

Fall 2024

ME 699 – ME Topics Course Descriptions

ME 699, Section A, 17479 – Interdisciplinary Senior Design

Counts as 500-level MNE Tech Elective. Does not count towards 600-level MNE Tech Elective. Does not replace or count as ME 574 or ME 575.

Prerequisites:

ME 533 – Machine Design

ME 535 – Measurements and Instrumentations

ME 571 – Fluid Mechanics

Course description:

This class focuses on solving real-world complex engineering problems through the application of engineering design principles, engineering science/analyses, and interdisciplinary collaboration and innovation. Students will work in teams with the facilitation of instructors to design, build, and test engineering devices, prototypes, simulation models, or data/computing-based solutions using a design process with design reviews and presentations.

NE 620 – NE Topics Course Descriptions

NE 620, Section A, 15978 – Radiation Simulation Modeling

Counts as 600-level MNE Tech Elective.

Prerequisites:

NE 495 – Elements of Nuclear Engineering

Course description:

Become proficient in solving nuclear radiation transport problems using common Monte Carlo simulation software, including a new interface package called TOPAS for the Geant4 toolkit. Obtain capability to simulate shielding problems and radiation sensing problems you encounter in nuclear engineering courses such as Radiation Shielding and Radiation Detection. Leverage KSU's Beocat supercomputer and parallel computing to solve challenging problems that are impossible to obtain analytically.

NE 620, Section B, 17113 – Nuclear Materials

Counts as 600-level MNE Tech Elective.

Prerequisites:

Course description:

The course provides an introduction to radiation damage and effects in common nuclear and electronics materials. The course will cover theory and experimental results from energetic particle damage.

NE 620, Section C, 17481 – Introduction to Engineering Analysis

Counts as 600-level MNE Tech Elective.

Prerequisites:

MATH 340 – Differential Equations

ME 400 – Computer Applications in Mechanical Engineering

Course description:

This course is a trial run for what will be NE 415, and it's all about teaching you, the student, how to use the computer to solve problems. We'll use the Python programming language, which is as easy a language to learn as any I've encountered. The Python language offers much more with all of the add-on packages available, all for free. What you will come out of the class with, at the least, is the ability (1) to comprehend, implement, and debug computer programs and (2) to identify and use appropriate tools (symbolic and numerical) within the Python ecosystem to solve engineering problems typical of our NE courses.

The purpose of this "trial run" is to work with a limited number of students with previous programming experience (e.g., ME 400) to test and to revise materials I'd previously used for ME 400 (see https://robertsj.github.io/me400_notes/). Going forward, it is expected that students will take CIS 209 or some other introductory programming course as a prerequisite to NE 415 because experience has shown that a single, three-credit course is not sufficient to teach both basic programming and computer-based problem solving.