SMU
School of
Computing and
Information Systems

Course Code:	**IS434**
Course Name:	**Social Analytics and Applications**
When was the course design document last verified by the Course Manager:	**October-2021**

NOTE: The information given in this document is for reference only; the updates given during the class sessions and/or eLearn will supersede the information given in this document.

IMPORTANT NOTICE

Please note that the below information is for Term 2, AY2024-25 and earlier. For AY2025-26 and onwards, there will be a new public course catalogue. Please watch out for email updates from RO/in BOSS.

1. Synopsis

In today's globally connected, online and mobile world, social media platforms are fast becoming the dominant means of communication and it is revolutionising the way businesses communicate with their customers. Many popular social media platforms such as Facebook and Twitter allow for instant, real-time multi-way communication. Collecting and analysing data from multiple online sources requires an Information Technology infrastructure. The data collected from online create a gold mine for businesses that want to understand and predict consumer and market behaviour. By leveraging sophisticated computing technologies, big data analytics can produce actionable insights valuable to the core operations of the business.

This course will explore emerging methods and applications for understanding online user behaviour on popular social media platforms. This course will expose students to a variety of real-world business cases, a collection of data analytics tools, best practices and hands-on exercises. Students will learn how to 1) identify analytics problems, 2) use data analytics tools and identify types of analysis to be performed, and 3) close the loop (the process of taking the analysis results and interpreting it contextually).

NOTE: This class is not open for 'auditing'. Any requests will be politely ignored.

2. Prerequisites/Co-requisites

Prerequisite(s): IS111 Introduction to Programming/SMT111 Programming for Smart City Solutions/CS101 Programming Fundamentals I

(Please check Course Catalogue in BOSS for updated information!)

3. Course Areas

Advanced Business Technology Major
Analytics Major
SMU-X
Technology & Entrepreneurship
Business Options
Econ Major Rel/Econ Options
IS Depth Electives
Social Sciences/PLE Major-rel
IS Major: Business Analytics Track
Analytics Major: Marketing Track
Analytics Major: Advanced Technology Track
IS Major: Software Development Track (for AY2017 and AY2018 intakes)

(Please check Course Catalogue in BOSS for updated information!)

4. Course Objectives

This course aims to provide students with a broad coverage and examples of social analytics techniques and trends underlying the current and future development. Upon completion of the course, students will be able to:

- Extract social media data via social APIs and custom scripts
- Extract social networks from non-network data such as transactional/operation data as well as textual conversations
- Computationally identify and quantify social influencers
- Computationally extract and identify trending topics
- Visualise social networks and text analysis results
- Deploy custom scripts in Amazon Web Services

5. Competencies

1. Demonstrate understanding of the business value of social analytics and how technologies can be used to create this value.
2. Develop web crawling programs to pull web-based data from remote servers.
3. Develop web scraping programs to extract relevant textual data.
4. Summarise unstructured textual data to understand social sentiment and trending topics.
5. Analyse and visualise social sentiment and trending topics.
6. Develop crawling programs to pull social media data from social media platforms via API (Application Programming Interface).
7. Analyse social relationships amongst different entities.
8. Analyse and visualise social influencers.
9. Compare and assess storage platforms for social data.
10. Build social analytics pipelines using cloud computing services.

6. Teaching Staff

Faculty

- Professor Wei GAO (Term 1)
- Professor Kyong Jin SHIM - Course Manager (Term 2)

Each term is planned slightly differently. Please click on the link below for each term.

- Term 1
- Term 2
- Term 3B

7. Term 1

Course Assessments

Assessment Categories	Weightage (%)
Class Participation	10
Quizzes	20
Assignments	30
Group Project	40
Total	**100**

* IS434 in Term 1 is no longer a SMU-X module and has no **AWS Cloud Foundations** certification as a graded component. However, the training materials (slides, videos) will be made available to all students - as some of our lab exercises WILL leverage **AWS services**.

Course Assessment Details

Class Participation (10%)
The evaluation is based on the student's in-class (e.g. class activities) and online contribution (e.g. online discussion forum) as well as the participation of weekly learning surveys.

Quizzes (20%)
There will be **two** quizzes, all of which are to be completed and submitted by individual students in-class. Each quiz will be based on the previous week(s)' lesson(s) and will be focused on applying the concepts and theories to specific examples and cases. There will be no make-up weekly quizzes given under any circumstances. One week prior to the quiz, the instructor will inform the students of reading materials (if any).

Assignments (30%)
There will be **three** graded assignments, all of which are to be completed and submitted by individual students. Students may work together to help one another with computer or tool-related issues. They may discuss the materials that constitute each assignment. However, each student is required to prepare and submit each and every assignment (including any computer work) on his or her own. Cheating is strictly forbidden. Cheating includes but is not limited to plagiarism and submission of work that is not your own. All assignments due are to be uploaded in eLearn by following the submission instructions provided in the assignment sheet. Students are required to check and confirm on eLearn the assignment due dates. Late work will be severely penalised in the following manner: 1) work submitted up to 24 hours late will result in penalty deduction of 10 percentage points; 2) work submitted after 24 hours and up to 2 days late will result in penalty deduction of 20 percentage points; 3) no work can be submitted after the 2 day period and instead, the usual non-submission and a mark of zero will be recorded. Assignment grades will be released two weeks later.

Hands-On Labs
In most weeks, there will be hands-on lab exercises. Lab exercises will be checked by the teaching staff in certain weeks. It will generally not be graded but can count towards class participation depending on the situation. It is very important that students bring their own laptop computer to each and every lesson. It is very important that students perform hands-on lab exercises on their own during the class time. Teaching Assistant(s) as well as the course instructor are physically in attendance to assist students during hands-on lab exercises.

Group Project (40%)
The Group Project is intended to complement the class materials – by getting students to investigate selected topics in greater depth and breadth. The primary output includes: 1) written report with business objectives, methods, techniques, tools and findings, 2) a poster that illustrates the methods and visualisation dashboard showing social analytics insights, 3) filled peer evaluation form rating all team members. Students must form groups of size 5 to 7, and they may form their own group (not assigned by the teaching staff).

Each group must identify a real-world client for this project while they are not required to work with the client directly. Each group must collect a real-world dataset for analysis. The data can be obtained from a real-world business or it can be obtained from public data sources (e.g. social media, news sites, other research centres or government agencies curating public data, etc.). Each group must perform social analytics on the obtained data and the analytics results must help solve the business problem(s) of your identified real-world client.

Examples of "social analytics" project include (but are not limited to):
- Helping a business/organisation establish/re-establish its presence on one or more social platforms. This entails analysing their current social presence by looking into social media posts and comments left by their customers.
- Helping a business launch and monitor a social media marketing campaign on one or more social platforms. Similarly to the above example, this entails analysing data crawled/scraped from social platforms and analysing it.
- Helping businesses better understand the market (e.g. competitor analysis, product/service reviews, emerging market analysis). For example, if a company were to enter the Asian market with their brand new product, they would have to research the market – to better understand 1) competitors and 2) consumers.

Lesson Plan

Week	Topic	Remarks
1	- Course overview and introduction to social media - Lab 1: Setting up development environment for social analytics	
2	- Social media use cases and analysis - Lab 2: Setting up AWS Free-tier Account	Project guide released
3	- AWS and cloud computing - Lab 3: Reddit APIs and data crawling	
4	- Network (Graph) essentials - Lab 4: Setting up social analytics on Cloud	**Assignment 1 due**
5	- Network structure and measure (I) - Lab 5: Social network analysis (1)	**Project group formation & registration**
6	- Network structure and measures (II) - Lab 6: Social network analysis (2)	
7	- Data mining and NLP essentials - Lab 7: Web crawling and scraping	**Quiz 1**
8 (Recess Week)	No Lesson	
9	- Group Project – Proposal presentation (in-class)	

10	- Text mining and analysis - Lab 8: Text analysis	**Assignment 2 due**
11	- Community detection and analysis - Lab 9: Social network analysis (3)	
12	- Information diffusion in social media - Lab 10: Social network analysis (4)	**Quiz 2**
13	- Group Project - final presentation	
14 (Study Week)	No lesson	**Assignment 3 Due**
15 (Exam Week)	No Lesson	**Group project due (report, poster, peer eval)**

Resources

Recommended Reading:

- Social Media Mining, R. Zafarani, M.-A. Abbasi, H. Liu, Cambridge University Press 2014 http://www.socialmediamining.info/
  - Chapter 1
  - Chapter 2.1-2.4
  - Chapter 2.5.1, 2.5.2, 2.5.3, 2.5.5
  - Chapter 2.6.1
  - Chapter 3.1.1, 3.1.2, 3.1.4, 3.1.5, 3.1.6
  - Chapter 3.2
  - Chapter 4.1
  - Chapter 5.1-5.3
  - Chapter 5.4.2
  - Chapter 5.5
  - Chapter 6.1.3
  - Chapter 7.2, 7.4
- Analyzing the Social Web, J. Golbeck, Morgan Kaufmann 2013. E-book available at SMU Library
  - Chapter 14-15

Tools:
Python, Gephi, Amazon Web Services, Tableau

8. Term 2

Course Assessments

Assessment Categories	Weightage (%)
Class Participation	10
Quizzes	30
Assignments	20
Group Project	40
Total	**100**

* IS434 no longer has **AWS Cloud Foundations** certification as a graded component.
** However, the training materials (slides, videos, 50% exam voucher) will be made available to all students - as some of our lab exercises WILL leverage **AWS services**.

Course Assessment Details

Class Participation (10%)
The evaluation is based on the student's in-class (e.g. class activities) and online contribution (e.g. online discussion forum).

Quizzes (30%)
There will be quizzes, all of which are to be completed and submitted by individual students in-class. Each quiz will be based on the previous week(s)' lesson(s) as well as assigned readings or videos. There will be no make-up weekly quizzes given under any circumstances. One week prior to the quiz, the instructor will inform the students of reading materials (if any).

Assignments (20%)
There will be two graded assignments, all of which are to be completed and submitted by individual students. Students may work together to help one another with computer or tool-related issues. They may discuss the materials that constitute each assignment. However, each student is required to prepare and submit each and every assignment (including any computer work) on his or her own. Cheating is strictly forbidden. Cheating includes but is not limited to plagiarism and submission of work that is not your own. All assignments due are to be uploaded in eLearn by following the submission instructions provided in the assignment sheet. Students are required to check and confirm on eLearn the assignment due dates. Late work will be severely penalized in the following manner: 1) work submitted up to 24 hours late will result in penalty deduction of 10 percentage points; 2) work submitted after 24 hours and up to 2 days late will result in penalty deduction of 20 percentage points; 3) no work can be submitted after the 2 day period and instead, the usual non-submission and a mark of zero will be recorded. Assignment grades will be released two weeks later.

Hands-On Labs
In most weeks, there will be hands-on lab exercises. Lab exercises will be checked by the teaching staff in certain weeks. It will generally not be graded but can count towards class participation depending on the situation. It is very important that students bring their own laptop computer to each and every lesson. It is very important that students perform hands-on lab exercises on their own during the class time. Teaching Assistant(s) as well as the course instructor will assist students during hands-on lab exercises.

Group Project (40%)

The Group Project is intended to complement the class materials – by getting students to investigate selected topics in greater depth and breadth. The primary output includes: 1) written report with business objectives, methods, techniques, tools and findings, 2) application such as web-based or mobile-based visualization dashboard showing social analytics insights. Students must form groups of size 4 to 6, and they may form their own group (not assigned by the teaching staff).

Each group must find a real-world client for this project. Each group must find a real-world dataset for analysis. The data can be obtained from a real-world business or it can be obtained from public data sources (e.g. social media, news sites, other research centers or government agencies curating public data, etc.). Each group must perform social analytics on the obtained data and the analytics results must help solve real-world business problem(s) of your real-world client.

Examples of "social analytics" project include (but are not limited to):

- Helping a business/organization establish/re-establish its presence on one or more social platforms. This entails analyzing their current social presence by looking into social media posts and comments left by their customers.
- Helping a business launch and monitor a social media marketing campaign on one or more social platforms. Similarly to the above example, this entails analyzing data crawled/scraped from social platforms and analyzing it.
- Helping businesses better understand the market (e.g. competitor analysis, product/service reviews, emerging market analysis). For example, if a company were to enter Asia market with their brand new product, they would have to research the market – to better understand 1) competitors and 2) consumers.

Lesson Plan

Week	Topic	Remarks
1	Course overview.	
2	Discussion on social phenomena (Part 1). Setting up development environment for social analytics.	
3	Discussion on social phenomena (Part 2) Python programming for social analytics & Social Media APIs.	
4	Social network analysis – node-level analysis	
5	Social network analysis – network-level analysis (network measures)	**Form project group & register in eLearn**
6	Analyzing social conversations in text & summarizing unstructured textual data	
7	Social network analysis – network-level analysis (community detection, evolving networks)	**Quiz 1**
8 (Recess Week)	No Lesson	**Group Project Proposal Draft Due**
9	Group Project - proposal presentation	**Group Project Proposal Slidedeck**
10	Social analytics - data pipeline in cloud	**Assignment 1 Due**
11	Social analytics - analytics cloud services	
12	Project Week	**Quiz 2**
13	Group Project - final presentation	**Submit group project**
14 (Study Week)	AWS Certification Exam Revision	**Quiz 3**

15 (Exam Week)	No Lesson	**Assignment 2 Due**
16 (Exam Week)	No Lesson	

Resources

Recommended Reading:

- The Tipping Point: How Little Things Can Make a Big Difference by Malcolm Gladwell (2000).
- Linked: How Everything Is Connected to Everything Else and What It Means for Business, Science, and Everyday Life by Albert-Laszlo Barabasi (2003).
- Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives -- How Your Friends' Friends' Friends Affect Everything You Feel, Think, and Do Paperback by Nicholas A. Christakis and James H. Fowler (2011).
- Guns, Germs, and Steel: The Fates of Human Societies by Jared M. Diamond (1997).
- Sapiens: A Brief History of Humankind by Yuval Noah Harari (2018).
- Outliers: The Story of Success by Malcolm Gladwell (2011).

Tools:
Python, Gephi, Amazon Web Services, Tableau

9. Term 3B

Course Assessments

Assessment Categories	Weightage (%)
Class Participation	10
Quizzes	40
AWS Cloud Practitioner Certification Exam	15
Group Project	35
Total	**100**

Course Assessment Details

Class Participation (10%)
The evaluation is based on the student's contribution to online topic-based discussions and troubleshooting Q&A.

Quizzes (40%)
There will be quizzes, all of which are to be completed and submitted by individual students online in eLearn (via Respondus Monitor). Each quiz will be based on the previous lessons as well as any assigned readings or videos. There will be NO make-up quizzes given under any circumstances. Two lessons prior to the quiz, the instructor will announce to the students what are the topics in scope for the upcoming quiz.

Amazon Web Services - Cloud Practitioner Certification Exam (15%)
In this course, students will be using several key AWS services and learn key concepts of cloud computing for social analytics and application development. As such, all officially enrolled students of IS434 Social Analytics & Application course at SMU will enjoy the benefit of DISCOUNTED (50%) certification exam (https://aws.amazon.com/certification/certified-cloud-practitioner/) sponsored by AWS via AWS-SMU partnership (usually priced at USD 100). As an X-course, IS434 students will enjoy further subsidy (approximately 20 ~ 30 USD per student). All enrolled IS434 students must complete the certification exam and submit the AWS-issued official score report to the course instructor by a specified deadline (regardless of PASS or FAIL). This score will count towards the final course grade. If a student has already taken this certification exam, he/she must present an official score report (it must be valid at the time of submission to the course instructor) issued by AWS.

Hands-On Labs
In most lessons, there will be hands-on lab exercises. It is very important that students complete all lab exercises on their own during the lesson time. Teaching Assistant(s) as well as the course instructor will be available online (synchronous) to assist students.

Group Project (35%)
The Group Project is intended to complement the class materials – by getting students to investigate selected topics in greater depth and breadth. Students must form groups of size 2 to 6. They may form their own groups (not assigned by the teaching staff). Given that Term 3B is rather short and also in light of the recent COVID-19 situation, we foresee some difficulty involved in finding real-world clients and engaging them as project sponsors. Thus, students are encouraged to come up with realistic business problem statements on their own, source out available real-world datasets, and perform social analytics for their Group Project. The primary output includes: 1) written report with business objectives,

methods, techniques, tools and findings, 2) application such as web-based or mobile-based visualization dashboard showing social analytics insights, 3) poster, and 4) Medium article.

In the past (Term 1 & Term 2), examples of "social analytics" project included (but were not limited to):

- Establish/re-establish its presence on one or more social platforms. This entails analyzing their current social presence by looking into social media posts and comments left by their customers.
- Launch and monitor a social media marketing campaign on one or more social platforms. Similarly to the above example, this entails analyzing data crawled/scraped from social platforms and analyzing it.
- Understand the market (e.g. competitor analysis, product/service reviews, emerging market analysis). For example, if a company were to enter Asia market with their brand new product, they would have to research the market – to better understand 1) competitors and 2) consumers.
- Listening to social conversations about recent/trendy topics, e.g. Hong Kong Protests, COVID-19, US Election, natural disasters, etc.

Lesson Plan

Lesson	Topic	Remarks
(1) 15-JUN-2020	Course overview. Setting up development environment for social analytics.	
(2) 16-JUN-2020	Discussion on social phenomena. Python programming for social analytics & Social Media APIs.	
(3) 18-JUN-2020	Analyzing social conversations in text & summarizing unstructured textual data. Setting up development environment for social analytics in Amazon Web Services.	
(4) 22-JUN-2020	Social network analysis – node-level analysis Quiz 1	**Form project group & register in eLearn**
(5) 23-JUN-2020	Social network analysis – network-level analysis (network measures)	
(6) 25-JUN-2020	Social analytics - text sentiment analysis	
(7) 29-JUN-2020	Social network analysis – network-level analysis (community detection, evolving networks). Other social media APIs & web scraping. Quiz 2	
(8) Break	No Lesson	
(9) 2-JUL-2020	Group Project - proposal presentation	**Group Project Proposal Pitch**
(10) 6-JUL-2020	Amazon Web Services - Social Analytics Pipeline Quiz 3	
(11) 7-JUL-2020	Special Topics *Other options: Guest speaker or company visit (TBD)*	
(12) 9-JUL-2020	AWS Cloud Practitioner certification exam revision	
(13) 13-JUL-2020	Quiz 4	
(14) 14-JUL-2020	No lesson (group project consultation)	
(15) 16-JUL-2020	Group Project - final presentation	**Submit group project (PPT, system code, poster, report) Post Medium article**

22-JUL-2020	Students must submit AWS Cloud Practitioner certification exam official score report to the instructor	

Resources

Recommended Reading:

- The Tipping Point: How Little Things Can Make a Big Difference by Malcolm Gladwell (2000).
- Linked: How Everything Is Connected to Everything Else and What It Means for Business, Science, and Everyday Life by Albert-Laszlo Barabasi (2003).
- Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives -- How Your Friends' Friends' Friends Affect Everything You Feel, Think, and Do Paperback by Nicholas A. Christakis and James H. Fowler (2011).
- Guns, Germs, and Steel: The Fates of Human Societies by Jared M. Diamond (1997).
- Sapiens: A Brief History of Humankind by Yuval Noah Harari (2018).
- Outliers: The Story of Success by Malcolm Gladwell (2011).

Tools:
Python, Gephi, Amazon Web Services

10. University Policies

Academic Integrity

All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences.

All work (whether oral or written) submitted for purposes of assessment must be the student's own work. Penalties for violation of the policy range from zero marks for the component assessment to expulsion, depending on the nature of the offense.

When in doubt, students should consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at https://smu.sharepoint.com/sites/oasis/SitePages/DOS-WKLSWC/UCSC.aspx.

Copyright Notice

Please note that all course materials are meant for personal use only, namely, for the purposes of teaching, studying and research. You are strictly not permitted to make copies of or print additional copies or distribute such copies of the course materials or any parts thereof, for commercial gain or exchange.

For the full copyright notice, please visit: https://smu.sg/Copyright-notice or *OASIS -> CAMPUS LIFE & EXCHANGE -> CONDUCT & DISCIPLINE -> UNIVERSITY COUNCIL OF STUDENT DISCIPLINE*

Accessibility

SMU strives to make learning experiences accessible for all. If you anticipate or experience physical or academic barriers due to disability, please let me know immediately. You are also welcome to contact the university's student accessibility support team if you have questions or concerns about academic provisions: accessibility@smu.edu.sg. Please be aware that the accessible tables in our seminar room should remain available for students who require them.

Digital Readiness for Teaching and Learning (DRTL)

As part of emergency preparedness, instructors may conduct lessons online via the Zoom platform during the term, to prepare students for online learning. During an actual emergency, students will be notified to access the Zoom platform for their online lessons. The class schedule will mirror the current face-to-face class timetable unless otherwise stated.