MTRE 1000 / 001 – Introduction to Mechatronics Engineering – Spring 2014

Instructor: Kevin McFall, PhD

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Office Hours: MTWRF 11:00 am – 12:00 pm or by appointment

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Location: Q 104 (robotics project in Q 118)

Meeting times: TR 4:00 pm – 4:50 pm

Pre-requisites: none


Course Catalog Description: An introduction to career opportunities in Mechatronics Engineering; familiarization with college and departmental policies, curriculum, and facilities.

Learning Outcomes:
• Appreciate the fundamental components that make up mechatronics engineering systems.
• Develop the capacity to think creatively and independently about new design problems.
• Undertake independent research and analysis and think creatively about engineering problem solving.

Topics Covered Include:
• The engineering profession, education in engineering, and introduction to design.
• Engineering solutions and representation of technical information.
• Engineering measurements, estimates, dimensions, units and conversions
• Engineering economics
• Statistics
• Statics, strength of materials, and material balance.
• Energy sources and alternatives.
• Fundamental energy principles.
• Electrical theory

Academic Misconduct
At SPSU, academic misconduct is defined as “any act that could have resulted in unearned advantage or that interferes with the appropriate academic progress of others”. All acts of academic misconduct will be reported to the Honor Council. For more information see www.spsu.edu/honorcode. Assignments may not be copied, not even in part, from any other source. The easiest way to avoid academic misconduct issues is to always do your own work; it's as simple as that. If you work together in large groups be certain that you sit down separately to write your actual submission so that it will be written in your own words.
Disability Statement
If you have a documented disability as described by the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) that may require you to need assistance attaining accessibility to instructional content to meet course requirements, please contact the ATTIC at 678-915-7361 as soon as possible. It is then your responsibility to contact and meet with the instructor. The ATTIC can assist you and the instructor in formulating a reasonable accommodation plan and provide support for your disability. Course requirements will not be waived but accommodations will be made, when appropriate, to assist you to meet the requirements.

Communication
Course material will be disseminated in D2L including lecture notes, homework solutions, project descriptions, etc. All official course announcements, including instructions when class may be cancelled, will be posted in the D2L course news. Be sure to check D2L regularly. Do not use the internal email system in D2L. The instructor will only respond to email sent to kmcfall@spsu.edu.

Grading scale
A  90-100
B  80-89
C  70-79
D  60-69
F  0-59

Attendance (10 points)
Typically, attendance is not taken in my classes. College is supposed to be filled with adults acting like adults. However, to get you in the habit of acting responsibly, 10 points of the final grade will be based on attendance. In general, late assignments are not accepted. Extenuating circumstances can result in exceptions to this rule, but agreement must be reached with the instructor in advance of the assignment or class that will be missed.
Graded assignments (60 points)

Eleven graded assignments are weighted equally. Groups of up to 3 members may submit assignments together. Due dates for the following topics are marked in the course schedule.

1) Pre-test (see quiz on D2L)
2) Interview of an engineer
3) Energy exercise
4) Personalized curriculum flowchart
5) Statics exercise
6) Visit student organization meeting
7) Strength of materials exercise
8) Circuits exercise
9) Literature review exercise
10) Statistics exercise
11) Engineering economics exercise

Project grades (30 points)

The term project is a mechatronics design competition using VEX robotic systems. The following items will count towards the project grade. Generally, the same grade will be shared by all team members although those found not contributing to the effort may receive reduced scores.

a) Sketches of multiple concepts generated during concept generation (10 points)
b) Decision table for identifying two viable concepts due (10 points)
c) Building of the Squarebot 2.0 as practice (15 points)
d) Building of two prototypes consistent with selected concepts (20 points)
e) A final working robot with the functionality of the best prototype (15 points)
f) Qualifying round score (15 points)
g) Final round score (up to 10 points extra credit for top two teams)
h) Detailed sketch of the final prototype (15 points)

Course schedule

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<tr>
<th>Week</th>
<th>Topic</th>
<th>Read</th>
<th>Due</th>
<th>Topic</th>
<th>Read</th>
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<tr>
<td>Jan 7, 9</td>
<td>Introduction</td>
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<td>Design process</td>
<td>Ch. 8</td>
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<td>Jan 14, 16</td>
<td>Surviving coursework</td>
<td>Ch. 5</td>
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<td>Concept generation</td>
<td>Ch. 9</td>
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<td>Jan 21, 23</td>
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<td>Concept selection</td>
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<td>Snow closure</td>
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<tr>
<td>Feb 4, 6</td>
<td>Energy</td>
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<td>VEX programming</td>
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<tr>
<td>Feb 11, 13</td>
<td>Snow closure</td>
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<td>Snow closure</td>
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<td>Feb 18, 20</td>
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<td>Feb 25, 27</td>
<td>Majors, careers, teamwork</td>
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<td>Mar 11, 13</td>
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<tr>
<td>Mar 18, 20</td>
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<td>Mar 25, 27</td>
<td>Circuits</td>
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<td>Prototype evaluation</td>
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<td>Apr 1, 3</td>
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<td>Apr 8, 10</td>
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<td>Apr 15, 17</td>
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