READ THE GUIDELINES CAREFULLY SENTENCE BY SENTENCE
**ALL EMAIL COMMUNICATIONS RELATED TO EE590 SHOULD BE SENT TO
msfine@usc.edu
Please do not use any other email.**
DIRECTIONS FOR EE590 and TEMPLATES
_____

EVERY MSFINE STUDENT SHOULD COMPLETE AN INDEPENDENT PROJECT IN ORDER TO GRADUATE

The procedure for signing up for EE590 (one unit) is as follows.

1. *Use the template below to write your proposal that describes what you plan to do. If you do not know what topic/problem you like to work on follow the instructions for a topic below or talk to Prof. Petros Ioannou.*
2. *Email the project proposal to: **msfine@usc.edu***
3. *Once Prof. Ioannou approves your proposal, submit a Directed Research Request on the MyViterbi website and indicate Prof. Ioannou as the supervisor. You will be notified via email once your DR Request is fully approved and the d-clearance is issued so that you can then register for EE 590 on WebRegistration.*

Purpose of Study: To follow guidelines, practice writing technical reports, doing an independent research study in financial engineering.

Grading
- Following the guidelines: 10%
- Proposal and final report write up : 25%
- Topic, solution and results: 65%

STRICT DEADLINES FOR PROPOSAL SUBMISSION*
   Summer: May 20 by 5pm
   Fall: August 20, by 5pm
   Spring: January 20 by 5pm
Proposals will be acceptable starting two weeks before the due date
The proposal file name should have the following:
   EE590_Proposal_Last Name_First Name.doc
Subsequent revisions will be indicated as
   EE590_ Proposal_Last Name_First Name_Revision 1or 2 etc.doc

STRICT DEADLINES FOR FINAL REPORT*
   Summer: July 20, by 5pm
   Fall: November 20, by 5pm
   Spring: April 20, by 5pm
The Final Report file name should have the following
   EE590_ Report_Last Name_First Name.doc

Subsequent revisions will be indicated as
      EE590_ Report_Last Name_First Name_Revision 1or 2 etc.doc

Make sure you use the same names as they appear on myviterbi so I can identify you. The deadlines for EE590 are not the same as the deadlines for courses. If you follow the above you should be OK.

NO LATE PROPOSALS OR FINAL REPORTS WILL BE ACCEPTED
USE MICROSOFT WORD
Use fond size 11 , space 1.15, Times New Romans, Border space Normal 1inch from sides and top and bottom. The use of extra space to fill pages or use of large side spaces is not allowed. If you copy graphs, figures or tables from any source you need to indicate so and provide a reference. Cut and paste of text from papers or reports and presenting as yours is plagiarism and is not allowed. All reports will be checked for overlaps using a plagiarism software tool.

PROPOSAL TEMPLATE

Use the structure and format below. Do not repeat the questions/instructions in blue.
IMPORTANT: Make sure you write correct English and use the word speller to correct all spelling errors. Proposals with spelling or grammar mistakes will be returned. Use check list at the end to check that you did things right, initial and include with proposal.

Template starts after the line.
_____

<div align="center">

COVER PAGE (1 page separate from the rest)

EE590 Project Proposal

</div>

Term:
Date:
Title of Project:
Name:
Student ID:
_____

NO SPACES BETWEEN FOLLOWING SECTIONS ARE ALLOWED

Proposed Work (3 pages min without counting space of Figures and Tables. Use no more than one Figure and one table)

  1. **Problem Statement**

(1 page min). What is the problem you are trying to solve and why is it important? Be very specific. Do not write irrelevant material to fill up space.

  2.   **Approach** (1 and 1/2 pages min)

What theory are you planning to use to solve the problem? What software tools are you planning to use? What assets and how many are you analyzing if any? Use equations to explain your approach where needed making sure all variables are defined. How are you going to collect your data? How will you validate or back-test your models or results? PLEASE do not put irrelevant material such as what others did to fill space. Your proposal will be returned

  3. **Deliverables and Expected Outcome** (1/2 page min)

Write what you will deliver at the end of the project to me. For example: Final report, Software code ready to run and whatever you believe is a deliverable should be stated. Who can use your results and how?

  4. **References** (no page limit)

Include all references and sources of information you have mentioned in your proposal. DO NOT LIST REFERENCES NOT MENTIONED IN PROPOSAL . List references as

[1] Ioannou PA, Mathematics and Tools for Financial Engineering, SIAM, 2021
[2] https://viterbigradadmission.usc.edu/programs/masters/msprograms/ms-financial-engineering/

and indicate in text as [1], [2]. Never use . [1] but use [1].

  5.   Include the **Check list** below as a separate page.

Check List for Proposal: Check that you addressed each item and initial it to the right:

1. **Confirm that you read the guidelines sentence by sentence. Failure to do so will lead to rejection of the proposal and taking it the following semester_____**
2. **Structure of document**: fond, spaces, minimum number of required pages. Font should be 11. Space should be single or 1.15. Margins should be 1in all around   _____
3. All **abbreviations** are defined when first appeared_____
4. All **figures and tables** are labeled with numbers and captions. Figure captions go under the plots and table captions above tables. Make sure you indicate units. _____
5. Figures, tables, diagrams, pictures taken from the web or papers should include the source otherwise it is plagiarism. They cannot be used to fill space _____
6. No text should be copied and paste from anywhere as it is plagiarism. If you quote someone you should put it under "…." and identify the source as a reference but it should not be more than a couple of lines._____
7. All listed references should be mentioned in text. Use format [1], [2] _____
8. **Grammar and English** should be carefully checked . No proposal with typos and grammatical errors will be accepted. _____
9. **All variables in equations should be defined**

PLIAGIARISM: *Any identified form of plagiarism will be reported to the University and in addition to receiving no credit for EE590 the graduation of the student may be affected. All past reports are kept and a software program is used to identify overlaps with past reports and literature. If you use figures or tables or diagrams from a website or papers you need to indicate that and include the reference. If you did a project in another course it cannot be used for EE590.*

I confirm that my proposal/report abides with the above guidelines and no material was copied from any source that is not indicated in the report and referenced accordingly.

Name _____

Signature_____

<u>**FINAL REPORT TEMPLATE**</u>

At least 8 pages long excluding references , cover page and appendix. Do not copy diagrams from references or leave empty spaces between sections in order to fill up pages. Use check list at the end to check that you did things right, initial and include with report.

<u>**Use MS Word**</u>

Template starts after the line.
_____
Cover Page (one separate page)

Course: EE590 Project Report
Name:
Student ID:
Email:
Term:
Project Title:
Date:

_____

Executive Summary
(1 page min**)**
- Describe what problem you considered
- How you solved it
- What are the results and conclusions

The summary tells the reader what the problem is how you solve it and what results you obtain and how significant they are. It is for the reader who does not want to read the rest of the report. No figures or diagrams should be included in this part.

1. **Introduction**
   (1 page min**)**
   - Describe in more detail what problem you addressed
   - Why is it important
   - What method you used
   - What are the results? Describe them in a couple of sentences. This is not the place to list them
   - What is the conclusion
   - Figures and tables should be labeled. Under the figure you write as an example ' Figure ?: Return vs Time' . Table captions go above the table. Plots are labeled as figures and captions go under the plot.
2. **Problem Statement**
   (1 page min**)**
   - Describe clearly the problem you considered.
   - What did you try to achieve by addressing the problem

3. **Approach**
   (5 to 8 pages**)**
   - Describe the theoretical method you use and why you chose it. Use equations to explain the theory with references. Focus on the equations you use. Do not simply copy theory from books without explaining how you used it.
   - DO NOT SIMPLY WRITE FORMULAS COPIED FROM BOOKS. SHOW HOW YOU USED THEM TO CALCULATE TERMS
   - Describe what data you needed and where you found them
   - Give a reference where you got them from
   - Describe your results and their significance
   - Use tables and graphs to explain your results
   - Describe whether your objectives and goals have been achieved

4. **Conclusions**
   (2 to 3 paragraphs**)**
   - Describe your conclusions
   - What is the significance of your results

5. **References**
   (as many pages as needed**)**
   - List all references and websites that you used and you referenced in the report. DO NOT INCLUDE ANY REFERENCE THAT IS NOT MENTIONED IN THE TEXT. Use same format as in proposal i.e number as [1], [2]....

6. **Check list (separate page) with initials and signature**

Appendix (as many pages as needed): Software used, list of Data etc
   - Attached software code used, ready to run i.e matlab code, excel etc

NOTES: Plots are labeled as Figures and Figure number and caption goes under the plot. Tables are labeled as tables and Table number and caption is placed above the table.

Check List for Final Report: Check that you addressed each item and initial it

1. **Confirm that you read the guidelines sentence by sentence. Failure to do so will lead to rejection of the report, getting no credit and retaking EE590 the following semester. Yes you will still have to pay again** _____

2. **Structure of document**: fond, spaces, minimum number of required pages. Font should be 11. Space should be single or 1.15. Margins should be 1in all around _____

3. All **abbreviations** are defined when first appeared_____

4. All **figures and tables** are labeled with numbers and captions. Figure captions go under the plots and table captions above tables. Make sure you indicate units. _____

5. Figures, tables, diagrams, pictures taken from the web or papers should include the source otherwise it is plagiarism. They cannot be used to fill space _____

6. No text should be copied and paste from anywhere as it is plagiarism. If you quote someone you should put it under "…." and identify the source as a reference but it should not be more than a couple of lines._____

7. All listed references should be mentioned in text. Use format [1], [2] _____

8. **Grammar and English** should be carefully checked . No report with typos and grammatical errors will be accepted. Check the tenses. Some students tend to use parts of the proposal that uses the words 'I will' , 'I plan' etc. The final report should state what you did not plan to do. _____

PLIAGIARISM: _Any identified form of plagiarism will be reported to the University and in addition to receiving no credit for EE590 the graduation of the student may be affected. All past reports are kept and a software program is used to identify overlaps with past reports and literature. If you use figures or tables or diagrams from a website or papers you need to indicate that and include the reference. Projects completed for other courses cannot be used for EE590._ **_All reports will be tested using a plagiarism software._**

I confirm that my proposal/report abides with the above guidelines and no material was copied from any source that is not indicated in the report and referenced accordingly.

Name _____

Signature_____

DIRECTIONS FOR TOPIC

You are encouraged to come up with your own topic. If you cannot below are some ideas:
Example A. Start with a $1 million hypothetical portfolio. Choose any of the following:

1. Invest fully in bonds. Invest all money in bonds by looking into risk, returns and diversification plus immunization for low sensitivity to interest rates. Test whether the portfolio generates the expected returns

2. Invest in a number of stocks, 30 or above that you analyze using optimization to maximize return or minimize risk or both. Test whether the portfolio generates the expected returns

3. Invest in mutual funds that you analyze for diversification, risk, return, manager performance and other criteria and use optimization to select a mix that maximizes return or minimizes risk or a combination. Consider at least 20 of them. Test whether the portfolio generates the expected returns

Use real data to develop models and make asset price predictions. Test whether your model generates the expected returns.

4 Use part of real data from past to set up your portfolio. Use remainder of past data to check whether what you expected to get is confirmed. For example, if you set up a portfolio with an expected return of 15% did you get it?

Other Example topics

1.   Develop models and train them using real data. Back test or validate your model using predicted and actual data. For example, you can use data from years 2010 to 2020 to train your model. Then the model can be used to predict values for the years 2021, 2022 for which you have the real data. Compute measures of the error (such as mean square error) between the predicted and actual data. Use plots and tables to present the results and comment on them. If the prediction error is large find out why. Is it because your approach is wrong in which case you need to correct, or something happened in the market that was not captured in the data you used to train the model.
2.   Use real data to verify Put Call parity and Black Sholes equations and compute implied volatilities for several stocks 20 or more.
3.   Monte Carlo simulations to solve a variety of different problems covered in EE518

The best topic of course is something that you have a strong interest and is defined by you.