Course Title	:	PMS 3002 Principle of Data Analytics
Recommended Study Year	:	1
No. of Credits/Term		3
Mode of Tuition	:	Lectures / Tutorial
Class Contact Hours	:	3 hours per week
Category in Major Prog.	:	Required
Discipline	:	Interdisciplinary
Prerequisite(s)	:	N/A
Co-requisite(s)	:	N/A
Exclusion(s)	:	N/A
Exemption Requirement(s)	:	N/A

Brief Course Description

With the large volume of data in various domain-specific applications in recent years, it is crucial to interpret and understand data in a scientific way. Data analytics, an essential method for identifying the hidden patterns and critical information from data, have been widely employed due to the rapid development of artificial intelligence and big data analytic techniques in recent years. In this course, students will explore the foundation, principle, methods, and potential applications of data analytics. Specifically, the course will contain modulesincluding data models in real life, analytical tools, qualitative and quantitative data extraction and analysis, and data visualisation.

Aims

This course aims to:
1. Introduce students to fundamental theories, concepts, and approaches in data analytics
2. Equip students with principles in applying data analytical tools for addressing real-world problems through modelling, extracting and visualising data
3. Enable students to professionally present ideas about data analytics for real-world problems
4. Introduce basic social sciences research methods to students

Learning Outcomes (LOs)

Upon successful completion of this course, students will be able to:
1. Evaluate the appropriate data models for the real-world problems
2. Apply the data analytical tools for data processing and interpretation
3. Demonstrate skills in analysing the relationships among various data extraction and visualisation methods
4. Develop data-driven solutions by integrating data analytical knowledge and skills
5. Understand basic social sciences methods

Indicative Content
1. Data and analysis
2. Data representation
3. Applied statistical modelling
4. Qualitative and quantitative data collection
5. Data analytical tools
6. Database management systems
7. Experimental data collection and analysis
8. Data extraction
9. Data visualisation
10. Ethical issue related data analytics
11. General social sciences research methods

Teaching Methods

The course will be delivered through lectures and hand-on practice. These two methods will provide students with adequate skills to independently work on their individual and group projects.

Measurement of Learning Outcomes

Learning Outcome	Individual project [1]	Group project [2]
1. Evaluate the appropriate data models for the real-world problems	✓	✓
2. Apply the data analytical tools for data processing and interpretation	✓	✓
3. Demonstrate skills in analysing the relationships among various data extraction and visualisation methods	✓	✓
4. Develop data-driven solutions by integrating data analytical knowledge and skills	✓	✓
5. Understand basic social sciences methods	✓	✓

Assessment

1. **40% Individual Assignment:** Students will be provided with a real-life problem and are required to develop a proposal (about 2500 words) by applying various data analytical tools and skills. Students must evaluate the possible data models and data analytical tools for the proposed solutions by linking the knowledge, principles, and concepts of data models, data analytics, data extraction, and data visualisation.[1]
2. **40% Group Assignment:** Students will work in groups to identify a real-world problem and develop a data-driven solution by integrating data analytics knowledge and skills including data models, data analytics, data extraction, and data visualisation. The assignment must be around 3000 words. [2]
3. **20% Group Presentation:** Students will present their ideas about the rationale and procedures for developing a data-driven solution. This is to verify their skills and critical thinking on how to employ scientific methods for presenting data solutions. Each group will have 30minues to present their work. [2]

Required/Essential Readings

Babbie, Earl R. The Practice of Social Research. Cengage Learning, 2020
Atzeni, P., Bugiotti, F., Cabibbo, L., & Torlone, R. (2020). Data modeling in the NoSQL world. *Computer Standards & Interfaces*, *67*, 103149.
Mitzenmacher, M., & Upfal, E. (2017). *Probability and computing: Randomization and probabilistic techniques in algorithms and data analysis*. Cambridge university press.
Telea, A. C. (2014). *Data visualization: principles and practice*. CRC Press.

Recommended/Supplementary Readings

Ferrara, E., De Meo, P., Fiumara, G., & Baumgartner, R. (2014). Web data extraction, applications and techniques: A survey. *Knowledge-based systems*, *70*, 301-323.
Kambatla, K., Kollias, G., Kumar, V., & Grama, A. (2014). Trends in big data analytics. *Journal of Parallel and Distributed Computing*, *74*(7), 2561-2573.
Additional readings may be given weekly on a topic by topic basis.
Russom, P. (2011). Big data analytics. *TDWI best practices report, fourth quarter*, *19*(4), 1-34.

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 and Course Work. 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/.