

Annexe A: New/Revised Course Content in OBTL+ Format

Course Overview

The sections shown on this interface are based on the templates [UG OBTL+](#) or [PG OBTL+](#)

If you are revising/duplicating an existing course and do not see the pre-filled contents you expect in the subsequent sections e.g. Course Aims, Intended Learning Outcomes etc. please refer to [Data Transformation Status](#) for more information.

Expected Implementation in Academic Year	AY2023-2024
Semester/Trimester/Others (specify approx. Start/End date)	Semester 1
Course Author * Faculty proposing/revising the course	Lee-Chua Lee Hong
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Course Title	Energy Resources Engineering
Course Code	EN3006
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

Course Requisites (if applicable)

Pre-requisites	
Co-requisites	
Pre-requisite to	
Mutually exclusive to	
Replacement course to	
Remarks (if any)	

Course Aims

This course aims to provide you with a general understanding on the various sources of energy, their availabilities, qualities and impacts on the environment, economic and society in the context of sustainable development. You will be provided with an overview on the current energy trends, issues and challenges as well as overview on the choice of energy use and technologies to meet these challenges in future for sustainable development.

Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Explain current energy supply and demand situations;
ILO 2	Apply basic knowledge of the various sources of energy;
ILO 3	Describe the impact of energy on economy, society and the environment;
ILO 4	Assess various legislative and regulatory approaches to a sustainable energy management;
ILO 5	Evaluate alternative energy solutions that are sustainable.

Course Content

This introductory course provides an overview of energy resources management in the context of sustainable economic development. Topics include energy and human society, energy resources and reserves, supply, distribution, utilisation, recovery and conversion, environmental impacts of energy utilisation, energy economics and policies.

No	Topic	Lecture Hrs	Tutorial Hrs
1.	Introduction to Energy, Technology and Human Society	2	1
2.	Overview on Non-Renewable Energy Resources	2	1
3.	Effect of Energy on Economy, Society and the Environment	4	2
4.	Energy Policy & Regulation	1	1
5.	Energy Policy Efficiency: Trends, Benchmarking, Auditing & Incentives	2	1
6.	Energy Conservation and Efficient Energy Conversion Technology	4	3
7.	Clean Fuels and Fuels Harmonisation	2	1
8.	Renewable Energy Sources and Hydrogen Economy	9	3
	Total	26	13

Reading and References (if applicable)

1. J.A. Fay and D.S. Golomb: "Energy and the Environment", 2nd Edition, Oxford University Press, 2011.
2. E. S. Cassedy and P. Z. Grossman: "Introduction to Energy: Resources, Technology & Society", 3rd Edition, Cambridge University Press, 2017.
3. United Nation Environment Programme: www.unep.ch/etb/publications/envImpAsse.php;
4. US Department of Energy: www.eia.doe.gov
5. UN Intergovernmental Panel on Climate Change (IPCC): www.ipcc.ch
6. Singapore's Energy Market Authority (EMA): www.ema.gov.sg

Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	Introduction to Energy, Technology and Human Society	1		In-person	Lectures & Tutorial
2	Overview on Non-Renewable Energy Resources	1, 5		In-person	Lectures & Tutorial
3	Effect of Energy on Economy, Society and the Environment	1, 2, 3			Lectures & Tutorial; Group Project: Grouping, Topic Selection & Allocation.
4	Effect of Energy on Economy, Society and the Environment	1, 2, 3		In-person	Lectures & Tutorial; Group Project: Grouping, Topic Selection & Allocation.
5	Energy Policy & Regulation Energy Policy Efficiency: Trends, Benchmarking, Auditing & Incentives Energy Conservation	4, 5		In-person	Lectures & Tutorial

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
6	Energy Policy Efficiency: Trends, Benchmarking, Auditing & Incentives Energy Conservation Efficient Energy Conservation Technology	1, 2, 3, 4, 5		In-person	Lectures & Tutorial
7	Efficient Energy Conversion Technology	1, 2, 3, 4, 5		In-person	Lectures & Tutorial
8	Efficient Energy Conversion Technology Clean Fuels and Fuel Harmonisation	1, 2, 3, 4, 5		In-person	Lectures & Tutorial
9	Clean Fuels and Fuel Harmonisation Renewable Energy Sources Hydrogen Economy	1, 2, 3, 4, 5		In-person	Lectures & Tutorial
10	Renewable Energy Sources Hydrogen Economy	1, 2, 3, 4, 5		In-person	Lectures & Tutorial; Group Project Report
11	Renewable Energy Sources Hydrogen Economy	1, 2, 3, 4, 5		In-person	Lectures & Tutorial; Group Project Report

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
12	Renewable Energy Sources Hydrogen Economy	1, 2, 3, 4, 5		In-person	Lectures & Tutorial; Group Project Report
13	Renewable Energy Sources Hydrogen Economy	1, 2, 3, 4, 5		In-person	Lectures & Tutorial; Group Project Report

Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lecture	Formal lectures on topics with in-class discussions
Tutorials	This helps you to understand the concept taught during lectures as well as promote life-long learning
Group Report	This helps you to achieve one or more of the outcomes as you need to do self study and research as well as promote team works.

Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Test/Quiz(CA1: Quiz 1)	1,2,3,4,5	EAB SLOS a,c,g	20	Individual	Analytic	Multistructural
2	Continuous Assessment (CA): Project(CA2 Group Project)	1,2,3,4,5	EAB SLOs b,e,f,g,h,i,j,l	30	Individual	Analytic	Relational
3	Summative Assessment (EXAM): Final exam(Final Examination)	1, 2, 3, 4, 5	EAB SLOs a,c,g	50	Individual	Holistic	Relational

Description of Assessment Components (if applicable)

Note: The group project assessment for this course is also reliant on you working closely as a team to complete the project. Hence, the Modification Factor (MF) will be applied to account for your individual contribution to the group project work. The MF is derived from panel judges' feedback, weekly discussion session and peer assessment. For more details on the MF calculation, please see Appendix 2.

Formative Feedback

The quiz questions will be discussed, and you will be able to view your quiz grade individually through Blackboard Grade Centre.
Each group will submit their comments with respect to other groups' reports to the course instructor. The group presentation grade will be released through Blackboard Grade Centre.

NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
Care for Environment	Basic
Care for Society	Basic
Collaboration	Basic
Global Perspective	Basic
Problem Solving	Basic

Course Policy

Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Policy (General)

Students are expected to take all scheduled assignments and tests by due dates. Students are expected to take responsibility to follow up with course notes, assignments and course related announcements. Students are expected to participate in all group project discussions and activities.

Policy (Absenteeism)

Group work requires each member to contribute to team-work. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities.

Policy (Others, if applicable)

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