GLOBAL SUMMER PROGRAMME 2027

ACCT 682 PROGRAMMING FOR BUSINESS ANALYTICS

Instructor Name : Wang Jiwei
Title : Associate Professor
Email : jwwang@smu.edu.sg
Office : School of Accountancy, Room 5025

COURSE DESCRIPTION

In this course, students acquire foundational statistical programming concepts and skills for business analytics through a widely used programming language Python. Students will also learn how to implement popular statistical learning algorithms using the programming language for data analysis. Upon successful completion of this course, students will be able to use programming techniques to explore how data is used to assess what drives financial performance and to forecast future financial scenarios. Students will understand how financial data and non-financial data interact to forecast events, detect financial discrepancies and frauds, predict corporate default, and determine business strategy. This course has been designed to equip students with algorithmic mind-set to create strategy and make better business decisions through business analytics.

LEARNING OBJECTIVES

Students are expected to demonstrate the following programming technical competencies upon successful completion of this course:

- Understand the role of data and analytics in solving accounting and business problems, such as revenue prediction, bankruptcy prediction, and fraud detection.
- Demonstrate familiarity with statistical programming in the contexts of accounting and finance.
- Transform financial and nonfinancial data into useful insights for business.
- Communicate inferences from analysis through writing, speaking, and visuals.
- Develop an ability to independently learn and explore new methods in business analytics in this ever-changing field.

Class activities are designed to further develop students' analytical, communication, and active learning skills, as well as students' professional ethics. Students must be prepared to go beyond seminar materials and prescribed reading.

PRE-REQUISITES / REQUIREMENTS / MUTUALLY EXCLUSIVE COURSE(S)

- This is a postgraduate-level course. While foundational knowledge in Accounting, Finance, and Economics is beneficial, it is not required.
- Students are required to bring a laptop with at least 8 GB of RAM.
- Upon completing the Global Summer Programme, students may be considered for course exemption if they are accepted into SMU's Master of Professional Accounting or Master of Science in Accounting (Data & Analytics) programmes.

ASSESSMENT METHODS

To pass the course, a student is required to obtain a total mark of 50% or better. All three assessment components below must be attempted and missing of any will result in failure of the course.
The assessment components are:

Class Participation and Activities	20%
Progress Assessment (assignments and/or pop quizzes)	30%
Group Project	50%
Total	**100%**

INSTRUCTIONAL METHODS AND EXPECTATIONS

The course will be conducted in class sessions that will last for 3 hours each with a short break in between. You are expected to come to these sessions prepared and be ready to respond to questions as required. This means doing the required readings and/or homework for each session.

The course is a combination of seminar, case discussion, guest speakers, and group project.

Students are expected to actively participate in class discussions.

CONSULTATIONS

By appointment or drop by

RECOMMENDED TEXT AND READINGS

Will be provided in due course

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://researchguides.smu.edu.sg/copyright.

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 accessibility services 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.

LESSON PLAN	
LESSONS	**TOPICS**
LESSON 1	*Course Logistics* *Jupyter: Thinking and Storytelling with Code and Data* ***Introduction to Business Analytics*** • *What is analytics* • *Status of business analytics* ***Basic Python Coding (I)*** • *Arithmetic commands* • *Variables* • *Data type and structure (Number, Character, List, Tuple, Set, Dictionary)*
LESSON 2	***Basic Python Coding (II)*** • *Conditional statement* • *For and While Loop* • *Function* • *Module, package, library* • *List* • *Dictionary* • *Numpy: ndarray*
LESSON 3	***Basic Python Coding (III)*** • *Pandas: DataFrame* • *Data manipulation with Pandas* • *Simple plotting*
LESSON 4	***Forecasting with Linear Regression*** • *Identifying sales drivers (macro-economy; policy/regulatory; consumer behavior; environment; industry; etc)* • *Univariate statistics* • *Exploratory Data Analysis (EDA)* • *Forecast models and validation* • *Panel data and Fixed effect* • *Training and testing data* • *Prediction accuracy (RMSE)* • *Plotting and visualization* • *Forecasting annual sales of a Singapore company*
LESSON 5	***Case: Forecasting Walmart Sales*** • *Kaggle competition: Walmart Store Weekly Sales Forecasting* • *Model evaluation metric: MAE vs RMSE*
LESSON 6	***Forecasting with Logistic Regression*** • *Logistic regression and coefficient interpretation* • *Advanced data visualization* • *Forecasting shipping delays using typhoon data*

LESSON 7	***Logistic Regression for Bankruptcy (I)*** • *Process risks from contracting with suppliers (shortages/bankruptcy/shipping delays/etc)* • *Use logistic regression to predict these* • *Altman Z-Score* • *Merton Distance-to-Default model* • *Confusion matrix* • *ROC and AUC* • *Predicting bankruptcy and credit rating downgrade*
LESSON 8	***Logistic Regression for Bankruptcy (II)*** • *Confusion matrix* • *ROC and AUC* • *Predicting bankruptcy and credit rating downgrade*
LESSON 9	***Detection of Corporate Fraud (I)*** • *Leveraging theory and research* • *Traditional linear models to predict corporate fraud* • *Regularization: Lasso, Ridge and Elastic Net regressions* • *K-fold cross validation* • *Predicting misstatements of US corporations*
LESSON 10	***Detection of Corporate Fraud (II)*** • *Decision trees* • *Bagging with Random Forest* • *Gradient boosting with XGBoost* • *Predicting misstatements of US corporations*
LESSON 11	*Invited Speaker: TBA*
LESSON 12	*GROUP PROJECTS DUE* *Group Project Presentations*