MODULE DESCRIPTOR

Module Title

Geothermal Energy and Applications

Reference	ENM508	Version	1
Created	June 2023	SCQF Level	SCQF 11
Approved	September 2023	SCQF Points	15
Amended		ECTS Points	7.5

Aims of Module

This course aims to provide participants with a solid foundation in the fundamentals of geothermal energy and a working knowledge of the scientific, technological and business aspects of the geothermal energy industry. This course will equip participants with the technical and business skills to exploit geothermal energy for decarbonising heating and cooling applications; to evaluate opportunities in the rapidly expanding geothermal energy market; and to meet UN Sustainable Development Goals 7 & 11.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Analyse the current energy transition and the role of geothermal energy technologies in producing sustainable energy, heating and cooling.
2	Evaluate the fundamentals, prospects, operations and advanced technologies used in the generation of electricity from geothermal energy resources.
3	Analyse the scientific, technological, environmental and social components of geothermal energy; drilling techniques, geothermal pumps, Enhanced and Advanced Geothermal Systems.
4	Economic evaluation of geothermal systems.
5	Critically appraise the technical and non-technical barriers to geothermal energy development.

Indicative Module Content

Geothermal energy resources, geothermal energy production,heating and cooling. Drilling for geothermal energy production, geothermal energy heat pumps, thermodynamics of geothermal heat pumps, classification of geothermal systems,Advanced geothermal systems (AGS) geothermal closed loop systems, Economics of geothermal systems, Technical and non technical barriers to geothermal energy development, geothermal system components

Module Delivery

Blended delivery - Lectures and Guided Self Study.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	35	35
Non-Contact Hours	115	115
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4, 5
Description:	Individual written report.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

Component 1 comprises 100% of the module grade. To pass the module, a D grade is required.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None but a background in engineering will be beneficial.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1	Rosen,M. A., Koohi-Fayegh, S., 2017. Geothermal Energy: Sustainable Heating and Cooling using Ground. Wiley.
2	Glassley, W.E., 2010. Geothermal Energy: Renewable Energy and the Environment. CPC Press.
3	Dickson, M. H., Fanelli, M., 2015. Geothermal untilization and technology, Routledge
4	DiPippo, R., 2005. Geothermal Power Plants: Principles, Applications and Case studies Elsevier Science.