

WESTERN SYDNEY
UNIVERSITY



School of Computer, Data and Mathematical Sciences



Learning Guide

300958 Social Web Analytics
Sydney City Session 1 2020

Unit Details

Unit Code:	300958
Unit Name:	Social Web Analytics
Credit Points:	10
Unit Level:	3
Assumed Knowledge:	Students are expected to be familiar with fundamental computer programming concepts.

Note: Students with any problems, concerns or doubts should discuss those with the Unit Coordinator as early as they can.

Unit Convenor (SCC)

Name: Dr Chris D'Souza

Email: C.D'Souza@city.westernsydney.edu.au

Consultation Arrangement:

Please liaise directly with the academic teaching this unit regarding appropriate consultation times. It is usually best to make contact with these staff via email.

Program Convenor (SCC)

Name: Dr Mahsa Razavi

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Consultation Arrangement:

Please liaise directly with the academic teaching this unit regarding appropriate consultation times. It is usually best to make contact with these staff via email.

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Note: The relevant Learning Guide Companion supplements this document

1 About Social Web Analytics

1.1 An Introduction to this Unit

The Social Web provides everyone with a voice, information from Facebook, Twitter and Google+ should allow us to identify trends and relationships in society. Whilst this has interest on a personal level, the killer-apps will be in analyzing such data for business; tracking the buzz around a new product, understanding the links between customers etc. This unit will introduce its students to the Social Web data that is available, and blend computational, mathematical and statistical concepts to allow extraction and analysis of such data.

1.2 What is Expected of You

Study Load

A student is expected to study an hour per credit point a week. For example a 10 credit point unit would require 10 hours of study per week. This time includes the time spent within classes during lectures, tutorials or practicals.

Attendance

Lectures and tutorials are designed to scaffold student learning and assist students to complete their assessment tasks. Students should endeavour to attend all lectures and tutorials. In particular, the tutorials involve practicing examples and the use of software that is essential in some or all of the assessment tasks. If there is a legitimate reason for an absence then the tutor should be emailed as a courtesy to explain the absence. Students who do not attend regularly and punctually for all tutorials and lectures may find that they are at risk of not passing their assessment.

Online Learning Requirements

Unit materials will be made available on the unit's vUWS (E-Learning) site (<https://vuws.westernsydney.edu.au/>). You are expected to consult vUWS at least twice a week, as all unit announcements will be made via vUWS. Teaching and learning materials will be regularly updated and posted online by the teaching team.

Students will require access to the unit vUWS site and lectures online.

Special Requirements

Essential Equipment:

Internet access

Legislative Pre-Requisites:

Not Applicable

Policies Related to Teaching and Learning

The University has a number of policies that relate to teaching and learning. Important policies affecting students include:

- [Assessment Policy](#)
- [Bullying Prevention Policy](#) and
- [Guidelines](#)
- [Enrolment Policy](#)
- [Examinations Policy](#)
- [Review of Grade Policy](#)
- [Sexual Harassment Prevention Policy](#)

- [Special Consideration Policy](#)
- [Student Misconduct Rule](#)
- [Teaching and Learning - Fundamental Code](#)
- [Student Code of Conduct](#)

Academic Integrity and Student Misconduct Rule

In submitting assessments, it is essential that you are familiar with the policies listed above and that you understand the principles of academic integrity. You are expected to act honestly and ethically in the production of all academic work and assessment tasks, submit work that is your own and acknowledge any contribution to your work made by others.

Important information about academic integrity, including advice to students is available at https://www.westernsydney.edu.au/studysmart/home/academic_integrity_and_plagiarism. It is your responsibility to familiarise yourself with these principles and apply them to all work submitted to the University as your own.

When you submit an assignment or product, you will declare that no part has been: copied from any other student's work or from any other source except where due acknowledgement is made in the assignment; submitted by you in another (previous or current) assessment, except where appropriately referenced, and with prior permission from the Unit Coordinator; written/produced for you by any other person except where collaboration has been authorised by the Unit Coordinator.

The Student Misconduct Rule applies to all students of Western Sydney University and makes it an offence for any student to engage in academic, research or general misconduct as defined in the Rule.

The University considers plagiarism, cheating and collusion as instances of academic misconduct. The University also considers submitting falsified documentation in support of applications for special consideration, including sitting of deferred examinations, as instances of general misconduct. You should be aware that changes were made to the Student Misconduct Rule commencing 1 January 2020 that provide for minimum sanctions that apply to certain conduct, including the provision of falsified documentation to the University.

You are strongly advised to read the [Student Misconduct Rule](#) and the Inappropriate Behaviour Guidelines at the commencement of each session to familiarise yourself with this process and the expectations of the University in relation to work submitted for assessment.

1.3 Changes to Unit as a Result of Past Student Feedback

The University values student feedback in order to improve the quality of its educational programs. The feedback provided helps us improve teaching methods and units of study. The survey results inform unit content and design, learning guides, teaching methods, assessment processes and teaching materials.

You are welcome to provide feedback that is related to the teaching of this unit. At the end of the semester you will be given the opportunity to complete a Student Feedback on Unit (SFU) questionnaire to assess the unit. You may also have the opportunity to complete a Student Feedback on Teaching (SFT) questionnaire to provide feedback for individual teaching staff.

As a result of student feedback, the following changes and improvements to this unit have recently been made:

- Lectures are provided at all campuses each week.

2 Assessment Information

2.1 Unit Learning Outcomes

Students are expected to gain an understanding of the fundamental concepts of Web based social networks as well as the ability to apply modern mathematical and statistical techniques to analyse the social network properties. Each of the assessment tasks has been designed to evaluate the extent to which you have achieved the learning outcomes.

	Outcome
1	Extract and process formatted data from social Web sources.
2	Use computer algorithms to visualise complex social Web interactions.
3	Use mathematical and statistical methods to identify significant trends in the social Web.
4	Use mathematical and statistical techniques to identify critical regions of a social network.
5	Partition a social network into clusters.
6	Choose an appropriate metric to measure the interaction between social network nodes.
7	Compute the popularity, authority and hub scores for network nodes.

2.2 Approach to Learning

This unit will be offered over a thirteen week period. Each week will consist of a two hour lecture and a two hour computer lab class. The assessments will consist of weekly online quizzes, of which the best 5 marks are counted, a group project, and a final examination.

The assessment items during the semester are designed to gauge your achievement and performance in relation to the unit learning outcomes; they are also an excellent preparation for the final examination, which is a summative examination with a threshold requirement. Students are encouraged to study learning materials weekly, since later topics are related to the early topics. It may be difficult to understand latter topics without understanding the former topics.

All teaching materials will be released on vUWS as the semester progresses. Moreover, all lectures will be recorded and uploaded to vUWS. - Please note that these online resources are meant to aid revision; they are NOT MEANT TO, AND CANNOT, REPLACE FACE TO FACE TIME during the weekly lectures and computer lab classes. Active participation in lectures and labs is crucial for mastering the learning outcomes: Records from previous years show that poor attendance in lectures and labs is highly correlated with failing the unit. The members of the teaching team are there to help you achieve the learning outcomes and succeed in this unit, but you need to make use of this offer.

Lectures

Data Analysis is based on understanding the logic behind the techniques which requires understanding mathematics/statistics. While this unit is too short to give all theoretical explanations of the techniques you will see, it is crucial that you know how a statistical method works; only then can you decide whether it is applicable to a situation in which you're interested. The objective of the lecture is to explain both how a statistical technique works and how to apply it.

Computer Labs

Understanding how a method works is the first step; being able to apply it in practice is the second. These computer lab classes will give you the opportunity to use theory in practice: We use the powerful open source statistics software R for teaching; it is a standard for professional statisticians all over the world. Students are encouraged to spend time with R in their own time, since they are assumed to have a basic understanding in R programming language,

and expected to excel their programming skills as the semester progresses.

2.3 Contribution to Course Learning Outcomes

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Course Learning Outcomes	ULO 1	ULO 2	ULO 3	ULO 4	ULO 5	ULO 6	ULO 7
1. Explain the complex networks involved when dealing with people, business and government in the context of ICT development, support and service provision.		Developed			Developed		Introduced
2. Evaluate the technological and software core of ICT theory and practice analysing and designing applications			Developed	Developed			
3. Apply the knowledge and skills required for the development of new applications and new application areas	Developed					Developed	Developed
4. Innovate by keeping up to date with the rapid development in technology and practice across the ICT domain, as an extension of their current understandings and the ability to find innovative ICT solutions and move the ICT field forward.							
5. Perform work of high quality with an awareness of the professional code of conduct, professional and personal ethics, and the legal and social implications of technological change relating to privacy of information and professional practice.							

2.4 Assessment Summary

The assessment items in this unit are designed to enable you to demonstrate that you have achieved the unit learning outcomes. Completion and submission of all assessment items which have been designated as mandatory or compulsory is essential to receive a passing grade.

To pass this unit you must:

1. Obtain at least 40% for the Final Exam.
2. Obtain at least 50% overall.

Item	Weight	Due Date	ULO's Assessed	Threshold
Exam	50%	Exam period	3, 4, 6, 7	Yes
Group Project Using a case study approach, groups of 3-5 students will write computer programs to extract and analyse social media data, producing a final report that will be marked.	30%	Week 13	1, 2, 3, 5	No
Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.	20%	Weeks 4, 5, 6, 7, 8, 10, 11, 12	1, 2, 3, 4, 5, 6, 7	No

Feedback on Assessment

Feedback is an important part of the learning process that can improve your progress towards achieving the learning outcomes. Feedback is any written or spoken response made in relation to academic work such as an assessment task, a performance or product. It can be given to you by a teacher, an external assessor or student peer, and may be given individually or to a group of students. As a Western Sydney University student, it is your responsibility to seek out and act on feedback that is provided to you as a resource to further your learning.

In this unit you can expect automatic feedback on your weekly quizzes, and comments or annotations made to the group project. You are also welcome to email the unit convenor, Dr. Chris D'Souza (C.D'Souza@city.westernsydney.edu.au) to discuss your progress.

2.5 Assessment Details

2.5.1 Exam

Weight:	50%
Type of Collaboration:	Individual
Due:	Exam period
Submission:	Exams will be handed to the examination invigilators at the end of the allocated examination time.
Format:	2 hour written exam, writing implements, and a calculator may be brought into the exam room. A set of problems will be provided and each student will independently provide a solution to the problems.
Length:	2 hours
Curriculum Mode:	Numerical Problem Solving
Threshold Detail:	Students who achieve less than 40% in this exam will receive a compulsory fail grade.

This is a compulsory assessment item. Students who do not attempt the final (or deferred exam, if eligible) will be given an automatic failing grade. Students who fail to pass the 40% hurdle on this exam will receive a compulsory fail grade.

This is an open book examination to determine whether you are able to employ the appropriate mathematical and statistical methods and techniques in given situations. It will be 2 hours in duration.

Resources:

The Final Exam will examine the material presented in the entire unit.
All printed materials, books and handwritten or printed notes are allowed.
Any calculator which has the primary function of a calculator is allowed. For example, calculators on mobile phones or similar electronic devices are not allowed.

Marking Criteria:

The total number of marks will be presented with each exam problem.

- Full marks for a given problem will be given for a correct solution to the problem.
- Partial marks will be given when the student has shown knowledge of how to solve the problem.

2.5.2 Group Project Using a case study approach, groups of 3-5 students will write computer programs to extract and analyse social media data, producing a final report that will be marked.

Weight:	30%
Type of Collaboration:	Group
Due:	Week 13
Submission:	Online through vUWS
Format:	A pdf report on a detailed practical data analysis must be submitted through the unit's vUWS site. Any source of information may be used.
Length:	30 hours Assessment will involve peer review
Curriculum Mode:	Report

The group project must be completed in groups of four students; you are advised to start forming groups around Week 7. Students must use the statistics software R to perform statistical analysis of the data imported from Twitter. Each group will have a different dataset. A report should include interpretation of the results, and presentation of the findings. You must prepare your report using R and submit it as a PDF file through the unit's vUWS site. You must submit a PDF file which includes all the details of the analysis performed by R through the unit's vUWS site. The report will be treated as a submission by the whole team, so all group members should work together on all parts of the project.

Resources:

The group project may be based on the material presented in the entire unit. Any source of information may be used.

Marking Criteria:

Criteria	High Distinction	Distinction	Credit	Pass	Unsatisfactory
Total mark	at least 85%	75% - 84%	65% - 74%	50% - 64%	less than 50%

2.5.3 Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.

Weight:	20%
Type of Collaboration:	Individual
Due:	Weeks 4, 5, 6, 7, 8, 10, 11, 12
Submission:	Quizzes will be completed within vUWS.
Format:	Each quiz will consist of four multiple choice or short answer questions.
Length:	15 minutes (each quiz)
Curriculum Mode:	Quiz

The online quizzes will be short tests, expected to take 15 minutes each, that will provide students a chance to assess their knowledge throughout the unit. There will be eight quizzes, but only the best five of the eight will contribute towards a student's final grade.

Each quiz will be available from Monday morning until midnight on the following Sunday. The material is based on the previous week's lab session and two weeks ago's lecture. You should be able to complete the quiz in about 15 minutes, you have only ONE attempt at each quiz. Students will see the timer option before they begin the test. Once started, quiz must be completed in one sit until the time expires.

There will be eight quizzes, but only the best five of the eight will contribute towards a student's final grade.

Correct answers of each quiz will be released after the due date.

Resources:

Each Online Quiz covers the material presented in the lectures and labs up to the previous week. Any source of information may be used.

Marking Criteria:

Each question will be given one mark for a correct answer, and 0 marks for an incorrect answer.

2.6 General Submission Requirements

Submission

- All assignments must be submitted by the specified due date and time.
- Complete your assignment and follow the individual assessment item instructions on how to submit. You must keep a copy of all assignments submitted for marking.

Turnitin

- The Turnitin plagiarism prevention system may be used within this unit. Turnitin is accessed via logging into vUWS for the unit. If Turnitin is being used with this unit, this means that your assignments have to be submitted through the Turnitin system. Turnitin from iParadigms is a web-based text-matching software that identifies and reports on similarities between documents. It is also widely utilised as a tool to improve academic writing skills. Turnitin compares electronically submitted papers against the following:
 - Current and archived web: Turnitin currently contains over 24 billion web pages including archived pages
 - Student papers: including Western Sydney University student submissions since 2007
 - Scholarly literature: Turnitin has partnered with leading content publishers, including library databases, text-book publishers, digital reference collections and subscription-based publications (e.g. Gale, Proquest, Emerald and Sage)
- Turnitin is used by over 30 universities in Australia and is increasingly seen as an industry standard. It is an important tool to assist students with their academic writing by promoting awareness of plagiarism. By submitting your assignment to Turnitin you will be certifying that:
 - I hold a copy of this assignment if the original is lost or damaged
 - No part of this assignment has been copied from any other student's work or from any other source except where due acknowledgement is made in the assignment
 - No part of the assignment has been written for me by any other person/s
 - I have complied with the specified word length for this assignment
 - I am aware that this work may be reproduced and submitted to plagiarism detection software programs for the purpose of detecting possible plagiarism (which may retain a copy on its database for future plagiarism checking).

Self-Plagiarising

- You are to ensure that no part of any submitted assignment for this unit or product has been submitted by yourself in another (previous or current) assessment from any unit, except where appropriately referenced, and with prior permission from the Lecturer/Tutor/Unit Co-ordinator of this unit.

Late Submission

- If you submit a late assessment, without receiving approval for an extension of time, (see next item), you will be penalised by 10% per day for up to 10 days. In other words, marks equal to 10% of the assignment's weight will be deducted from the mark awarded.
- For example, if the highest mark possible is 50, 5 marks will be deducted from your awarded mark for each late day.
- Saturday and Sunday are counted as one calendar day each.
- Assessments will not be accepted after the marked assessment task has been returned to students.
- This is consistent with Clause 51 of the Western Sydney University's Assessment Policy - Criteria and Standards-Based Assessment.

Extension of Due Date for Submission

Extensions are only granted in exceptional circumstances. To apply for an extension of time, locate an application form via the Western Sydney University homepage or copy the following link:

https://www.westernsydney.edu.au/currentstudents/current_students/forms

Application forms must be submitted to the Unit Coordinator/Convenor. Requests for extension should be made as early as possible and submitted within policy deadlines. Appropriate, supporting documentation must be submitted with the application. An application for an extension does not automatically mean that an extension will be granted. Assessments will not be accepted after the marked assessment task has been returned to students.

Resubmission

Resubmission of assessment items will not normally be granted if requested.

Application for Special Consideration

It is strongly recommended that you attend all scheduled learning activities to support your learning. If you have suffered misadventure, illness, or you have experienced exceptional circumstances that have prevented your attendance at class or your completion and submission of assessment tasks, you may need to apply for Special Consideration via the Western Sydney University website. http://www.westernsydney.edu.au/currentstudents/current_students/services_and_facilities/special_consideration2 or the Student Centre/Sydney City Campus Reception. Special Consideration is not automatically granted. It is your responsibility to ensure that any missed content has been covered. Your lecturer will give you more information on how this must be done.

3 Teaching and Learning Activities

Weeks	Lecture	Prac/Lab	Other	Assessments Due
Week 1 09-03-2020	Introduction to the Social Web	Introduction to R		
Week 2 16-03-2020	Introductory R programming and data structures	Introduction to the Social Web		
Week 3 23-03-2020	Simple Exposure Analysis	Introductory R programming and data structures		
Week 4 30-03-2020	Text Mining 1 (indexing, weighting, querying, metrics)	Simple Exposure Analysis		- Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.
Week 5 06-04-2020	Visualisation	Text Mining 1 (indexing, weighting, querying, metrics)	<i>Note: Public Holidays may affect classes this week. More information will be provided on vUWS</i>	- Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.
Week 6 13-04-2020	Text Mining 2 (Clustering)	Visualisation	<i>Note: Public Holidays may affect classes this week. More information will be provided on vUWS</i>	- Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.
Week 7 20-04-2020	Graphs 1 (Definition, Graph statistics, Storage)	Text Mining 2 (Clustering)		- Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.
Week 8 27-04-2020	Graphs 2 (PageRank, HITS, Shortest Path)	Graphs 1 (Definition, Graph statistics, Storage)		- Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.
Week 9 04-05-2020	Time 1 (trends, trend periodicity)	Graphs 2 (PageRank, HITS, Shortest Path)		- Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.
Week 10 11-05-2020	Time 2 (BACI designs)	Time 1 (trends, trend periodicity)		- Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.

Weeks	Lecture	Prac/Lab	Other	Assessments Due
Week 11 18-05-2020	Spatial Analysis	Time 2 (BACI designs)		- Online quizzes (best 5 from 8 quizzes) - able to be done off campus, as a regular learning prompt.
Week 12 25-05-2020	Text Mining 3 (Sentiment Analysis)	Spatial Analysis		- Group Project Using a case study approach, groups of 3-5 students will write computer programs to extract and analyse social media data, producing a final report that will be marked.
Week 13 01-06-2020	Revision	Text Mining 3 (Sentiment Analysis)		
Week 14 08-06-2020	Examination week			- Exam

The above timetable should be used as a guide only, as it is subject to change. Students will be advised of any changes as they become known on the unit's vUWS site.

4 Learning Resources

4.1 Recommended Readings

Prescribed Textbook

Russell, M. A. (2013). *Mining the social web* (2nd ed.). Sebastopol, CA: O'Reilly.

Additional Reading

Aggarwal, C. C. (2011). *Social Network Data Analytics*. Boston, MA: Springer Science+Business Media, LLC.

De Nooy, W., Mrvar, A., & Batagelj, V. (2011). *Exploratory social network analysis with Pajek* (Rev. and expanded 2nd ed.). New York, NY: Cambridge University Press.

Easley, D., & Kleinberg, J. (2010). *Networks, crowds, and markets: reasoning about a highly connected world*. New York: Cambridge University Press.

Kadushin, C. (2012). *Understanding social networks: concepts, theories, and findings*. New York: Oxford University Press.

Kolaczyk, E. D. (2009). *Statistical Analysis of Network Data: Methods and Models*. New York, NY: Springer-Verlag New York.

Newman, M. E. J. (2010). *Networks: an introduction*. Oxford: Oxford University Press.

Russell, M. A. (2011). *21 recipes for mining Twitter*. Sebastopol, Calif: O'Reilly Media.

Scott, J., & Carrington, P. J. (2011). *The SAGE handbook of social network analysis*. London: SAGE Publications.

Ting, I.-H., Hong, T.-P., & Wang, L. S. L. (2012). *Social Network Mining, Analysis and Research Trends: Techniques and Applications*. Business Science Reference.

Tsvetovat, M., & Kouznetsov, A. (2011). *Social network analysis for startups*. Sebastopol, CA: O'Reilly Media Inc.