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| **Course Title** | Introduction to Computational Political Science |
| **Course Code** | GOV3219 |
| **Recommended Study Year** | Any |
| **No. of Credits/Term** | 3 |
| **Mode of Tuition** | Lecture-Tutorial |
| **Class Contact Hours** | 3 hours per week |
| **Category** | Major in Government and International Affairs (Elective Course) |
| **Discipline** | Social Sciences |
| **Prerequisite(s)** | NIL |
| **Co-requisite(s)** | NIL |
| **Exclusion(s)** | NIL |
| **Exemption Requirement(s)** | NIL |

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| **Brief Course Description** |
| How has the rise of big data and computational tools transformed the process of political science research? This course provides students with a foundation in computational tools used in political science research, such as web scraping, natural language processing (NLP), social network analysis (SNS), and machine learning. |

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| **Aims** |
| This course aims to:   1. Introduce students to the fundamentals of computational political science. 2. Develop students' understanding of political science research questions and how computational methods can be applied to address them. 3. Provide hands-on experience with data collection, processing, analysis, and visualization. 4. Encourage students to apply computational methods to real-world problems and challenges. 5. Design and build computational systems to explore and analyze some aspects of the human world. |
| **Learning Outcomes** |
| On completion of the course, students should be able to:   1. Describe the opportunities and challenges of political science in the age of big data. 2. Evaluate research on social phenomena from different fields, including political science, computer science, and data science. 3. Practice the essential techniques to analyze social big data using Python or R. 4. Propose research questions that are suited to be examined by computational methods. 5. Design a research project that utilizes the techniques and methods to address political science problems. |

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| **Indicative Content** |
| Module I: Introduction to Computational Political Science  a. Overview of computational political science: goals, challenges, and applications  b. Interdisciplinary nature of the field  c. Ethical considerations in computational political research    Module II: Social Network Analysis  a. Introduction to social networks in political studies b. Measures of centrality and structural analysis  c. Network visualization and interpretation    Module III: Web Scraping and Data Collection  a. Web scraping techniques for collecting social media and web data  b. APIs for data retrieval  c. Data preprocessing and cleaning  d. Ethical considerations in web scraping    Module IV: Natural Language Processing  a. Introduction to Natural Language Processing  b. Pre-processing text data: tokenization, stemming, and stop-word removal  c. Sentiment analysis and topic modelling    Module V: Machine Learning  a. Supervised and unsupervised machine learning  b. Training data, test data, validation data  c. Dimension reduction, clustering, and prediction    Module VI: Ethics and principles in Computational Research |
| **Teaching Method** |
| Lectures combined with tutorials involving written assignments and presentations. Real political and social events and research examples will be used to illustrate the concepts and techniques of various research methods. Students are required to construct their own research project to apply what they have learnt in the course. |

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| **Measurement of Learning Outcomes** |
| |  |  |  | | --- | --- | --- | | Components | LOs to be measured | Description | | Class participation and attendance (20%) | measures LOs 1-3 | Students will be graded according to their degree of class participation and other relevant contributions to the class discussion. | | Homework assignments (30%) | measures LOs 2-3 | There will be 3 hands-on exercises to reinforce concepts and techniques learnt in class. Each exercise is due in two weeks after the release of assignment. | | Final exam (50%) | measures LOs 4-5 | This will assess students’ understanding of the basic concepts, case studies, and debates encountered in this course. | |

**Assessment**

Class participation and attendance 20%   
Homework assignments 30%   
Final Exam 50%

**Required/Essential Readings**

Grimmer, Justin, Margaret E. Roberts, and Brandon M. Stewart. Text as data: A new framework for machine learning and the social sciences. Princeton University Press, 2022.   
   
Salganik, Matthew J. Bit by bit: Social research in the digital age. Princeton University Press, 2019.   
   
Van Atteveldt, W., Trilling, Damian and Calderón, Carlos. A. Computational analysis of communication. Wiley Blackwell, 2022.

**Recommended/Supplementary Readings**

Buyalskaya, Anastasia, Marcos Gallo, and Colin F. Camerer. "The golden age of social science." Proceedings of the National Academy of Sciences 118, no. 5 (2021): e2002923118.   
   
Edelmann, Achim, Tom Wolff, Danielle Montagne, and Christopher A. Bail. "Computational social science and sociology." Annual Review of Sociology 46 (2020): 61-81.   
   
Lazer, David, Alex Pentland, Lada Adamic, Sinan Aral, Albert-László Barabási, Devon Brewer, Nicholas Christakis et al. "Computational social science." Science 323, no. 5915 (2009): 721-723.   
   
Lazer, David MJ, Alex Pentland, Duncan J. Watts, Sinan Aral, Susan Athey, Noshir Contractor, Deen Freelon et al. "Computational social science: Obstacles and opportunities." Science 369, no. 6507 (2020): 1060-1062.   
   
Lindstedt, Nathan C. "Structural topic modeling for social scientists: A brief case study with social movement studies literature, 2005–2017." Social Currents 6, no. 4 (2019): 307-318.   
   
Rodriguez, Maria Y., and Heather Storer. "A computational social science perspective on qualitative data exploration: Using topic models for the descriptive analysis of social media data." Journal of Technology in Human Services 38, no. 1 (2020): 54-86.   
   
Schroeder, Ralph. "Big Data and the brave new world of social media research." Big Data & Society 1, no. 2 (2014): 2053951714563194.   
   
Theocharis, Yannis, and Andreas Jungherr. "Computational social science and the study of political communication." Political Communication 38, no. 1-2 (2021): 1-22.   
   
Zhang, Han, and Jennifer Pan. "Casm: A deep-learning approach for identifying collective action events with text and image data from social media." Sociological Methodology 49, no. 1 (2019): 1-57.

Important Notes:

1. Students are expected to spend a total of 9 hours (i.e. 3 hours of class contact and 6 hours of personal study) per week to achieve the course learning outcomes.
2. Students shall be aware of the University regulations about dishonest practice in course work, tests and examinations, and the possible consequences as stipulated in the Regulations Governing University Examinations. In particular, plagiarism, being a kind of dishonest practice, is “the presentation of another person’s work without proper acknowledgement of the source, including exact phrases, or summarised ideas, or even footnotes/citations, whether protected by copyright or not, as the student’s own work”. Students are required to strictly follow university regulations governing academic integrity and honesty.
3. Students are required to submit writing assignment(s) using Turnitin.
4. To enhance students’ understanding of plagiarism, a mini-course “Online Tutorial on Plagiarism Awareness” is available on <https://pla.ln.edu.hk/>.
5. Students are allowed the use of AI for (i) information search (which should be subsequently fact-checked) and (ii) as an additional tool for language checking (other than Grammarly, Google, etc.). They will also be asked to submit a declaration form for the assignments. For more details, students should consult the Teaching and Learning Centre (TLC)’s handbook, “*Best Practice for Ethical and Responsible Use of Generative AI*” (online available at: <https://www.ln.edu.hk/f/upload/84485/AI%20Practice_updated%2024%20Jul%202023_final.pdf>). In addition, students using ChatGPT must adhere to the University’s data privacy and security policies.

**Grading rubric for class participation and attendance**

**(20 marks)**

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| **Criteria** | **Excellent** | **Good** | **Fair** | **Pass** | **Failure** | **Marks** |
| **Frequency of**  **class**  **participation**  **and attendance**  **(50%)** | Student initiates  contributions  more than once in each session  Attend all lectures and tutorials  (50) | Student initiates  contributions  once in each  session.  Attend 60 to 80 percent of lectures and tutorials  (35) | Student provides  contributions  after the  instructor  solicits input  Attend 20 to 40 percent of lectures and tutorials  (25) | Student provides limited  contributions  after the  instructor  solicits input  Attend 10 percent of lectures and tutorials (15) | Student does  not provide  contributions  after the  instructor  solicits input  Never show up in lectures and tutorials (0) |  |
| **Quality of**  **Comments (30%)** | Comments are  always insightful  & constructive.  Comments  balanced between  general  impressions,  opinions &  specific,  thoughtful  criticisms or  contributions (30) | Comments mostly  insightful &  constructive.  Occasionally  comments are too  general or not  relevant to the  discussion (20) | Comments are sometimes  constructive,  with occasional  signs of insight.  Comments not always relevant  to the  discussion (15) | Comments are  sometimes  constructive,  although mostly are not  relevant  to the  discussion (10) | Comments are  uninformative.  Heavy reliance  on personal  opinion &  personal  feeling (e.g., “I  like it”, “I do  not like it”) (0) |  |
| **Attention (20%)** | Student listens  attentively when others present, as shown by  comments that build on others’ remarks (i.e.,  student hears  what others say & contributes to the dialogue) (20) | Student is mostly  attentive when  others present, as shown by  comments that  build on others’ remarks.  Occasionally  needs  encouragement or reminder from instructor of focus of comment (15) | Student is often  inattentive.  Instructor has to remind student  of focusing on class (10) | Student is often  inattentive.  Instructor has to remind student  of focusing on class, And sometimes works (5) | Does not listen  to others;  regularly talks  while others  speak or does  not pay  attention while  others speak;  detracts from  discussion;  sleep, etc (0) |  |
| **Total Marks** |  | | | | | | |

**Grading rubric for homework assignments (3 x 10 marks)**

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| **Criteria** | **Excellent** | **Good** | **Fair** | **Pass** | **Failure** | **Marks** |
| **Concepts and conceptualization (20%)** | Covered directly relevant concepts and conceptualization that fit the topic (20) | Used some definitions and concepts that fit the topic (15) | Included definitions and concepts that fairly fit the topic (10) | Included definitions and concepts that do not fit the topic (5) | Used no concepts and showed little effort of conceptualization (0) |  |
| **Argument (20%)** | Arguments both well supported and compared to conflicting explanations (20) | Main arguments valid, systematic, and well supported (15) | Some arguments valid and well supported (10) | Some arguments valid nut not well supported (5) | Weak, invalid, or no argument, a simple assertion (0) |  |
| **Use of Data or Evidence (50%)** | Fully exploits the richness of the data/evidence/ideas, and is sufficiently persuasive (50) | Feasible evidence, appropriately selected and not over-interpreted (35) | Some appropriate use of evidence but uneven (20) | Some appropriate use of evidence but very uneven (5) | Weak, invalid, or no argument, a simple assertion (0) |  |
| **Organization and Writing (10%)** | Structure enhances the argument, strong sections and logical flow.  Clear writing (10) | Structure supports the argument, clearly ordered sections fit together well.  Some minor English errors (7) | Bad structure (inconsistent, redundant, or disconnected).  Minor English errors (4) | Bad structure (inconsistent, redundant, or disconnected).  Frequent English errors (1) | Needs significant re-organization. Too many grammatical errors  Low readability (0) |  |
| **Total Marks** |  | | | | | |

**Grading rubric for final exam (50 marks)**

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| **Criteria** | **Excellent** | **Good** | **Fair** | **Pass** | **Failure** | **Marks** |
| **Comprehension**  **of all the**  **relevant**  **concepts (40%)** | Shows a deep  and insightful  level of  understanding  (40) | Shows a good  level of  understanding (30) | Shows a fair  level of  understanding (20) | Shows an inadequate  level of  understanding (10) | Shows no understanding  (0) |  |
| **Application of**  **concepts to the**  **problem posed**  **(40%)** | Concepts are all  applied correctly  (40) | Most concepts  are applied  correctly (30) | Some concepts  are applied too  generally or  misapplied but  the central  concepts are  applied  correctly (20) | Many concepts  are applied too  generally or  misapplied but  the central  concepts are  applied  correctly (10) | Most concepts are  applied too  generally or  misapplied (0) |  |
| **Ideas are**  **expressed**  **logically,**  **accurately and**  **clearly (10%)** | Expression of  ideas is  consistently  accurate, logical  and clear (10) | Expression of  ideas is generally  accurate, logical  and clear, with  some minor  lapses (7) | Expression of  ideas is  comprehensible  but there are  some major  lapses (4) | Expression of  ideas is  comprehensible  but there are  many major  lapses (1) | Expression of  ideas is largely  comprehensible  with some major  inconsistencies  and errors (0) |  |
| **Quality of**  **English (10%)** | English is  excellent (10) | English is  proficient with  no major errors (7) | English  conveys the  essential  meaning but  has a number  of errors (4) | English inadequately  conveys the  essential  meaning and  has a number  of errors (1) | English is below  acceptable  university  standard (0) |  |
| **Total Marks** |  | | | | | |

**Final Overall Grade**

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| Mark Ranges | Grade |
| 85 -100  80-84 | A  A- |
| 75-79  70-74  65-69 | B+  B  B- |
| 60-64  55-59  50-54 | C+  C  C- |
| 45-49  40-44 | D+  D |
| 0-39 | F |