ENGR 102: Engineering Problem Solving II

CLASS SCHEDULE AND LOCATION:

COURSE FORMAT: In-class lecture, class activities, group projects, and exams
CREDIT HOURS: 3 credit hours
PREREQUISITES: ENGR 101, MATH 153 or MATH 155 with C or better
INSTRUCTOR:
E-MAIL:
OFFICE:
OFFICE HOURS:


RECOMMENDED SOFTWARE: MATLAB (2010 Student Version)

REQUIRED MATERIALS: Flashdrive and binder.

INTRODUCTION
This course is the second part of a two-course sequence that provides a solid foundation in fundamental skills needed for beginning engineering students to academically succeed and professionally prepare for challenges in a technologically changing world. The objective of this project-based course is to prepare students for an engineering career by providing opportunities to apply mathematics to solve engineering problems, acquire and refine team working skills, practice written and verbal communication skills, enhance problem solving and design skills, and use a computer as a tool for analysis, modeling, design, and communication.

COURSE CONTENT
Students completing this course successfully will:
- Work in teams and manage projects
- Write technical reports, presentation materials, and posters
- Design and deliver an oral presentation using presentation media
- Presenting work at a poster session
- Understand and apply personal and professional ethics
- Use the engineering design process for problem solving
- Develop programming concepts using MATLAB with emphasis on applications of mathematics, probability, and statistics
STUDENT LEARNING OUTCOMES
Upon completion of this course, students will be able to:

- Work collaboratively in a team (I.3.d)
- Use problem-solving techniques and apply knowledge of mathematics (algebra, geometry, trigonometry and calculus), science (basic chemistry and physics) and engineering principles to solve engineering problems (I.3.a)
- Define and formulate engineering problems in a form solvable on a computer (I.3.e)
- Break a problem into the necessary steps and develop an algorithm for its solution (I.3.e)
- Represent the algorithm as a flow chart or pseudo-code (I.3.e)
- Convert the flow chart or pseudo-code into a MATLAB program (I.3.e)
- Model behavior of elements within a system to better understand a problem which needs to be solved (I.3.e)
- Design a system, component, or process to meet desired needs (I.3.c)
- Prepare technical reports and posters (I.3.k)
- Make formal oral presentations of their work (I.3.b)
- Use Microsoft Word, Excel, and Power Point as tools to analyze, report on, and present data (I.3.g)
- Apply computer programming logic and principles, as part of the problem-solving process, to write code to perform computations, analyze data, plot data, and create a model of a system (I.3.b)
- Use MATLAB as an engineering tool to perform computations, analyze data, plot data, and model a simple system as part of solving an engineering problem (I.3.k)
- Apply ethics to make engineering decisions (I.3.f)

GRADING
Grades are based upon student performance on assignments, tests and quizzes, and projects, as well as upon student participation in required activities, such as study labs and a variety of outside of class experiences designed to show students more about the engineering profession. Each assessment tool is weighed as follows:

35% Projects (Projects 1 and 2 count 10% each, Project 3 counts 15%).
20% Homework, In-class Assignments, Quizzes and Portfolio.
30% Exams (5% First Exam, 10%Second Exam, 15%Final).
10% Study Lab Participation [See Study Lab Policy]
5% Out of Class Experiences [See OCE Policy]

Note: Graded material will not be kept longer than one semester after the course is completed.

GRADING SCALE
Letter grades are assigned according to the following scale:
A 90% – 100%
B 80% – 89%
C 70% – 79%
D 60% – 69%
F Below 60%
GRADING POLICIES

- Grade assignment for participation in Study Labs is governed by the relevant policy. A copy of the policy which governs Study Labs will be handed out in class. Grade assignment for completion of required Out of Class Experiences is governed by the relevant policy. A copy of the Out of Class Experience policy will be handed out in class. Opportunities for Out of Class Experiences will be announced in class, sent through email, and/or posted on the bulletin board outside of G-11.
- Tentative dates for Exams are on the course schedule. There may be additional, unannounced quizzes. Quizzes may not be made up.
- No make-up exams are permitted, except by prior arrangement with the instructor, at the sole discretion of the instructor.
- Assignments are due at the beginning of class on the due date assigned. It is expected that assignments will be printed out before class starts and handed in on time. Additionally, electronic copies of assignments may be requested. These electronic copies must also be submitted prior to the start of class. Late assignments will not be accepted or graded; extenuating circumstances may be considered at the discretion of the instructor.
- This course contains both team and individual elements. All homework, quizzes, and exams are considered individual assignments. Anyone found to be cheating on any individual assignment will be disciplined according to the University’s policy on Academic Integrity.

ATTENDANCE POLICY

Class attendance is mandatory unless excused by the instructor. The basis for an excused absence will follow University policy. Students who are absent from class for any reason are responsible for all missed work. Students who miss a quiz or an exam will not be permitted to make it up, except in the case of a documented family or other legitimate emergency. Any exception will be allowed at the sole discretion of the instructor.

DAYS OF SPECIAL CONCERN

WVU recognizes the diversity of its students and the needs of those who wish to be absent from class to participate in Days of Special Concern, which are listed in the Schedule of Courses. Students should notify their instructors by the end of the second week of classes or prior to the first Day of Special Concern, whichever is earlier, regarding Day of Special Concern observances that will affect their attendance. Further, students must abide by the attendance policy of their instructors as stated on their syllabi. Faculty will make reasonable accommodation for tests or field trips that a student misses as a result of observing a Day of Special Concern.

CLASSROOM CONDUCT

Since you are all professionals in training, you are expected to conduct yourself in a professional manner while in this class. For instance, while the class is in progress, everyone is expected to remove their hats and sunglasses, put away the newspaper, refrain from eating and drinking, and turn off cell phones. No texting is allowed while the class is in progress. When giving a presentation, you are expected to dress professionally. As part of your professional preparation, you should begin acquiring professional attire (dress shoes, slacks, shirts, and ties). Please do not force the instructor to remind you that you should behave in a professional manner.

This code of conduct also applies to any out of class experiences you choose to attend. Remember, guest lecturers have taken time out of their schedules to come and speak at WVU. As a representative of the College of Engineering you are expected to treat these guest lecturers with the respect due them, and remember one of these lecturers could end up your future boss. Be sure to act accordingly.
ACADEMIC INTEGRITY
In taking this course, it is assumed you aspire to a professional career in which you will lead people and manage resources. As a result, your personal integrity is an integral component of your preparation for such a career. Therefore, I will require that you adhere to the academic guidelines specified in the University Catalog and at the following website: http://www.arc.wvu.edu/admissions/integrity.html
If you have any questions, please do not hesitate to contact me.

WVU STATEMENT OF SOCIAL JUSTICE
West Virginia University is committed to social justice. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. The instructor of this course concurs with that commitment and expects to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

STATEMENT ON DISABILITY ACCOMMODATION
If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise the instructor and make appropriate arrangements with the Office of Disability Services (304-293-6700).

Important Dates to Remember! Please mark your calendars!

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Last Day to Register</td>
<td>Friday, Jan 18</td>
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<td>MLK Day Recess</td>
<td>Monday, Jan 21</td>
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<td>Mid-Semester</td>
<td>Friday, Feb 1</td>
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<td>Last Day to Drop a Class</td>
<td>Friday, Feb 22</td>
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<td>Spring Break</td>
<td>March 25-29</td>
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<td>Mini-Conference</td>
<td>Monday, Apr 29</td>
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<td>Last Day of Classes</td>
<td>Friday, May 3</td>
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# TENTATIVE COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>1/14-18</td>
<td>Syllabus, Announcements, Intro to MATLAB (Ch 1,2)</td>
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<tr>
<td>2</td>
<td>1/21-25</td>
<td>Scalars Vectors and Arrays, Mathematical Ops (Ch 2, 3)</td>
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<td>3</td>
<td>1/28-2/1</td>
<td>Mathematical Ops (Ch 3) Script files (Ch 4)</td>
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<td>4</td>
<td>2/4-2/8</td>
<td>Basic Plotting (Ch 5)</td>
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<td>5</td>
<td>2/11-2/15</td>
<td>if-end conditionals (Ch 6), <strong>Project#1 Due</strong></td>
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<td>6</td>
<td>2/18-2/22</td>
<td><strong>Exam #1</strong></td>
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<td>7</td>
<td>2/25-3/1</td>
<td>for loops (Ch 6)</td>
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<tr>
<td>8</td>
<td>3/4-3/8</td>
<td>for loops (Ch 6)</td>
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<tr>
<td>9</td>
<td>3/11-3/15</td>
<td>while loops (Ch 6)</td>
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<td>10</td>
<td>3/18-3/22</td>
<td><strong>Project#2 Due</strong>, Presentations Project #2</td>
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<td>3/25-3/29</td>
<td><strong>Spring Break</strong></td>
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<td>11</td>
<td>4/1-4/5</td>
<td>Functions (Ch 7)</td>
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<td>12</td>
<td>4/8-4/12</td>
<td>Function (Ch 7), <strong>Exam #2</strong></td>
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<td>13</td>
<td>4/15-4/19</td>
<td>Advanced Plotting (Ch 5,10), Optional Topics</td>
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<td>14</td>
<td>4/22-4/26</td>
<td>Optional Topics, Project work</td>
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<td>15</td>
<td>4/29-5/3</td>
<td><strong>Project #3 Due</strong>, Presentations Project #3</td>
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<td>16</td>
<td>5/6-5/10</td>
<td>Finals Week</td>
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Note: Instructor reserves the right to make changes on this syllabus as needed.