



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



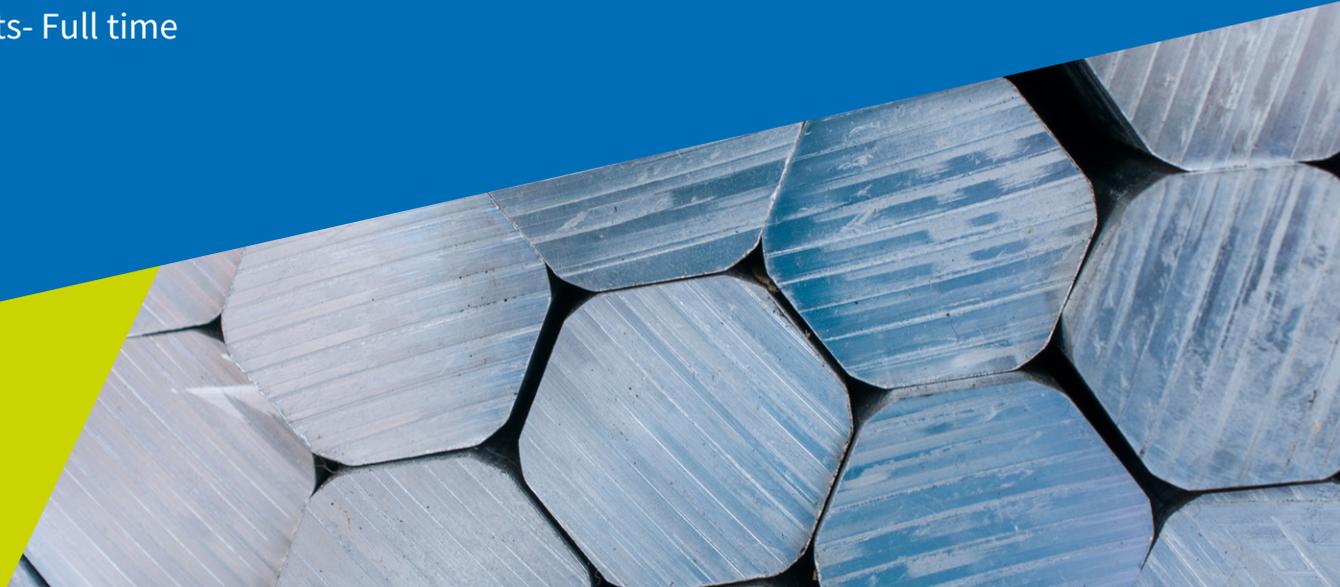
Rialtas na hÉireann
Government of Ireland

FUTURE JOBS
IRELAND
Preparing Now for Tomorrow's Economy



Postgraduate Diploma in Circular Economy and Recycling Technologies

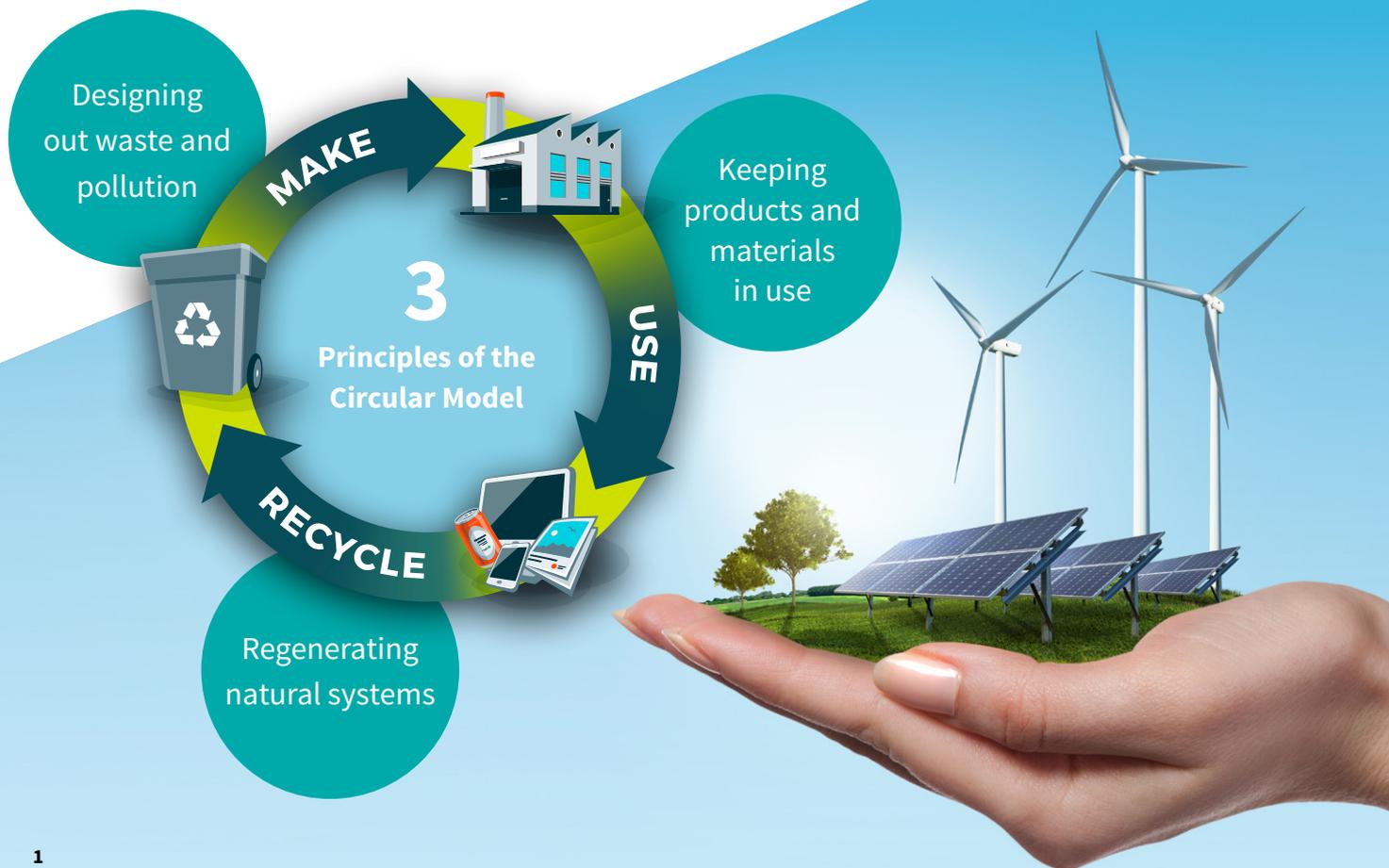
60 Credits- Full time

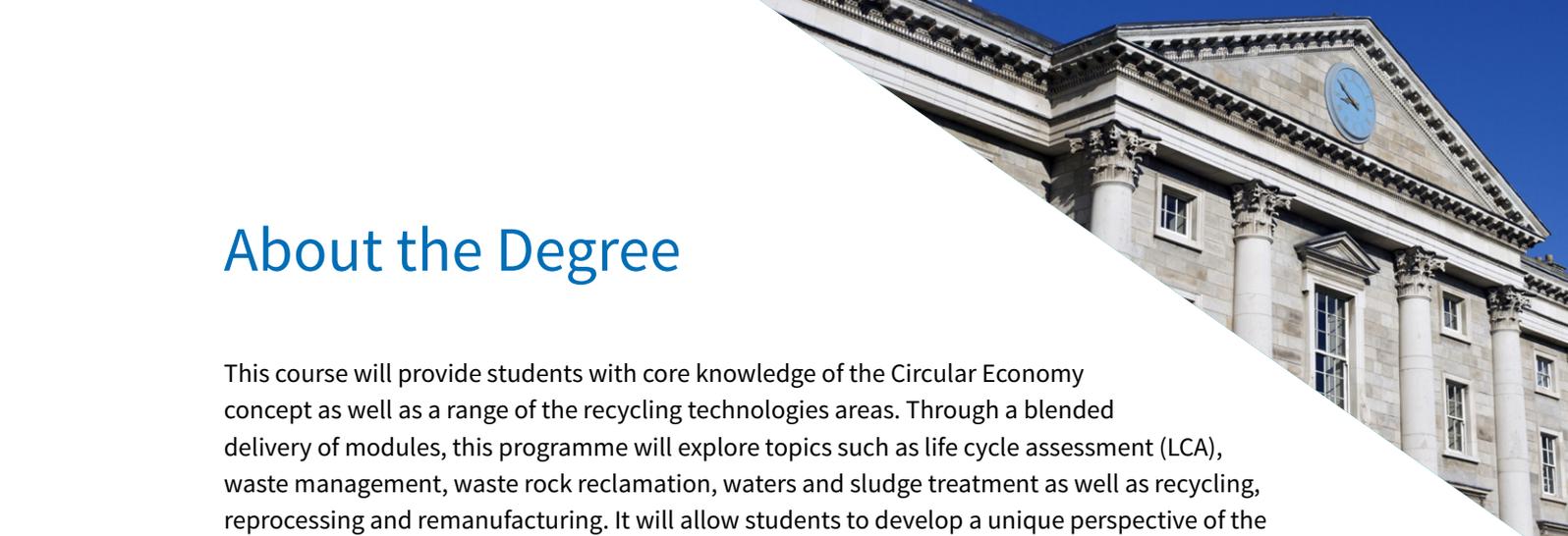


Waste management, scarcity of resources, minimizing emissions and maximizing selective reuse and recycling processes: these are issues that need to be considered to allow for future economic growth, reduction of negative environmental impacts and to tackle climate disruption.

The Circular Economy concept offers strong alternative solutions to these problems. The main goal of this approach is to keep products, components, and materials at their highest levels of use and value by closing the loop of product life cycles. This approach requires allowing economic activity to grow while minimising the use of finite resources and waste generation.

The circular model is based on three principles:





About the Degree

This course will provide students with core knowledge of the Circular Economy concept as well as a range of the recycling technologies areas. Through a blended delivery of modules, this programme will explore topics such as life cycle assessment (LCA), waste management, waste rock reclamation, waters and sludge treatment as well as recycling, reprocessing and remanufacturing. It will allow students to develop a unique perspective of the design process to enable the recovery and reuse of materials.

Teaching will be provided by a multidisciplinary team of experts across the Schools of Chemistry, Physics, Engineering and Natural Sciences, all of whom are active researchers in this cutting-edge area. This course also includes a research project that will be supervised by one of our academic experts across the Schools of Chemistry, Engineering, Physics and Natural Sciences.

This is one of the first programmes of its kind internationally and is distinctive in its structure, offering students a unique opportunity to combine knowledge and research expertise in the area.

What industrial experts say

“The development of this course will ensure the availability and expertise in this critical skills area. Experts in this field are becoming more and more in demand as companies strive to meet ambitious sustainability goals and Corporate Social Responsibility... The [course topics] are of strategic importance”

BOLIDEN TARA MINES



Course Structure

This curriculum is designed to allow students from science and engineering disciplines to gain the scientific and industrial knowledge required to contribute to the sector. The programme structure includes online components, as well as group work, presentations, and individual research.

The course will consist of eight taught modules delivered either through online or in person teaching. This includes a cross-cutting introductory module (core) which is designed to equipped students with the foundational information necessary to progress through the remaining modules in the programme.

1 Introduction to Circular Economy and Materials
Challenges, trends and limitations of a Linear Economy
Circular Economy principles and basic frameworks
Properties and characterisation of materials
A Hydrogen economy

2 Introduction to Energy Economics
An overview of world energy demand
How physics and chemistry relate to materials for energy
Greenhouse gases and the carbon cycle
Economics of energy market

3 Plastics, Composites and Plastics Recycling
Fundamentals of plastics
Plastic recycling techniques
Energy recovery (heat, biofuel, electricity)
Combustible gases recovery from organic waste

4 Waste Management and Energy Recovery
Definition of waste
Solid waste assessment, management and control
Energy recovery from solid waste

5 Sustainable Materials and Environmental Management
Fundamentals of materials and product design for a circular economy
Biological cycles, ingredients and materials
Bioeconomy
The carbon cycle and global climate change

6 Raw Materials Management and Recycling
Global geology
Methods of extraction
Reclamation and decommissioning of mine sites
Critical raw materials and their role

7 Regenerative and Environmental Aspects
Operating principles of regenerative economy
Relocation of the economy and redevelopment of know-how
Designing out waste and pollution
Environmental restoration and regeneration

8 Life cycle assessment (LCA)
The principles and application of LCA
LCA frameworks
Environmental indicators
Performing an LCA: data sources and software

9 Research Project
This module will enable students to develop key research skills and offer them the opportunity to understand how researchers work in an academic environment. Their individual project will provide them with the expertise to engage with industry in a specialised area upon graduation.



Career Opportunities

Graduates of this programme will be uniquely placed to work in a wide range of sectors such as manufacturing, environmental and recycling industries. Graduates will provide significant expertise and added value to companies and support growth and competitiveness across relevant Irish and European industries. Numerous global manufacturing companies are also based in Ireland such as Apple, Glen Dimplex, Medtronic and MSD (Merck). Ireland is also home to an large recycling industry and actively promotes and supports sustainability.

For those interested in pursuing academic research, the School hosts many internationally recognised academics in research. Graduates will also be eligible to pursue further study in other universities who are currently working in this and related research fields.

Trinity provides a distinctive education based on academic excellence and a transformative student experience that encourages students to be active participants in their learning. Through this programme, students will develop a unique range of knowledge, skills and attributes that will enhance their employability and prepare them for their future career journey.

Under the Third Level Graduate Scheme, the Irish Government allows both EU and non-EU/EEA students to seek employment 24 months after completing their postgraduate study.



Entry Requirements

This programme is suitable for graduates who have achieved an upper second-class honours degree (at 2.1 or above) or the international equivalent in either science or engineering. Those with an equivalent professional qualification are also encouraged to apply. Exceptions for those with relevant industrial or other experience may be considered and will require the approval of the Dean of Graduate Studies.

A minimum GPA of 3.0/4.0, approximately equivalent to an overall grade of 70-75%, is required for entry.

Course Fees

The fee levels for the current academic year are available at www.tcd.ie/academicregistry/fees-and-payments/

Application queries?

Contact TCDChem-circularecon@tcd.ie

Application

Applications will be accepted until November 29th (non-EU applicants) and December 17th (EU applicants). Final decisions on all applications will be made by December 17th. However, as entry is highly competitive, early application is advised.

Your application should consist of the following documents

- ▶ Cover letter outlining your interest in the degree.
- ▶ Curriculum Vitae.
- ▶ Transcript of academic results.
- ▶ Copies of degree certificates.
- ▶ Contact details of two academic references.
- ▶ English language certificate if necessary (see below).

Applicants whose first language is not English or who have not completed their undergraduate degree through the medium of English are welcome but may be required to demonstrate their English through an assessment or interview with the Course Director prior to a final decision on admission. Trinity's English language requirements are available at <http://www.tcd.ie/study/apply/admission-requirements/postgraduate/>



Top 7 reasons

to study the Circular Economy
and Recycling Technologies
at Trinity College Dublin

1. One of the main goals of Trinity College Strategic Plan 2020-25 is to provide **leadership in sustainability**. This will be achieved through improvements in energy use, reduction in waste (e.g. single use plastics) and promoting areas such as sustainable transport and biodiversity. This course reflects both the expertise of our academics in these areas as well as Trinity's commitment to achievement of these goals.
2. **This course is part of Trinity E3** (Engineering, Environment and Emerging Technologies) education. This education is built on the philosophy that it is possible to have a vibrant economy while supporting the natural world and the people, societies, and cultures it sustains.
3. **Trinity is recognised as one of the world's leading research – intensive universities**. Students will engage with academics who are internationally recognised leaders in their research fields. Trinity is also the only Irish member of the prestigious League of 22 European Research Universities (LERU).
4. Trinity encourages innovation and an entrepreneurial spirit, providing incubation programmes for student-led companies, and has been named as **Europe's leading university for producing venture backed entrepreneurs**. Trinity ranks 92nd in the world for Graduate Employability* and is committed to preparing its students for the ever-changing challenges of the 21st century workplace.
5. **Trinity is Ireland's premier university and ranks in the top 100 in 18 subjects**.
6. The Trinity campus is located in the heart of one of the **most popular and safest cities in the world**. Dublin is a vibrant and multicultural European capital, which ranks as the 34th best student city in the world. Ireland is the gateway to Europe.
7. Companies such as **Google, Apple, LinkedIn and Paypal have located their European Headquarters** in Ireland.

*QS World University Graduate Employability Rankings 2020



Contact us

Prospective students should contact the course director at the details below.

Course Director: Prof. Iouri Gounko

Email: TCDCHEM-circularecon@tcd.ie For more information on the course, please visit www.chemistry.tcd.ie/study

