ENGINEERING

PROSPECTUS 2021

COLLEGE OF ENGINEERING

1920~2020

Swansea University
Prifysgol Abertawe

Contents

04 WHY ENGINEERING?
06 CAREER SUPPORT
11 STUDENT SUPPORT
14 RESEARCH
16 LOCATION
20 ACADEMICS
24 INTERNATIONAL COMMUNITY
27 COURSE DIRECTORY
43 THE COLLEGE (INTERNATIONAL)
44 WHAT'S NEXT?
45 SUMMER SCHOOL
46 FAQS
47 HOW TO GET HERE

STRONG INDUSTRY LINKS

£450m BEACHSIDE BAY CAMPUS

IMPORTANT INFORMATION – PLEASE READ

The following message contains some very important information. Please read it before you use this prospectus.

This guide was updated in the **Autumn of 2020.** It contains information on programmes that Swansea University intends to run for students who are planning to start university in 2021 and 2022. We have made every reasonable effort to ensure that the information provided is both helpful and accurate as at the date of publication. However, some changes, for example to programmes, study location, facilities or fees may become necessary due to legitimate staffing, financial, regulatory, academic and COVID-19 guidance reasons. We will endeavour at all times to keep any changes to a minimum and to keep prospective students informed appropriately. Any changes to the information contained in this guide will be updated quarterly.

Undergraduate:
www.swansea.ac.uk/undergraduate-programme-changes and on the online pages at
www.swansea.ac.uk/undergraduate/courses

Accredited degrees IN A VARIETY OF ENGINEERING DISCIPLINES

Every one of our **ENGINEERING COURSES ARE RANKED TOP 15 IN THE UK FOR GRADUATE PROSPECTS** (The Complete University Guide 2021)

The Complete University Guide 2021 ranks our **RESEARCH QUALITY 7TH IN THE UK** for General Engineering

97% of graduates in employment or further study **within 6 months** of graduating (DLHE)

Innovative TEACHING

Global community of students from **OVER 115 COUNTRIES**

SWANSEA IS RANKED 6TH IN THE UK FOR STUDENT SATISFACTION NSS 2020

94% of our academic staff are producing **World-Leading or Internationally Excellent Research** (REF 2014)

TEF Gold Teaching Excellence Framework

THE HIGHEST AWARD (GOLD) FOR TEACHING EXCELLENCE AT UK UNIVERSITIES

£10 million of new teaching and research equipment

TOP 10 IN THE UK FOR GRADUATE LEVEL EMPLOYABILITY *with comparable size universities* (DLHE)

30,000m² OF ACADEMIC AND LABORATORY SPACE

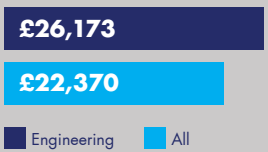
Why Engineering?

DO YOU WANT TO?

- Solve problems
- Be able to change the way we live
- Apply maths and science to the real world to make a difference
- Work in a challenging and lucrative profession
- Gain skills that will keep you in demand for your entire career

YES? → **ENGINEERING HAS THE RIGHT COURSE FOR YOU**

GRADUATE SALARIES



(Engineering UK 2019 Report)

Nearly 5.7 million employees work in engineering enterprises in the UK, representing just over 19% of total UK employment in all registered enterprises.

(www.ctp.org.uk 2020 Guide)

265,000

skilled entrants required annually to meet demand for engineering enterprises through to 2024.

(www.ctp.org.uk 2020 Guide)

WE CANNOT SOLVE OUR PROBLEMS WITH THE SAME THINKING WE USED WHEN WE CREATED THEM

ALBERT EINSTEIN

CAREER SUPPORT

We are committed to ensuring that our students are provided with the best level of employability support from day one of their degree with us.

We have a dedicated Employability Team within the College, whose role it is to continuously provide opportunities for our students to improve their skills and find their perfect career post graduation.

Our support includes:

- Annual Engineering Careers Fair
- Industry presentations
- Alumni networking sessions
- Mock interviews
- Mock assessment centre sessions
- Company networking and
- Skills Event
- Site visits
- Summer/short work placement support
- CV and application guidance
- An Employability Champion for each Engineering discipline

> "Our vision for employability is to equip our engineering graduates with the ability to address engineering challenges of the future, leading to fulfilling and distinguished careers. Professional and capable, they will demonstrate the value of having a Swansea University Engineering degree as the backbone to a rewarding engineering career."
>
> **Dr Gavin Bunting, Director of Employability in the College of Engineering**

> "I have been able to make use of the company visits to secure myself interviews for placement work over the summer and hope that once I graduate I can get a graduate job with the same company."
>
> **Manesh Patel, 3rd Year Electronic and Electrical Engineering student**

Year in... INDUSTRY

All of our degree programmes offer a

YEAR IN INDUSTRY SCHEME

OUR STUDENTS HAVE UNDERGONE PLACEMENTS WITH

AIRBUS BMW BOSCH CARGIL CUMMINS DTR MEDICAL GE AVIATION GSK JCB RED BULL TATA STEEL VALERO & MORE

Institution of MECHANICAL ENGINEERS

JOIN OUR Formula Student Team

DESIGN AND BUILD A RACING CAR, LEARN NEW SKILLS, WORK IN A TEAM AND COMPETE IN FSUK IN SILVERSTONE

MORE INFORMATION CAN BE FOUND AT:
WWW.MOTORSPORT.SWAN.AC.UK

AECOM Airbus **ATKINS** BAE Systems
ARUP GROUP
Babcock International Group **BMW** BP
Bloodhound SSC British Airways
Dow Corning
Chevron
EDF Energy IBM
Ford Motor Company
French Connection UK
FUJITSU JN Bentley
Hyder Consulting UK
JAGUAR LAND ROVER
GE Aviation
Jones Bros **MURCO PETROLEUM** **JACOBS** Laing O'Rourke
Kier Group Phillips 66 Panasonic Corporation
Mercedes AMG Petronas **Qinetiq**
THE ROYAL MINT
RAYMOND BROWN GROUP Valero Energy Corporation
Quantex **MINISTRY OF DEFENCE**
Royal Military Academy
ROYAL NAVY WorleyParsons Schaeffler TIMET
MOTT MACDONALD
Offshore Design Engineering Ltd (Ode)
Tata Steel TATE & LYLE
Rolls-Royce

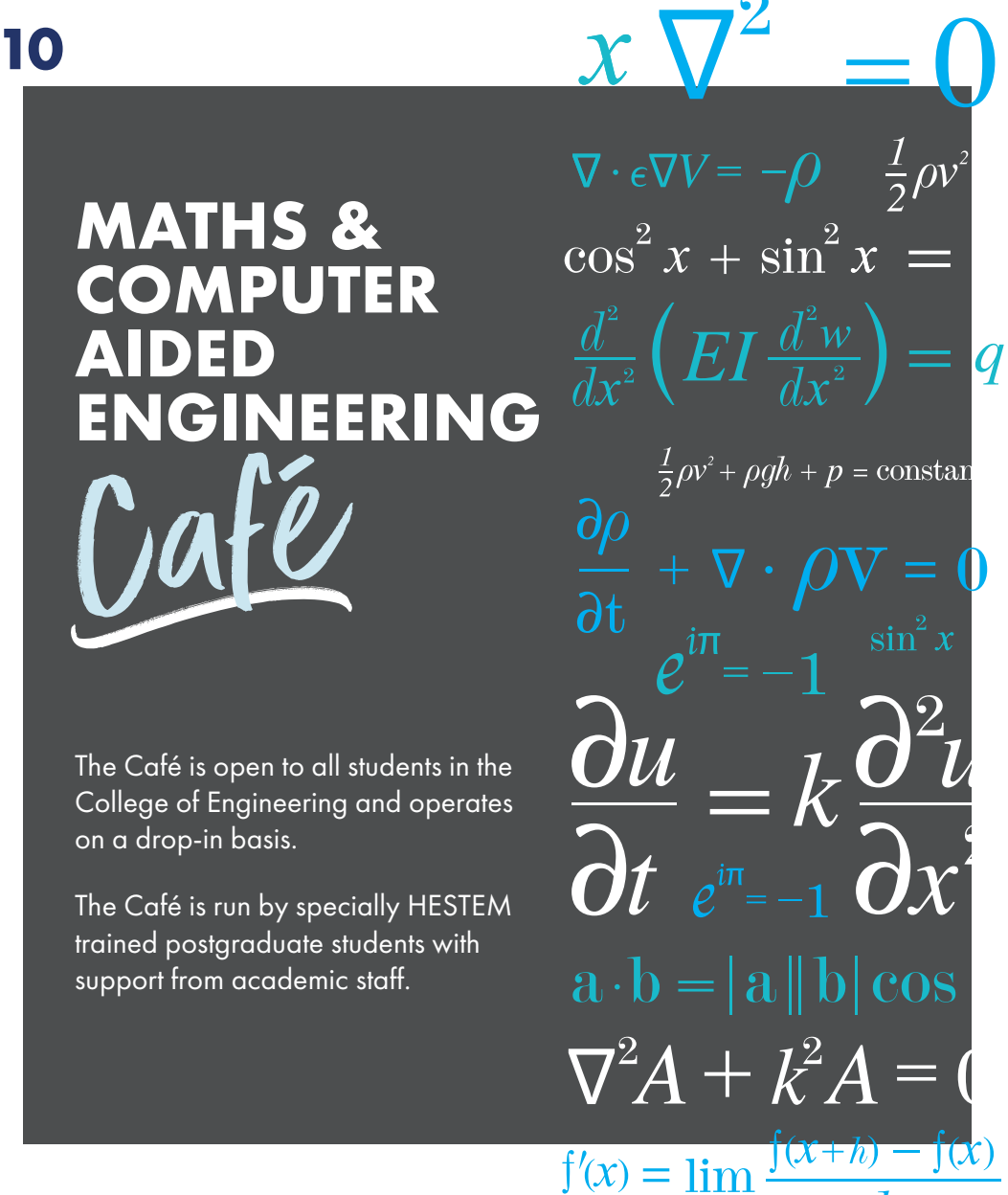
COLLABORATION WITH INDUSTRY

We have strong and established links with a large variety of local, national and international companies, both with our teaching and research, and as graduate employers and placement providers.

MATHS & COMPUTER AIDED ENGINEERING Café

The Café is open to all students in the College of Engineering and operates on a drop-in basis.

The Café is run by specially HESTEM trained postgraduate students with support from academic staff.



STUDENT SUPPORT, TEACHING & LEARNING

Providing the best student experience possible is of the utmost importance to us at the College, and we have well-established systems and support staff in place in order to facilitate this.

ACADEMIC MENTOR PROGRAMME

Each student is assigned a Personal Academic Mentor (previously known as a Personal Tutor), with whom they meet throughout the year in a series of compulsory individual and group sessions. Your Personal Academic Mentor is there to provide support and encouragement to help you achieve your academic potential, and as an individual academic contact for every student.

PEER MENTOR PROGRAMME

New students in Y0 and Y1 will have the opportunity to sign up as a mentee of a student from Y2-4, who they can meet with several times in the year to chat about general student life. Please contact our Student Information Team either in person via the College of Engineering Reception, or by emailing **engengagement@swansea.ac.uk** for more information on this programme.

STUDENT REPRESENTATIVES

A Student Representative is elected from each programme for each year of study to provide the feedback and views of the student body on a range of topics to academic and support staff at the monthly Student-Staff Forums.

ONLINE RESOURCES

The Student Intranet, MyUni and Canvas online pages are regularly updated with relevant resources, including: lecture notes, assignment/exam results and feedback, careers event information and graduate job opportunities.

ACADEMIC OFFICE HOURS

All teaching staff have designated office hours during the week. Students are encouraged to drop in to discuss lecture content, request assignment feedback, or to raise any academic issues that they have.

COLLEGE PEER MENTOR COORDINATOR

Your College Peer Mentor Coordinator is your gateway to accessing advice and guidance during your studies here at the College of Engineering. You can reach them in person via the College of Engineering Reception in Engineering Central, between 10am-12pm and 2pm-4pm on Monday, Tuesday, Thursday, Friday, and 1pm-3pm on Wednesday.

SUPPORT CAFES

Open to all Engineering students. We run cafés in Maths, Computer Aided Engineering, Software, Science, and Writing.

FIND OUT MORE

Check out our student guide at: **www.swansea.ac.uk/engineering/courses/student-support**

SOCIETIES & STUDENT NETWORKS

We have societies and networks where you can meet like-minded people, take part in events, develop your study support network, and enhance your employability. Find out more

AEROSPACE ENGINEERING SOCIETY

CHEMICAL AND ENVIRONMENTAL ENGINEERING SOCIETY

CIVSOCIALITES

ELECTRONIC & ELECTRICAL ENGINEERING SOCIETY

MATERIALS ENGINEERING SOCIETY

MECHANICAL ENGINEERING SOCIETY

SWANSEA WOMEN IN ENGINEERING SOCIETY

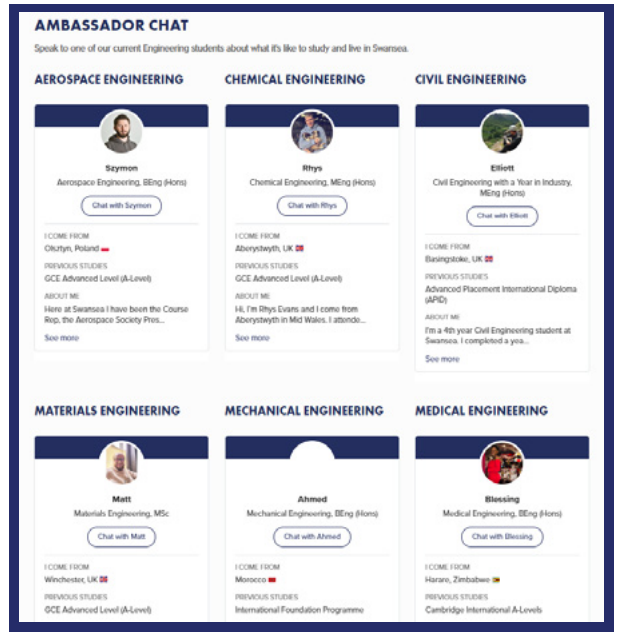
MEDICAL ENGINEERING SOCIETY

BAME STUDENT IN ENGINEERING NETWORK

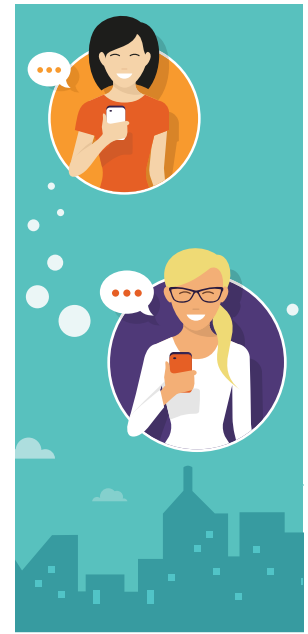
SWANSEA UNIVERSITY RACE ENGINEERING

WANT TO KNOW WHAT IT'S LIKE TO STUDY ENGINEERING AND LIVE IN SWANSEA?

Who better to ask than the current students themselves!
You can speak to any of our Engineering Student Ambassadors through UniBuddy.



HAVE A CHAT NOW!



unibuddy

Check out our UniBuddy Chat here:
https://bit.ly/Eng-Ambassador-Chat

WE'RE CHANGING THE WORLD

From the development of the Finite Element Method at Swansea in the 1960s to our present day research turning buildings into power stations, we strive for our research to have a real impact.

Research pioneered at the College of Engineering harnesses the expertise of academic staff within the department.

Research groups within the College are focusing on a variety of areas, including alternative energy, membrane technology, aerospace materials, printing technology, aerodynamic design and medical diagnosis.

CURRENT PROJECTS

Improved aerodynamic design process for the aerospace industry through the application of unstructured mesh technology

Improve the efficiency and environmental sustainability of gas turbine engines for Rolls-Royce

Developing marine energy with minimum environmental impact

Use of new diagnostic medical technology to improve detection of abnormal blood clotting

Optimisation of membrane systems and its benefit to water treatment, food processing and medicine

ACTIVE BUILDINGS THAT CAN GENERATE, STORE AND RELEASE THEIR OWN SOLAR ENERGY

The concept of Active Buildings was developed by Swansea University's SPECIFIC Innovation and Knowledge Centre. The roofs and walls of buildings are 'activated' by adding a coating or cladding that can generate heat and electricity from the sun; these are combined with technologies in the building that can store the energy until it is needed.

In its first year of operation the Active Classroom generated 1.5 times the energy it used. In its second year, when one of the rooms became an office space, it met its own energy needs.

Buildings account for about 40% of the UK's energy consumption and 40% of global greenhouse gas emissions.

The energy consumed by both Active Buildings is less than half the industry benchmark for a standard classroom or office building of the same size, even before the energy generated is taken into account.

Find our more about our

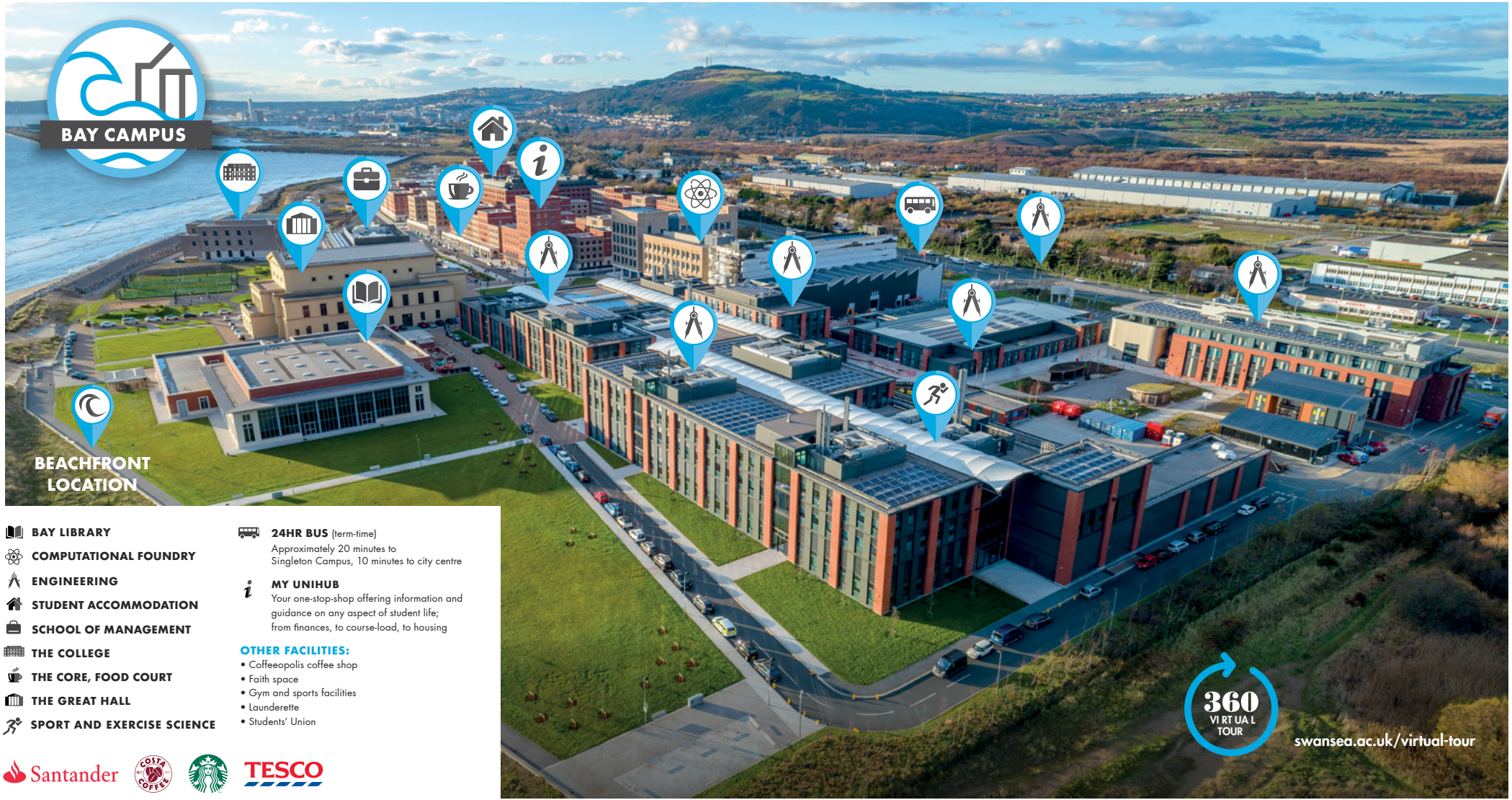
WORLD CHANGING RESEARCH

www.swansea.ac.uk/engineering/research

BREAKING RESEARCH NEWS

COMPUTATIONAL AERODYNAMICS SYSTEM REVOLUTIONISES DESIGN OF BLOODHOUND

NEW DIAGNOSTIC MEDICAL TECHNOLOGY DETECTS ABNORMAL BLOOD CLOTS EARLIER



- **BAY LIBRARY**
- **COMPUTATIONAL FOUNDRY**
- **ENGINEERING**
- **STUDENT ACCOMMODATION**
- **SCHOOL OF MANAGEMENT**
- **THE COLLEGE**
- **THE CORE, FOOD COURT**
- **THE GREAT HALL**
- **SPORT AND EXERCISE SCIENCE**

24HR BUS (term-time)
Approximately 20 minutes to Singleton Campus, 10 minutes to city centre

MY UNIHUB
Your one-stop-shop offering information and guidance on any aspect of student life; from finances, to course-load, to housing

OTHER FACILITIES:
- Coffeeopolis coffee shop
- Faith space
- Gym and sports facilities
- Launderette
- Students' Union

WALES

Wales is one of the four countries that make up the United Kingdom (UK). Wales has its own language – the oldest living language in Europe – and the University offers discounted Welsh lessons if you would like to learn!

Wales has an abundance of castles to explore, mountains to climb and delicious local dishes to try – the perfect antidote to a long week of studying. If you would like to find out more about things to do in Wales, we recommend that you visit: **visitwales.co.uk**

Wales is the land of *mythical* **KING ARTHUR**

LESS THAN
1 HOUR
FROM CARDIFF

LESS THAN
3 HOURS
FROM LONDON

LESS THAN
4 HOURS
FROM MANCHESTER

10 Things YOU MUST DO

1. Eat Joe's Ice Cream
2. Paddle in Swansea Bay
3. Visit the National Waterfront Museum – one of many museums and galleries in the city
4. Surf down the Gower
5. Grab fish & chips at Mumbles Pier
6. Walk around our Marina
7. Socialise with friends on Wind Street
8. Eat Welsh cakes at Swansea Market
9. Watch football, or the nation's favourite, rugby at the Liberty Stadium
10. Take in a show at the Grand Theatre

WHEREVER YOU GO IN SWANSEA...

you're by the sea

It's a beautiful location and a buzzing city; warm and friendly, it's compact, yet offers it all.

Swansea is as rich an environment for living as it is for learning. From its breath-taking sweep of award-winning beaches and coves to its dazzling nightlife, eclectic dining and unique shopping experiences, it's 378km² of everything you need to make your student experience amazing.

SWANSEA IS THE 5TH MOST HAPPIEST STUDENT CITY IN THE UK

(Sodexo 2019)

SWANSEA HAS AN ESTIMATED POPULATION OF

246,500

HOME OF THE GOWER
THE UK'S FIRST AREA OF OUTSTANDING NATURAL BEAUTY

OUR ACADEMICS

The College of Engineering has over 853 members of staff, including 194 academics, 218 professional service and 194 research staff.

> "I've come from a career in industry, so I know what attributes the top companies are looking for in Engineering graduates."
>
> **Dr Patricia Xavier**

> "The work that I have been doing at Swansea has shaped the design of the BLOODHOUND SSC and has inspired a range of new research ideas."
>
> **Dr Ben Evans**

> "As a College we are committed to the advancement of gender equality and dedicate substantial efforts to ensuring the principles of Athena SWAN are embedded in our college culture for the benefit of all students and staff."
>
> **Dr Camilla Knight**

> "As the College of Engineering's Deputy Director of Learning and Teaching I am passionate about enabling the very best approaches to learning and teaching. On a daily basis I help staff and students research, trial and employ a spectrum of educational technologies."
>
> **Dr Paul Holland**

You can find out more information about our academic staff on our website: **www.swansea.ac.uk/engineering/staff**

ALL OF OUR DEGREE PROGRAMMES OFFER A

YEAR ABROAD SCHEME

During my time in Beijing, I had the opportunity to meet people from all parts of the globe, which was very interesting as I got to meet many different cultures.

Georgios Kontosis
BEng Mechanical Engineering
(Summer Abroad)

AUSTRALIA
CANADA
CZECH REPUBLIC
FRANCE
GERMANY
SPAIN
USA

BECOME A GLOBAL STUDENT

ZAMBIA

The College of Engineering runs an annual expedition to Zambia that gives students and staff the opportunity to put their theoretical knowledge into practice by completing a humanitarian project.

PUT YOUR LEARNING INTO PRACTICE

ENHANCE YOUR EMPLOYABILITY

www.swansea.ac.uk/engineering/international-expeditions

WE ARE A TRULY GLOBAL COLLEGE OF ENGINEERING...

STUDENTS FROM **115** COUNTRIES

KAROLINE KJUSS, NORWAY

"I wanted a university with top study facilities and lecturers, and of course a University with a good location. I got more than I expected."

MEREDITH DAVIES, USA

"Living in Swansea was exciting because I don't go to school in a large city. Swansea is big enough to have a lot going on, but small enough so it isn't overwhelming."

FELIX MMEKA, NIGERIA

"I needed to find an amazing city (amazing people and scenes, balanced lifestyle of both education and extra-curricular activities, low cost of living, etc.) that I could call home while studying and after 5 amazing years, I can say I haven't been disappointed with that choice."

BLYTON PEREIRA, INDIA

"I decided to come to Swansea due to its great reputation in the UK and the world."

ANQI LI, CHINA

"I really enjoyed Swansea and found the lecturers very supportive."

HUEY YII KUOK, MALAYSIA

"I decided to study Engineering at Swansea University after I read up on the impressive graduate employability percentages and the ranking of the College of Engineering online. I really liked what I found."

AHMED MAHMOUD, EGYPT

"Staff members are incredibly supportive. I sensed that during my stay and even before arriving here. My course supervisor kept (and is still) checking up on me regularly during my course duration. To sum up, the institution embraced me from day one, and I couldn't have been more thankful."

NASSER AL-KAABI, QATAR

"I decided to study a BEng in Mechanical Engineering at Swansea University because Swansea is a safe place and the University has a good population."

Innovative TEACHING

We're proud to provide an outstanding learning experience and are championing 'blended learning', which includes the use of online/e-learning technologies to complement, support and enhance traditional face-to-face learning methods. Blended learning includes:

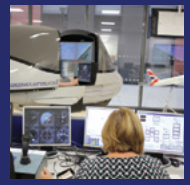
VIRTUAL REALITY
Visiting buildings before they're built, or learning about intimate parts of machinery, helps give our students a new understanding of what they are studying.

LIGHTBOARD
Built by a team of our undergraduate students, our Lightboard Studio allows the creation of interactive videos, where the presenter faces towards the screen with overlaid writing and PowerPoint slides.

LECTURE CAPTURE
Many of our academics record their lectures, so that students can re-watch them in their own time.

ONLINE LEARNING MATERIALS
Created by our academics to enhance student understanding of difficult topics.

COURSE DIRECTORY

AEROSPACE ENGINEERING

28

CHEMICAL ENGINEERING

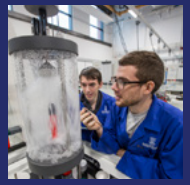
30

CIVIL ENGINEERING

32

ELECTRONIC & ELECTRICAL ENGINEERING

34

MATERIALS SCIENCE & ENGINEERING

36

MECHANICAL ENGINEERNG

38

MEDICAL ENGINEERING

40

FOUNDATION YEAR

42

AEROSPACE ENGINEERING

Aerospace Engineering is the classical engineering discipline for the design, manufacture and maintenance of aerospace vehicles.

BEng		MEng	
Aerospace Engineering	H400	Aerospace Engineering	H403
with a Year in Industry	H402	with a Year in Industry	H404
with a Year Abroad	H401	with a Year Abroad	H406

3RD IN THE UK
FOR GRADUATE PROSPECTS
The Complete University Guide 2021

TYPICAL OFFER:
ABB – BBB BEng
AAB – ABB MEng
(including Mathematics)
see website for further details

Here is a sample of the topics you will study during your degree:

YEAR 1
- Strength of Materials
- Fluid Mechanics
- Thermodynamics
- Design and Laboratory Classes
- Engineering Design
- Engineering Mechanics
- Introduction to Materials Engineering
- Engineering Analysis
- Introduction to Aerospace Engineering

YEAR 2
- Computer Aided Engineering
- Aerodynamics
- Airframe Structure
- Flight Mechanics
- Aerospace Systems
- Structural Mechanics for Aerospace Engineers
- Aerospace Control
- Experimental Studies – Aerospace
- Rocket and Space Technology (optional)
- Mechanical Properties of Materials (optional)

YEAR 3 – FHEQ LEVEL 6
- Gas Dynamics
- Research Project
- Engineering Management
- Propulsion
- Aerospace Engineering Design
- High Performance Materials and Selection
- Satellite Systems (optional)
- Space Propulsion and Power Systems (optional)
- Finite Element Method (optional)
- Computational Aerodynamics (optional)

YEAR 4 – FHEQ LEVEL 7 (MEng ONLY)
- Fluid-Structure Interaction
- Group Project
- Numerical Methods for Partial Differential Equations
- Advanced Airframe Structures
- Flight Dynamics and Control
- Strategic Project Planning
- Advanced Aerodynamics
- Structural Integrity of Aerospace Materials
- Finite Element Method (optional)
- Simulation Based Product Design (optional)

For the most up-to-date module information, access our course pages here:
www.swansea.ac.uk/engineering/aerospace

CAREERS
Swansea graduates are consistently in high demand with aerospace engineering employers. Below is a list of typical career prospects for aerospace graduates:

- Aerodynamicist in Motorsport and Sustainable Energy Sector
- Aircraft Design Engineer
- Aircraft MRO Engineer
- Aircraft Systems Engineer
- Airline Pilot
- Automotive Engineer
- Defence Engineer
- High Speed Railway Engineer
- Rocket Scientist
- Satellite Design Engineer
- Space Applications Engineer

GET IN TOUCH
Email: engineering@swansea.ac.uk
Tel: +44 (0)1792 295514
swansea.ac.uk/engineering

AT WORK WITH...

Mrunal Deshmukh

AIRCRAFT CONFIGURATION AND CHANGE MANAGER, AIRBUS

I work for Airbus as an Aircraft Configuration and Change Manager for the Single Aisle family. My role involves being the transnational focal point for the XLR project and co-ordinate all the UK based MOD (Modification) openings and closures. On a daily basis, I liaise with different departments (e.g. Engineering, Customer Services, Finance, Procurement etc.) to support all the config related activities.

My Aerospace Engineering degree form Swansea University helped me in so many ways. From application of the technical knowledge acquired from the course, to soft skills gained from interaction with course mates coming from cultures and backgrounds from all over the world. We worked under strict deadlines and on complicated projects. This has certainly prepared me to build a great work ethic.

CHEMICAL ENGINEERING

Chemical engineers design, operate and optimise chemical and physical processes that turn raw materials into valuable products for human use.

	BEng	MEng
Chemical Engineering	H831	H801
with a Year in Industry	H832	H890
with a Year Abroad	H800	H802

Here is a sample of the topics you will study during your degree:

YEAR 1 – FHEQ LEVEL 4

- Chemical Process Principles
- Chemical and Environmental Engineering Laboratory
- Heat Transfer
- Chemical Engineering Skills
- Fluid Mechanics
- Environmental Awareness for Engineers
- Engineering Analysis
- Process Analysis and Design
- Introductory Organic Chemistry
- Instrumental and Analytical Chemistry

YEAR 2 – FHEQ LEVEL 5

- Separation Processes
- Biochemical Engineering
- Reactor Design
- Instrumentation Measurement and Control
- Process Design and Simulation
- Thermodynamics of Process Design
- Fluid Flow
- Process Modelling
- Process and Pilot Plant Operations
- Statistical Techniques in Engineering

YEAR 3 – FHEQ LEVEL 6

- Safety and Loss Prevention
- Process Equipment Design, Selection & Control
- Particulate Systems
- Reactor Design
- Separation Processes
- Engineering Management
- Energy and Low Carbon Technologies
- Chemical Engineering Design Project
- Environmental Engineering Practice

YEAR 4 – FHEQ LEVEL 7 (MEng ONLY)

- Design Project
- Colloid and Interface Science
- Complex Fluids and Rheology
- Optimisation
- Biochemical Engineering
- Membrane Technology (optional)
- Water and Wastewater Engineering (optional)
- Principles of Nanomedicine (optional)
- Desalination (optional)
- Pollutant Transport by Groundwater Flows (optional)

For the most up-to-date module information, access our course pages here: **www.swansea.ac.uk/engineering/chemical**

CHEMICAL ENGINEERING AT SWANSEA IS RANKED

3RD IN THE UK
FOR GRADUATE PROSPECTS

The Complete University Guide 2021

TYPICAL OFFER:
ABB – BBB BEng
AA – ABB MEng
(including Mathematics)
see website for further details

CAREERS

There are global career opportunities available in a vast range of industry sectors including: energy, water, healthcare and the environment. Below is a list of typical career prospects for Chemical Engineering graduates:

- Analytical Chemist
- Applications Engineer
- Chemical Engineer
- Energy Engineer
- Energy Manager
- Mining Engineer
- Petroleum Engineer
- Product/Process Development Scientist
- Technical Plant Manager
- Wellsite Drilling Engineer

GET IN TOUCH

Email: engineering@swansea.ac.uk
Tel: +44 (0)1792 295514
swansea.ac.uk/engineering

AT WORK WITH...

Hozefa Arsiwala

PROCESS ENGINEER, CLIMAX MOLYBDENUM

I am currently working as a Process Engineer in a company called Climax Molybdenum, which is a Freeport-McMoran company. The site that I work for is a smeltering plant which produces a chemical called Ferro-Molybdenum, which goes into steel to give its particular properties. I am currently looking into process safety and process optimisation.

The degree has not only helped with my education but also helped with my social and personal skills. I have learnt how to handle daily issues logically. I have had a brilliant time studying in Swansea University; I still do miss it. I have made great friends and still carry a strong relationship with most of my lecturers.

CIVIL ENGINEERING

Civil Engineers play an integral role in modern society and are responsible for the built environment that surrounds us.

	BEng	MEng
Civil Engineering	H200	H201
with a Year in Industry	H202	H204
with a Year Abroad	H206	H207

CIVIL ENGINEERING AT SWANSEA IS RANKED

5TH IN THE UK FOR GRADUATE PROSPECTS

The Complete University Guide 2021

TYPICAL OFFER:
ABB – BBB BEng
AAB – ABB MEng
(including Mathematics)
see website for further details

Here is a sample of the topics you will study during your degree:

YEAR 1 – FHEQ LEVEL 4

- Civil Laboratory
- Engineering Sustainability
- Strength of Materials
- Highway Design and Surveying
- Conceptual Design
- Engineering Mechanics
- Introduction of Materials Engineering
- Engineering Analysis
- Civil Engineering Structural Analysis Practice
- Fluid Mechanics

YEAR 2 – FEHQ LEVEL 5

- Fluid Mechanics
- Structural Mechanics
- Reinforced Concrete Design
- Basic Soil Mechanics
- Steel Design
- Problem Solving in Engineering with Matlab
- Engineering Management (Civil)
- Dynamics
- Civil Engineering Design Practice
- Introductory Geology for Engineers

YEAR 3 – FEHQ LEVEL 6

- Construction Management and Project Delivery
- Structural Mechanics
- Geomechanics
- Finite Element Method
- Engineering of Foundation
- Superstructure Design
- Hydrology and Unsteady Flow
- Research Project
- Costal Processes and Engineering

YEAR 4 – FEHQ LEVEL 7 (MEng ONLY)

- Fluid-Structure Interaction
- Dynamics and Transient Analysis
- Computational Plasticity
- Reservoir Modelling and Simulation
- Finite Element Computational Analysis
- Advanced Structural Design
- Advanced Structural Analysis
- Flood Risk Management
- Group Project
- Coastal Engineering

For the most up-to-date module information, access our course pages here: **www.swansea.ac.uk/engineering/civil**

CAREERS

Swansea graduates are consistently in high demand with civil engineering employers. Below is a list of typical career prospects for Civil Engineering graduates:

- Building Control Surveyor
- Consulting Civil Engineer
- Contracting Civil Engineer
- Site Engineer
- Structural Engineer
- Geotechnical Engineer
- Water Engineer
- Town Planner
- Building Services Engineer
- Engineering Geologist
- Environmental Consultant
- Quantity Surveyor

GET IN TOUCH

Email: engineering@swansea.ac.uk
Tel: +44 (0)1792 295514
swansea.ac.uk/engineering

AT WORK WITH...

George Lance

ASSISTANT ENGINEER, ATKINS

I am currently an Assistant Engineer at Atkins. I work with multidisciplinary teams across the UK and India to help deliver a variety of new build and highway improvement schemes.

The industry related modules taught as part of the course were great at preparing me for the way real world projects work.

The group project during my MEng year in particular was really good experience, and the opportunity to work with industry professionals was brilliant practice for the graduate world.

ELECTRONIC & ELECTRICAL ENGINEERING

Electronic and Electrical Engineering is amongst the most exciting and progressive subjects available today, catering to projects such as mobile phone networks and renewable energy sources that define and mould the world around us.

BEng		MEng	
Electronic & Electrical Engineering	H602	Electronic & Electrical Engineering	H606
with a Year in Industry	H604	with a Year in Industry	H601
with a Year Abroad	H603	with a Year Abroad	H600

ELECTRONIC & ELECTRICAL ENGINEERING AT SWANSEA IS RANKED

10TH IN THE UK
STUDENT SATISFACTION

The Guardian University Guide 2021

TYPICAL OFFER:
ABB – BBB BEng
AAB – ABB MEng
(including Mathematics)
see website for further details

Here is a sample of the topics you will study during your degree:

YEAR 1 – FHEQ LEVEL 4

- Instrumentation of Control
- Digital Design
- Dynamic Systems
- Signals and Systems
- Microcontrollers
- Analogue Design
- Circuit Analysis
- Engineering Analysis
- Power Engineering
- Functional and Smart Materials

YEAR 2 – FHEQ LEVEL 5

- Electronic Circuits
- Electrical Machines
- Electronic Materials and Devices
- Control Systems
- Software Engineering
- Signals and Systems
- Group Design Exercise
- Electromagnetics
- Semiconductor Technology
- Practical Circuits

YEAR 3 – FHEQ LEVEL 6

- IC Design
- Microwave Circuits and Antennas
- Power Systems
- Power Electronics
- Research Project
- Engineering Management
- Communications
- Digital Communications (optional)
- Quantum Devices (optional)
- Nanoelectronics (optional)

YEAR 4 – FHEQ LEVEL 7 (MEng ONLY)

- Power Semiconductor Devices
- Advanced Power Electronics and Drives
- Modern Control Systems
- Advanced Power Systems
- Energy and Power Electronics Laboratory
- Signals and Systems (optional)
- Digital Communications (optional)
- Wireless Communications (optional)
- Optical Networks (optional)
- Problems at the Nanoscale (optional)

CAREERS

Students have progressed into a wide variety of industry sectors, including research centres, the public sector and as entrepreneurs. Below is a list of typical career prospects for graduates:

- Analogue and Digital Circuit Design Engineer
- Broadcast Engineer
- Control and Instrumentation Engineer
- Electrical Engineer
- IT Consultant
- Multimedia Programmer
- Power Systems and Power Electronics Engineer
- Systems Analyst
- Technical Author
- Technical Sales Engineer
- Telecommunication Engineer

For the most up-to-date module information, access our course pages here: **www.swansea.ac.uk/engineering/electrical**

GET IN TOUCH

Email: engineering@swansea.ac.uk
Tel: +44 (0)1792 295514
swansea.ac.uk/engineering

AT WORK WITH...

Andy Dodd

GRADUATE ENGINEER, HORIBA MIRA

My degree catapulted me into a graduate engineer role at HORIBA-MIRA, a world-class centre for vehicle engineering, test and development. The course covered a broad range of topics, building strong foundations on which I could start my career. Using the knowledge and skills I developed at Swansea University, I quickly became an effective member of the team and regularly work alongside experts in the field.

MATERIALS SCIENCE & ENGINEERING

Materials Science and Engineering is a multi-disciplinary subject, which focuses on the control of properties of matter for application in numerous sectors of science and engineering.

BEng		MEng	
Materials Science & Engineering	J500	Materials Science & Engineering	J504
with a Year in Industry	J502	with a Year in Industry	J503
with a Year Abroad	J510	with a Year Abroad	J506

Here is a sample of the topics you will study during your degree:

YEAR 1 – FHEQ LEVEL 4

- Introduction to Materials Engineering
- Manufacturing Technology
- Materials Resources
- Mechanical Properties of Materials
- Materials Practical: Structure/ Property Links in Metals
- Engineering Analysis for Materials
- Instrumental and Analytical Chemistry
- Engineering Sustainability (optional)
- Foundation Chemistry (optional)
- Engineering Science (optional)

YEAR 2 – FHEQ LEVEL 5

- Functional and Smart Materials
- Microstructure Evolution and Control in Metallic Materials
- Polymers: Structures and Processing
- Computational Materials
- Mechanical Deformation in Structural Materials
- Microstructure Development in Alloy Systems
- Applied Examples in Polymeric and Metallic Materials
- Order and Disorder in Materials
- Modelling and Simulation of Materials
- Strength of Materials

YEAR 3 FHEQ LEVEL 6

- Research Project
- Computation Materials
- Fracture and Fatigue
- Ceramics
- Polymers: Properties and Design
- Engineering Management
- Metals: Advanced Manufacturing and Protection
- Microstructure and Characterisation
- Physical Metallurgy of Steels
- Composite Materials

YEAR 4 – FHEQ LEVEL 7 (MEng ONLY)

- Polymer Processing
- Additive Manufacturing
- Entrepreneurship for Engineers
- Group Project
- Simulation Based Product Design
- Strategic Project Planning
- Structural Integrity of Aerospace Metals
- Aerospace Materials Engineering
- Power Generation Systems
- Environmental Analysis and Legislation

MATERIALS SCIENCE & ENGINEERING AT SWANSEA IS RANKED

1ST IN THE UK FOR GRADUATE PROSPECTS

The Complete University Guide 2021

TYPICAL OFFER:
ABB – BBB BEng
AAB – ABB MEng
see website for further details

CAREERS

Materials Science and Engineering graduates have a variety of career options available to them in industrial sectors including: aerospace, the automotive industry, manufacturing, sports and energy generation. Below is a list of typical career prospects for Materials Science and Engineering graduates:

- Biomedical Engineer
- Manufacturing Systems Engineer
- Materials Engineer
- Metallurgist
- Patent Examiner
- Product Development Scientist
- Quality Manager
- Research Scientist

For the most up-to-date module information, access our course pages here: **www.swansea.ac.uk/engineering/materials**

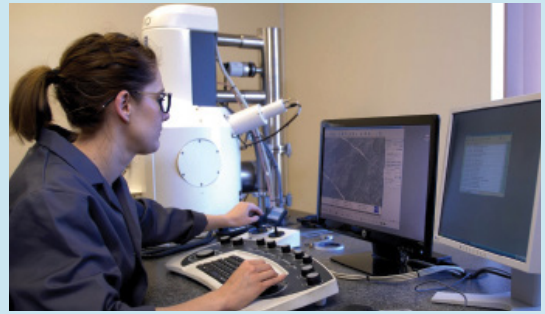
GET IN TOUCH

Email: engineering@swansea.ac.uk
Tel: +44 (0)1792 295514
swansea.ac.uk/engineering

AT WORK WITH...

Sarah Bagnall

CONSULTANCY MANAGER, R-TECH MATERIALS



My role specialises in failure analysis, particularly for the petrochemical, oil and gas, and power generation industries. I manage the operational activities of the consultancy business, business development and the investigative metallurgical work. This includes failure analysis, quality problems and product liability issues for a variety of industries, particularly in power generation, petrochemical and process plant for an international client base.

I also manage the consultancy business' research and development programmes; an ongoing project is an Innovate UK funded study to develop a novel integrity model for stainless steels in high temperature nuclear applications in partnership with EDF Energy. This project follows on from a previous Innovate funded project and the master's I completed with Swansea University on the thermal degradation of austenitic stainless steels.

MECHANICAL ENGINEERING

Mechanical Engineers are innovative professionals, found at the core of every aspect of the modern engineering industry, from concept to invention.

	BEng		MEng
Mechanical Engineering	H300	Mechanical Engineering	H304
with a Year in Industry	H305	with a Year in Industry	H306
with a Year Abroad	H308	with a Year Abroad	H309

MECHANICAL ENGINEERING AT SWANSEA IS RANKED

6TH IN THE UK FOR GRADUATE PROSPECTS

The Complete University Guide 2021

TYPICAL OFFER:
ABB – BBB BEng
AAB – ABB MEng
(including Mathematics)
see website for further details

Here is a sample of the topics you will study during your degree:

YEAR 1 – FHEQ LEVEL 4

- Engineering Sustainability
- Strength of Materials
- Fluid Mechanics
- Thermodynamics
- Design and Laboratory Classes
- Engineering Mechanics
- Engineering Professional Development
- Introduction to Materials Engineering
- Manufacturing Technology
- Engineering Analysis

YEAR 2 – FHEQ LEVEL 5

- Dynamic Systems
- Thermodynamics
- Stress Analysis
- Computer Aided Engineering
- Design of Machine Elements
- Manufacturing Technology
- Fluid Mechanics
- Heat Transfer (optional)
- Circuit Analysis (optional)
- Digital Manufacturing (optional)

YEAR 3 – FHEQ LEVEL 6

- Control Systems
- Research Project
- Fluid Mechanics
- Manufacturing Optimisation
- Engineering Management
- Mechanical Engineering Practice
- Mechanical Engineering Design
- Finite Element Method (optional)
- Dynamics (optional)
- Kinematics for Running a Robot (optional)

YEAR 4 – FHEQ LEVEL 7 (MEng ONLY)

- Advanced Thermo Fluid Dynamics
- Polymer Processing
- Systems Monitoring, Control, Reliability, Survivability, Integrity and Maintenance
- Additive Manufacturing
- Entrepreneurship for Engineers
- Group Project
- Simulation Based Product Design
- Strategic Project Planning
- Metallurgy and Process Optimisation
- Advanced Solid Mechanics

For the most up-to-date module information, access our course pages here: **www.swansea.ac.uk/engineering/mechanical**

CAREERS

Mechanical Engineering students from Swansea University have progressed into a vast array of roles in numerous sectors. Below is a list of typical career prospects for Mechanical Engineering graduates:

- Aerospace Engineer
- Automation Engineer
- Automotive Engineer
- Design Engineer
- Industrial Engineer
- Maintenance Engineer
- Manufacturing Engineer
- Mechanical Engineer
- Project Manager
- Reliability Engineer
- Research Engineer
- Stress Engineer

GET IN TOUCH

Email: engineering@swansea.ac.uk
Tel: +44 (0)1792 295514
swansea.ac.uk/engineering

AT WORK WITH...

Alice Lacy

GRADUATE MECHANICAL ENGINEER, AECOM

I'm currently working as a Graduate Mechanical Engineer at AECOM based in London. I work with a range of professionals on projects within Europe designing mechanical systems to enable clients to achieve efficient and functional office space for their businesses.

Studying a Mechanical Engineering MEng with a Year in Industry at Swansea has provided me with all the key factors that I need while starting off my career. My confidence and knowledge of engineering has given me the ability to be hands-on at work and help in areas that are more advanced. Through coursework and my interest in STEM activities at Swansea, my presentation skills and communication have definitely proven very helpful in my day to day work.

MEDICAL ENGINEERING

Medical Engineering is a multi-disciplinary subject consisting of the application of core engineering principles to a broad range of instrumentation used in modern medicine.

BEng		MEng	
Medical Engineering	HB18	Medical Engineering	HB1V
with a Year in Industry	HB19	with a Year in Industry	HB1W
with a Year Abroad	HB01	with a Year Abroad	HB02

GENERAL ENGINEERING COURSES ARE RANKED **2ND IN THE UK** FOR COURSE SATISFACTION

The Guardian University Guide 2021

ACCREDITED DEGREE

TYPICAL OFFER:
ABB – BBB BEng
AAB – ABB MEng
(including Mathematics)
see website for further details

Here is a sample of the topics you will study during your degree:

YEAR 1 – FHEQ LEVEL 4

- Strength of Materials
- Instrumentation of Control
- Circuit Analysis
- Fluid Mechanics
- Introduction to Material Engineering
- Numerical Methods for Biomedical Engineers
- Chemical Engineering Science
- Human Physiology
- Human Neuromusculoskeletal Systems
- Engineering Mechanics (optional)

YEAR 2 – FHEQ LEVEL 5

- Fluid Flow
- Process Modelling
- Statistical Methods in Engineering
- Heat Transfer
- Design for Medical Engineering
- Experimental Studies for Medical Engineers
- Cell Biology and Cell Mechanics for Engineers
- Biomedical Instrumentation
- Physiological Systems
- Selected Medical Diagnostic Techniques

YEAR 3 – FHEQ LEVEL 6

- Tissue Engineering
- Computer Aided Product Design
- Finite Element Method
- Research Project
- Engineering Management
- Mechanical Deformation in Structural Materials
- Implant and Prosthetic Technology
- Medical Engineering Group Design Project
- Biomedical Flows in Physiology and Medical Devices

YEAR 4 – FHEQ LEVEL 7 (MEng ONLY)

- Individual Research Project
- Numerical Methods for Partial Differential Equations
- Fracture and Fatigue
- Implant Engineering
- Simulation Based Product Design
- Strategic Project Planning
- Nanoscale Simulation
- Principles of Nanomedicine
- Polymers: Properties and Design
- Medical Imaging

For the most up-to-date module information, access our course pages here: **www.swansea.ac.uk/engineering/medical**

CAREERS

Below is a list of typical career prospects for Medical Engineering graduates:

- Application Engineer in Medical Devices
- Bioinstrumentation Engineer
- Biomaterials Engineer
- Biomedical Engineer
- Clinical Engineer/Scientist
- Medical Physicist (requiring postgraduate degree)
- Medical Research Scientist
- Physician Associate (requiring postgraduate degree)
- Prosthetic Design Engineer
- Rehabilitation Engineer
- Robotic Surgical Instruments Developer

GET IN TOUCH

Email: engineering@swansea.ac.uk
Tel: +44 (0)1792 295514
swansea.ac.uk/engineering

AT WORK WITH...

Gyan Bhatia

TECHNICAL SALES ENGINEER AND MANAGER, OXFORD INSTRUMENTS NANOSCIENCE

My role at Oxford Instruments NanoScience is a Technical Sales Engineer and Manager for UK, Ireland, France and Scandinavia. My role includes engineering consultation and design reviews, which include consulting on system concepts and requirements with academics on new and existing products.

The most advantageous thing I did at Swansea University is getting involved with lots of different things! Being a part of the rugby club exec, medical engineering society, representing my medical engineering cohort as a subject ambassador for open days.

I strongly believe the skills you learn in this element of the degree are highly transferrable into a professional company. Additionally, I made nice connections with different postgraduates, professors and researchers associated with my project, which helped me to get where I am today.

FOUNDATION YEAR

SEE WEBSITE FOR FULL ENTRY REQUIRMENTS

Engineering offers an enormous range of opportunities for graduates. If you do not have typical entry qualifications, or are an overseas student without the entry requirements for the first year, these four-year schemes are designed to provide wider access to accredited honours degrees.

The Foundation Year (Level 0) consists of 11 modules spread over two teaching blocks. Modules will include subjects in the following areas: mathematics, key skills for engineers, fundamentals of materials, thermofluid mechanics, structural petroleum and polymeric materials, optics and sound, electricity and magnetism and mechanics. The Foundation Year forms part of an integrated BEng degree scheme and is subject to the same undergraduate tuition fees. Transfer to MEng, Year in Industry, or Year Abroad schemes is possible during Level 2, provided you meet the minimum grade requirements in Y1-2.

Engineering with Foundation Year	H101
Aerospace Engineering with Foundation Year	H405
Chemical Engineering with Foundation Year	H835
Civil Engineering with Foundation Year	H205
Electronic and Electrical Engineering with Foundation Year	H605
Materials Science and Engineering with Foundation Year	J505
Mechanical Engineering with Foundation Year	H307
Medical Engineering with Foundation Year	HBC9

Overseas (non-EU) students will study their Foundation Year with The College, in a brand new building on the same campus. See p.43 for further information.

GET IN TOUCH

Email: engineering@swansea.ac.uk
Tel: +44 (0)1792 295514
swansea.ac.uk/engineering

For the most up-to-date module information, access our course pages here: **www.swansea.ac.uk/engineering/foundation-year**

Here is a sample of the topics you will study during your degree:

- Mathematics
- Key Skills for Engineers
- Fundamentals of Materials
- Thermofluid Mechanics
- Structural Petroleum and Polymeric Materials
- Optics and Sound
- Electricity and Magnetism
- Mechanics

CAREERS

Swansea graduates are consistently in high demand with engineering employers in all sectors.

Our Foundation Year prepares you to enter onto any of our accredited undergraduate degree programmes. For examples of career opportunities for our graduates, take a look at the different courses on pages 28-41.

WELCOME TO THE COLLEGE

If you are an International (non-EU) student studying a Foundation Year, your degree will begin at The College.

The College offers academic pathways at Swansea University that lead to undergraduate and postgraduate degrees.

The College provides teaching in smaller groups, with a personalised and supportive educational philosophy that encourages students to reach their maximum academic potential. All courses are available with a choice of start dates and durations, depending on your qualifications and English Language proficiency.

When you study in The College, you are a full student of the University from the start of your course.

The College has an all new purpose built building located on the beachfront Bay Campus, the same campus as the College of Engineering. There is a new 411-bed student residence just for the students of The College, also located on the Bay Campus.

www.swansea.ac.uk/the-college

WHAT'S NEXT?

After completing an Engineering degree at Swansea University, many students choose to continue their studies in order to maximise their earning potential and employability. Students who undertake a postgraduate degree realise personal and professional progression and gain valuable high-level skills sought after by employers, alongside an internationally respected qualification.

The College of Engineering offers multiple taught and research master degree programmes in Aerospace, Chemical, Civil, Computational, Electronic and Electrical, Materials, Mechanical Engineering, as well as Nanotechnology and Sport and Exercise Science.

Many of our students go on to study PhD or Engineering Doctorates, where they undertake projects with companies such as Rolls-Royce and Tata Steel.

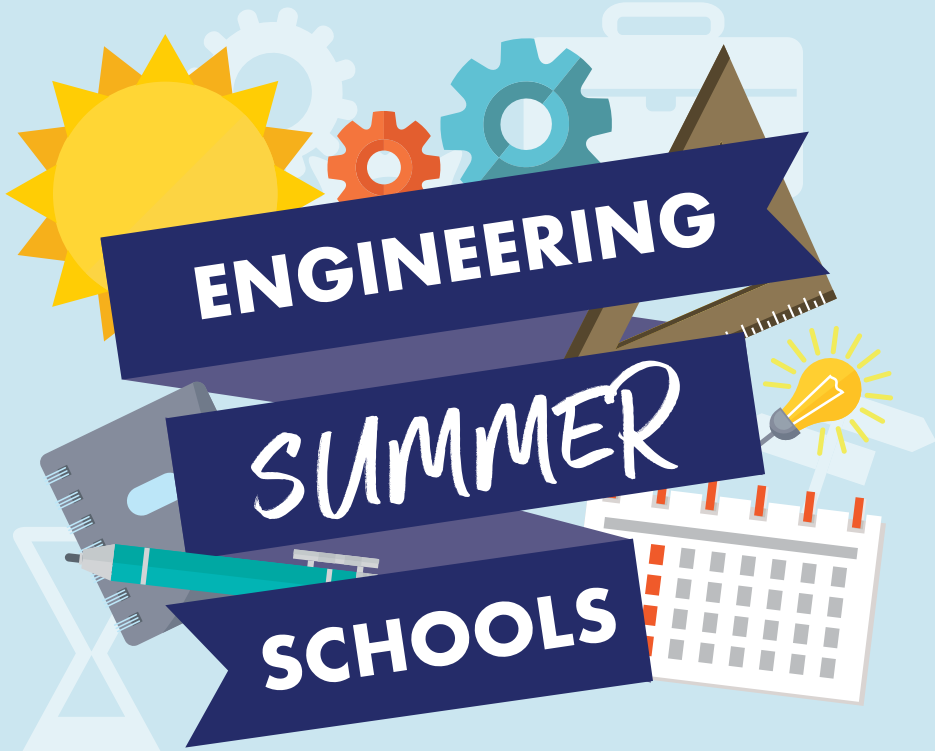
97%

of graduates in employment or further study **within 6 months** of graduating (DLHE)

FIND OUT MORE

For more information on postgraduate study please visit:

swansea.ac.uk/engineering



We run summer schools every year designed for year 12 students who are thinking about applying to university. They are residential courses which give an insight into all our courses and help students decide whether an engineering degree is likely to be for them. They usually run in July and you can register your interest in the summer schools throughout the year.

To find out more information, visit:
www.swansea.ac.uk/engineering/summer-schools

FREQUENTLY ASKED QUESTIONS

Q CAN I VISIT SWANSEA UNIVERSITY?

A Yes. We offer a number of Open Days throughout the year. In addition, we are happy to arrange independent visits. Just get in touch! We really encourage students and their parents/friends to visit us to get a feel for Swansea and the university. ** Subject to change due to COVID-19, please view:* **www.swansea.ac.uk/opendays**

Q DOES THE COLLEGE OFFER PART-TIME OR DISTANCE LEARNING OPTIONS?

A We offer part-time options. However, all the courses are taught on campus. Distance learning is not available.

Q DO I NEED A-LEVEL MATHEMATICS?

A Students ask us this frequently. The answer is that some schemes do require Mathematics and others don't. Materials Science and Engineering can be studied without A-Level Mathematics and can be an excellent choice for those looking for a slightly less mathematical engineering degree. The remainder of the schemes do require Mathematics to A-Level standard or equivalent. However, our integrated Foundation Year schemes are designed to allow students without Mathematics to study Engineering – it just means an additional year of study at university.

Q CAN I CHOOSE A YEAR IN INDUSTRY?

A Many of the courses offer the opportunity for a year in industry, which can be undertaken in the UK or overseas. In recent years, students have used this option to work or study in Europe, America or Australia. This will add a further year to the length of the programme.

Q SHOULD I CHOOSE A MEng OR BEng DEGREE?

A The prestigious MEng degrees demand higher entry qualifications, so you firstly need to see whether you can meet this. The MEng is a four year course, which covers every aspect of engineering to work in the engineering industry. MEng students typically go on to be influential engineers and managers, so the emphasis during the course is on team management and some very high-tech engineering skills based on our world-class research. An accredited MEng is the fastest way to achieve the educational requirements for Chartered Engineer status (CEng). However, the BEng degrees are often the most popular option and contain everything you need to know to be an engineer. Students can choose to take a further 'matching section' if they wish to apply to be a Chartered Engineer. It is worthwhile noting that it is perfectly possible to transfer onto (and off) the MEng programme, providing you meet the minimum average required in Y1-2 of your degree.

Q WANT TO FIND OUT MORE?

A If you're a teacher, careers or education advisors, visit our website for more information on the resources available. We are happy to visit schools or colleges and give talks on a range of topics.

CONTACT US
College of Engineering
Bay Campus
Swansea University
SA1 8EN
Wales
UK

Telephone: +44 (0)1792 295514
Email: engineering@swansea.ac.uk

FOLLOW US
SwanseaUni

1920~2020

Swansea University
Prifysgol Abertawe

swansea.ac.uk/engineering