ECE 580 **SPRING 2019**
Correspondence # 16 March 14, 2016

ABOUT THE TERM PROJECT

For the term project, you have two options:

Option 1 : Choose three references (published after 1980) on a topic of your choice, which have a common theme of relevance to the subject matter of this course. Read these three papers, digest their contents, and write a report (to run around 15 pages, single column, 11 or 12 pt font) explaining (in your own words) their contributions. The report should be a critical survey on the contents of the papers as they relate to the common theme, and should indicate possible directions for extensions as you see them.

Option 2 : Present (in a written report) results of some original research (carried out by you) on any one of the topics listed below.

Due Date for the Report : May 2, 2019 (Thursday)

Another deadline : By **Thursday, March 28**, you should let me know (by email or in person) of your choice (between the two options above), and in case of *Option 1* clear with me your selection of the three references.

Some possible topics for the project :

1. Fixed-point theorems, and their applications in optimal control.
2. Fixed-point theorems, and their applications in the convergence analysis of optimization algorithms.
3. Numerical techniques for infinite-dimensional optimization.
4. Functional analysis techniques in the analysis and optimization of distributed-parameter systems.
5. Realization theory for infinite-dimensional systems.
6. Hardy spaces, and their role in worst-case (H^∞) controller and estimator designs.
7. Identification using functional analysis techniques.
8. Controllability and observability of infinite-dimensional linear systems.
9. Stability and stabilizability of infinite-dimensional linear systems.
10. Filtering, smoothing, and prediction for stochastic processes.
11. Realization theory for stochastic systems.
12. Hypothesis testing.
13. Wavelets.
14. Chaotic motion, and its analysis using functional analysis methods.
15. Gauss-Seidel and Jacobi algorithms in the iterative computation of equilibria in games defined on infinite-dimensional spaces.
16. Functional analysis methods in zero-sum differential games.
17. Functional analysis methods in nonzero-sum differential games.
18. Image reconstruction from noisy data.
19. Compressive sensing.
20. Functional analysis methods in neural networks.
21. Advanced topics on duality in constrained optimization.
22. Distributed computation and learning.
23. Reinforcement and machine learning.
24. Other topics of relevance to the course material.

over .....

A (partial/incomplete) list of journals from which you can draw the references

SIAM J. Control and Optimization
SIAM J. Numerical Analysis
J. Optimization Theory and Applications
IEEE Trans. Automatic Control
IEEE Transactions on Neural Networks
IEEE Transactions on Signal Processing
IEEE Transactions on Image Processing
Mathematical Programming
J. Differential Equations
J. Mathematical Analysis and Applications
Econometrica
J. Economic Dynamics and Control
J. Games and Economic Behavior
Annals of Probability
J Machine Learning Research
Neural Computing

SIAM Review
SIAM J. Applied Mathematics
Automatica
IEEE Trans. Information Theory
IEEE Trans. Systems, Man and Cybernetics
IEEE Trans. Information Forensics and Security
IEEE/ACM Transactions on Networking
Mathematics of Control, Signals, and Systems
J. Functional Analysis
Mathematics of Operations Research
J. of Economic Theory
J. Mathematical Economics
International J. Game Theory
Annals of Statistics
Machine Learning
Annals of Probability