ECE 580
NETWORK THEORY
Fall 2020

LECTURES: **MW 10:00-11:50 am, online.**

INSTRUCTOR: **Gabor C. Temes, Professor, temes@eecs.oregonstate.edu**

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

PREREQUISITE: Graduate standing

TEACHING ASSISTANT: Manjunath Kareppagoudr

TA Office Hours: Wednesday 3:4.30 pm via zoom

Web Site: http://classes.engr.oregonstate.edu/eecs/Fall2020/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. 21, 10 - 11:50 am.

FINAL EXAMINATION: Monday, Dec. 7, 12 – 2 pm.