Module Code	CE7J02
Module Name	J2: Solar Energy Conversion & Applications
ECTS Weighting[1]	5 ECTS
Semester taught	Semester 1
Module Coordinator/s	Assoc. Prof. Sarah McCormack (Sarah.McCormack@tcd.ie) **Lecturer(s):** Prof. Laurence Gill (Laurence.gill@tcd.ie)
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	On successful completion of this module, students should be able to: LO1. Describe the function and design of difference system types of (i) solar thermal including the flat plate, evacuated tube, thermosiphon and integrated collector store systems and (11) photovoltaic including monocrystalline silicon, amorphous, thin film and multijunction modules and emerging technologies. LO2. Calculate optical properties of material for solar energy systems based on spectral measurements. LO3. Explain how the performance of solar energy systems varies annually and diurnally, depending on location, sky conditions, device and application type and load/user behaviour. LO4. Clarify which materials are best suited for use in solar panels as well as explain what surface treatments can be used to enhance thermal and electrical performance. LO5. Describe the function of the most important components necessary in a solar energy system. LO6. Describe the state of the art in thermal and photovoltaic technologies as well as show an insight into future trends and advances. **Graduate Attributes: levels of attainment** To act responsibly - Enhanced To think independently - Enhanced To develop continuously - Enhanced To communicate effectively - Enhanced

Module Content	This module introduces a range of topics in the advanced physics and technology of solar energy conversion and materials, devices and applications. Participants will gain an in dept knowledge of current advances in solar energy, principles of operation of solar thermal and photovoltaic devices, technological challenges and their applications. The module also provides an introduction into next generation technologies. The aim of this module is to give the students an extended foundation of the main concepts of solar energy and to enable them to practically apply their knowledge in research and development.
Teaching and Learning Methods	A combination of lectures, tutorials and laboratories.

Assessment Details[2] Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due
Examination	3 hour examination	ALL	50%	
Continuous Assessment	Group work – designing solar PV and thermal systems	LO1,3,5	50%	6

Reassessment Requirements	100% Examination (3 hours), weighted at 50% to pass

Contact Hours and Indicative Student Workload[2]	
	Contact hours: 33 hrs
	Independent Study (preparation for course and review of materials): 45 hrs
	Independent Study (preparation for assessment, incl. completion of assessment): 45 hrs

Recommended Reading List	Photovoltaic solar energy conversion. G. H. Bauer, (2015) Springer.
Module Pre-requisite	None
Module Co-requisite	None
Module Website	https://www.tcd.ie/courses/postgraduate/az/course.php?id=DPTEG-ENSE-1F09
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	No
Module Approval Date	
Approved by	
Academic Start Year	15 th September 2025
Academic Year of Date	2025/2026