SEE6128: RENEWABLE ENERGY GENERATION

Effective Term
Semester B 2025/26

Part I Course Overview

Course Title
Renewable Energy Generation

Subject Code
SEE - School of Energy and Environment
Course Number
6128

Academic Unit
School of Energy and Environment (E2)

College/School
School of Energy and Environment (E2)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract
This course focuses on the various renewable energy generation systems that are crucial in modern society. The course will cover the operational principles of renewable energy generation systems, exploring their advantages and major drawbacks.

A core emphasis will be placed on understanding how these renewable technologies contribute to sustainable development. Students will acquire a comprehensive understanding of the economic feasibility and environmental impact of renewable energy generation strategies. By the end of this course, students will be equipped with knowledge of the technologies that harness renewable resources, preparing them to contribute to a greener and more sustainable future.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the worldwide energy crisis and the primary driver for the urgent transition to renewable energy sources.	20	x	x	
2	Comprehend the foundational concepts behind diverse renewable energy technologies.	30	x		
3	Analyse the technical characteristics and performance metrics of different renewable energy systems.	30	x	x	
4	Evaluate techno-economics and sustainability aspects of renewable energy generation.	20	x		x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Students will engage in lectures with facilitated discussion to gain key concepts related to renewable energy generation.	1, 2, 3, 4	3.0 hrs/wk
2	Lab-based experiment	Students will deepen their understanding of the key concepts and theories, and apply them to practice through laboratory experiments.	1, 2, 3, 4	6 (for the whole semester)
3	Presentation	Students will select a case study related to the course topic and deliver an oral presentation to share their research findings	2	

4	Mid-term test	Students will take mid-term to assess their understanding and ability to apply subject-related knowledge learned in class, textbooks and required reading materials.	1, 2, 3, 4	
5	Final examination	Students will participate in examination to assess their understanding and ability to apply subject-related knowledge learned in class, textbooks and required reading materials.	1, 2, 3, 4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Assignments	1, 2, 3, 4	20	-	Yes
2	Laboratory experiments and reports	2, 3	20	Formative Assessment	Yes
3	Presentation	2	10	-	Yes
4	Mid-term test	1, 2, 3, 4	25	Duration : 2 hours, if applicable	No

Continuous Assessment (%)

75

Examination (%)

25

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

To pass a course, a student must do ALL of the following:
1) obtain at least 30% of the total marks allocated towards coursework (combination of assignments, pop quizzes, term paper, lab reports and/ or quiz, if applicable);
2) obtain at least 30% of the total marks allocated towards final examination (if applicable); and
3) meet the criteria listed in the section on Assessment Rubrics.

Assessment Rubrics (AR)

Assessment Task

Assignments (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to evaluate and analyse different processes for renewable energy generation techniques, such as photovoltaic and biological systems.

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Laboratory experiments and reports (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to conduct experiments and analyse results related to renewable energy generation.

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Presentation (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to understand the operational mechanisms of renewable energy generation and elucidate their potential benefits and limitations.

Excellent

(A+, A, A-) High

Good
(B+, B, B-) Significant

Fair
(C+, C, C-) Moderate

Marginal
(D) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Mid-term test (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Ability to analyse and calculate practical problems in issues related to renewable energy generation.

Excellent
High

Good
Significant

Fair
Moderate

Marginal
Basic

Failure
Not evening reaching marginal levels

Assessment Task
Final Examination (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Ability to analyse and calculate practical problems in issues related to renewable energy generation.

Excellent
(A+, A, A-) High

Good
(B+, B, B-) Significant

Fair
(C+, C, C-) Moderate

Marginal
(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task
Assignments (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to evaluate and analyse different processes for renewable energy generation techniques, such as photovoltaic and biological systems.

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Moderate

Failure
(F) Not even reaching marginal levels

Assessment Task
Laboratory experiments and reports (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to conduct experiments and analyse results related to renewable energy generation.

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Moderate

Failure
(F) Not even reaching marginal levels

Assessment Task
Presentation (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to understand the operational mechanisms of renewable energy generation and elucidate their potential benefits and limitations

Excellent
(A+, A, A-) High

Good

(B+, B) Significant

Marginal
(B-, C+, C) Moderate

Failure
(F) Not even reaching marginal levels

Assessment Task
Mid-term test (Applicable to students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to analyse and calculate practical problem in issues related to renewable energy generation.

Excellent
High

Good
Significant

Marginal
Moderate

Failure
Not even reaching marginal levels

Assessment Task
Final Examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Ability to analyse and solve practical problems related to energy generation

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Moderate

Failure
(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

- Global energy crisis
- Renewable resource potential
- Sustainable energy production

- Computational assessment of energy system
- Biomass-energy nexus
- Carbon neutrality
- Techno-economic analysis and life cycle assessment

Reading List

Compulsory Readings

	Title
1	Buchla, D., Kissell, T. E., & Floyd, T. L. (2015). Renewable energy systems. Pearson Education.
2	Smets, A., Jäger, K., Isabella, O., van Swaaij, R. and Zeman, M. (2016). Solar Energy: The Physics and Engineering of Photovoltaic Conversion, Technologies and Systems. UIT Cambridge.

Additional Readings

	Title
1	Crawley, G. M. (2013). The world scientific handbook of energy. World Scientific
2	Boyle, G. (2012). Renewable energy: power for a sustainable future. Oxford University Press.
3	Balzani, V., & Armaroli, N. (2010). Energy for a sustainable world: from the oil age to a sun-powered future. John Wiley & Sons.
4	Kreith, F., Kutscher, C. F., and Milford, J. B. (2018). Principles of sustainable energy systems. CRC press
5	Lin, C.S.K., Kaur, G., Li, C., and Yang, X. (2021). Waste Valorisation: Rethinking Waste streams in a Circular Economy. John Wiley & Sons.