

SDSC6021: GENERATIVE ARTIFICIAL INTELLIGENCE

New Syllabus Proposal

Effective Term

Semester A 2026/27

Part I Course Overview

Course Title

Generative Artificial Intelligence

Subject Code

SDSC - Data Science

Course Number

6021

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

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course explores the principles, methodologies, and applications of modern generative AI models, including large language models and diffusion models. Students will gain hands-on experience in designing, training, and fine-tuning generative models while examining their real-world impact across industries. We will also discuss the ethical implications of generative AI, addressing critical issues like bias, misinformation, intellectual property, and societal consequences.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Understand the basic concepts of generative models, including large language models, diffusion models, and their probability foundation.	30	x	x	
2	Learn to deploy generative AI systems, such as medium-scale large language models and diffusion models.	40	x	x	x
3	Analyze Ethical and Societal Impacts of the usage of generative AI.	30	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	Learning through teaching is primarily based on lectures.	1, 2, 3	39 hours in total
2	Take-home assignments	Learning through take-home assignments is primarily based on doing toy experiments on large language models.	2, 3	after class

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Homeworks (mini projects)	1, 2, 3	30	The mini-projects will ensure that the students understand the basic concepts in generative AI systems including LLMs and diffusion models. (0-60%)	Yes
2	Final project	1, 2, 3	50	The final project provide students chances to practice deploying generative AI systems to solve real-world problems, and demonstrate their achievements learned in this course. (0-60%)	Yes

Continuous Assessment (%)

80

Examination (%)

20

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

50

Minimum Examination Passing Requirement (%)

50

Additional Information for ATs

Note: To pass the course, the student need to obtain a minimum of 50% in the overall mark.

Assessment Rubrics (AR)**Assessment Task**

Homeworks (mini projects) (for students admitted in Semester A 2026/27 & thereafter)

Criterion

Ability to learn the basic concepts of generative AI

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

Criterion

Ability to run a generative AI model to solve real-world 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

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

Criterion

Ability to learn the basic concepts of generative AI

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

- 1. Foundations of Generative AI (Probability Theory & Bayesian Inference)
- 2. Classification of generative models
 - Latent Variable Models (VAEs, GANs, Normalizing Flows)
 - Autoregressive Models (LMs)
 - Energy-Based Models
- 3. Large language models
 - Basic structure
 - Training and inference
- 4. Diffusion models
- 5. Evaluation of generative models
- 6. Ethics & Responsible AI
 - Deepfakes & Misinformation
 - Data Privacy & Synthetic Data
 - Mitigating Harmful Outputs

Reading List

Compulsory Readings

Title	
1	Lecture slides and other related material