

COMP 7810
Quantitative Methods for Data
Analytics and Artificial
Intelligence

Course Instructors: Dr. LAN, Liang

Dr. LIU, Yang

Teaching Assistants:

Mr. HE, Xin

Mr. REN, Jinfu

About Me

- Dr. LAN Liang
 - Assistant Professor in Department of Computer Science
 - Senior Researcher in Lenovo Machine Intelligence Research Center
 - Scientist II, I2R, ASTAR, Singapore
 - Researcher, Huawei Noah Ark Lab
 - Ph.D., Temple University
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 - Office hours: 2:00pm – 4:00pm (Wednesdays) or by appointments



About LIU Yang

- Dr. LIU Yang

- Research Assistant Professor in Department of Computer Science
- Postdoc Research Associate from Yale University; PhD from HK PolyU
- Machine learning, decision making, visual content analysis, data analytics, healthcare, brain modeling, ...

- Contact Information

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Outline

- Timetable
- Course Contents
- Learning Outcomes
- Assessment Methods

- Time of our classes
 - 13 weeks from Sep 3 to Dec 3
 - Time: 18:30 ~ 21:20 (Tuesdays)
- Classroom of our class
 - Lectures: OEE1017
 - Labs: FSC801C, FSC801D, RRS638

The figure displays three calendar grids for the months of September, October, and November. Each grid shows the days of the month, with some dates highlighted in red to indicate holidays. A green box highlights the 3rd of each month.

September

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

14 The day following the Mid-Autumn Festival

October

		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

1 National Day
7 Chung Yeung Festival

November

					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

25-26 Christmas holidays

Course Contents

- Part One
 - Instructor: Dr. LAN Liang
- Part Two
 - Instructor: Dr. LIU Yang

Course Contents

- **Python for Data Analytics**

- Introduction to data analytics; Python fundamentals; Python libraries for data analytics: NumPy and Pandas

- **Linear Algebra**

- Basic vector and matrix operations; Matrix properties (e.g., trace, rank); Eigenvalues and Eigenvectors; Python libraries for linear Algebra

- **Multivariable Calculus**

- Introduction to artificial intelligence and machine learning; Partial derivatives and gradients; Multivariable chain rule; Jacobian and Hessian matrices; Python libraries for multivariable calculus

- **Probability and Statistics**

- Conditional probability and independence; Discrete and continuous random variables; Expectation and variance; Multiple random variables; Descriptive statistics; Parameter estimation and hypothesis testing; Regression Analysis; Python library for probability and statistics

PART1 Class Arrangement

Week	Lecture/ Lab
W1	Introduction to Data Analytics Python Fundamentals
W2	Python libraries for data analytics: NumPy and Pandas
W3	Lab 1: Python basics and Introduction to Pandas
W4	Linear Algebra <ul style="list-style-type: none">• Basic vector and matrix operations• Matrix properties: trace, range, and determinant
W5	Linear Algebra <ul style="list-style-type: none">• Eigenvalues and Eigenvectors• Principal Component Analysis• Linear Regression
W6	Lab 2: Linear Algebra using Numpy
W7	April 18, 2019 Quiz and Revisit Part I of COMP7180

- Both **Lectures** and **Lab Tutorials** will be conducted in **OEE1017**.
- For the week of lab, we will first have 1.5 hour lab tutorial in **OEE 1017** and then move to labs (**RRS638, FSC801C, FSC801D and FSC901E**).

Learning Outcomes

- Course Aims:
 - To learn the various quantitative methods
 - Gain hands-on programming skills necessary for data analytics and artificial intelligence
- Knowledge:
 - Describe the essential concepts in linear algebra for data analytics and artificial intelligence
 - Understand fundamental multivariable calculus for data analytics and artificial intelligence
 - Explain the essential concepts in probability and statistics for data analytics and artificial intelligence
- Professional Skills (based on Python Programming):
 - Apply quantitative methods for data analytics
 - Implement quantitative methods via a programming language

Assessment methods

- Continuous Assessment (40%)
 - Lab exercises + Quizzes
- Examination (60%)
 - Final examination
- Import Notices
 - Plagiarism: Students who plagiarized and who were plagiarized will be given **zero mark**.
 - Final Exam: In order to pass this course, students should attain **at least 30% of the final examination mark**.
 - **A cumulative GPA at least 2.50 for graduation**