

Biochemical Engineer

Introduction

Biochemical Engineers are concerned with chemical changes in living things. They apply their scientific knowledge to create safe and efficient processes in the production of pharmaceuticals and foodstuffs, and in the treatment of waste.

Also known as

- Engineer, Biochemical
- Bioengineer



Work Activities

As a Biochemical Engineer, you will apply scientific principles to develop processes and equipment which changes raw materials into a wide range of products, such as pharmaceuticals, food and fuels.

If you work for a pharmaceutical company, you will use your knowledge to produce drugs, medicines, vaccines and hormones.

You will help to find and produce the right mixture of components to make a drug, and then make sure that the drug can be produced on the right scale for the people who need it.

As a Biochemical Engineer, you will work out what the processes are, and then design, develop and monitor the equipment needed to produce a drug on a large scale. You'll use computers to simulate, model and control such processes. Then you will monitor the development of processes and make any changes or improvements if necessary.

Or you might work alongside Life Scientists to develop genetic engineering techniques. These enable medical professionals to treat a wide range of medical conditions in the body, without the need for drug treatments. You'll need to take into account cost, safety and environmental concerns.

Biochemical Engineers may also work for biotechnology companies that use genetic engineering techniques to try to improve crop yields or increase their resistance to pests and disease.

You could work for a food processing company, helping to transfer food from producers to consumers in a safe, convenient and environmentally friendly way.

As a Biochemical Engineer, you will have a very important role in protecting the environment. For example, you may use mixtures of growing biological cells to detoxify human waste and many types of industrial waste.

You may lead a team, including other Engineers and Engineering Technicians. You could also work alongside Biologists and Chemists.

Work normally takes place in an office, industrial plant or laboratory.

Being able to read, write and speak Welsh may be an advantage when you're looking for work in Wales.

Personal Qualities and Skills

To become a Biochemical Engineer, you need:

- to enjoy solving problems as well as applying logic and creativity to think of new ways to solve problems
- to be committed to keeping up to date with advances in this fast-changing area
- strong communication and interpersonal skills to interact with Engineers and Scientists from other disciplines
- the ability to lead and motivate others
- to work well as part of a team

- an excellent grasp of modern technology
- a commitment to protecting the environment
- knowledge of issues such as waste management and climate change

Pay and Opportunities

Pay

The pay rates given below are approximate.

- Starting: £30,000 - £34,000
- With experience: £37,000 - £45,500
- Senior Biochemical Engineers earn £49,500 - £54,000

Hours of work

Most Biochemical Engineers work around 35-40 hours a week, Monday to Friday. However, early starts, late finishes and some weekend work may be required, especially as deadlines approach.

Where could I work?

Employers are pharmaceutical companies (using biochemical techniques to make medicines), food and drink manufacturers, waste disposal firms and government departments, for example, the Department for Environment, Food and Rural Affairs (Defra).

Opportunities for Biochemical Engineers occur with employers in towns and cities throughout the UK.

Where are vacancies advertised?

Vacancies are advertised in local/national newspapers, on recruitment and employers' websites, and on Find a Job (www.gov.uk/jobsearch).

GreenJobs is a job board aimed at people interested in green careers:

www.greenjobs.co.uk/browse-jobs/engineering/

Social media websites, such as LinkedIn, Twitter or Facebook, are a great way to network, find vacancies and get in contact with possible employers. Make sure that your profile presents you in a professional manner that will appeal to potential employers.

Take a look at our General Information Article 'Finding Work Online'.

Entry Routes and Training

Entry routes

Biochemical Engineers usually complete a relevant engineering degree, foundation degree or HND, such as biochemical engineering. Some courses combine chemical engineering with biochemical engineering, environmental engineering, pharmaceutical engineering and biotechnology.

Specialist degrees in biochemical engineering are available at a small number of universities.

It's also possible to complete a first degree in general chemical engineering and then complete postgraduate training or a postgraduate qualification in biochemical engineering.

It's essential to check prospectuses carefully to make sure the course you choose is appropriate to the branch of engineering you want to follow.

A great way to get into this career is through an internship. Take a look at our information article 'Internships', for more details.

Training

Some graduates join graduate training schemes, which offer structured training and learning.

Depending on their level of entry, Biochemical Engineers can gain Chartered Engineer (CEng) or Incorporated Engineer (IEng) professional status. Both are highly regarded by employers throughout industry.

To register as a CEng or an IEng, you must join a relevant, professional engineering institution licensed by the Engineering Council, such as the Institution of Chemical Engineers (IChemE).

To become a CEng or an IEng, you need to demonstrate the appropriate competence and commitment. The standards for this are set out in the Engineering Council's UK-SPEC document, which can be downloaded from their website.

UK-SPEC and the engineering institution you've joined can tell you which qualifications are accredited or approved towards CEng or IEng status. Your engineering institution will also advise you on, and process, your application.

Routes to CEng status include completing:

- an accredited honours degree in engineering or technology, plus either an appropriate Masters degree or engineering Doctorate (EngD) accredited by a professional engineering institution, or appropriate further learning to Masters level
- or, an accredited integrated MEng degree

Routes to IEng status include completing:

- an accredited Bachelors or honours degree in engineering or technology
- or, an HNC, HND or foundation degree in engineering or technology, plus appropriate further learning to degree level
- or, an NVQ level 4, which has been approved by a licensed engineering institution

However, you can still become a CEng or an IEng if you don't have these academic qualifications. Further information about the assessment process can be found in UK-SPEC.

Work Experience

Previous experience working in a scientific environment would be really useful for this career.

Progression

Depending on their qualification, Biochemical Engineers can progress by taking on more responsibility for the management of engineering projects and teams of Engineers.

Some Biochemical Engineers choose to become self-employed or take contract work on a freelance basis.

Qualifications

To enter a degree course in biochemical engineering, the usual requirement is:

- 3 A levels
- GCSEs in your A level subjects at grade C/4 or above
- a further 2/3 GCSEs at grade C/4 or above
- at least 2 science subjects (from maths, chemistry, physics or biology) are often required at A level
- English, maths and a science subject are usually required at GCSE at grade C/4 or above

Check college/university websites very carefully for their exact requirements.

Other qualifications, such as a relevant BTEC level 3 qualification, or the International Baccalaureate Diploma are often accepted.

Some universities accept the Welsh Baccalaureate as equivalent to 1 A level.

Adult Opportunities

Age limits

It is illegal for any organisation to set age limits for entry to employment, education or training, unless they can show there is a real need to have these limits.

Courses

If you don't have the qualifications needed to enter your chosen degree or HND course, a college or university Access course (eg, Access to Engineering) could be the way in.

These courses are designed for people who have not followed the usual routes into higher education. No formal qualifications are usually needed, but you should check this with individual colleges.

Teesside University offers a BEng (Hons) in Chemical Engineering, via part-time evening classes.

The University of Birmingham offers an MSc in Biochemical Engineering, by part-time study.

Training

Information on pathways to registration as a Chartered (CEng) or Incorporated (IEng) Engineer can be found on the Engineering Council's website.

Funding

Funding for postgraduate courses is available through universities from the Engineering and Physical Sciences Research Council (EPSRC) and the Biotechnology and Biological Sciences Research Council (BBSRC).

Further Information

Professional institutions Professional institutions have the following roles:

- To support their members.
- To protect the public by keeping standards high in their professions.

For more information on the institution(s) relevant to this career, check out the contacts below.

Contacts

- **Semta**
Skills for science, engineering and manufacturing technologies
Address: 14 Upton Road, Watford, Hertfordshire WD18 0JT
Tel: 0845 6439001
Email: customerservices@semta.org.uk
Website: www.semta.org.uk
- **The Engineer**
Engineering technology news
Email: customerservices@theengineer.co.uk
Website: www.theengineer.co.uk
- **Tomorrow's Engineers**
Publisher: EngineeringUK and Royal Academy of Engineering
Email: contactus@tomorrowsengineers.org.uk
Website: www.tomorrowsengineers.org.uk

- **GreenJobs**
Email: info@greenjobs.co.uk
Website: www.greenjobs.co.uk
- **New Scientist**
Publisher: Reed Business Information Ltd
Email: ns.subs@quadrantsubs.com
Website: www.newscientist.com
- **Biochemical Society**
Address: Charles Darwin House, 12 Roger Street, London WC1N 2JU
Tel: 020 7685 2400
Email: genadmin@biochemistry.org
Website: www.biochemistry.org
- **Biotechnology and Biological Sciences Research Council (BBSRC)**
Address: Polaris House, North Star Avenue, Swindon SN2 1UH
Tel: 01793 413200
Email: webmaster@bbsrc.ac.uk
Website: www.bbsrc.ac.uk
- **Earthworks-jobs.com**
Website: www.earthworks-jobs.com
- **Department for Environment, Food & Rural Affairs (Defra)**
Address: Nobel House, 17 Smith Square, London SW1P 3JR
Tel: 0845 9335577
Email: defra.helpline@defra.gsi.gov.uk
Website: www.gov.uk/government/organisations/department-for-environment-food-rural-affairs
- **Engineer Jobs**
Publisher: Venture Marketing Group
Email: ner@vmgl.com
Website: www.engineerjobs.co.uk
- **Getting into Engineering Courses**
Author: James Burnett Publisher: Trotman
Website: www.mpw.ac.uk/university-guides/getting-into/engineering-courses/
- **Scottish Engineering**
Scottish enquiries
Address: 105 West George Street, Glasgow G2 1QL
Tel: 0141 2213181
Email: consult@scottishengineering.org.uk
Website: www.scottishengineering.org.uk
- **Engineering Council**
Address: 246 High Holborn, London WC1V 7EX
Tel: 020 3206 0500
Website: www.engc.org.uk
- **Engineering Training Council Northern Ireland (ETC NI)**
Northern Ireland Enquiries
Address: Sketrick House, Ards Business Park, Jubilee Road, Newtownards BT23 4YH
Tel: 028 9182 2377
Email: info@etcni.org.uk
Website: www.etcni.org.uk
- **Engineering and Physical Sciences Research Council (EPSRC)**
Address: Polaris House, North Star Avenue, Swindon SN2 1ET
Tel: 01793 444000

Website: www.epsrc.ac.uk

- **Teesside University Open Learning (Engineering)**

Address: School of Science & Engineering, Teesside University, Middlesbrough, Tees Valley TS1 3BA

Tel: 01642 342740

Email: tuole@tees.ac.uk

Website: www.tees.ac.uk/schools/sse/tuol/

- **Institution of Chemical Engineers (IChemE)**

Address: Davis Building, Railway Terrace, Rugby CV21 3HQ

Tel: 01788 578214

Email: enquiries@icheme.org

Website: www.icheme.org

- **whynotchemeng**

Publisher: Institution of Chemical Engineers (IChemE)

Email: enquiries@icheme.org

Website: www.whynotchemeng.com

Related Careers

- Chemical Engineer
- Energy Engineer
- Materials Technician
- Metallurgist