

BME6145: APPLIED ARTIFICIAL INTELLIGENCE FOR BIOMEDICAL AND HEALTHCARE APPLICATIONS

New Syllabus Proposal

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Applied Artificial Intelligence for Biomedical and Healthcare Applications

Subject Code

BME - Biomedical Engineering

Course Number

6145

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

BME8145 Applied Artificial Intelligence for Biomedical and Healthcare Applications

Exclusive Courses

Nil

Part II Course Details

Abstract

Applied Artificial Intelligence for Biomedical and Healthcare Applications is a university course designed to equip postgraduate students with the capability to apply artificial intelligence (AI) algorithms to biomedical and healthcare problems. It consists of 1) introduction to applied computational intelligence, overview and review of various areas of emerging technologies of computational intelligence systems (e.g., 2) neural networks, 3) fuzzy logic, 4) simulated annealing, 5) genetic algorithm, and 6) swarm intelligence), and 7) applications of intelligence systems in biomedical and healthcare domains.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe basic principles of different artificial intelligence (AI) algorithms including neural networks, fuzzy logic, simulated annealing, genetic algorithm and swarm intelligence.		x	x	
2	Explain representative designs and fundamental concepts on the above AI algorithms in different biomedical and healthcare applications		x	x	
3	Apply the knowledge covered in this course as a project based on their ideas and the market needs for different biomedical and healthcare applications			x	x
4	Apply storytelling techniques to share ideas of adopting AI algorithms for biomedical and healthcare application.			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	Lecture	Students will develop, expand and consolidate their understanding of key concepts related to the course materials.	1, 2	2 hrs/week for 11 weeks

2	Tutorials or guest lectures	Students will participate in-class exercise with guidance from the tutors, or they will discuss with guest speakers on successful application stories of intelligence systems in biomedical and healthcare domains.	1, 2, 3, 4	1 hr/week for 11 weeks
3	Project presentation	Students will thoughtfully engage in the development process of AI solutions by integrating what they learn from this course and their innovative ideas. Students will summarize the proposed AI solutions as presentation slides and then present them, supported with analytical/ simulation analyses and results of preliminary implementation of the proposed AI algorithms or solutions.	1, 2, 3, 4	3 hrs for 1 weeks

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("- for nil entry)	Allow Use of GenAI?
1	Assignments	1, 2, 3	20	-	Yes
2	Project Report and Presentation	1, 2, 3, 4	20	-	Yes
3	Mid-term Examination	1, 2, 3	20	1.5 hours	No

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Assessment Rubrics (AR)**Assessment Task**

Assignments

Criterion

ABILITY to REPORT the principles, theory, and applications related to various AI algorithms in biomedical and healthcare applications, as covered in this course.

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 report and presentation

Criterion

ABILITY to EXPLAIN 1) the ideas of proposed AI-solutions and 2) the implementation of AI algorithms in the target biomedical and healthcare applications.

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

Mid-Examination and Examination

Criterion

ABILITY to ANALYSE characteristics, performance attributes, and related fundamental technical aspects of various AI algorithms, as covered in this course, in different biomedical and healthcare application scenarios.

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

Biomedical, Healthcare, Artificial Intelligence, Computational Intelligence, Neural Network, Fuzzy Logic, Simulated Annealing, Genetic Algorithm, and Swarm Intelligence

Reading List**Compulsory Readings**

Title	
1	N.A.

Additional Readings

Title	
1	Tom Lawry AI in Health: A Leader's Guide to Winning in the New Age of Intelligent Health Systems ISBN 978-0367333713
2	Dr Parag Suresh Mahajan MD Artificial Intelligence in Healthcare: AI, Machine Learning, and Deep and Intelligent Medicine Simplified for Everyone ISBN 978-1954612020
3	Kerrie Holley, Siupo Becker AI-First Healthcare: AI Applications in the Business and Clinical Management of Health ISBN 978-1492063155