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> Power Electronics Fundamentals Skills Bootcamp



Deadline for applications: 4 October 2024.

Course overview

This innovative Skills Bootcamp on Power Electronics Fundamentals aims to develop your knowledge and understanding of power semiconductor materials, devices, and power electronic converters in the context of general industrial, consumer electronics and automotive applications. The 10-week course aims to equip you with a thorough understanding of various semiconductor materials, wide bandgap devices, their properties and characteristics, processing and fabrication, power conversion and switching techniques.

SKILLS FOR LIFE

SKILLS BOOTCAMPS

The course offers you the opportunity to familiarise and learn the following content:

- › Understand the fundamental properties and physics of semiconductor materials.
- › Understand the concepts of efficient power conversion and evaluate the properties of active and passive devices used in power electronic circuits.
- › Learn about different power electronic converters in the management of electric power.

Apply for this course (<https://webapp.coventry.ac.uk/CUapply/>)

Course duration

This course will run over 10 weeks from **4 November 2024 to 13 January 2025**. For more details please contact CUSkillsBootcamp@cusltd.co.uk (<mailto:CUSkillsBootcamp@cusltd.co.uk>).

Venue

This course will delivered online.

Why you should study this course

The course covers essential topics such as introduction to power conversion, basic electric and magnetic circuits, switching devices such as BJT, MOSFET, IGBT, types of electric power conversion and their converter design. The course will enable you to find a job involving energy conversion using power electronics in sectors such as energy and automotive.

About Skills Bootcamps

Skills Bootcamps are flexible courses of up to 16 weeks for adults aged 19 or over and can give you the opportunity to build up valuable sector-specific skills based on local employer demand and can provide a direct path to a job on completion. They are free to individuals. Where an employer is training an existing employee, they must contribute to the cost of the course. For small or medium sized enterprise: £440 and large sized enterprise: £1320. Please contact CUSkillsBootcamp@cusltd.co.uk (mailto:CUSkillsBootcamp@cusltd.co.uk) for more information.

Skills Bootcamps are aimed at adults who are either unemployed, in work, self-employed, looking to change career or returning to work after a break. They are an opportunity to learn and develop technical skills in the chosen Skills Bootcamp. We encourage all eligible adults to apply, including those from underrepresented groups.

Places are limited and will be allocated on a first-come, first-served basis to eligible applicants. Please note that individuals are only eligible to participate in one Skills Bootcamp per financial year and must not be on more than one Skills Bootcamp at any one time, but you can apply for multiple Skills Bootcamps.

Collaborations with other organisations

West Midlands Combined Authority



Gradcore



What you'll study

You will explore DC-DC, DC-AC, AC-DC, AC-AC conversion methods and the converters used for this electric power conversion. Practical applications in industries, automotive, and renewable energy systems are emphasised, ensuring that you can apply theoretical concepts to real-world scenarios.

Week 1

- > Introduction to Electric Power Conversion
- > Power Electronics versus Linear Electronics
- > Classification, Scope, and Applications
- > Inductors and Capacitors

Week 2

- > Introduction to Basic Electrical and Magnetic Circuit Concepts
- > Electric Circuits
- > Magnetic Circuits

Week 3

- > Physics and properties of semiconductors
- > Semiconductor materials—Introduction
- > Semiconductor devices processing and fabrication
- > P-N junction theory & Avalanche Breakdown
- > Diodes & Power Diodes

Week 4

- > Semiconductor Devices
- > Bipolar Junction Transistors
- > Thyristors & Gate Turn-Off Thyristors
- > Power MOSFETs
- > Insulated Gate Bipolar Transistors

Week 5

- > Generic Power Electronic Circuits: AC-DC Conversion (uncontrolled)
- > Diode Rectifiers - Introduction
- > Single-Phase Diode Bridge Rectifiers
- > Three-Phase Diode Rectifiers

Week 6

- › Phase-Controlled Rectifiers - Introduction
- › Thyristor Circuits and their Control
- › Single-Phase Converters
- › Three-Phase Converters

Week 7

- › Introduction to Generic Power Electronic Circuits: DC-DC Conversion
- › Step-Down (Buck) Converter
- › Step-Up (Boost) Converter
- › Other DC-DC converters & Introduction to PWM techniques

Week 8

- › Generic Power Electronic Circuits: DC-AC Conversion
- › Switch-Mode DC- AC Inverters - Introduction
- › Single-Phase Inverters
- › Three-Phase Inverters
- › Other Inverter Switching Schemes

Week 9

- › Generic Power Electronic Circuits: AC-AC Conversion
- › Phase-Controlled Single-Phase AC Voltage Controller
- › Phase-Controlled Three-Phase AC Voltage Controllers
- › Other AC- AC Conversion
- › Applications of AC- AC Converters

Week 10

- › Applications of Power Electronics
- › Residential and Industrial Applications
- › Electric Utility Applications
- › Solar And Wind Renewable Energy Systems
- › Electric and Hybrid Electric Vehicles

We regularly review our course content, to make it relevant and current for the benefit of our students. For these reasons, course modules may be updated.

Teaching contact hours

This course is delivered online Monday to Thursday 6pm to 8pm offering you the opportunity to study from home and around other commitments. Skills Bootcamps are flexible courses that can allow you to build up valuable sector-specific skills based on local employer demand and can provide a direct path to a job on completion.

Our experienced academic staff will provide engaging and stimulating class sessions, bringing in their industry technical experience and research to the virtual classroom.

Throughout this course, you can expect up to 80 hours of learning activities, made up of online teaching and independent learning. Additionally, you will be expected to undertake significant self-directed study of approximately 120 hours, depending on the demands of individual modules.

As an innovative university, we use different teaching methods including online tools and emerging technologies. So, some of your teaching hours and assessments may be delivered online.

Entry requirements

Fees and funding

Facilities

How to apply

Careers and opportunities

Further study

Related courses

Disclaimers

Contact us

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Our locations

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