

**City University of Hong Kong**  
**Course Syllabus**

**offered by Department of Systems Engineering**  
**with effect from Semester B 2024 / 25**

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**Part I Course Overview**

**Course Title:** Sustainability and Green Systems

**Course Code:** SYE6301

**Course Duration:** One Semester

**Credit Units:** 3

**Level:** P6

**Medium of Instruction:** English

**Medium of Assessment:** English

**Prerequisites:**  
*(Course Code and Title)* Nil

**Precursors:**  
*(Course Code and Title)* Nil

**Equivalent Courses:**  
*(Course Code and Title)* Nil

**Exclusive Courses:**  
*(Course Code and Title)* Nil

## Part II Course Details

### 1. Abstract

This course provides a comprehensive overview of the principles, practices, and tools for addressing sustainability and green production systems. It explores the design concepts, methodologies, and technological solutions for optimizing the operational efficiency and sustainability of production and service systems.

The course covers the ESG (environmental, social, and governance) framework, including the design and maintenance strategies for developing eco-friendly, resource-efficient products, processes, and service offerings. Furthermore, it guides students in implementing holistic "greening" approaches across the entire lifecycle of production operations, facilities, and their associated supply chain networks.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	<b>Explain</b> the design concepts, methods, tools, the key technologies and the operation of sustainable green production and service systems.	10%	✓	✓	
2.	<b>Apply</b> the principles, techniques and methods to customize the learned generic concepts to meet the needs of a particular industry/service.	20%	✓	✓	
3.	<b>Identify</b> the strategies for the purpose of satisfying a set of given sustainable green production/service system requirements.	30%		✓	✓
4.	<b>Design</b> the rules and processes to meet the market need and the green production/service system requirements by selecting and evaluating suitable technical, managerial / project management and supply chain management schemes.	40%	✓	✓	✓
		100%			

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.*

### 3. Learning and Teaching Activities (LTAs)

(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Lecture/ Directed Studies	<u>Large class activities:</u> Lectures on the topics of the keyword syllabus.	✓	✓			2 hours/week
Tutorial	<u>Group work activities</u> Group projects are given to students for the investigation in relation to the CILOs. Students will discuss the projects during the tutorial period. The group assessment is based on the group presentation and the group report.	✓	✓	✓	✓	1 hours/week
Self-study	<u>Individual work activities</u> Students are required to carry out self-study on webs and search appropriate technical and managerial information/data in conjunction with the lecturing materials to accomplish a set of given requirements. The work of the self-study will be presented as an individual report for assessment.	✓	✓	✓	✓	20 hours/Sem

Activity Type	Timetabled Activity (Hours per week)
Lecture/Tutorial/Laboratory Mix	Lectures/Action learning activities/Projects (3)
<b>Or</b>	
<b>Directed Studies/Group or Individual work</b>	<b>Directed Studies Consultation (1); Group or Individual Work (2)</b>

### 4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: <u>50</u> %						
Group presentation & report	✓	✓	✓	✓	25%	5% of the marks is based on the presentation and 20% is based on the report of the softcopy of PPT.
Individual report	✓	✓	✓	✓	25%	20% of the marks is based on the accomplishment of satisfying the given requirements and 5% is based on the write-up of peer Assessment.
Examination: <u>50</u> % (duration: 2 hours , if applicable)						
					100%	

For a student to pass the course, at least 30% of the maximum mark for the examination should be obtained.

## 5. Assessment Rubrics

*(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)*

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

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Examination	1.1 Ability to explain in detail the design concepts and the operations of the sustainable green production and service systems 1.2 Ability to identify the strategies in satisfying a set of given requirements to a green production and service system 1.3 Capacity for applying accuracy methods to design green products/services.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Group presentation & report	Ability to explain in detail and with accuracy methods of inquiry useful in analysing to develop sustainable green strategy and the design of a production/service system for greener environment	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Individual report	3.1 Capacity for self-directed learning on webs and search appropriate information/data in conjunction with the lecturing materials to accomplish a set of given requirements 3.2 Ability to assess the teamwork	High	Significant	Moderate	Basic	Not even reaching marginal levels

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Examination	1.1 Ability to explain in detail the design concepts and the operations of the sustainable green production and service systems 1.2 Ability to identify the strategies in satisfying a set of given requirements to a green production and service system 1.3 Capacity for applying accuracy methods to design green products/services.	High	Significant	Moderate/Basic	Not even reaching marginal levels
2. Group presentation & report	Ability to explain in detail and with accuracy methods of inquiry useful in analysing to develop sustainable green strategy and the design of a production/service system for greener environment	High	Significant	Moderate/Basic	Not even reaching marginal levels
3. Individual report	3.1 Capacity for self-directed learning on webs and search appropriate information/data in conjunction with the lecturing materials to accomplish a set of given requirements 3.2 Ability to assess the teamwork	High	Significant	Moderate/Basic	Not even reaching marginal levels

### Part III Other Information (more details can be provided separately in the teaching plan)

#### 1. Keyword Syllabus

*(An indication of the key topics of the course.)*

Challenges and Drivers of Green Production and Service Systems. Principles of Lean, Sustainable, and Green Production/Service. WEEE (Waste Electrical and Electronic Equipment) and RoHS (Restriction of Hazardous Substances). Eco-design. Recycling and Remanufacturing. Life Cycle Assessment. Environmental Impact Assessment. Industrial Ecology. Industrial Symbiosis. Sustainable Engineering. Humanity and Technology. ESG (Environmental, Social, and Governance). Green Rapid Production. Sustainable Green Systems Design and Management. Alternative Energy Resources. International industrial and research case studies from the USA, Europe, Japan, Hong Kong, China and elsewhere.

#### 2. Reading List

##### 2.1 Compulsory Readings

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

NIL

##### 2.2 Additional Readings

*(Additional references for students to learn to expand their knowledge about the subject.)*

1.	Thomas E. Graedel, Matthew J. Eckelman. "Industrial Ecology and Sustainability" World Industries Scientific Publishing Co Pte LTD. 2023.
2.	Charbel Jose Chiappetta Jabbour, Syed Abdul Rehman Khan "Sustainable Production and Consumption Systems" Springer Nature. 2021.
3.	Samuel Ayodele Iwarere. "Sustainable Engineering: concepts and Practices" Springer International Publishing A&G. 2024.
4.	Edited By Sherin Zafar, Mohd Abdul Ahad, M. Afshar Alam, Kashish Ara Shakil. "Green Automation for Sustainable Environment". CRC Press. 2022.
5.	Edited By K. Saravanan, G. Sakthinathan. "Handbook of Green Engineering Technologies for Sustainable Smart Cities". CRC Press. 2021.
6.	Edited By V. Sivasubramanian. "Environmental Sustainability Using Green Technologies". CRC Press. 2020.