**Dominican University of California**

**MSBA5511 – Financial Analytics**

**2023**

**Updated on March 9, 2023**

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**Instructor:**

Tina Xiaotian Zhang, Ph.D.

Adjunct Professor of Dominican University of California

Professor of Finance

Saint Mary’s College of California

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**Class dates: Saturdays 8am-12:30pm & Wednesdays 7-9:40pm**

Saturdays 03/18/2023; 4/1/2023; 4/15/2023; 4/29/2023-**Science Building 231**

Wednesdays Zoom online

Xiaotian Zhang is inviting you to a scheduled Zoom meeting.

Topic: MSBA5511 Financial Analytics Wed 7-9:40pm 3/18-5/2

Time: Mar 22, 2023 07:00 PM Pacific Time (US and Canada)

Every week on Wed, until Apr 26, 2023, 6 occurrence(s)

Mar 22, 2023 07:00 PM

Mar 29, 2023 07:00 PM

Apr 5, 2023 07:00 PM

Apr 12, 2023 07:00 PM

Apr 19, 2023 07:00 PM

Apr 26, 2023 07:00 PM

Please download and import the following iCalendar (.ics) files to your calendar system.

Weekly: <https://dominican-edu.zoom.us/meeting/tJ0udOquqj4sG9JgMoeDxlXu6iqcMC18Z5s-/ics?icsToken=98tyKuChrTgpHNCQthiBRox5A4jCb-7wiCVdjfp3mzLqBgRLbjvjYOtTMZ9cQYDq>

Join Zoom Meeting

<https://dominican-edu.zoom.us/j/99333645616>

Meeting ID: 993 3364 5616

Passcode: 123456

One tap mobile

+16694449171,,99333645616# US

+16699006833,,99333645616# US (San Jose)

Dial by your location

+1 669 444 9171 US

+1 669 900 6833 US (San Jose)

+1 253 205 0468 US

+1 253 215 8782 US (Tacoma)

+1 346 248 7799 US (Houston)

+1 719 359 4580 US

+1 360 209 5623 US

+1 386 347 5053 US

+1 507 473 4847 US

+1 564 217 2000 US

+1 646 931 3860 US

+1 689 278 1000 US

+1 929 205 6099 US (New York)

+1 301 715 8592 US (Washington DC)

+1 305 224 1968 US

+1 309 205 3325 US

+1 312 626 6799 US (Chicago)

Meeting ID: 993 3364 5616

Find your local number: https://dominican-edu.zoom.us/u/aTrTmXVAU

**Office Hour:**

Zoom online, 45 mins after class on Wednesdays and by appointment.

**Required Texts:**

Richard A., Dennis, W., Jerald E., David E., and Anson, M. “Quantitative Investment Analysis”, 3rd Edition, ISBN-13: 978-1119104223; ISBN-10: 111910422X

**Suggested Texts:**

“Financial Management: Theory & Practice”, ISBN-13: 978-1439078099, ISBN-10: 1439078092

SAS Institute, “Stock Market Analysis Using the SAS System: Portfolio Selection and Evaluation”, ISBN-10: 155544623X; ISBN-13: 978-1555446239.

**Course Description (from approved Program Curriculum and Course Descriptions)**

This course teaches students how to build successful financial models using analytics. It employs financial econometrics and predictive modeling using computer software to provide insights into internal and external financial information. Topics include cross-sectional risk and return models such as the Capital Asset Pricing Model (CAPM), portfolio optimization, performance forecasting, and the Black-Scholes option pricing model. Additional topics include hypothesis testing in Finance and regressions in Finance.

Students are required to do projects applying econometrics to real world financial problems. Students not familiar with algebra and elementary statistics should plan to make up the deficit early in the course.

**SAS** Studio (a Data Analysis and Statistical Software) and **Excel for Windows** are required in the course.

**Grade Determination:**

Open-book Midterm exam 25%

Open-book Final exam 30%

Class participation 13%

Current event presentation 2%

Assignments 10%

Group Project 20%

A: Above 95 A-: 90 – 95

B+: 87 – 89 B: 83 – 86

B-: 80 – 82 C+: 77 – 79

C: 73 – 76 C-: 70 - 72

D+: 67 – 69 D: 63 – 66

D-: 60 – 62 F: Less than 60

**Exams:**

Both two exams are open-book and open note. TBD: Some questions are in-class (either synchronous online or in person); and some questions are take-home. The final exam is not intended to be cumulative; however, concepts learned earlier in the course will be necessary in later parts of the course.

No make-up is allowed unless the student obtains written permission from Program Director with a written note.

**Assignments:**

Financial Analytics courses have a reputation for taking a lot of time to grasp to the materials and apply them to real world problems. The best way to learn modeling is through practice. Therefore, assignments will be given throughout the quarter. Homework will be collected before the start of next week’s session. **No late work will be considered. An email of code (txt) plus report (WORD) are required.**

1. Some assignments are to be completed by your **voluntarily established groups**. The group size must be less than 4 persons. The group may also be required to make an **oral presentation** to the class summarizing their conclusions. **Please CC all group members in emails for anything related to group assignments/submissions.**
2. Some individual assignments are graded mainly on effort. That is, you get a full credit as long as you submit completed assignments on time, put in an honest effort, and there are no egregious mistakes.

**Attendance Policy:**

Attendance is recommended. I only provide make-up exams for students who have excused absence with official notes and/or unexpected emergence.

**Class participation:**

1. Attending all class meetings does NOT secure the full credits of class participation. While some concepts will be covered in a "lecture" format, your active and constructive participation is expected. I hope that most of the class hours will be in an interactive format in which you will be challenged with questions and problems.
2. To be prepared for class, you may want to read the chapters before coming to class.
3. Sharing your personal experiences/understanding related to (1) the concepts discussed (2) problems like those discussed, and (3) current events.
4. In class quizzes will be a part of class participation.
5. All students are expected to behave in a professional manner with the instructor and their classmates during the course. Disruptive behavior is not acceptable, and will be penalized by at least 5 points.

**Current event presentation:**

Each person is required to do one of the following:

1. A short and informal PPT presentation (< 5mins) about the topics of financial analytics in which she or he is interested. It is important that you need to relate your presentation with the topics related to this class. The length of the presentation should not exceed 5 minutes. I also encourage you to bring any current newspaper or magazine article that has some bearing with managerial finance and share with the class. If you have difficulty finding an appropriate topic to present, please consult me as early as possible. Email me the slides deck by 9pm the day before the presentation.
2. If there is no enough class presentation space, a 3-page report about the topics of financial analytics in which she or he is interested. It is important that you need to relate your report with the topics related to this class.

**Group Project: Portfolio Selection and Evaluation**

The goal of the project is 1) to use risk-return framework to select and analyze investments; 2) to briefly understand investment strategies in the stock market, especially for short-term investments; 3) to evaluate the financial/accounting performance of individual stocks; 4) to analyze portfolio characteristics and performance; and 5) to optimize your portfolio.

Each group (3-4 people) must manage a separate portfolio and submit a project report.

Go to [www.wallstreetsurvivor.com](http://www.wallstreetsurvivor.com) and set up an account. The website keeps the records, so please save your account balance on every Friday.

1. Start a game play of $100K contest **on the first available trading day following our meeting**. You can have any stock trades allowed by the website, 5 positions maximum and 100 trades for the investment horizon. You can take long or short positions.

2. Your portfolio performance is to be evaluated against a benchmark of S&P 500 index. The weekly return of S&P 500 will be calculated.

You need to fill the returns in the below table every week.

|  |  |  |
| --- | --- | --- |
|  | Portfolio | S&P500 |
| Start on the week of Friday 3/17 | $100K | S&P500 Index:\_\_\_\_\_\_ |
| Weekly return (%): 3/20-3/24 | \_\_\_\_\_\_\_\_% | \_\_\_\_\_\_\_\_% |
| Weekly return (%): 3/27-3/31 |  |  |
| Weekly return (%): 4/3-4/7 |  |  |
| Weekly return (%): 4/10-4/14 |  |  |
| Weekly return (%): 4/17-4/21 |  |  |
| End on Friday 4/21 | $\_\_\_\_\_\_ | S&P500 Index:\_\_\_\_\_\_\_ |
| Holding period return (%) 3/17-4/21 | \_\_\_\_\_\_\_% | \_\_\_\_\_\_\_% |

Return (weekly) % = Price (this Friday) / Price (last Friday) –1

|  |  |
| --- | --- |
| Eg, S&P 500 on Friday 2/19/2021 was 3,876.50 |  |

S&P 500 on Friday 2/26/2021 was 3,811.15.

S&P 500 return in the week 2/22-2/26 was 3811.15/3876.50 -1 = - 1.67%

1. **Week 1 (Date: W, 3/22)** submit your first report of portfolio holdings (PI\_1). The report includes at least 1) a brief introduction of your investment strategy; 2) the stock symbol, name, number of shares, purchased price per share, the dollar amount and the percent weight of each position in your portfolio, and 3) brief financial data for the companies. Two pages maximum.

You start the portfolio at $100000 cash. You bought Apple, Tesla, Google, and kept the remaining cash. The weights (or initial weights when you purchased the stocks) are calculated as below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Stock | Price | Share | Cost base (Initial market value) | Initial weight |  |
| Apple | 200 | 25 | 5000 | 5.00% |  |
| Tesla | 800 | 10 | 8000 | 8.00% |  |
| Google | 2000 | 5 | 10000 | 10.00% |  |
| Cash |  |  | 77000 | 77% |  |

Portfolio return is a weighted average of asset returns.

**3. Week 3 (Date: W, 04/05)** submit your second report of portfolio holdings (PI\_2). The report includes at least 1) any updates of your trading; 2) performance measures: expected return, risk and correlation; 3) estimated betas; and other quantitative measures (Alpha, Sharpe ratio, etc).

4. End the paper money play on **Friday 4/21** and prepare the draft of your report (a word file and presentation slides).

6. Present your results to the class on **Saturday** **04/29**. The presentation should consist of 9-12 slides and be approximately 8 minutes long.

1. **Submit the written project report by Wed 05/03**. **See attached sample outline.** With exhibits it should be at most 10 pages long. Use line spacing of one and a half lines, and 12 point type.

**About the Instructor**

Dr. Tina Xiaotian Zhang is Professor of Finance at Dominican University of California and Saint Mary’s College of California. She is the founding director of China EMBA program of Saint Mayr’s and a Visiting Professor in Finance in IESD Tongji University, China. She holds a Ph.D. in Finance from Temple University and a B.A. in Finance from Nanjing University. Her research work has been published in high quality academic journals, including *Journal of Corporate Finance*, *Managerial Finance, International Finance Review, Global Economic Review, Global Strategy Journal*, etc. Her edited book titled as “The Political Economy of Chinese Finance” was published in 2016.

Dr. Zhang is a member of the American Finance Association (AFA), the Financial Management Association International (FMA) and the Academy of International Business (AIB). She has been the session Chairperson in the FMA, the panelist of various forums, and the ad-hoc reviewer of academic journals. One of her business proposals is the finalist of Pioneering Competition for Overseas Chinese Scholars in 2009. She is a selective recipient of the U.S. Center for International Business Education and Research Fellowship. She serves as an advisory director for one private investment company in China.

Dr. Zhang currently studies the AI technology in the financial market. She has a publication titled as “[AI-Generated Corporate Environmental Data: An Event Study with Predictive Power](https://www.researchgate.net/publication/336700655_AI-Generated_Corporate_Environmental_Data_An_Event_Study_with_Predictive_Power)”. Her current project utilizes the AI generated data in the food/restaurant industry to analyze financial performance.

**SAS OnDemand Academic course**

I'd like to invite you to enroll in my SAS OnDemand for Academics course. I plan to teach using the following software: SAS® Studio.

As a first step, please create your account for SAS OnDemand for Academics. To register, visit <https://odamid.oda.sas.com> and click on *Register for an account*.

After you have successfully created your account, follow these steps:

1. Sign on the the Control Center at <https://odamid.oda.sas.com>.
2. Look for the *Enroll in a course* link in the "Enrollments" section near the bottom of the page. Click this link to start the enrollment.
3. Enter the course code: 51a8e9a7-bd2a-4844-88d2-e3cac92b6d2d
4. Submit the form.
5. Confirm that this is the correct course and then click the button to finish enrolling.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  | | --- | --- | | Course Name: | MSBS5511\_2023 Dominican University of California | | Level: | Graduate | | Institution: | Dominican University of California | | Created: | 2023-03-09 | | Course Code: | 51a8e9a7-bd2a-4844-88d2-e3cac92b6d2d | | Description: | Financial Analytics | |  | |  |

I have also uploaded data for us to use in our course. You will be able to access that data using a LIBNAME or FILENAME statement with this path:

*LIBNAME datalib ‘*/courses/d77fe415ba27fe300’ access=readonly;

[Please retype the symbol of ‘ and ’ on SAS Studio.]

**Academic Honesty**

Dominican University of California is an academic community. All of our community members are expected to abide by ethical standards both in their conduct and in their exercise of responsibilities toward other members of the community. Students, faculty members, administrators, and staff are expected to adopt standards of behavior that place a high value on respecting the ideas of others. All intellectual accomplishments—examinations, papers, lectures, experiments, and other projects—should adhere to the highest standards of academic integrity and ethics.

The faculty, administration, and staff recognize their obligation to provide continuing guidance as to what constitutes academic honesty and to promote procedures and circumstances that will reinforce the principle of academic honor. Fundamental to the principle of independent learning is the requirement of honesty and integrity in the performance of academic assignments, both in the classroom and outside. Students should avoid academic dishonesty in all of its forms, including plagiarism, cheating, and other forms of academic misconduct.

The University reserves the right to determine in any given instance what action constitutes a violation of academic honesty and integrity.

## Tentative Course Outline

Below are some of the topics to be covered and the approximate weekly schedule. We may rearrange some meetings. I expect that there will be additions and deletions during the quarter as I become aware of the previous education of class members.

|  |  |  |
| --- | --- | --- |
| WEEK | TOPIC | BOOK |
| Sat 03/18 | Syllabus & SAS Studio  Return and Risk Measures |  |
|  | Statistical concepts and market returns | 3 |
| Wed 03/22 | Return and Risk Measures  Stock/Portfolio return evaluations  Correlation | 3  5 (SFRatio, VaR) 6 (Sharpe Ratio) |
| Wed 03/29  Sat 04/01 | Return and Risk trade off  Asset Pricing Models  CAPM and 3-Factor Model  Key measures: Beta and Alpha | 5 (SFRatio, VaR) 6 (Sharpe Ratio)  11&References |
|  |  |  |
|  | Hypothesis Testing: means difference  Midterm exam preparation | 7 |
|  |  |  |
| Wed 04/05 | Midterm exam |  |
|  |  |  |
| Wed 04/12 | Hypothesis Testing  means difference  variance difference | 7 |
| Sat 04/15 | Optimization (Excel and SAS) | References |
| Wed 04/19 | Group project: Portfolio Optimization  Market Anomalies (TBD)  Time Series (TBD) | 9&11  10 |
|  |  |  |
| Wed 04/26 | Market anomalies | 10, References |
|  | Final exam preparation |  |
| Sat 04/29 | Project presentation  Final exam (in class part) |  |
|  |  |  |
| Wed 05/03 | **Group Project + Final exam (take home part) due** |  |

Course google drive

<https://drive.google.com/drive/folders/1DYr3udB94Acseym9xU8Ewg64cRfyFHTH?usp=sharing>

Course live agenda

<https://docs.google.com/document/d/1PZBdvv2P-5cHCmclBNPEnKww-hKOuybfX51clpIOQCY/edit?usp=sharing>

Course signup sheet

<https://docs.google.com/spreadsheets/d/13z7zP_yPjWA3TycJ8B6zYdEJi-yp3C_w1i2i_-Sj5Mw/edit?usp=sharing>

**References:**

CAPM (Nobel Memorial Prize in Economics in 1990)

<https://en.wikipedia.org/wiki/Capital_asset_pricing_model>

<http://www.investopedia.com/articles/06/capm.asp>

<http://www.columbia.edu/~ks20/FE-Notes/4700-07-Notes-CAPM.pdf>

Fama French 3-Factor Model (Nobel Memorial Prize in Economics in 2013)

<http://www-personal.umich.edu/~kathrynd/JEP.FamaandFrench.pdf>

<http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html>

<https://en.wikipedia.org/wiki/Fama%E2%80%93French_three-factor_model>

Portfolio Optimization (Nobel Memorial Prize in Economics in 1990)

<http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1990/markowitz-lecture.pdf>

<http://www.investopedia.com/terms/e/efficientfrontier.asp>

<https://en.wikipedia.org/wiki/Efficient_frontier>

Options Pricing (Nobel Memorial Prize in Economics in 1997)

<http://www.investopedia.com/university/options-pricing/black-scholes-model.asp>

<https://en.wikipedia.org/wiki/Black%E2%80%93Scholes_model>

<https://www.khanacademy.org/economics-finance-domain/core-finance/derivative-securities/black-scholes/v/introduction-to-the-black-scholes-formula>