MASTER SYLLABUS

ENGS 102 – PROGRAMMING FOR ENGINEERS

Created by: Cullen Haskins
Updated by: Dr. Lucas Craig

Canino School of Engineering Technology
Department: ENGINEERING SCIENCE
Semester/Year: Fall 2022
A. **TITLE:** PROGRAMMING FOR ENGINEERS

B. **COURSE NUMBER:** ENGS 102

C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

   - # Credit Hours: 2
   - # Lecture Hours: per week
   - # Lab Hours: 2- two hour labs per week
   - Other: per week

   Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE:** Yes ☐ No ☒

E. **GER CATEGORY:** None: ☒ Yes: GER

   *If course satisfies more than one: GER*

F. **SEMESTER(S) OFFERED:** Fall ☐ Spring ☐ Fall & Spring ☒

G. **COURSE DESCRIPTION:**

   This course provides an introduction to computer programming using equation solving software. Students will learn the skills necessary to create predictive models and solve basic engineering problems as well as methods for graphically presenting results and data using said software. The skills taught in this course will assist in the analysis of engineering problems in more advanced course work. Two hour labs are held twice every week.

H. **PRE-REQUISITES:** None ☐ Yes ☒ If yes, list below:

   MATH 123 w/ C or better or equivalent or higher course

   **CO-REQUISITES:** None ☒ Yes ☐ If yes, list below:
I. **STUDENT LEARNING OUTCOMES:** *(see key below)*

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Develop simple predictive models using equation solving software</td>
<td>PENDING ABET OUTCOME UPDATE</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>PS None Subsets Subsets</td>
</tr>
<tr>
<td>b. Illustrate data through 2D and 3D plots</td>
<td></td>
<td>1-Comm Skills 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>W None Subsets Subsets</td>
</tr>
<tr>
<td>c. Demonstrate the use of control structures in programming</td>
<td></td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>PS None Subsets Subsets</td>
</tr>
<tr>
<td>d. Recognize the correct use of string vs. numerical data</td>
<td></td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA Subsets Subsets Subsets</td>
</tr>
<tr>
<td>e. Apply programming to engineering problems</td>
<td></td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>PS None Subsets Subsets</td>
</tr>
</tbody>
</table>

**KEY**

<table>
<thead>
<tr>
<th>ISLO #</th>
<th>Institutional Student Learning Outcomes [ISLO 1 – 5]</th>
<th>ISLO &amp; Subsets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication Skills \ Oral [O], Written [W]</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Critical Thinking \ Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Foundational Skills \ Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Social Responsibility \ Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
<td></td>
</tr>
</tbody>
</table>

*Include program objectives if applicable. Please consult with Program Coordinator*
J. **APPLIED LEARNING COMPONENT:** Yes ☒ No ☐

If YES, select one or more of the following categories:

☑ Classroom/Lab  ☐ Civic Engagement
☐ Internship     ☐ Creative Works/Senior Project
☐ Clinical Placement ☐ Research
☐ Practicum       ☐ Entrepreneurship
☐ Service Learning ☐ Community Service

K. **TEXTS:**


L. **REFERENCES:**

None

M. **EQUIPMENT:** None ☒ Needed:

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

Exams, Quizzes, and Homework

P. **DETAILED COURSE OUTLINE:**

I. Introduction
   a. Use of the Matlab command screen and mathematical operators
   b. Management of variables and syntax
   c. Annotation requirements for program code

II. Plotting in Matlab
    a. Generating plots and subplots of varies engineering problems
    b. Generating three-dimensional plots

III. Syntax commands in Matlab
    a. While loops
    b. If / Elseif, and Else statements
    c. For loops

IV. Data input/ output
    a. Strings
    b. Scalar
    c. Vector
    d. Keyboard
    e. File reading and generation

V. Numerical methods

VI. Advanced graphics
Q. LABORATORY OUTLINE: None ☒ Yes ☐