BME6117: BIOMEDICAL SAFETY AND RISK ASSESSMENT

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Biomedical Safety and Risk Assessment

Subject Code
BME - Biomedical Engineering
Course Number
6117

Academic Unit
Biomedical Engineering (BME)

College/School
College of Biomedicine (BD)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
MBE6117/BME8130 Biomedical Safety and Risk Assessment

Exclusive Courses
Nil

Part II Course Details

Abstract

This course introduces the important elements of biosecurity and bio/medical-safety. Students will be provided with an overview of the bio-safety practices, equipment, and facilities for the safe and secure handling of biological samples and dangerous pathogens in a laboratory setting. Related topics such as biorisk management, biocontainment, bio-safety levels, bio-hazard symbols, risk assessment, bloodborne or airborne pathogens and toxins, bio-terrorism and food safety will be covered.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the basic concepts of bio/medical-safety bio-security, biorisk management, biocontainment, bio-terrorism, and food safety.		x		
2	Apply the concepts of biorisk management, biocontainment, and risk assessment to analyse some practical problems.			x	x
3	Select relevant knowledge elements and technologies to obtain solutions for some common problems towards biorisk management of pathogens and toxins.			x	
4	Demonstrate reflective practice in an engineering context.			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	Describe the concepts of bio/medical-safety bio-security, biorisk management, biocontainment, bio-terrorism, and food safety.	1, 2	39 hours
2	Assignment	Require students to solve a problem based on the major concepts of biorisk management, biocontainment, and risk assessment etc. covered in the lectures	1, 2	NA

3	Mini-project	Require students to identify one biosafety related event through a literature review and analyse a possible solution to overcome the problems	3, 4	NA

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Midterm test	1, 2	10	-	No
2	Assignment	1, 2	15	-	Yes
3	Mini-project	3, 4	15	-	Yes

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Assessment Rubrics (AR)

Assessment Task

Midterm test (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Describe the basic concepts of bio/medical-safety, biosecurity, biorisk management, and biocontainment etc. and apply them to analyse some practical 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
Assignment (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Identify and solve a problem based on the major concepts of biorisk management, biocontainment, and risk assessment etc.

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
Mini-project (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Identify one bio/medical-safety related event through a literature review.
Analyse the cause(s) of the event and propose a control and prevent method.

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 (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
Describe the major concepts of bio/medical-safety biosecurity biorisk management, and biocontainment etc.
Identify biohazardous conditions to be considered in the design and/or operation of a laboratory; ability to conduct a risk assessment

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
Midterm test (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Describe the basic concepts of bio/medical-safety, biosecurity, biorisk management, and biocontainment etc. and apply them to analyse some practical problems.

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Assignment (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
Identify and solve a problem based on the major concepts of biorisk management, biocontainment, and risk assessment etc.

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

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Mini-project (for students admitted from Semester A 2022/23 to Summer Term 2024)

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Describe the major concepts of bio/medical-safety, biosecurity, biorisk management, and biocontainment etc.
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(B-, C+, C) Basic

Failure
(F) Not even reaching marginal levels

Part III Other Information

Keyword Syllabus
Bio/medical-safety: Bio-security and Bio-terrorism
Biohazard: A biological agent or condition, individual risk, and institutional risk
Biorisk Management: Risk Assessment, Biocontainment, and Risk Communication
Biosafety Levels: Risk Group
Lab Biosafety Practices and Techniques
Laboratory Facilities and Design: Local Codes of Practice, Safety Equipment

Biosafety Events: Laboratory-Acquired Infections (LAIs)
Bioterrorism and Food Safety
Biosafety laws: regulations and ordinance

Reading List

Compulsory Readings

	Title
1	Biosecurity : Understanding, Assessing, and Preventing the Threat Burnette, Ryan, Hoboken : Wiley, 2013

Additional Readings

	Title
1	Laboratory biosafety manual (Third edition), World Health Organization 2004
2	Responsible life sciences research for global health security, World Health Organization, 2010