

Email completed form or send questions to Pilar O'Cadiz: mpocadiz@tanms.ucla.edu

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Course Number: MAE M20 / CEE M20

Course Name: Introduction to Computer Programming with MATLAB

COURSE CONTENT DESCRIPTION

- Describe the specific societal impact topics or ethics issues that are addressed in the course.
- Specify the time dedicated to cover this content through lecture and other in-class learning activities (e.g. videos, class discussions). We encourage that the equivalent of one course lecture period (100 min.) be dedicated, either in one class period or distributed throughout the quarter (e.g., six-minute vignette at beginning or end of each lecture; or five 20-minute presentations/discussion sessions distributed over the 10-week quarter).

The specific societal impact topics addressed in this course deal with (1) logic and conditional statements, (2) pseudocode development and its programming implementation, and (3) numerical simulation of engineering and socioeconomic systems. Students learn how to use computer programming to systematically take a decision after accounting for the given conditions and constraints. This decision-making process can involve simple logic and conditional statements or constrained/unconstrained mathematical optimization. Students learn techniques for data visualization (e.g., plotting, image processing, and video processing) and data file processing. These tools are expected to help communicate the impact of our decisions. Students also learn algorithms to solve multivariable differentiable equations and apply them to model one or more socioeconomic and engineering systems in their assignments, e.g., predator-prey models and progress of infectious diseases.

A total of 300 minutes of lecture time is spent on the above concepts during the quarter. This includes (1) 100 minutes on logic and conditional statements, (2) 100 minutes on mathematical modeling by solving differential equations, and (3) 100 minutes on data visualization and file processing. At least two homework assignments (out of a total of 7 - 10 homework assignments) test the students on these topics. The course culminates in a final project. Part of the project requires familiarity with data visualization tools.

OUTCOMES

- Provide at least one or two course student learning outcomes aligned with the [ABET Student Outcome Criteria #4: The ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.](#)
- Current course outcomes can be viewed at <https://my.engineering.ucla.edu>
Under the Accreditation tab are the survey questions that students answer when they complete the course evaluation at the end of the quarter. Students are asked to rate the extent to which they acquired specific knowledge or skills related to each stated outcome for that course.

Outcome 1: Students will learn the basic concepts of logical operations, arithmetic operations, loops, and conditional statements, and apply them to model engineering systems

Outcome 2: Students will learn algorithms for sorting, searching, and root finding; familiarize with built-in functions for these algorithms; learn to apply these algorithms to solve multivariable differential equations.