GENERAL INFORMATION

Instructor: Zigan Wang
Email: wangzg@hku.hk
Office: KK902
Phone: 2859 1045
Consultation times: By appointment

Subclass A: Semester 1, Wednesday, 9:30 – 12:20 in KK202
Subclass B: Semester 2, Friday, 14:30 – 17:20 in KKLG101

Pre-requisites: ACCT1101 Introduction to financial accounting; or ECON1210 Introductory microeconomics; or FINA1310 Corporate finance
Co-requisites: 
Mutually exclusive:

Course Website:
Other important details:

COURSE DESCRIPTION

This course provides undergraduate students a foundation in managing and analyzing financial datasets. Data analysis is a very important skill for the students to master. The first part of the course focuses on building skills – data manipulation using programming languages. The second part introduces various financial databases. Through practice on real-world financial datasets, students will learn methods used to warehouse and retrieve data for statistical computing. The course then turns to analytical methods with a focus on demonstrating these methods on real-data from various contexts in finance. Methods covered include manipulation of time series and panel data, statistical modeling and inference, simple textual analysis, classification and alternative datasets, etc. Problem sets and projects will be the primary mode of learning. Course learning will be supplemented with exposure to industry speakers from the local financial industry.

COURSE OBJECTIVES

1. Develop skills in database design, management, and access as would be expected of a first-year investment analyst.
2. Gain proficiency in programming and performing basic data cleaning, custodianship and data manipulation.
3. Gain a working understanding of different analytical methods used in finance and where the methods would be appropriate.
4. Gain fluency for at least one analytical method of the student’s choosing through course projects.

FACULTY GOALS

Goal 1: Acquisition and internalization of knowledge of the programme discipline
Goal 2: Application and integration of knowledge
Goal 3: Inculcating professionalism and leadership
Goal 4: Developing global outlook
Goal 5: Mastering communication skills

COURSE LEARNING OUTCOMES

<table>
<thead>
<tr>
<th>Course Learning Outcomes</th>
<th>Aligned Faculty Goals</th>
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<tbody>
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CLO1 – Students will learn to store and access data efficiently using modern database storage methods.

CLO2 – Students will gain an overview of analytical methods used in finance and their typical application, and demonstrate understanding of how to apply the methods through highly-supervised programming assignments.

CLO3 – Students will demonstrate strong fluency in one analytical method of their own choice through course projects.

CLO4 – Students will be encouraged to creatively apply methods or data to solve specific industry problems.

CLO5 – Students will be encouraged to communicate ideas.

<table>
<thead>
<tr>
<th>COURSE TEACHING AND LEARNING ACTIVITIES</th>
<th>Expected contact hour</th>
<th>Study Load (% of study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;L1. - Lectures</td>
<td>16</td>
<td>40%</td>
</tr>
<tr>
<td>T&amp;L2. – Weekly projects.</td>
<td>32</td>
<td>55%</td>
</tr>
<tr>
<td>T&amp;L3. – Three industry speakers. Students will be expected to attend two.</td>
<td>4</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Brief Description (Optional)</th>
<th>Weight</th>
<th>Aligned Course Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. Problem sets</td>
<td>Students will have multiple problem sets involving high-difficulty programming problems. Each step will enforce a particular skill. Students will be then given a choice of an open-ended problem using example data and be asked to solve the problem. Students can work in groups.</td>
<td>70%</td>
<td>CLO 1-4</td>
</tr>
<tr>
<td>A2. A final project</td>
<td></td>
<td>25%</td>
<td>CLO 1-4</td>
</tr>
<tr>
<td>A3. General engagement and participation</td>
<td></td>
<td>5%</td>
<td>CLO 5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
<td></td>
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STANDARDS FOR ASSESSMENT

Course Grade Descriptors

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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<tbody>
<tr>
<td>A+, A, A-</td>
<td>The student would can competitively apply analytical methods used in the course independently.</td>
</tr>
<tr>
<td>B+, B, B-</td>
<td>The student appears to be able to apply analytical methods, but requires guidance.</td>
</tr>
<tr>
<td>C+, C, C-</td>
<td>The student has a conceptual understanding of methods applied in the course, but could not be expected to apply all methods used in the course.</td>
</tr>
<tr>
<td>D+, D</td>
<td>The student has shown effort, but a limited understanding of course content.</td>
</tr>
<tr>
<td>F</td>
<td>The student has not demonstrated effort to understand course content.</td>
</tr>
</tbody>
</table>

Assessment Rubrics for Each Assessment

For assignments, the main driver of assessment will be accuracy with respect to the answers on which the assignments are based. An “A” quality course assignment looks professional and any discrepancies can be explained carefully. A “B” course assignment is mostly correct, but gaps in understanding remain. A “C” course assignment shows obvious gaps in understanding.
For the final course project, assessment will be based on quality of execution and originality of the investment idea. An A course project will demonstrate thorough understanding of course methods, careful consideration of pitfalls to analysis, and some element of originality. The work will be well communicated and easy to understand.

### COURSE CONTENT AND TENTATIVE TEACHING SCHEDULE

I assume a twelve-week course schedule. I am going to provide assignments that are likely too many for a course of this length, but the number of assignments will be optional according to the course policy described in the section on Course Policy.

I also plan to have perhaps two or three course speakers. I know some Hong Kong-area financial professionals and I will see about their availability – attendance and a short write-up will be equivalent to an assignment.

Programming will be kept on Python.

1. **Week 1:**
   a. Lecture: History of financial technologies

2. **Week 2:**
   a. Lecture: Modern financial technologies / Guest lecture of Bitcoin and other digital currencies
   b. Required Assignment:
      i. Installation of Python and required packages
      ii. Write a “Hello World” program

3. **Week 3:**
   a. Lecture: Overview of programming in finance, introduction to financial data
   b. Required Assignment:
      i. All Python problems on Codeacademy.com

4. **Week 4:**
   a. Lecture: Writing Python codes to acquire data.
   b. Required Assignments:
      i. Create a Jupyter notebook and load a dataset
      ii. Clean a dataset

5. **Week 5:**
   a. Lecture: Manipulating data retrieved from a database.
   b. (Optional) Lecture: Program to email
   c. Required Assignment:
      i. Combine two datasets

6. **Week 6:**
   b. Optional Assignment:
      i. A programming assignment involving a financial dataset and some standard data manipulations one may commonly see in industry. Produce summary statistics

7. **Week 7:**
   a. Lecture: Introduction to WRDS financial database, Compustat, CUSIP/GVKEY
   b. Optional Assignment
      i. Manipulate Compustat data using pandas.

8. **Week 8:**
   a. Lecture: Introduction to BoardEx
   b. Optional Assignment
      i. Create a graph of BoardEx network.

9. **Week 9:**
   a. Lecture: Introduction to Federal Reserve banking financial database
   b. Optional Assignment
      i. Assignment related to banking data manipulation

10. **Week 10:**
    a. Lecture: Introduction to hedge fund and mutual fund database
    b. Optional assignments:
11. Week 11:
   a. Lecture: Stock trading database, CRSP
   b. Optional assignments:
      i. Clean a dataset

12. Week 12:
   a. Lecture: High frequency stock trading database, TAQ

**REQUIRED/RECOMMENDED READINGS & ONLINE MATERIALS** (e.g. journals, textbooks, website addresses etc.)

- [https://www.coursera.org/](https://www.coursera.org/)
- [https://www.codecademy.com/](https://www.codecademy.com/)
- Review of Economics and Statistics

**MEANS/PROCESSES FOR STUDENT FEEDBACK ON COURSE**

Online response via Moodle site

**COURSE POLICY** (e.g. plagiarism, academic honesty, attendance, etc.)

The code of ethics and attendance policy will be applied.

To encourage participation and to discourage students from overinvesting in skills of low personal interest, I will have a relatively flexible policy regarding assignments:

- I will have 10 assignments, but students only have to do 7.
- The assignments will have extra credit.
- Students can work in groups, but a group can only have a maximum of 2 people.

**ADDITIONAL COURSE INFORMATION** (e.g. e-learning platforms & materials, penalty for late assignments, etc.)

I may prescribe self-learning materials to supplement students’ learning. Most of this will be optional. Late assignment policy will be to accommodate students who provide reasonable notice about competing obligations. Given that some assignments will be optional, students may also simply do other assignments given later in the course. I want to encourage self-motivated students to outperform, but do not want to discourage students excessively for a new module.