience.cranfield.ac.uk

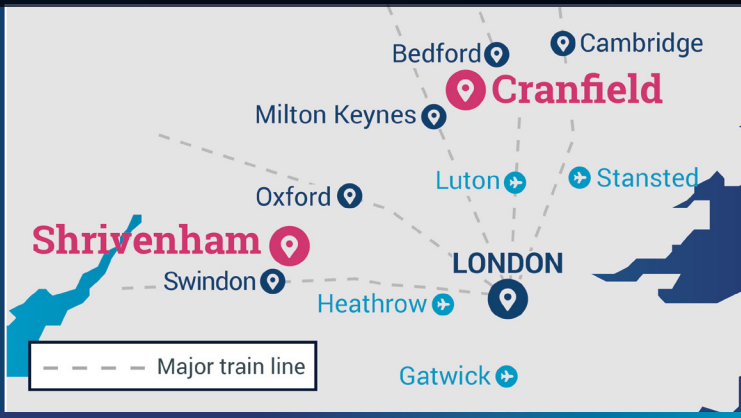
How to **apply**

Read more about our entry requirements and how to apply at **www.cranfield.ac.uk/apply**

Our **location**

Located just over an hour from London in the English countryside, Cranfield's campus environment supports close, working relationships between our multinational postgraduate students and academic and industry experts.

www.cranfield.ac.uk/visit



www.cranfield.ac.uk/computing-ai

Our sector study areas:

Aerospace,
Defence and Security,
Energy and Sustainability,
Environment and Agrifood,
School of Management,
Manufacturing and Materials,
Transport Systems,
Water.

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For a full list of Cranfield courses, please see our **prospectus** and **website**.

Cranfield University,
Cranfield, MK43 0AL, UK

T: +44(0)1234 75 8082
E: study@cranfield.ac.uk
www.cranfield.ac.uk