DSC6029: TOPICS OF ARTIFICIAL INTELLIGENCE FOR BIOMEDICAL STUDIES

Effective Term
Semester A 2026/27

Part I Course Overview

Course Title
Topics of Artificial Intelligence for Biomedical Studies

Subject Code
DSC - Data Science
Course Number
6029

Academic Unit
Data Science (DS)

College/School
College of Computing (CC)

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
SDSC6029 Topics of Artificial Intelligence for Biomedical Studies

Exclusive Courses
Nil

Part II Course Details

Abstract

The rapid advancement of artificial intelligence (AI) technologies is revolutionizing the biomedical field, impacting areas such as medical imaging, drug discovery, personalized medicine, and patient care. This course aims to explore the technological innovations driving this transformation and their implications for healthcare and biomedical research. We will begin by reviewing fundamental concepts and models of artificial intelligence, followed by an in-depth analysis of selected case studies that highlight industrial applications. Through the examination of academic papers, we will uncover the underlying principles of AI, its economic impact, and current research challenges in the biomedical domain. The course is designed to be interactive, featuring classroom discussions, case studies, group projects, and the possibility of guest speakers from the industry.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain clearly the fundamentals of the biomedical engineering and biomedical technologies in the context of specific applications.	15	x		
2	Elaborate in details the key ideas behind each area that enable it to be successful for its purpose.	25	x	x	
3	Assess prevailing practices in biomedical engineering and identify approaches that enhance the existing biomedical application.	30	x	x	x
4	Utilize ideas and methods learned to solve given practical problems in potential areas.	30	x	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	In-class Activities	Students will engage in formal lectures and interactive discussions on identified latest academic research papers and/or industrial practices of identified topics.	1, 2, 3, 4	26 hours/semester

2	Project	Students will participate in a term project so that students to learn problem-solving using selected projects pertaining to the subjects discussed.	1, 2, 3, 4	13 hours/semester

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Class Participation: - Attendance and in-class discussion are strongly emphasized for this course. - In particular, the in-class discussion component will focus on discussing selected research papers and identified industrial practice through student groups. - Scoring favour those demonstrate well in these activities.	1, 2, 3, 4	10	-	Yes
2	Project Presentation: - Presenting the independent work of the course project, either single-person or a group, on selected topics provided by the lecture. - Assessments will be based on individual's presentation performance, in terms of clarity, structure, depth, innovation, and quality of answers to questions.	1, 2, 3, 4	30	-	Yes

3	Course Paper: - A report paper written in accordance with the course project on selected topics provided by the teacher. - Assessments will be based on the quality of the report paper, in terms of the academic difficulties and the depth of the paper, quality of the empirical/ numerical implementation, availability of the codes. Special points will be given to whether there are new discoveries throughout the process of the conducting the project.	1, 2, 3, 4	30	-	Yes

Continuous Assessment (%)

70

Examination (%)

30

Examination Duration (Hours)

2

Minimum Examination Passing Requirement (%)

30

Assessment Rubrics (AR)

Assessment Task

Class Participation (for students admitted in Semester A 2026/27 & thereafter)

Criterion

Percentage of classroom attendance.
The quality and intensity of participating in-class discussion, answering questions, 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
Project Presentation (for students admitted in Semester A 2026/27 & thereafter)

Criterion
Quality of the presentation.
Clarity, structure, depth, innovation, and quality of answering questions in terms of demonstration of mastering the basic concepts and the ability to apply methods learned to biomedical 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
Course Paper (for students admitted in Semester A 2026/27 & thereafter)

Criterion
Quality of report paper.
Academic depth, implementation quality, and the quality of writing. Particular emphasis will be given to whether there are new discoveries throughout the process of the conducting the project, and whether the report paper show ability to solve conceptual and real-world problems using methods learned in class.

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
Exam (for students admitted in Semester A 2026/27 & thereafter)

Criterion
30%

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

a. Introduction to Artificial Intelligence in Biomedicine
   - Overview of AI concepts and applications in healthcare
b. Machine Learning Techniques for Medical Data
   - Supervised and unsupervised learning methods
   - Feature selection and data preprocessing
c. AI in Medical Imaging
   - Techniques in image recognition and analysis
   - Applications in radiology and pathology
d. Natural Language Processing in Healthcare
   - Text mining and analysis of clinical notes
   - Chatbots and virtual health assistants
e. AI for Drug Discovery and Development
   - Computational drug design and screening
   - Predictive modeling in pharmacology
f. Other Selected Topics

Reading List

Compulsory Readings

	Title
1	Lecture Notes; Selected Academic Papers.

Additional Readings

	Title
1	NIL