SDSC2005: INTRODUCTION TO COMPUTATIONAL SOCIAL SCIENCE

Effective Term
Semester B 2023/24

Part I Course Overview

Course Title
Introduction to Computational Social Science

Subject Code
SDSC - School of Data Science
Course Number
2005

Academic Unit
School of Data Science (DS)

College/School
School of Data Science (DS)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
SDSC1001 Introduction to Data Science* and SDSC2001 Python for Data Science

*Pre-requisite SDSC1001 will be exempted for students who are enrolled in Minor in Data Science

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

Data science centres around data, originated by human or non-human. This course provides students with an extensive exposure to the elements of computational social science that concerns exclusively with human-generated data. Topics include opportunities and challenges for social science research in the digital age, descriptive/predictive vs. explanatory research, found data versus made data, research design, causal inference, sampling of social units, online experiment, behavioural analytics, text mining, and social research ethics.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain clearly fundamental principles and methods of computational social science (CSS)	20	x		
2	Classify various CSS methods of data collection and data analysis	20	x	x	
3	Evaluate existing CSS studies and design new studies to improve weaknesses in the existing studies	30	x	x	x
4	Apply appropriate CSS methods to solve given practical problems	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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Learning through teaching is primarily based on lectures.	1, 2, 3, 4	39 hours in total
2	Case studies	Describe and critique classic cases of computational social science.	3, 4	in or after classes

3	Take-home assignments	Learning through in-class or take-home assignments is primarily based on interactive problem solving and hands-on exercises allowing instant feedback.	2, 3, 4	in or after class

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Participation in discussions	1, 2, 3, 4	10	To enable and encourage students to engage in interactive learning in class or outside classroom (through online discussion board)
2	Test	1, 2, 3, 4	20	Questions are designed for the first part of computational social science to see how well the students have learned the fundamental concepts and methods, and applications to real world context. (10-20%)
3	Hands-in assignments	3, 4	10	These are skills based assessment to enable students to demonstrate the basic concepts, methods and algorithms of computational social science, and applications of computational social science in some applications. (10-20%)
4	Final Project	1, 2, 3, 4	20	This task will enable students to apply the concepts and case studies learned in class for a computational social science project.

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs

Note: To pass the course, apart from obtaining a minimum of 40% in the overall mark, a student must also obtain a minimum mark of 30% in both continuous assessment and examination components.

Assessment Rubrics (AR)

Assessment Task

Test

Criterion

Ability to understand and apply key concepts and methods of computational social science.

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

Hands-in assignments

Criterion

Ability to learn the basic concepts, apply methods of computational social science, and design relevant studies for real world 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
Final project

Criterion
Ability to develop a computation social science project.

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

Criterion
Ability to solve conceptual and operational questions using computational social science.

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
Characteristics of social research, descriptive research, predictive research, explanatory research, "found" data, "made" data, causal inference, sampling of social units, research design, online experiment, behaviour analytics, text mining, research ethics in social research

Reading List

Compulsory Readings

	Title
1	Introduction to computational social science: Principles and applications 2nd ed., by Claudio Cioffi-Revilla, Springer, 2017
2	Bit by bit: Social research in the digital age, by Matthew Salganik, Princeton University Press, 2018

Additional Readings

	Title
1	Nil