ECE 580
NETWORK THEORY
Fall 2022

LECTURES:	**MW 10:00-11:50 am, in KEC 1003.** https://oregonstate.zoom.us/j/95995128945?pwd=dUx5T2JpL2pScTlPUlp6WXRaa04zQT09
INSTRUCTOR:	**Gabor C. Temes, Professor** **3091 Kelley Eng. Ctr.** **temes@eecs.oregonstate.edu**
OFFICE HOUR:	**MW 14:00-15:00 pm**
PREREQUISITE:	**Graduate standing in ECE**
Website:	**https://classes.engr.oregonstate.edu/eecs/fall2022/ece580**
TA:	**Manxin Li <liman@oregonstate.edu>**
TA Office Hours:	**TR 13:00-14:00 pm, in class zoom room**

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. 19, 10:00 - 11:50 am.

FINAL EXAMINATION: Wednesday, Dec. 7, 14:00 - 16:00 pm.