1. Course number and name

**ENGR315** **Systems Analysis Laboratory**

2. Credits, contact hours

**1 credit; one 2-hour-45-minute laboratory session per week; engineering topic**

3. Instructor’s name

**Dr.** **Rashid R. Kohan**

4. Text book, title, author, and year

**None**

a. other supplemental materials

**All laboratory exercises and pre-lab information is provided to students in lab sessions.**

References:

* **Carlson, G.E. (1998): Signal and Linear System Analysis, Wiley.**
* **Gabel, R.A. and Roberts, R.A. (1987): Signals and Linear Systems, 3rd ed. Wiley.**
* **Kamen, E.W. (1987): Introduction to Signals and Systems, 2nd ed. McMillan.**
* **McGillem and Cooper (1995): Continuous and Discrete Signal and System Analysis.**
* **Phillips, Charles L., Parr, John M., Riskin, Eve (2007): Signals, Systems and Transforms. Prentice-Hall.**

5. Specific course information

a. brief description of the content of the course (catalog description)

**Laboratory exercises on signals and systems in the time and frequency domains, linearity and time invariance, causality and stability, time-domain solutions of differential equations, impulse response, convolution, Fourier series and Fourier transform methods, Laplace transforms, system functions**

b. prerequisites

**ENGR 305 Systems Analysis (may be taken concurrently)**

c. required or elective course

**Required for Electrical Engineering**

6. Specific goals for the course

a. specific outcomes of instruction

* Students will demonstrate the ability to use Matlab to plot signals in the continuous-time domain.
* Students will demonstrate the ability to use Matlab to verify theoretical solution  
  of linear differential equations in response to impulse and step inputs.
* Students will demonstrate ability to use Matlab to plot convolution of twofunctions.
* Students will demonstrate the ability to use Matlab to determine and plot Fourier series and Fourier transform of functions.
* Students will demonstrate the ability to use Matlab to determine and plot Laplace transforms and inverse transforms.
* Students will demonstrate the ability to use Matlab to determine the system  
  function, Bode plots and pole-zero plots.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are

addressed by the course.

Course addresses ABET Student Outcome(s): 1, 2, 3, 4, 7

7. Brief list of topics to be covered

* Introduction to MATLAB
* Introduction to basic concepts of signals and systems
* Time-domain solutions of differential equations
* Linearity and time invariance
* Modeling of LTI systems
* Time-domain methods of analysis of linear systems, Impulse response, Convolution
* Fourier series and Fourier transform methods
* Laplace Transform