

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

Instructor: Kevin McFall, PhD

Office Phone: 678-915-3004

Cell Phone: 610-573-6242

Office Address: Q 344

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

E-mail: kmcfall@spsu.edu

Location: Q 104 (robotics project in Q 118)

Meeting times: TR 4:00 pm – 4:50 pm

Pre-requisites: none

Textbook: Oakes, Leone, Gunn, *Engineering Your Future: A Brief Introduction to Engineering*, 4th edition, Oxford University Press, 2012.

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

Week	Tuesday			Thursday		
	Topic	Read	Due	Topic	Read	Due
Jan 7, 9	Introduction			Design process	Ch. 8	1)
Jan 14, 16	Surviving coursework	Ch. 5		Concept generation	Ch. 9	
Jan 21, 23	Units	Ch. 6		Concept selection		a)
Jan 28, 30	Snow closure			Snow closure		
Feb 4, 6	Energy		2)	VEX programming		b)
Feb 11, 13	Snow closure	Ch. 1-3		Snow closure		
Feb 18, 20	Statics		3)	Bot build phase		c)
Feb 25, 27	Majors, careers, teamwork	Ch. 1-3, 10	4)	Bot build phase		d)
Mar 11, 13	Strength of materials		5)	Bot build phase		
Mar 18, 20	Software tools	Ch. 7	6)	Bot build phase		
Mar 25, 27	Circuits		7)	Prototype evaluation		e)
Apr 1, 3	Literature review		8)	Practice run		
Apr 8, 10	Statistics		9)	Bot qualification round		f)
Apr 15, 17	Engineering economics		10)	Bot final round		g)
Apr 22, 24	Work experience	Ch. 12	11)	Equipment return		h)