Wharton County Junior College

Course Title	Programming for Engineers
Course Prefix, Num. and Title	ENGR 2304
Division	Math & Physical Sciences
Department	Physics & Engineering
Course Type	Academic General Education Course (from ACGM, but not WCJC Core)
Course Catalog Description	Programming principles and techniques for matrix and array operations, equation solving, and numeric simulations applied to engineering problems and visualization of engineering information; platforms include spreadsheets, symbolic algebra packages, engineering analysis software, and laboratory control software.
Pre-Requisites	MATH 2413; and credit for or concurrent enrollment in ENGR 1201
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours: Lab/Other Hours	3:2:2
Equated Pay Hours	3
Lab/Other Hours Breakdown: Lab Hours	2
Lab/Other Hours Breakdown: Clinical Hours	0
Lab/Other Hours Breakdown: Practicum Hours	0
Other Hours Breakdown	0

Approval Signatures

Title	Signature	Date
Prepared by:	Kamile Yagci Digitally signed by Kamile Yagci DN: cn=Kamile Yagci, o=Wharton County Juinor College, ou=Physics and Engineering, email=yagcik@wcjc.edu, c=US Date: 2021.08.02 13:42:41 -05'00'	12/16/2020
Department Head:	Kamile Yagci Digitally signed by Kamile Yagci DN: cn=Kamile Yagci, o=Wharton County Juinor College, ou=Physics and Engineering, email=yagcik@wcjc.edu, c=US Date: 2021.08.02 13:43:05 -05'00'	12/16/2020
Division Chair:	Jennifer Mauch Digitally signed by Jennifer Mauch DN: cn=Jennifer Mauch, o, ou=Wharton County Junior College, email=mauchj@wcjc.edu, c=US Date: 2021.08.06 14:39:00 -05'00'	12/16/2020
Dean/VPI:	Donald S Smith Digitally signed by Donald S Smith Date: 2021.09.09 16:22:57 -05'00'	12/16/2020
Approved by CIR:	Kevin Dees Digitally signed by Kevin Dees Date: 2021.08.18 11:10:43 -05'00'	12/16/2020

Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

MATLAB:

- Introduction to MATLAB
- Vectors and Matrices
- Introduction to MATLAB Programming
- Selection Statements
- Loop Statements and Vectorizing Code
- MATLAB Programs
- String Manipulation
- Data Structures: Cell Arrays and Structures
- Advanced File Input and Output
- Advanced Functions
- Introduction to Object-Oriented Programming and Graphics

MS Excel (optional):

- Ribbon Basics
- Basic Operations
- Using Functions
- Conditional Functions
- Data Mining
- Charts
- Regression Analysis

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

1. Use matrix and array operations for equation solving.
2. Identify the strengths and weaknesses of the conventional programming languages.
3. Use spreadsheets and their built-in features to solve a variety of engineering problems, applying both quantitative and qualitative methodologies.
4. Describe methods for the design of programs that control equipment or analyze data.
5. Write computer programs to solve engineering problems and perform engineering simulations using common software tools.
6. Graphically present engineering data, results, and conclusions.

Methods of Assessment:

Class work, homework assignments, quizzes, and/or exams, posters/graphs/charts, oral

Required text(s), optional text(s) and/or materials to be supplied by the student:

1. Stormy Attaway/MATLAB A Practical Introduction to Programming and Problem Solving / Elsevier / 4th ed
2. Bernard V. Liengme / A Guide to Microsoft Excel 2013 for Scientists and Engineers / Elsevier / 1st ed (optional)
3. MS Excel

4. MATLAB software

Students must have computer access to the WCJC website, their WCJC student email and online accounts. WCJC has open computer labs, with internet access, on all campuses for students to use.

Suggested Course Maximum:

20

List any specific or physical requirements beyond a typical classroom required to teach the course.

Computer laboratory classroom.

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

Projects	20-60%
Coursework (homework, quizzes, etc.)	10-30%
Exam average	15-30%
Final (at least 50% comprehensive)	15-25%
	100% course total

The overall course grade is assigned as specified by the college:

A = 90–100

B = 80–89

C = 70–79

D = 60–69

F = below 60

Curriculum Checklist:

☒**Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.

☐**Administrative WCJC Core Course**. Attach the Core Curriculum Review Forms

- ☐Critical Thinking
- ☐Communication
- ☐Empirical & Quantitative Skills
- ☐Teamwork
- ☐Social Responsibility
- ☐Personal Responsibility

☐**WECM Course** -If needed, revise the Program SCANS Matrix and Competencies Checklist