DSC6026: SOCIAL NETWORK ANALYSIS

Effective Term
Semester A 2026/27

Part I Course Overview

Course Title
Social Network Analysis

Subject Code
DSC - Data Science
Course Number
6026

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
Prior knowledge of Python programming and basic machine learning skills will be helpful for learning this course.

Precursors
Nil

Equivalent Courses
SDSC6026 Social Network Analysis

Exclusive Courses
Nil

Part II Course Details

Abstract
In an era where social connections drive everything from viral trends on TikTok to global collaborations on Wikipedia, understanding the structure and dynamics of social networks is essential for understanding complex social phenomena.

This course aims to equip students with cutting-edge computational tools and theoretical frameworks to analyze how social networks shape human behavior, information flow, and societal outcomes. By combining social and network science theories, complex systems modeling techniques, and computational social science methodologies, students will learn to model and predict complex social dynamics on real-world social networks ranging from social networking sites (e.g., X, Facebook, Instagram, LinkedIn), media and content communities (e.g., YouTube, Reddit, RedNote), crowd collaboration platforms (e.g., Wikipedia, Github), sharing economy websites (e.g., Airbnb, Uber), co-authorship networks, to human mobility networks and online dating apps. Through hands-on assignments and final projects where students will apply advanced computational methods to analyze empirical network data and social phenomena, this course empowers students to conduct rigorous and impactful research that bridges academia and industry, preparing them for careers in data analytics, platform management, policy advising, tech innovation, and beyond.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Master foundational concepts in graph theory and apply them to represent and visualize social networks. Compute and interpret node-level metrics (e.g., degree centrality, betweenness, eigenvector centrality) to identify key actors, influencers, and vulnerabilities within networks.	20	x	x	
2	Analyze network-level properties (e.g., density, clustering coefficients, small-world phenomena) to evaluate overall structure, efficiency, and robustness in social systems. Implement and evaluate community detection algorithms (e.g., modularity optimization) to uncover hidden subgroups and understand polarization or cohesion in online and offline communities.	30	x	x	
3	Develop and fit statistical models for network formation, growth, and dynamics (e.g., preferential attachment model, stochastic block model) to test hypotheses about tie creation, diffusion processes, and collective behavior.	20	x	x	x
4	Critically apply network analysis to address real-world social problems, advancing theoretical contributions while designing interventions that leverage network insights for positive societal impact.	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	Lecture	Weekly lectures are designed to foster learning and understanding of key concepts and topics in this field.	1, 2, 3, 4	in class
2	Paper presentation	Students will form groups to present and critique a research paper assigned for each week. Each team will only select one week to give the presentation.	1, 2	in class (after lecture)
3	Final project	Students will conduct a team-based research project on topics covered in this course. Students will gain experience to perform research projects from proposing the idea, collecting and analyzing data, to writing and presenting new findings.	1, 2, 3, 4	after class

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Assignments	1, 2	30	Students will apply programming and modeling skills to analyze empirical social network datasets. These assignments are designed to make sure that students have learned the concepts of each week's topics.	Yes
2	Paper presentation	1, 2	10	Reading academic papers and giving presentations can help students deeply understand each week's topics and concepts.	No
3	Final project presentation	1, 2, 3, 4	15	Students will practice skills in clearly communicating complex scientific ideas and findings to lay audiences.	No

4	Final project report	1, 2, 3, 4	15	The final report enables students to practice academic writing skills.	No

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
Students can apply programming and analytical skills to examine real-world social network datasets.

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

Criterion
Ability to understand and critique a given research paper.

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

Criterion
The project report will be evaluated based on its novelty, significance, robustness, and societal impact.

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

Criterion
Ability to critically interpret research findings and present them to lay audience clearly, as well as response to open questions.

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 in Semester A 2026/27 & thereafter)

Criterion
Ability to solve conceptual and operational questions.

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
social networks, social media, information diffusion, crowd dynamics, complex systems

Reading List

Compulsory Readings

	Title
1	Easley, David, and Jon Kleinberg. Networks, crowds, and markets: Reasoning about a highly connected world. Cambridge University Press, 2010.