

**ECE 580**  
**NETWORK THEORY**  
**Fall 2023**

**LECTURES:** **MW 10:00-11:50 am, in 207 Bexell Hall.**  
<https://oregonstate.zoom.us/j/95280517759?pwd=eGtUdDhmWVRoTTBZOTIEVkJZPeHk3QT09>

**INSTRUCTOR:** **Gabor C. Temes, Professor**  
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**OFFICE HOUR:** **MW 1:30-3:00 pm**

**PREREQUISITE:** **Graduate standing in ECE**

**Website:** <https://classes.engr.oregonstate.edu/eecs/fall2023/ece580>

**TA:** **Manxin Li <liman@oregonstate.edu>**

**TA Office Hours:** **TR 1:00-2:00 pm, via class zoom link**

**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. 18, 10:00 - 11:50 am.**

**FINAL EXAMINATION:** **Thursday, Dec. 14, 6:00 – 7:50 pm.**