Course Outline

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Course Details

Course Code	COMP9312
Course Title	Data Analytics for Graphs
Units of Credit	6
Course Website	http://cse.unsw.edu.au/~cs9312/21T2/ (http://cse.unsw.edu.au/~cs9312/21T2/)
Handbook Entry	http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP9312.html (http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP9312.html)

Assumed Knowledge

Before commencing this course, students should:

- databases
- data structures

Student Learning Outcomes

After completing this course, students will:

1. Store and represent graph data using appropriate data structures
2. Implement fundamental graph traversal techniques
3. Analyze cohesive subgraph models and their representative computation algorithms

4. Analyze and implement basic machine learning methods
5. Implement techniques for graph embedding, graph neural networks

Teaching Strategies

- Lectures: deliver the basic concepts and explain with detailed examples
- Tutorials: reinforce concepts and provide additional examples
- Consultation: weekly consultation to provide personalized advice to students on their progress in the course.
- Assignments: allow students to solve significant problems

Teaching Rationale

The learning focus in this course is primarily lectures (theoretical knowledge) and projects (practical knowledge). The course will have an emphasis on problem-solving for real applications.

Student Conduct

The **Student Code of Conduct** (Information (https://student.unsw.edu.au/conduct) , Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer (mailto:ethics-officer@cse.unsw.edu.au) , Grievance Officer (mailto:grievance-officer@cse.unsw.edu.au) , or one of the student representatives.

Plagiarism is defined as (https://student.unsw.edu.au/plagiarism) using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity (https://student.unsw.edu.au/plagiarism)
- UNSW Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism (https://student.unsw.edu.au/plagiarism)

The pages below describe the policies and procedures in more detail:

- Student Code Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)
- Student Misconduct Procedure (https://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)
- Plagiarism Policy Statement (https://www.gs.unsw.edu.au/policy/documents/plagiarismpolicy.pdf)
- Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students (https://www.engineering.unsw.edu.au/computer-science-engineering/about-us/organisational-structure/student-services/policies/essential-advice-for-cse-students)

Assessment

Number	Name	Full Mark
1 *	Assignment 1	30
2 *	Assignment 2	20
3 *	Project 1	50
4	Final Exam	100

Later Submission Penalties:
*10% reduction of your marks for the 1st day, 30% reduction/day for the following days
The final mark is calculated by the geometric mean:
Final Mark= sqrt((ass1 + ass2 + proj1) * FinalExam)

Lectures time

Mon 15:00 - 17:00 (Weeks:1-2,4-5,7-10),

Tue 15:00 - 17:00 (Weeks:1-5,7-10)

Resources for Students

Texts and recommended readings:

- Introduction to algorithms (https://mitpress.mit.edu/books/introduction-algorithms-third-edition) by Thomas H, Cormen, et al
- Cohesive subgraph computation over large sparse graphs: algorithms, data structures, and programming techniques (https://books.google.com.au/books?hl=en&lr=&id=FzKBDwAAQBAJ&oi=fnd&pg=PP6&dq=cohesive+subgraph+computation++bipartite+graph+ by Lijun Chang and Lu Qin.
- Graph Representation Learning (https://www.cs.mcgill.ca/~wlh/grl_book/) by William L. Hamilton
- Networks, Crowds, and Markets: Reasoning About a Highly Connected World (http://www.cs.cornell.edu/home/kleinber/networks-book/) by David Easley and Jon Kleinberg
- Network Science (http://networksciencebook.com/) by Albert-László Barabási

Course Evaluation and Development

This course is evaluated each session using the myExperience system.

More information

For further information on this course, and to keep up to date with any changes, please consult the course website (frequently).

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