# ENUMBC UGC Instructions for New Course Request Form (revised 10/2011)

**Course number & title:** Enter the number and title of the course at the top of the page. Contact the Registrar's Office to confirm that the desired course number is available.

**Date submitted:** The date that the form will be submitted to the UGC.

**Effective date:** The semester the new course is in effect, if approved.

**Contact information:** Provide the contact information of the Chair or UPD of the department or program housing the course. If the course is not housed in a department or program, then provide the same information for the head of the appropriate academic unit. (See UGC Procedures) If another faculty member should also be contacted for questions about the request and be notified about UGC actions on the request, include that person's contact information on the second line.

**Course number:** For cross-listed courses, provide all the numbers for the new course.

**Transcript title:** Limited to 30 characters, including spaces.

**Recommended Course Preparation:** *Please note that all 300 and 400 level courses should have either recommended course preparation(s) or prerequisite(s) and that 100 or 200 level courses may have them.*
Here fill in what previous course(s) a student should have taken to succeed in the course. These recommendations will NOT be enforced by the registration system. Please explain your choices in the "rationale" (discussed below).

**Prerequisite:** *Please note that all 300 and 400 level courses should have either recommended course preparation(s) or prerequisite(s)* Here fill in course(s) students need to have taken before they enroll in this course. These prerequisites will be enforced through the registration system. Please explain your choices in the "rationale" (discussed below).

**NOTE:** Please use the words "AND" and "OR", along with parentheses as appropriate, in the lists of prerequisites and recommended preparation so that the requirements specified will be interpreted unambiguously.

**NOTE:** Unless otherwise indicated, a prerequisite is assumed to be passed with a "D" or better.

**Maximum total credits:** This should be equal to the number of credits for courses that cannot be repeated for credit. For courses that may be repeated for credit, enter the maximum total number of credits a student can receive from this course. E.g., enter 6 credits for a 3 credit course that may be taken a second time for credit, but not for a third time. Please note that this does NOT refer to how many times a class may be retaken for a higher grade.

**Grading method(s):** Check all that apply.

**Proposed catalog description:** Provide the exact wording of the course description as it will appear in the next undergraduate catalog. Course proposals should be a) no longer than 75 words, b) stated in declarative sentences in language accessible to students, and c) avoid reference to specific details that may not always pertain (e.g., dates, events, etc.). Course descriptions should not repeat information about prerequisites (which are always listed alongside the course description)."

**Rationale:** Please explain the following:
a) Why is there a need for this course at this time?
b) How often is the course likely to be taught?
c) How does this course fit into your department's curriculum?
d) What primary student population will the course serve?
e) Why is the course offered at the level (ie. 100, 200, 300, or 400 level) chosen?
f) Explain the appropriateness of the recommended course preparation(s) and prerequisite(s).
g) Explain the reasoning behind the P/F or regular grading method.
h) Provide a justification for the repeatability of the course.

**Cross-listed courses:** Requests to create cross-listed courses must be accompanied by letters of support via email from all involved department chairs. Proposals for new courses or the addition of a cross-listing to an existing course must include as a part of the rationale the specific reason why cross-listing is appropriate. Email from all involved department chairs is also required when cross-listing is removed and when a cross-listed course is discontinued. Please note that Special
Topics courses cannot be cross-listed.

**Course Outline:** Provide a syllabus with main topics and a weekly assignment schedule which includes complete citations for readings with page numbers as appropriate. Explain how students' knowledge and skills will be assessed.

*Note: the UGC form is a Microsoft Word form. You should be able to enter most of the information by tabbing through the fields. The document is protected. In the rare case that you need to unprotect the document, use the password 'ugcform'. Beware that you will lose all the data entered in the form's fields if you unlock and lock the document.*

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

Date Submitted: February 2, 2016          Proposed Effective Date: July 1, 2016

|  | Name | Email | Phone | Dept |
|---|---|---|---|---|
| Dept Chair or UPD | Dr. Anne Spence | aspence@umbc.edu | 5-3308 | Mech. Engr. |
| Other Contact | Dr. Maria Sanchez | msanchez@umbc.edu | 5-3304 | Mech. Engr. |

**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:**

Many transfer students arrive at UMBC without the appropriate prerequisite knowledge in MATLAB. Most of these students have completed a course similar to ENES101. Often this course includes all of the appropriate engineering and design components but lacks the programming component. Instead of requiring them to take ENES101 simply to gain the programming skills, we are proposing this one credit course. The result of articulating their ENES101 course without the MATLAB component results in transfer students being less prepared for upper level ENME, ENCH and CMPE courses. Additionally, some native students that have taken ENES 101 may need a refresher in MATLAB programming as there is often a 4-semester gap between courses. We are proposing this new course to remedy the need and ensure student success in upper level engineering courses.

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 it 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