

HKUST - School of Engineering

Course descriptions for Pre-enrollment (Fall 2023)

Courses which can be pre-enrolled

CENG 1000 Introduction to Chemical and Biological Engineering [3 Credit(s)]

From chemistry to engineering, molecules to useful products. Physical, chemical and biochemical transformation of materials. Survey of industries related to modern chemical and biological engineering. Basic principles of materials and energy balance. Strategy of molecular synthesis, process selection and design, economic and environmental considerations. Examples taken from a diverse range of products spanning realms of food, consumer products, energy, environment, and medicine. Case studies and team projects on process and product design. For engineering students only.

Background: Level 3 or above in HKDSE 1/2x Chemistry OR in HKDSE 1x Chemistry OR CHEM 1004 OR CHEM 1010 OR CHEM 1020

CENG 1700 Introduction to Environmental Engineering [3 Credit(s)]

Fundamentals of environmental impact assessment will be discussed. Life cycle analysis of carbon and energy will be introduced using case studies. Principles of environmental engineering for control of air, water, solid and noise pollution will be discussed, including global pollution, pollution prevention and minimization. Cost of available technologies will be analyzed.

Exclusion: CIVL 2140

Background: Level 3 in HKDSE 1/2x Chemistry OR CHEM 1010

CHEM 1008 Introductory Chemistry [3 Credit(s)]

This course targets science or engineering students with very little to no chemistry background. It provides a general introduction to basic principles of chemistry. Key topics include state of matters, atoms and elements, molecules and compounds, atomic structures and periodicity, molecular structures, quantities in chemical reactions, bonding theories, acids and bases, and solution chemistry.

Exclusion(s): Level 3 or above in HKDSE 1/2x Chemistry OR HKDSE 1x Chemistry, a passing grade in AL/AS Chemistry, any CHEM courses at or above 1004-level

CHEM 1020 General Chemistry I [3 Credit(s)]

his course targets at students who have acquired more advanced knowledge in fundamental Chemistry in high school. Key topics include atomic structure and periodicity, bonding theories, chemical energy, and properties of gases, liquids and solids. Other topics such as chemical kinetics, chemical equilibrium and organic molecules will be briefly reviewed.

Prerequisite(s): Level 3 or above in HKDSE 1/2x OR level 3 or above in HKDSE 1x Chemistry OR CHEM 1008

Exclusion(s): CHEM 1010

CIVL 1100 Discovering Civil and Environmental Engineering [3 Credit(s)]

A general overview of civil and environmental engineering, infrastructure development and engineering ethics is provided. The course includes both lectures and laboratory sessions, where the laboratory sessions are primarily directed to students who require the development of feasible conceptual solutions for the analysis and design of the basic problems in structural, geotechnical and environmental engineering. For first year engineering students under the four-year degree curriculum only.

COMP 1021 Introduction to Computer Science [3 Credit(s)]

(If you are considering to study DSCT and you have granted credit transfer in COMP1022P, you are highly recommended to take this course COMP2011 as it is required by DSCT)

This course introduces students to the world of Computer Science. Students will experience a range of fun and interesting areas from the world of computing, such as game programming, web programming, user interface design and computer graphics. These will be explored largely by programming in the Python language.

Exclusion(s): COMP 1022P, COMP 1022Q (prior to 2020-21), COMP 2011, COMP 2012H

ELEC 1100 Introduction to Electro-Robot Design [4 Credit(s)]

The course introduces the fundamental knowledge on the design, implementation and evaluation of a robot and its sub-systems. It covers the basic principles of analog and digital circuits as well as robot sensing and control mechanisms. Students have to apply the knowledge and principles learned to design and build a functional robot by the end of the course. Students who have completed ELEC 2200, ELEC 2350, ELEC 2400, ELEC 2420, or ELEC 3310, must obtain instructor's approval to take this course.

ELEC 1200 A System View of Communications: from Signals to Packets [4 Credit(s)]

Have you ever wondered what technologies go into your mobile phone or a WiFi hotspot? Through hands on work with a simple but fully functional wireless communication system, you will understand the basic engineering tools used and tradeoffs encountered in the design of these systems. This course is centered on weekly laboratories, each designed to introduce an important concept in the design of these systems. The lab sessions are supported by two one-hour lectures and a tutorial that introduce the concepts for the next laboratory, as well as reviewing and expanding the concepts learned in the previous laboratory.

Corequisite(s): (COMP 1021 OR COMP 1022P) AND (MATH 1003 OR MATH 1014 OR MATH 1020 OR MATH 1024)

Mode of Delivery: [SPO] Self-paced online delivery; [BLD] Blended learning

ENGG 1100 First Year Cornerstone Engineering Design Project Course [3 Credit(s)]

This project course is designed specifically for first year engineering students. This course aims at providing engineering students experiential learning experience through exposing students to knowledge and skills from different SENG disciplines before making decision on their majors. Students in this course will be divided into design teams. Each team will use the acquired knowledge and skills to design and build an engineering artifact, e.g. an airship. In order to offer the course at scale, the technical components will be offered online and students would be engaged in experiential learning through working on team projects. For First year Engineering students only.

Exclusion(s): ENGG 1200

Mode of Delivery: [BLD] Blended learning

IEDA2010 Industrial Engineering and Decision Analytics [3 Credit(s)]

This course provides an introduction to industrial engineering and decision analytics (IEDA). It comprises of two parts. The first part introduces basic IE analytical tools, such as optimization, game theory, probability and statistics, at a conceptual level. In the second part, many of the IEDA practical concepts, including production and operations management, logistics and supply chain management, financial technology are introduced.

Exclusion(s): IEDA 2200

LIFS 1901 General Biology I [3 Credit(s)]

This course targets science students not having taken HKDSE 1x Biology or AL/AS Biology. It provides students with a general overview of fundamental biology: basic characteristics of life (the chemistry of life, cells), vital life processes (respiration, photosynthesis, genetics), essential concepts of evolution and ecology, and so on.

Exclusion(s): Level 3 or above in HKDSE 1x Biology, a passing grade in AL/AS Biology

ISDN 1001 Introduction to Integrative System and Design [3 Credit(s)]

This is a foundation course in which students will learn about the societal, economical, and cultural impact of integrative systems and the importance of integrating design into the creation of integrative systems. Through lectures, discussions, case-study and presentation, hands-on dis-assembly and re-assembly exercises, students will learn about the basic design principles, design terminology, design skill-sets, design thinking and process, and how a good design relates to the design principles. Students will also learn about what is an integrative system and the importance of using technology to build an integrative system and how it is decomposed into different sub-systems that involve multiple technology components, interacting with each other.

ISDN 1002 Redefining Problems for the Real Needs [3 Credit(s)]

Design Research is an introduction of research methodology and methods used for exploring problems as well as identifying opportunities for design initiatives. It guides designers how to unravel needs and problems in the real world before inventing. This course introduces students various design research principles, methods and ethics for investigating people and their world. It is a learning-by-doing course in which students, work in groups, learn the principles in class and apply them in the field. The course sets out several challenges in local context. After conducting both contextual research and user research, students are guided to seek insights and identify opportunities for technological innovation aiming to solve the identified problems. Overall, students explore the real world in a lively yet methodical way.

ISDN 1006 Human-centered Innovation [3 Credit(s)]

A project-based, experiential course that exposes students to practice the five modules in design thinking - "Empathize", "Define", "Ideate", "Prototype" and "Test". The unmet needs will be identified by observing the daily routine of real services and people. Research on existing solutions and how to conduct the stakeholder and market analyses will be taught for designing the needs screening matrix in needs selection. Students are going to unlock their creativity potentials through the in-class activities. The new ideas of addressing the unmet needs are generated in which the ideas are grouped and organized into a concept map. To translate a promising concept from an idea into a rudimentary design, the concept exploration is facilitated by prototyping. The prototypes are tested by the potential users. This course aims to develop students' communication, interpersonal, analytical, design and project management skills.

MECH 1902 Energy Systems in a Sustainable World [3 Credit(s)]

Various fuels used by mankind, fossil and renewable sources; power generation technologies and the controversies; energy efficient technologies and the applications in buildings and consumable products; energy efficient manufacturing technologies; low energy infrastructure and impact to modern life style; myths behind sustainable energy systems and the debates; energy entrepreneurship, case studies and social impact.

MECH 1906 Mechanical Engineering for Modern Life [3 Credit(s)]

Mechanical Engineering covers the broadest range of engineering amongst all related disciplines. In addition to the production of modern products useful in daily life, it is also associated with power generation and distribution, as well as new materials development. These will be used to explain mechanical engineering principles and their usage in product design and manufacture. Contents include Engineering Materials, Solid Mechanics and Structural Design, Renewable Energy, Indoor Environmental Quality, Smart Green Building, Energy Design, Sensors and Instrumentation, Robots and Controls, together with MEMS and LED Fabrication. First year students are preferred.

MECH 1907 Introduction to Aerospace Engineering [3 Credit(s)]

Introduction to the field of Aerospace engineering, discussion of basic aerospace systems and disciplines, working vocabulary of the field. Basic concepts. Demonstration through examples.

PHYS 1101 Introductory Physics [4 Credit(s)]

This course is for students with no physics background. It can serve as a standalone introduction to physics or as a preparatory course for students who intend to take PHYS 1112. It is not a preparatory course for PHYS 1111; students with no calculus background who plan to take General Physics should take calculus concurrently with PHYS 1101 so that they meet the prerequisites for PHYS 1112. Topics covered include heat and gases, force and motion, waves, and electricity and magnetism.

Exclusion(s): Level 3 or above in HKDSE 1/2x Physics or HKDSE 1x Physics; any PHYS courses at 1100-level or above

PHYS 1112 General Physics I with Calculus [3 Credit(s)]

PHYS 1111 and PHYS 1112 target students who have learned the most basic knowledge in physics in high school. Students with more advanced physics background should consider taking PHYS 1312. PHYS 1112 employs a calculus-based approach. Students without knowledge of calculus should take PHYS 1111 instead. Key topics include motions and Newton's Laws, work and energy, conservation of energy and momentum, rotation, rigid body, simple harmonic and damped oscillations, forced oscillations, standing waves and sound waves, kinetic theory and the laws of thermodynamics. Students without the physics prerequisite but who have taken PHYS 1101 or equivalent, and/or without the mathematics prerequisite but who have taken MATH 1012/ MATH 1013/ MATH 1020/ MATH 1023 or equivalent may seek instructor's approval for enrolling in the course.

Prerequisite(s): (Level 3 or above in HKDSE 1/2x OR in HKDSE 1x Physics) AND Level 3 or above in HKDSE Mathematics Extended Module M1/M2

Exclusion(s): PHYS 1111, PHYS 1312

Courses will be pre-registered:

HMAW 1905 Behavioral Foundations of University Education: Habits, Mindsets, and Wellness [3 Credit(s)]

This course will help students adapt to university life through advising, sharing and discussion, and applying the science of well-being to enhance their personal and interpersonal development. It also aims to foster their self-understanding and confidence as young adults who can fully enjoy their university education and career thereafter. The course has 3 components: Lectures and Seminars, Self-Directed Experience, and Advising and Community Meetings. Lectures and Seminars will orientate students to their respective Schools/IPO, provide academic advices and equip them with the scientific bases of well-being. Self-Directed Experience will provide opportunities to develop mindsets and habits for students' physical and social-emotional wellness and personal enrichment. In Advising and Community Meetings, students will bring knowledge and skills together through reflection and discussion with peers and School/IPO advisors. Topics such as learning and time management skills, purpose of university education, and planning for personal and professional development will be covered. Graded PP, P or F.

Exclusion(s): IDPO 1010

According to students' qualification, either LANG 1401 or LANG 1402 will be registered

LANG 1401 Intensive English Studies for University Studies [3 Credit(s)]

This is an intensive English language course for students in their first year of study who need language enhancement and proficiency training to build a strong foundation in English. Students will develop the language skills necessary to communicate effectively and complete academic tasks in an English-medium university. They will also build skills and habits for self-directed learning at university. The content of this course focuses on developing students' language foundation, and tasks and activities are designed so that they can receive enhanced teacher support and feedback.

Exclusion(s): LANG 1002, LANG 1003, Level 3 or above in HKDSE English Language

LANG 1402 English Studies for University Studies [3 Credit(s)]

This course aims for students in their first year of study and will develop students' spoken and written language proficiency. The course also introduces academic literacy skills common to all disciplines. Students will learn to evaluate others' opinions, develop strong arguments and communicate those arguments effectively in written and spoken English. In addition to traditional academic writing, the course includes elements of academic communication that go beyond the text level to incorporate academic communication that includes text and audio. They will also build skills and habits for self-directed learning at university.

Prerequisite: (Level 3 in HKDSE English Language with all papers at or above level 3) OR (Level 4 in HKDSE English Language) OR (Level 5 in HKDSE English Language with some papers but not all at or above level 4) OR (Overall bandscore of 6.0 in IELTS) OR (Overall bandscore of 6.5 in IELTS with some but not all subscores at or above 6.0) OR equivalence of the above

Exclusion(s): LANG 1002, LANG 1003

According to students' qualification, either MATH1012 or MATH1013 will be registered

MATH 1012

Calculus IA

[4 Credit(s)]

This is an introductory course in one-variable calculus, the first in the Calculus I and II sequence, designed for students that have not taken HKDSE Mathematics Extended Module M1 or M2. Topics include functions and their limits, continuity, derivatives and rules of differentiation, applications of derivatives, and basic integral calculus.

Exclusion(s): Level 3 or above in HKDSE Mathematics Extended Module M1 or M2; AL Pure Mathematics; AL Applied Mathematics; MATH 1003, MATH 1013, MATH 1014, MATH 1020, MATH 1023, MATH 1024

MATH 1013

Calculus IB

[3 Credit(s)]

This is an introductory course in one-variable calculus, the first in the Calculus I and II sequence, designed for students that have taken HKDSE Mathematics Extended Module M1/M2. Topics include functions and their limits, continuity, derivatives and rules of differentiation, applications of derivatives, and basic integral calculus.

Prerequisite(s): Level 3 or above in HKDSE Mathematics Extended Module M1/M2;

Exclusion(s): AL Pure Mathematics; AL Applied Mathematics; MATH 1012, MATH 1014, MATH 1020, MATH 1023, MATH 1024