SYE4108: PRODUCT DEVELOPMENT AND INNOVATION

Effective Term
Semester A 2026/27

Part I Course Overview

Course Title
Product Development and Innovation

Subject Code
SYE - Systems Engineering
Course Number
4108

Academic Unit
Systems Engineering (SYE)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Students under 2-year curriculum (ASII Entry):
Completion of at least 30 CUs of the programme requirement (excluding OOD, University Language) by semester B of the preceding academic year.

Students under 4-year and 3-year curriculum (both normative 4-year and ASI entry):
Completion of at least 45 CUs of the Major Requirement (excluding GE & College Requirements).

Precursors
Nil

Equivalent Courses
SEEM4034 Product Development: Managerial Approach &
SEEM4109 Product and Service Design and Innovation or
ADSE4108 Product Development and Innovation

Exclusive Courses

SYE2108 Innovative Thinking for Systems Engineering Design

Part II Course Details

Abstract

Innovation is essential for modern enterprises to maintain their competitive edge. This course equips students with foundational knowledge and skills that are critical for innovative product development. Students will learn a wide range of theories, methods, and tools to support empathy, ideation, prototyping, and optimization throughout the product innovation process. Emphasis is placed on harnessing cutting-edge generative AI to boost design creativity and drive innovation. Through a team-based product development project, students will gain hands-on experience and develop innovative products with commercialization potential. This course is tailored to prepare students for leadership roles in innovative enterprises or startups.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Learn theories and methods for creative design and innovation	30	x	x	
2	Experience and understand product development process	40		x	x
3	Develop system thinking and soft skills for collaboration	30	x	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	Lectures, tutorials, in-class exercises		1, 2, 3	39 hours/semester
2	Product development project activities		1, 2, 3	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Project reports and presentations	1, 2, 3	30	Team project	Yes
2	Project team peer evaluation	1, 2, 3	10	Team project	No

3	Homework assignments	1, 2	30	Course work	Yes
4	Classroom participation and contribution to collective learning	1, 2	10	Course work	Yes

Continuous Assessment (%)

80

Examination (%)

20

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

Examination: Students will be assessed via the examination to their understanding of the concepts and techniques learned as well as the capabilities to apply these concepts, theories and techniques.

Assessment Rubrics (AR)

Assessment Task

Course work (

Criterion

Based on homework assignments (30%), and classroom participation and contribution to collective learning (10%)

Excellent (A+, A, A-)

Strong evidence of capacity to analyse and synthesize; superior grasp of subject matter.

Good (B+, B, B-)

Evidence of grasp of subject, some evidence of critical capacity and analytic ability.

Fair (C+, C, C-)

Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material.

Marginal (D)

Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.

Failure (F)

Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.

Assessment Task

Team project

Criterion

Based on team project reports and presentations (30%), and team peer evaluation (10%);

Excellent (A+, A, A-)
Strong evidence of capacity to analyse and synthesize; superior grasp of subject matter.

Good (B+, B, B-)
Evidence of grasp of subject, some evidence of critical capacity and analytic ability.

Fair (C+, C, C-)
Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material.

Marginal (D)
Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.

Failure (F)
Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.

Assessment Task
Examination

Criterion
Based on submitted written work

Excellent (A+, A, A-)
Strong evidence of capacity to analyse and synthesize; superior grasp of subject matter.

Good (B+, B, B-)
Evidence of grasp of subject, some evidence of critical capacity and analytic ability.

Fair (C+, C, C-)
Student who is profiting from the university experience; understanding of the subject; ability to develop solutions to simple problems in the material.

Marginal (D)
Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.

Failure (F)
Little evidence of familiarity with the subject matter; weakness in critical and analytic skills.

Part III Other Information

Keyword Syllabus

- Theoretical foundations of creativity, design, and innovation.
- Empathy techniques for user need identification.
- Creativity techniques for idea generation for new product design.
- Prototyping techniques for innovative product development.
- Innovation taxonomy and strategies.
- Project planning and management for new product development.

Reading List

Compulsory Readings

	Title
1	Jianxi Luo, "Design Science: Driving Innovation with Unified Principles", Springer, 2026
2	Lecture notes and slides provided by the instructor