Course Outline

EE300/ EE200 Data Science for Economic Analysis

Semester 1/2021 (Aug 9 – Nov 22, 2021)

Number of credits: 3 credits

Lecture Time: Section 046401: Monday, 09.00 – 12.00 hours

Lecture Venue: Section 046401 Zoom ID 7178169150

Google Classroom: 6bceaix

Instructors: Asst. Prof. Dr. Monthien Satimanon

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Office: Room 10, 60th year building, 4th floor, Faculty of Economics

Office hours: by appointment

Course description

Learning to work with data. Topics include (1) data sampling and cleaning (2) data storage and management (3) exploratory data analysis (4) prediction based on statistical tools such as regression, classification and clustering (5) communication of results through visualization and summary statistics. Students learn through real--world examples using programs such as advanced MS Excel, Python or R..

Prerequisite: 2nd year student or above.

(have taken at least 34 credits)

Course objective:

In this course, students will learn to conduct data analysis and project on their topic of interest. Since this course focuses on economic issues, your topic and group project should be related to either microeconomics or macroeconomics. What the course will do is to stimulate an active-learning environment. Unlike most of the other classes you have attended, there won't be that many lectures. My role in this class will be a coach and conductor, rather than a lecturer.

This course divides into two significant parts. In the first part, I hope to introduce you to essential elements of a proper idea about the data and data science. To do this, we will discuss how to come up with meaningful linkages between business, economics, and data. We will then discuss

different components of standard data (your team paper). This part includes an introduction, literature review, theoretical framework, data acquisition, data management, prediction, and visualization of findings. You will be assigned to read and practice on data science projects as well as past seminar papers. The students will work on the suggested data and coding project.

In the second part, you will gradually take more roles in class. Each of you and your time will take a turn to present your topic, related literature, theoretical framework, methodology, and findings. Other students will pay close attention to your presentation. They will then come up with constructive comments and suggestions to improve your data science project. Occasionally, we will turn the class into individual meetings and team meetings. The course is where you discuss specific questions regarding your data science project and data skill with me.

Textbooks:

There is no textbook for this course. However, I will post some useful articles on Google Classroom. There is also a list of readings that will be in Google classroom

Suggested readings by topics will be available after knowing you guys:

1. **Data Science: business, computer, and statistics and mathematics**

   Data Literacy, Fact, and Truth.
   Talk to me.
   Design Thinking:
   OKRs:
   Designing Your Life:
   The Book of Why:
   3 Dimensions of Data Science, Statistics, and Econometrics.
   https://clevertap.com/blog/data-science/
   https://www.vox.com/the-highlight/2019/5/14/18520783/harvard-economics-chetty
   Data Science (MIT Press Essential Knowledge series)
   Data for the People: How to Make Our Post-Privacy Economy Work for You
   by Andreas Weigend
   Everybody Lies: Big Data, New Data, and What the Internet Can Tell Us About Who We Really Are
   by Seth Stephens-Davidowitz
   https://datarockie.com/free-data-science-books/
   Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy
   https://www.businessinsider.com/netflix-facebook-cambridge-analytica-documentary-trailer-great-hack-2019-7

2. **Data Sampling and Cleaning**
   https://towardsdatascience.com/sampling-techniques-a4e34111d808
   http://siteresources.worldbank.org/INTPOVRES/Resources/477227-1142020443961/2311843-1142870725726/2337154-1328041661816/8405489-1342716080957/12-StataforSampling2012(KristenHimelein).pdf
   https://www.tableau.com/learn/whitepapers/data-prep-best-practices

3. **Data Storage and Management**
   http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.661.538&rep=rep1&type=pdf
   https://www.bmc.com/blogs/data-lake-vs-data-warehouse-vs-database-whats-the-difference/

4. **Exploratory Data Analysis: Describe or Explain**
   - Tabulation
   - Excel
   - Pivot
   - Power BI
   - Stata®
   - R
   - Python
   - Orange

   Book of Why
   Causal Inference in Statistics
   Angrist, Joshua D., and Jörn-Steffen Pischke. Mastering 'Metrics: The Path from Cause to Effect. Princeton: Princeton University Press, 2015.

5. **Prediction**
   - Machine Learning basic form.

   https://bruegel.org/2018/11/machine-learning-and-economics/
   Criteria for prediction
   - Is it about causation?

   http://www.equality-of-opportunity.org/bigdatacourse_stanford/
   Mullainathan, Sendhil, and Jan Spiess. 2017. "Machine Learning: An Applied Econometric Approach." Journal of Economic Perspectives 31 (2): 87-106.
   Stock, James H. and Mark W. Watson. Introduction to Econometrics. 4th Edition. Boston: Pearson, 2018. Note: earlier editions and all international editions printed in English are acceptable.

6. **Communication and Visualization**
   - Storytelling with data
   - Show and Tell
   - Draw to Win
   - Dashboard White Paper from Tableau
   - Ted Talk by Han Rosling
   - Ted Talk by Simon Sinek

Other teaching materials:

If there is any PowerPoint presentation, the file(s) will be on Google Classroom.

Evaluation:

1.	Group Review of Literature AKA book review	10%
2.	Group Presentations on software and coding comparison on Gartner	10%
3.	Group presentations of project and coding requirement	10%
4.	Group work on data visualization or dashboard:	20%
5.	Group work on Python or R replication	10%
6.	Final data science project and Communication	40%

Data Science Projects: A vital element of the course will be five small data projects, and final data science project, which will give students hands-on experience in working with data. We recommend and will support using the statistical software program like Stata® and Excel® for these projects, but

students are welcome to use other applications (e.g., Power BI, R, Python, Tableau, RapidMiner, Alteryx), provided that their code and workflow are clear. The group projects are designed to be more substantial than traditional problem sets and will include significant coding, reading, and writing elements that will give students a sense of how data scientists work.

Collaboration Policy: Discussion and the exchange of ideas and works are essential to data science work. You and your teams are encouraged to consult and discuss with your classmates on the data projects and to share resources and codes. However, you should ensure that any work you submit for evaluation is the result of your work and that it reflects your integrity. You should also understand and practice the standard citation practices, and please cite any books, articles, websites, lectures, etc. that have helped you with your work. If you received any help with your work (e.g., feedback on drafts, help with code, or programming), you must also acknowledge and give credit to this assistance.

Your final Data Science Project

The project should be between 20-25 pages long presentation, including graphs, tables, dashboards, and figures (excluding bibliography and appendices). The paper should be composed of 5 main parts: 1) introduction 2) literature review 3) theoretical framework and methodology, and 4) findings 5) conclusion. We will discuss each section in more detail in class.

(This schedule is subject to change. Please see Google Classroom for changes to dates, etc.)

Class	Topics
9 Aug	Introduction - Review of Course and Data Science Resource. Identification of your project and install your tools. Conduct Group Meetings to identify your topics, relevant literature, and Data Science Tool.
16 Aug	Introduction - Review of Course and Data Science Resource. Identification of your project and install your tools. Conduct Group Meetings to identify your topics, relevant literature, and Data Science Tool.
23 Aug	*Book or Paper Review presentation*
30 Aug	*Workshop on Excel or PowerBI*
6 Sep	*Group presentation of Dashboard.*
13 Sep	*Workshop on Tableau or Power BI*
20 Sep	*Midterm Week and Review of Python or R*
---- Midterm Exam: Submission of Data Science Project Interim Report	
4 Oct	*Workshop - R or Python*

Class	Topics
11 Oct	*Workshop - R or Python*
18 Oct	*Workshop - R or Python*
25 Oct	*Workshop - R or Python*
1 Nov	*Machine Learning on Python*
8 Nov	*Orange for Machine Learning*
15 Nov	*Orange for Machine Learning*
22 Nov	*Presentation of Machine Learning*
---- Final Project Presentation: TBA	

BACHELOR OF ECONOMICS
THAMMASAT UNIVERSITY

ACADEMIC CALENDAR & HOLIDAY
SEMESTER 1/2021

Semester 1/2021 (August 9 - November 27, 2021)	
Classes Begin	August 9, 2021
Add-drop period	August 6 - 15, 2021
Tuition Fee Installment Plan For ID.61-63 only *(9 AM - 10.30 PM)*	#Round 1 (July 16 – 18, 2021) #Round 2 (August 30 – September 3, 2021) #Round 3 (September 20 – 22, 2021)
*H.M. Queen Sirikit The Queen Mother's Birthday**	*August 12, 2021*
*Prince Mahidol Day**	*September 24, 2021*
Mid-term Examination Period	September 27 - October 3, 2021
Withdrawal period with "W" on record	October 11 - November 15, 2021
*H.M. King Bhumibol Adulyadej The Great Memorial Day**	*October 13, 2021*
*Substitution for King Chulalongkorn's Day**	*October 22, 2021*
*King Chulalongkorn's Day**	*October 23, 2021*
Last day of class for Semester 1/2021	November 27, 2021
Final exam period	November 29-30, December 1-3, 7-9, 11-17, 2021
*H.M. King Bhumibol Adulyadej The Great's Birthday**	*December 5, 2021*
*Substitution for H.M. King Bhumibol Adulyadej The Great's Birthday**	*December 6, 2021*
*Constitution Day**	*December 10, 2021*

Remark * Holiday, No classes during this period

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