

**ECE 580**  
**NETWORK THEORY**  
**Fall 2019**

**LECTURES:** MW 10:00-11:50 am  
Room: ALS 4001

**INSTRUCTOR:** Gabor C. Temes, Professor  
3091 Kelley Eng. Ctr.  
[temes@eecs.oregonstate.edu](mailto:temes@eecs.oregonstate.edu)

**OFFICE HOUR:** MW 14:00-15:00 pm

**PREREQUISITE:** Graduate standing in ECE

**TA:** Vadakkan Kayyil, Ajmal <[vadakkaa@oregonstate.edu](mailto:vadakkaa@oregonstate.edu)>;  
Hu, Hang <[huhan@oregonstate.edu](mailto:huhan@oregonstate.edu)>

**TA Office Hours:** Thursday 3-4:30 pm(Kelley Atrium)  
Friday 3-4:30 pm(Kelley Atrium)

**Class Webpage:** <http://classes.engr.oregonstate.edu/eecs/fall2019/ece580/>

**TEXT:** Lecture notes will be posted on the Web. Parts of the following books will be used:

- Electrical Network Theory, N. Balabanian and T. Bickart, Krieger Publishing Co., 1983: Chapters 1-3 & 8.
- Introduction to Circuit Synthesis and Design, G. Temes and J. LaPatra, McGraw-Hill, 1977: Chapters 7-9 & 12.
- Electrical Networks, J. Choma, Krieger Publishing Co., 1991: Chapters III & IX.

**(Note: It is not necessary to acquire these books. Most are out of print. Lecture notes will be posted on the class website.)**

**MATERIAL TO BE COVERED (if time permits):**

- **Network classification:** linear/nonlinear, time-varying/invariant, active/passive, lossy/lossless, reciprocal/nonreciprocal, lumped/distributed, dynamic/memoryless, sampled-data/continuous-time networks. Definitions useful in all discussions involving circuits.
- Networks components:** R, L, C elements; ideal/perfect/real transformers; op-amps; gyrators; independent/dependent sources. Definitions useful in all discussions involving circuits.
- Network analysis:** the incidence matrix; branch relations; nodal analysis; two-port parameters; multiport networks; multiport parameters; scattering relations and parameters; transfer functions; sensitivity analysis. The basis of computer-aided and paper-and-pencil circuit analysis of passive, active R-C, Gm-C and switched-capacitor filters.
- Network synthesis:** approximation theory for continuous-time and sampled-data filters; the design of passive, active R-C, Gm-C and switched-capacitor filters. The basics of active, passive and sampled-data analog filters.

**MIDTERM EXAMINATION: Wednesday, Oct. 23, 10 - 11:50 am.**

**FINAL EXAMINATION: Thursday, December 12, 6 - 8 pm.**