ELEN 112: Modern Network Synthesis and Design  
TEXT: G. Daryanani, *Principles of Active Network Synthesis and Design*

### SYLLABUS

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<th>WEEK</th>
<th>TOPICS</th>
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| 1    | 01/09  | Review of network analysis  
Network functions and Bode plots | 1, 2 |
| 2    | 01/16  | Basic filter concepts  
The approximation problem | 3, 4 |
| 3    | 01/23  | The approximation problem (ctd.) | 4 |
| 4    | 01/30  | Basic active filter synthesis  
**MIDTERM 1** | 7 |
| 5    | 02/06  | Basic active filter synthesis (ctd.)  
Probability and random variables | 7  
Appendix C |
| 6    | 02/13  | Sensitivity analysis | 5 |
| 7    | 02/20  | Positive feedback biquads  
**MIDTERM 2** | 8 |
| 8    | 02/27  | Positive feedback biquads (ctd.)  
Negative feedback biquads | 8, 9 |
| 9    | 03/05  | Negative feedback biquads (ctd.)  
Switched capacitor filters | 9 |
| 10   | 03/12  | Passive network synthesis | 6 |

**FINAL EXAM: Tuesday, March 20, 6:30-9:30**
LEARNING OUTCOMES

Students who successfully complete this course should be able to:

1. Formulate node voltage equations for op-amp circuits in the s-domain.
2. Apply Butterworth, Chebyshev and elliptic approximation techniques.
3. Determine a transfer function that satisfies given filter specifications.
4. Utilize positive and negative feedback biquads to realize a given transfer function.
5. Perform a basic sensitivity analysis of a filter.
6. Design and test filters that meet a given set of specifications.

GENERAL INFORMATION

OFFICE: Engineering Center, Room 223
OFFICE HOURS: Tuesday, 4:00-5:00, Thursday 10:30 – 11:30, and by appointment.
PHONE: (408) 554-2394
E-MAIL: azecevic@scu.edu

GRADING

Homework 10%
Midterms 15% each
Design Project I 10%
Design Project II 20%
Final 30%

HOMEWORK

Homework problems will be assigned on a weekly basis.

DESIGN PROJECTS

Both projects involve simulation in Matlab and SPICE, and the performance of the designed circuits will be evaluated in the laboratory.