

SDSC6020: ARTIFICIAL INTELLIGENCE FOR SCIENTIFIC KNOWLEDGE DISCOVERY

New Syllabus Proposal

Effective Term

Semester A 2026/27

Part I Course Overview

Course Title

Artificial Intelligence for Scientific Knowledge Discovery

Subject Code

SDSC - Data Science

Course Number

6020

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

- 1) Basic programming skills (Python recommended)
- 2) Foundational course in linear algebra, calculus, and statistics
- 3) Introductory knowledge of machine learning is helpful but not required
- 4) Basic Knowledge in physics, chemistry or biology.

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course explores the application of Artificial Intelligence (AI) techniques to accelerate scientific research and facilitate the discovery of new scientific knowledge. Students will learn foundational AI methods, data analysis, and machine learning models tailored for scientific data, along with case studies from various disciplines such as biology, physics and chemistry.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Mastering the concept of artificial intelligence and its application in python	25%	x		
2	Ability to program in python and relevant AI code	25%	x		
3	Apply data-driven tools to scientific discovery problems	25%		x	
4	Discuss state-of-the-art development in the relevant areas and to form opinions on specific issues	25%			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	Students will engage in lectures which introduce the understanding and applications of various concepts and methods.	1, 2, 3, 4	25 hours/semester
2	Tutorials	Students will participate tutorial sessions that have explanation and exercises to familiarize themselves with the methods learnt during the lectures.	1, 2, 3, 4	6 hours/semester

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Assignments	2, 3, 4	40	-	Yes
2	Course Project	1, 2, 3, 4	30	-	Yes

Continuous Assessment (%)

70

Examination (%)

30

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Assessment Rubrics (AR)**Assessment Task**

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

Criterion

Train students' ability to theorize and solve various types of scientific problems with AI tools.

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

Criterion

Nurture students' ability in solving real scientific problems using data-driven tools.

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

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

Criterion

Students will demonstrate their understanding and application of key concepts, theories, and problem-solving skills relevant to the course material.

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

Reading List