

Prerequisite Courses for non-ECE majors entering the MS program in ECE

Amar Basu, February 2016

Students admitted to Wayne State's MS degree program in electrical or computer engineering should have the background expected of a masters level candidate in ECE. The purpose of the following prerequisites is to maintain academic integrity of the program and ensure students success during the degree and in the student's future career.

Students coming from an EE or ECE undergrad will likely have the following courses and are exempt. Students who have undergraduate degrees in fields other than electrical or computer engineering must show that they have taken courses equivalent to those below. Items 1-3 are mandatory, and the others are recommended based on which area the student wants to pursue during the MS degree. If a student has not taken the mandatory courses or their equivalents, he or she must take them at WSU or other institution. The student has two options: 1) Take the course prior to entering the MS program. WSU allows students to enroll as a 'post-bac', and are charged undergraduate tuition for the courses. The student may then apply for the MS program after the prerequisites are complete. 2) The courses may be taken while enrolled in the MS program. In this case, the student is granted a conditional admission, which states that the student must complete the course with a B or better in order to graduate with the MS degree.

1) Circuits (required)

3300 Introduction to Electrical Circuits. Cr. 4 (LCT: 3; LAB: 3)

Prereq: PHY 2185; prereq. or coreq: MAT 2150. Open only to students enrolled in professional engineering programs. Electrical quantities and waveforms; resistance and Ohm's law; networks and Kirchhoff's laws; network equivalents; nodal and mesh analysis; Thevenin's theorem and other network theorems. Sinusoidal steady-state response. First- and second-order systems. Introduction to sinusoidal steady-state response. Material Fee as indicated in the Schedule of Classes (T)

2) Linear Systems (required)

4330 Linear Network and System Analysis. Cr. 4 (LCT: 4)

Prereq: ECE 3330. Open only to students enrolled in professional engineering programs. Laplace transform for complete solution of linear network or system response. Homogeneity, superposition, and time invariance properties. Convolution; Fourier analysis of periodic signals; discrete-time signals, difference equations, and z-transform methods. Formulation of equilibrium equations for electromechanical systems. Linear incremental concepts. (T)

3) Programming (required)

4050 Algorithms and Data Structures. (CSC 5050) Cr. 4

Prereq: CSC 2000. Open only to students enrolled in professional engineering programs. Introduction to problem solving methods and algorithm development; data abstraction for structures such as stacks, queues, linked lists, trees, and graphs; searching and sorting algorithms and their analysis. (Y)

4) Digital electronics or microcomputers (recommended for computer engineering students)

2610 Digital Logic I. Cr. 4 (LCT: 3; LAB: 3)

Prereq: PHY 2185 and CSC 2000. Open only to students enrolled in professional engineering

programs. Introduction to Boolean algebra; switches, gates. Minimization of switching circuits, ROMs, PROMs, and PLAs. Flip-flops. Reduction and minimization of sequential machines. The state-assignment problem. Asynchronous sequential circuits. Material Fee as indicated in the Schedule of Classes. (T)

3620 Introduction to Microcomputers. Cr. 4 (LCT: 3; LAB: 3)

Prereq: B E 1200 and ECE 2610. Basics of digital systems, number systems, functional blocks of microcomputers, assembly language and machine code, applications of microcomputers and experimental demonstrations. Introduction to digital logic. Material Fee as indicated in the Schedule of Classes (T)

5) Electromagnetics or Semiconductors (recommended for electrical engineering students)

4570 Fundamentals of Microelectronic Devices. Cr. 4 (LCT: 4)

Prereq: ECE 3300, PHY 3300, MAT 2150 for non-ECE students. Open only to students enrolled in professional engineering programs. Aspects of electrical properties of semiconductors, the physical electronics of P-N junction, bipolar, field effect transistors, and device fabrication technology essential to understanding semiconductor active devices and integrated circuits. Introduction to the behavior of semi-conductor and electronics devices. (T)

4800 Electromagnetic Fields and Waves I. Cr. 4 (LCT: 4)

Prereq: ECE 3330. Open only to students enrolled in professional engineering programs. Fundamentals of electromagnetic engineering, static electric and magnetic fields using vector analysis and fields of steady currents, Maxwell's equations and boundary value problems. Basic principles of plane waves, transmission lines and radiation. (T)

6) Control Theory (recommended for controls students, since 4470 is a prereq for graduate level control courses)

4470 Control Systems I. Cr. 4 (LCT: 4)

Prereq: ECE 4330. Open only to students enrolled in professional engineering programs. System representations; feedback characteristics; time-domain characteristics; signal flow graph, Routh-Hurwitz criteria; Root Locus Plots; Nyquist criteria, Bode plots; PID, phase-lead and phase-lag controller design. (T)