

BME4104: TECHNOLOGY FOR DRUG DISCOVERY

Effective Term

Semester B 2023/24

Part I Course Overview

Course Title

Technology for Drug Discovery

Subject Code

BME - Biomedical Engineering

Course Number

4104

Academic Unit

Biomedical Engineering (BME)

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

Nil

Precursors

Nil

Equivalent Courses

MBE4104 Technology for Drug Discovery

Exclusive Courses

NIL

Part II Course Details

Abstract

This course aims to provide students with a comprehensive knowledge on the technologies for drug discovery by introducing the process of drug discovery and the basic technologies used in the drug discovery. The course starts with the fundamental knowledge and key concepts in drug discovery and development, and then introduce the recent advances in drug discovery technology. At the end of the course, the students will not only be able to obtain the basic knowledge on the technologies for drug discovery, but also understand the recent developments in the field. This course is organized to enable students to understand this interdisciplinary subject with minimal background. Its major components include fundamentals in drug discovery, chemical and biological assays, screening and analytical technology, sensing and measurement methods, high throughput approaches, new computational and biological modalities for drug discovery, and the overall pipeline for new drug development.

Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the basic principles for drug discovery process and related technologies.	x		
2	Select relevant knowledge and technologies to obtain solutions for some common problems in the development of technology for drug discovery.	x		
3	Integrate the principles stated in CILO-1 to analyze some practical problems.		x	
4	Demonstrate reflective practice in an engineering context.		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.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lecture	Introduction of key concepts.	1, 2, 3, 4	3 hrs/week
2	Group-based Presentation Projects	Presentation and data analysis in the context of real drug discovery process.	2, 3, 4	3 hrs/week for 2 weeks

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Mini-projects	2, 3, 4	35	
2	Exercises	1, 2	15	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

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

Assessment Rubrics (AR)**Assessment Task**

Mini-projects

Criterion

Ability to identify scientific and engineering problems, review relevant literatures and technologies, understand key analytical/chemical/biological/computational tools for drug discovery, and present in a logic, scientific way.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Exercises

Criterion

Describe the concepts and principles and provide solution to related analytical problems.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

Capability of applying the concepts introduced in lectures for analysis of results from biomedical measurements; understand key concepts and mechanisms in drug discovery; have a big picture of the pipeline and progress in drug discovery field.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Drug discovery
Drug target
Pre-clinical trial
Drug toxicity
Analytical technology
High throughput screening
Pharmacokinetics
Bio-sensor for drug discovery
Bio-marker
Data analysis for drug discovery

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

	Title
1	Drug Discovery and Development: Technology in Transition, 2nd Edition by Raymond G Hill.
2	The Practice of Medicinal Chemistry, 4th Edition by Camille Georges Wermuth.