COM8010: COMPUTATIONAL SOCIAL SCIENCE METHODS

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Computational Social Science Methods

Subject Code
COM - Media and Communication
Course Number
8010

Academic Unit
Media and Communication (COM)

College/School
College of Liberal Arts and Social Sciences (CH)

Course Duration
One Semester

Credit Units
3

Level
R8 - Research Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
COM8005 Quantitative Research Methods or equivalent

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course provides students with an extensive exposure to the fundamental principles and essential techniques of computational social science methods, ranging from automatic collection of digital and online data to machine learning with or without human supervision. The methods are intended to complement and enhance the traditional social science methods of data collection and analysis, such as survey, experiment, content analysis, and statistical analysis. Topics include opportunities and challenges for computational social science research in the digital age, descriptive/predictive vs. explanatory research, found data versus made data, research design, causal inference, sampling of social media, online experiment, behavioural analytics, text mining, and online research ethics. The course is useful for students who are interested in using computational methods for social, cultural, business, legal, and other areas of research.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain clearly fundamental principles and essential methods of computational social science (CSS)	20	x		
2	Evaluate the validity, reliability and practicality of CSS methods	20	x	x	
3	Design new CSS 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 benchmark cases of computational social science.	1, 2, 3	in or after class
3	Hands-on assignments	Learning through in-class or take-home assignments is primarily based on hands-on exercises.	2, 3, 4	in or after class

4	Research project	Design an independent study by applying computational social science methods to a research question of theoretical and/or practical importance, with integration with traditional methods encouraged.	2, 3, 4	after class

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Class discussions	1, 2, 3	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.	Yes
2	Hands-in assignments	2, 3, 4	30	These are skill-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.	Yes
3	Research paper	2, 3, 4	50	Assessment of the paper will be based on the validity, reliability, and originality of the research design and the accuracy and clarity of the resulting paper.	No

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

0

Minimum Examination Passing Requirement (%)

0

Additional Information for ATs

Students are permitted to use AI tools for formative tasks (e.g., literature search, brainstorming ideas, proofreading, etc.) related to the required research paper, but are prohibited to use AI tools for summative tasks of the research paper (e.g., data collection, analysis, interpretation, and paper writing).

Assessment Rubrics (AR)

Assessment Task

Class discussions (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to understand and apply key concepts and methods of computational social science and articulation of problems of and solutions to dilemmas in computational social science research.

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 (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to demonstrate knowledge and skills of basic procedure, methods and techniques 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

Research paper (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Ability to design an innovative and practicable study on an important issue in social science research, collect, integrate and analyse relevant data, and present the results in concise and assessible ways.

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

Class discussions (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to understand and apply key concepts and methods of computational social science and articulation of problems of and solutions to dilemmas in computational social science research.

Excellent

(A+, A, A-) Actively participate in the lecture sessions and initiate discussion with the instructor

Good

(B+, B) Attend all the lecture sessions

Marginal

(B-, C+, C) Attend most of the lecture sessions

Failure

(F) Do not attend the lecture sessions

Assessment Task

Hands-in assignments (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to demonstrate knowledge and skills of basic procedure, methods and techniques of computational social science, and design relevant studies for real world applications.

Excellent

(A+, A, A-) Fully complete all the tutorial tasks and actively seek knowledge outside class

Good

(B+, B) Fully complete all the tutorial tasks

Marginal

(B-, C+, C) Able to complete the basic tutorial tasks only

Failure

(F) Fail to hand in tutorial tasks

Assessment Task

Research paper (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Ability to design an innovative and practicable study on an important issue in social science research, collect, integrate and analyse relevant data, and present the results in concise and assessible ways.

Excellent

(A+, A, A-) Demonstrate creativity in applying knowledge learnt in class and outside class

Good

(B+, B) Able to apply knowledge learnt in the class to the project

Marginal

(B-, C+, C) Able to deliver a project with some computational elements

Failure

(F) Fail to use the knowledge taught in the course in the project

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Part III Other Information

Keyword Syllabus

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

Reading List

Compulsory Readings

	Title
1	Cioffi-Revilla, C. (2017). Introduction to computational social science: Principles and applications 2nd ed. Springer.
2	Salganik M. (2018). Bit by bit: Social research in the digital age. Princeton University Press.
3	Ackland, R. (2013). Web social science: Concepts, data and tools for social scientists in the digital age. Sage.

Additional Readings

	Title
1	Lazer, D., Pentland, A. S., Adamic, L., Aral, S., Barabasi A. L., Brewer, D., ... & Jebara T. (2009). Life in the network: the coming age of computational social science. Science (New York, NY) 323(5915), 721.
2	Watts, D. J. (2013). Computational social science: Exciting progress and future directions. The Bridge on Frontiers of Engineering 43(4), 5-10.
3	Golder, S. A., & Macy, M. W. (2014). Digital footprints: Opportunities and challenges for online social research. Annual Review of Sociology 40 129-152.
4	Shah, D. V., Cappella, J. N., & Neuman, W. R. (2015). Big data, digital media, and computational social science: Possibilities and perils. The ANNALS of the American Academy of Political and Social Science 659(1), 6-13.
5	Ackland, R., & Zhu, J. J. (2015). Social network analysis. In Innovations in digital research methods. SAGE Publications.
6	Liang, H., & Zhu, J. J. H. (2017). Big data, collection of (social media, harvesting). In J. Matthes, C. S. Davis, & R. F. Potter (Eds.), International Handbook of Communication Methods, Wiley & Sons.