

# MTRE 1000 Introduction to Mechatronics Engineering Fall 2017

## Instructor

Kevin McFall, PhD (lecture) and Meiling Sha (laboratory)

E-mail: [kmcfall@kennesaw.edu](mailto:kmcfall@kennesaw.edu)

Office Phone: 470-578-5136

Cell Phone: 610-573-6242

Office Location: Q320

Office Hours: MTWHF 9-10 am or by appointment

## Course Description

### Catalog Description

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

### Course Details

Term: Fall 2017

Course name: Introduction to Mechatronics Engineering

Course number: MTRE 1000

Section numbers: 01, C66, and C67

Meeting times: Lecture M 12:00-12:50 and laboratory M 2:00-4:45 (01) or W 11:00-1:45 (C66 and C67)

Room number: Lecture Q106, and laboratory Q118

### Learning Outcomes

By the end of this course, students will:

- appreciate the fundamental components that make up mechatronics engineering systems.
- undertake independent research, analysis, and design to creatively solve engineering problems.

### Topics covered

- The engineering profession, education in engineering, and introduction to design.
- Engineering solutions and representation of technical information.
- Engineering measurements, estimates, dimensions, units and conversions
- Technical topics such as engineering economics, statistics, statics, strength of materials, material balance, energy sources and alternatives, and electrical theory

### Required Materials

Lynn, K. A. & Braden, S. W. (Eds.). (2015). *Foundations of Academic Inquiry*. 7th Edition. (FOAI) Bay City, MI: Hayden-McNeil Publishing. This textbook is highly recommended, but not mandatory to buy.

All students are required to wear safety glasses at all times in the laboratory. Safety glasses will be provided to students at the beginning of the semester, and students having lost their pair are responsible for replacements.

## Learning Community

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Together with EDG 1211 Engineering Graphics I, this course is part of the Learning Community (LC) for Mechatronics Engineering students (sections C66 and C67). The primary LC goal is to help entering freshman succeed by plugging them into college life and prepare for the academic rigor of our program. An assignment for this course involves CAD drawings, making the connection to the sister course in the LC. The lecture portion of the course will combine both LC and non-LC students.

## Teams

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Most assignments in this course will be completed in teams that will be assigned in the second week of classes. The intention of the teams is to create a close-knit study group. All assignments with calculations and the entire robot project will be completed in teams. All team members are expected to contribute equally to the teams. Students not pulling their weight will be given a warning once and thereafter will be assigned zero grades for subsequent assignments unless their activity level increases to an acceptable level.

Robotics kits will be checked out to each team. **No student is permitted to access any kit other than the one assigned to their team.** Each team must verify the contents of their kit in the beginning and end of the semester. Teams failing to check out their kits with the instructor will receive half price on the first project assignment, and will be assigned an incomplete grade for the course if the kit is not checked back in at the end of the semester.

## Course Communication

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Course material will be disseminated in D2L including lecture notes, homework solutions, 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.

All Kennesaw State University computer labs provide free use of computers running these applications. Refer to <http://uits.kennesaw.edu/support/labhours.php> for locations/hours of computer labs.

KSU provides technology training and support for students. Use this support for issues with any of the standard campus technologies (such as D2L, KSU wireless, student email, etc.). Students can contact KSU's Technology Services in several ways:

- Email: [studenthelpdesk@kennesaw.edu](mailto:studenthelpdesk@kennesaw.edu)
- Call: 770-499-3555
- Walk-in support: See <http://uits.kennesaw.edu/support/> for times and locations

## Late/Missed Assignments and Attendance

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In general, late and improperly submitted 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 to be missed. D2L dropboxes will close at the beginning of class on due dates, and late and improper submissions will be assigned a zero grade.

## Grading Policy

Attendance	5%
Lab cleanliness	10%
Assignments	50%
Project	35%
<b>Total</b>	<b>100%</b>

**Grade Conversion:** A: (90-100), B: (80-89), C: (70-79), D: (60-69), F: (0-59)

### Attendance (5%)

Typically, attendance is not recorded in my other classes. College is supposed to be filled with adults acting like adults. However, to get you in the habit of acting responsibly, 5% of the overall grade will be based on attendance in both lecture and lab. Late arrival to class (after your name has been called) results in a 75% attendance grade for the day.

### Lab cleanliness (10%)

Each team is allocated a dedicated workspace in the lab, which is expected to remain tidy. When leaving lab, no stray items are allowed left on the workspace. A partially, or completely, built robot may remain as long as it is connected as a single piece. Any trash or spare parts left will result in a 10% deduction from the lab cleanliness grade. A similar deduction results from losing or damaging important robotic parts such as motor leads breaking, lost sensors, etc.

### Assignments (50%)

All graded assignments are weighted equally. A single submission for each team is collected for assignments marked as group submissions. Be sure to include all team members' names, but leave any names off for team members who did not contribute. Due dates for the following topics are marked in the course schedule and are due at the beginning of lecture. See D2L for more detailed descriptions of these assignments.

- 1) Pre-test (individual – see quiz on D2L)
- 2) Literature review exercise as a single JPG, DOCX, or PDF file (individual – see D2L drop box)
- 3) Personality assessment and reflection as a single JPG, DOCX, or PDF file (individual – see D2L drop box)
- 4) Personalized curriculum flowchart as a single JPG, DOCX, or PDF file (individual – see D2L drop box)
- 5) Interview of an engineer as a single JPG, DOCX, or PDF file (individual – see D2L drop box)
- 6) Visit student organization as a single JPG, DOCX, or PDF file (individual – see D2L drop box)
- 7) Energy exercise (group – hardcopy submission)
- 8) Statics exercise (group – hardcopy submission)
- 9) Circuits exercise (group – hardcopy submission)
- 10) Global engineering company as a single JPG, DOCX, or PDF file (assignment – see D2L drop box)
- 11) Statistics exercise (group assignment – hardcopy submission)

## Robotics Project (35%)

The term project is a mechatronics design competition using VEX robotic systems. The following items will count equally 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. The following assignments are due at the beginning of Friday lab. See D2L for more detailed descriptions of these assignments.

- Building of the Clawbot (half points if kit not checked)
- Remote control Clawbot programmed to autonomously turn around
- Concept sketches and decision table as a single JPG, DOCX, or PDF file (see drop box on D2L)
- Time management plan for bot build as a single JPG, DOCX, or PDF file (see drop box on D2L)
- CAD drawing of custom robot part as a single JPG, DOCX, or PDF file (see drop box on D2L)
- Complete mechanical design of the prototype with moving parts controlled by remote
- Vlog post answering questions from students at Martin Technology Academy
- Log of bot build activities and reflection as a single JPG, DOCX, or PDF file (see drop box on D2L)
- Final robot competition score<sup>1</sup>

## Course Outline

Week of	Lecture (Monday)			Laboratory (Wednesday and Friday)	
	Topic	Read	Due	Topic	Due
Aug 14	Goal identification		1) <sup>2</sup>	VEX programming	
Aug 21	Study skills	Ch. 1-3		Kit check out	
Aug 28	Navigating campus		2)*	Clawbot programming	a)
Sep 04	No lecture			Competition reveal	b)
Sep 11	Personality assessment		3)*	Concept generation/selection	c)*
Sep 18	Coursework and curriculum	Ch. 5-7		Bot build/program/test	d)*
Sep 25	Dimensions and units			Bot build/program/test	
Oct 02 <sup>3</sup>	Unit conversions		4)*	Bot build/program/test	
Oct 09	Energy			Bot build/program/test	
Oct 16	Vectors		5)*	Bot build/program/test	e)*
Oct 23	Statics		6)*	Bot build/program/test	f)
Oct 30 <sup>4</sup>	Circuits		7)	Bot build/program/test	
Nov 06	Statistics		8)	Bot build/program/test	g)
Nov 13	z-transform		9)	Bot build/program/test	
Nov 27	Engineering careers	Ch. 8-10	10)*	Competition dress rehearsal	h)* and i) <sup>1</sup>
Dec 04	Diversity and globalization	Ch. 11-13	11)	No lab	

\* Assignments marked in red with an asterisk are submitted in D2L dropboxes. Submissions need not be digitally produced, but must be legible, high-quality scans (i.e. not grainy images captured with smart phones) and must be uploaded as a single JPG, DOCX, or PDF file.

<sup>1</sup> The robot competition will take place in the afternoon of December 1st outside of class time.

<sup>2</sup> This online D2L quiz is due Thursday August 17 at 5:00 pm.

<sup>3</sup> The last day to withdraw from classes without penalty is October 4.

<sup>4</sup> Registration for next Spring 2018 begins November 1.

# University Policies

## Academic Integrity

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Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section II of the Student Code of Conduct addresses the University's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to University materials, misrepresentation/ falsification of University records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the University Judiciary Program, which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement. See also <https://web.kennesaw.edu/scai/content/ksu-student-code-conduct>.

No student shall receive, attempt to receive, knowingly give or attempt to give unauthorized assistance in the preparation of any work required to be submitted for credit as part of a course (including examinations, laboratory reports, essays, themes, term papers, etc.). When direct quotations are used, they should be indicated, and when the ideas, theories, data, figures, graphs, programs, electronic based information or illustrations of someone other than the student are incorporated into a paper or used in a project, they should be duly acknowledged.

Assignments may not be copied, not even in part, from any other source without proper citation. Collaboration on assignments among students and other individuals is wholeheartedly encouraged. In order to avoid possible plagiarism issues, limit such collaboration to discussion of how to approach the problem and what strategies, equations, and techniques should be used to solve it. When actually writing down your solution, ensure you (and your team-members as appropriate) are not in the same room as outside collaborators nor referencing a copy of their work. Your solution will then be written in your own words and therefore not plagiarized.

**All acts of academic misconduct will be documented with the Student Academic Misconduct Incident form and included on the student's academic record.**

## Campus Carry

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We recognize that the Kennesaw State University community has questions and concerns regarding the concealed carry of firearms on the Kennesaw State University campuses. The University System of Georgia has issued general guidance developed by the USG Office of Legal Affairs.

Frequently Asked Questions can be found here: <http://police.kennesaw.edu/campuscarry.php>

The full text of USG's Guidance on H.B. 280 can be found [here](#).

USG has provided additional guidance on H.B. 280, which can be found [here](#).

If you have any questions that are not addressed, please contact [AskLegal@kennesaw.edu](mailto:AskLegal@kennesaw.edu).

## Accessibility

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Any student with a documented disability needing academic adjustments is requested to notify the instructor as early in the semester as possible. Verification from KSU Student Disability Services is required. All discussions will remain confidential.

## Advising

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All undergraduate students are required to have a meeting with an academic advisor each semester until earning 30 semester hours. Students must schedule these meetings on their own, and must be completed prior to registration for the next semester. Students will not be able to register until they have met with an academic advisor. Appointments are made with either a faculty member or departmental advisor in the student's major, or an advisor in the NEST. The professional advisor for the Mechatronics Engineering program is Ms. Lynne Murray whose office is in building M.