

SDSC2005: INTRODUCTION TO COMPUTATIONAL SOCIAL SCIENCE

Effective Term

Semester A 2024/25

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.

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, 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 and projects | 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 explain 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 involving a variety of research phrases.

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 | The Practice of Social Research, 15th edition, by Earl Babbie, Cancage, 2021 |
| 2 | Bit by bit: Social research in the digital age, by Matthew Salganik, Princeton University Press, 2018 |

Additional Readings

| Title | |
|--------------|-----|
| 1 | Nil |