

COURSE CONTENT

Academic Year	2024/2025	Semester	1
Course Coordinator	Assoc Prof. Raymond Lau Wai Man		
Course Code	CB1102		
Course Title	Introduction to Chemical and Biomedical Engineering		
Pre-requisites	Nil		
No of AUs	1		
Contact Hours	13 hours lecture, 0 hours tutorial		
Proposal Date	6 Nov 2019		

Course Aims

This course aims to provide students with background of chemical engineering and bioengineering, as well as the career planning and options after graduation. Industry speakers and SCBE alumni will share information on industry landscape in Singapore, internship and career path preparation and personal career journey related to chemical engineering and bioengineering.

Intended Learning Outcomes (ILO)

Upon completion of this course, you should be able to:

- 1) recognize the wide range of opportunities for chemical engineers and bioengineers.
- 2) describe the different roles in a particular industry for chemical engineers and bioengineers.
- 3) identify the industries and roles of personal interests.
- 4) locate the resources available for career planning and development.

Course Content

Key topics covered

- 1) Career planning and development
- 2) Entrepreneurship
- 3) Graduate studies
- 4) Local industries for chemical engineers and bioengineers

Assessment (includes both continuous and summative assessment)

Component	Course LO Tested	Related Programme LO or Graduate Attributes	Weighting	Team /Individual	Assessment rubrics
Course Assessment (Quiz)	1, 2, 3, 4	I	60%	Individual	NA
Continuous Assessment (Essay)	1, 2, 3	I	40%	Individual	Appendix 1
Total			100%		

Mapping of Course ILOs to EAB Graduate Attributes

Course Intended Learning Outcomes	Cat	EAB's 12 Graduate Attributes*												
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	
	Core													•
recognize the wide range of opportunities for chemical engineers and bioengineers.														
describe the different roles in a particular industry for chemical engineers and bioengineers.														

identify the industries and roles of personal interests.	
locate the resources available for career planning and development	

Legend:

- Fully consistent (contributes to more than 75% of Intended Learning Outcomes)
- ◐ Partially consistent (contributes to about 50% of Intended Learning Outcomes)
- § Weakly consistent (contributes to about 25% of Intended Learning Outcomes)
- Blank Not related to Student Learning Outcomes

Formative feedback

In class question and answer dialogue session will be conducted to clear doubts.

Learning and Teaching approach

Approach	How does this approach support students in achieving the learning outcomes?
Lecture	Industry speakers and SCBE alumni will share information on industry landscape in Singapore, internship and career path preparation and personal career journey related to chemical engineering and bioengineering. In class question and answer dialogue session(s) will be conducted to answer specific questions raised during the sharing.

Reading and References

Nil

Course Policies and Student Responsibilities

General: Students are expected to take all scheduled assignments 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 in class discussions and activities.

Continuous assessments: Students are required to attend all continuous assessments.

Absenteeism: Continuous assessments make up a significant portion of students' course grade. Absence from continuous assessments without officially approved leave will result in no marks and affect students' overall course grade.

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. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors

Instructor	Office Location	Phone	Email
Raymond Lau	N1.2-B2-32	6316 8830	wmlau@ntu.edu.sg

Planned Weekly Schedule

Week	Topic	Course LO	Readings/ Activities
1	Overview	1, 2	Nil
2	Career paths as chemical engineers and bioengineers	1, 2, 3	Nil
3	Career planning – graduate attributes	3, 4	Nil
4	Career planning – internship	3, 4	Nil
5	Sharing from industry / alumni	1, 2, 3	Nil
6	Sharing from industry / alumni	1, 2, 3	Nil
7	Sharing from industry / alumni	1, 2, 3	Nil
8	Sharing from industry / alumni	1, 2, 3	Nil
9	Sharing from industry / alumni	1, 2, 3	Nil
10	Sharing from industry / alumni	1, 2, 3	Nil
11	Sharing from industry / alumni	1, 2, 3	Nil
12	Sharing from industry / alumni	1, 2, 3	Nil

Appendix 1: Assessment Criteria

<u>Criteria</u>	<u>Exceed Expectations</u>	<u>Meet Expectations</u>	<u>Meet Baseline Expectations</u>	<u>Below Expectations</u>
LO 1, 2, 3	<p>Demonstrates strong interest of chemical and/or biomedical industry.</p> <p>Exhibits deep understanding of different job roles, responsibilities and skills needed for chemical engineers or bioengineers in a particular industry.</p> <p>Essay is written in a concise, coherent, well-organized and well-structured manner. The format is consistent throughout.</p>	<p>Demonstrates reasonable interest of chemical and/or biomedical industry.</p> <p>Exhibits acceptable understanding of different job roles, responsibilities and skills needed for chemical engineers or bioengineers in a particular industry.</p> <p>Essay is concise, coherent, and organized. The format is consistent throughout.</p>	<p>Demonstrates shallow interest of chemical and/or biomedical industry.</p> <p>Exhibits narrow understanding of different job roles, responsibilities and skills needed for chemical engineers or bioengineers in a particular industry.</p> <p>Essay is organized but the format is inconsistent.</p>	<p>Shows no interest of chemical and/or biomedical industry.</p> <p>Do not exhibit any understanding of different job roles, responsibilities and skills needed for chemical engineers or bioengineers in a particular industry.</p> <p>Essay is unorganized and difficult to comprehend.</p>

Appendix 2: The EAB (Engineering Accreditation Board) Accreditation SLOs (Student Learning Outcomes)

- a) **Engineering knowledge:** Apply the knowledge of mathematics, natural science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems
- b) **Problem Analysis:** Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- c) **Design/development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- d) **Investigation:** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- e) **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
- f) **The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- g) **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.
- h) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- i) **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
- j) **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- k) **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- l) **Life-long Learning:** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change