UMBC UGC New Course Request: ENES 103 Introduction to MATLAB for Engineering Applications

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COURSE INFORMATION:

Course Number(s)	ENES 103
Formal Title	Introduction to MATLAB for Engineering Applications
Transcript Title (≤30c)	Intro to MATLAB for Engineering
Recommended Course Preparation	
Prerequisite	Placement in MATH 151
Credits	1
Repeatable?	☒ Yes ☐ No
Max. Total Credits	1
Grading Method(s)	☒ Reg (A-F) ☐ Audit ☐ Pass-Fail

PROPOSED CATALOG DESCRIPTION (no longer than 75 words):

Students will be introduced to the MATLAB computational software tool for engineering applications. Fundamental programming concepts will be covered including data types, arithmetic and Boolean operators, conditional statements, loops, scripts and functions. Additional topics will include plotting, input/output and engineering mathematical toolboxes.

RATIONALE FOR NEW COURSE:

We assumed that students registering to the junior course ENME 303 Topics in Engineering Mathematics have some background in MATLAB programming. For native students this background is acquired in ENES 101. However, transfer students may have taken a similar course that did not include MATLAB programming resulting in transfer students being less prepared for ENME 303. Additionally, some native students that have taken ENES 101 may need a refresher in MATLAB programming since there is a 4-semester gap between these two courses. We are proposing this new course to remedy the need and ensure student success in ENME 303.

We are planning to offer this course every semester if possible but at minimum twice a year (winter and summer).

The course is offered at the 100 level because is intended to be a follow up or compliment to ENES 101 and the prerequisite is placement in MATH 151.

Students need a basic understanding of engineering mathematics at the level of entering calculus (trigonometry, algebra).

ATTACH COURSE OUTLINE (mandatory):

MATLAB Basics – 3 Class Sessions
- MATLAB Environment
- Operators
- Arrays
- Scalar vs. Array Operations
- Boolean Logic
- Data Types
- Print Statements
- Basic Plot Commands

Logical Branching – 2 Class Sessions
- Logic
- IF Statement
- WHILE Statement

Loops – 2 Class Sessions
- WHILE Loop
- FOR Loop
- Looping vs. Vectorization

User Defined Functions – 2 Class Sessions
- Passing Variables
- Arguments
- Global vs. Local Variables
- Sub functions and Anonymous Functions
- Scripts vs. Functions

Advanced Data Types – 1 Class Session
- Complex Numbers
- Strings
- Cell Arrays
- Data Structures

Input/Output Functions – 2 Class Sessions
- Command Line (Display, fprintf)
- File input/output

Advanced Plotting Tools – 2 Class Sessions
- formatting plots
- Scatter plots
- Contour Plots
- Surface Plots

Engineering Toolboxes
- Basic Statistics
- Root Finding
- Solving Systems of Equations

Weekly assignments and a final project will be assigned for grading