IE 431.001 – Manufacturing Support Systems

COURSE SYLLABUS: Fall 2020

INSTRUCTOR INFORMATION

Instructor: Dr. Sasan Khorasani, Assistant Professor
Office Hours: MW 2PM – 4.30 PM (virtual); or by appointment
Email Address: Sasan.Khorasani@tamuc.edu
Communication Response Time: 2 days

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

Textbook Required
Groover, Mikell P. (2014). Automation, Production Systems, and Computer-Integrated Manufacturing, 5th edition, Pearson, Inc (ISBN- 978-0134605463).

Software Required

- BASIC Stamp Windows Editor version 2.4.2
- AnyLogic Personal Learning Edition
- Microsoft Word, Excel, and PowerPoint.

Course Description

Concepts, principles, and relationships of automated assembly devices, computer-aided drafting/design (CADD), computer-aided manufacturing (CAM), industrial robots, numerical control (NC), industrial lasers, programmable logic controllers (PLCs),

The *syllabus/schedule are subject to change.*

automated guided vehicles (AGVs), flexible manufacturing systems (FMS), and computer-integrated manufacturing (CIM).

(2019-2020 Undergraduate Catalog, Texas A&M University-Commerce, http://catalog.tamuc.edu/undergrad/)

Prerequisites: PHYS 2426 (or equivalent) with a minimum grade of C.

Student Learning Outcomes

1. Explain various reasons for employing automation in a manufacturing environment and describe various applications.
2. Describe the basic function of a sensor and an actuator in an automated system and give examples of both categories.
3. Select an appropriate sensor and/or actuator for a given automated application.
4. Describe the fundamentals of NC technology.
5. Use a Programmable Logic Controller (PLC) and embedded microcontroller, to perform specified control functions.
6. Describe the basic anatomy and attributes of an industrial robot.
7. Identify and distinguish the different components and interfaces in a Flexible Manufacturing System.
8. Troubleshoot a system and take appropriate action(s) to resolve the issue(s).
9. Design an automated system to meet defined operational specifications.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Using Microsoft Word, Excel, and PowerPoint.

This course is fully online, and supported by a D2L web page.

Important Notes:

- Some class sessions will be live, while some will be asynchronous. The instructor will let students know in advance if the class session will be live. Attendance is not mandatory to the live sessions. Both live and asynchronous sessions will be recorded and made available for students on D2L.
- All assignments have to be submitted under the designated dropbox at the D2L website. No e-mail submissions for assignments will be accepted.
- For handwritten assignments, exams, or quizzes students must scan all work in a single document either as a pdf or as a MS Word file. If you do not have a scanner, you can use your smartphone to scan files in a single document. There are several applications available for both Apple and Android phones.

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- Do not forget to title the documents as: yourfirstname_your lastname_assignment number
- Late work is not accepted, unless student has an acceptable excuse proven by a doctor's note or any legal documentation.

Instructional Methods

This is a fully online class. The instructional methods in this course include; lectures, class discussion, written assignments, problem solving, and assignments. The instructor will mainly utilize power point slides during his lecture.

GRADING

Final grades in this course will be based on the following scale:

A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% or Below

Grading rubric

Exam 1:	25%
Exam 2:	25%
Exam 3:	25%
Term project:	25%

Assessments

This course utilizes lectures and assignments to assist students in achieving the course learning outcomes. The assessment criteria for the stated student learning outcomes will include a term project, labs, and exams.

There will be three exams. Students will apply automation techniques to solve applied engineering problems. Exams will be used to asses a student's knowledge and skills related to industrial automation concepts.

The student project is devised to make students utilize their knowledge to solve real world problems. The types of projects will be left up to the student teams. The final report should be comprehensive, should describe methods used, and should show and illustrate the improvements and the final solution. A detail written procedure will be provided at the time of team member formation.

TECHNOLOGY REQUIREMENTS

Browser support

D2L is committed to performing key application testing when new browser versions are released. New and updated functionality is also tested against the latest version of supported browsers. However, due to the frequency of some browser releases, D2L cannot guarantee that each browser version will perform as expected. If you encounter any issues with any of the browser versions listed in the tables below, contact D2L Support, who will determine the best course of action for resolution. Reported issues are prioritized by supported browsers and then maintenance browsers.

Supported browsers are the latest or most recent browser versions that are tested against new versions of D2L products. Customers can report problems and receive support for issues. For an optimal experience, D2L recommends using supported browsers with D2L products.

Maintenance browsers are older browser versions that are not tested extensively against new versions of D2L products. Customers can still report problems and receive support for critical issues; however, D2L does not guarantee all issues will be addressed. A maintenance browser becomes officially unsupported after one year.

Note the following:

- Ensure that your browser has JavaScript and Cookies enabled.
- For desktop systems, you must have Adobe Flash Player 10.1 or greater.
- The Brightspace Support features are now optimized for production environments when using the Google Chrome browser, Apple Safari browser, Microsoft Edge browser, Microsoft Internet Explorer browser, and Mozilla Firefox browsers.

Desktop Support

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Microsoft® Edge	Latest	N/A
Microsoft® Internet Explorer®	N/A	11
Mozilla® Firefox®	Latest, ESR	N/A

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Google® Chrome™	Latest	N/A
Apple® Safari®	Latest	N/A

Tablet and Mobile Support

Device	Operating System	Browser	Supported Browser Version(s)
Android™	Android 4.4+	Chrome	Latest
Apple	iOS®	Safari, Chrome	The current major version of iOS (the latest minor or **point** release of that major version) and the previous major version of iOS (the latest minor or **point** release of that major version). For example, as of June 7, 2017, D2Lsupports iOS 10.3.2 and iOS 9.3.5, but not iOS 10.2.1, 9.0.2, or any other version. Chrome: Latest version for the iOS browser.
Windows	Windows 10	Edge, Chrome, Firefox	Latest of all browsers, and Firefox ESR.

- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
    - 512 MB of RAM, 1 GB or more preferred
    - Broadband connection required courses are heavily video intensive
    - Video display capable of high-color 16-bit display 1024 x 768 or higher resolution

- **For YouSeeU Sync Meeting sessions *8 Mbps* is required.** Additional system requirements found here: https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements

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- You must have a:
    - Sound card, which is usually integrated into your desktop or laptop computer
    - Speakers or headphones.
    - *For courses utilizing video-conferencing tools and/or an online proctoring solution, a webcam and microphone are required.

- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. At a minimum Java 7, update 51, is required to support the learning management system. The most current version of Java can be downloaded at: JAVA web site http://www.java.com/en/download/manual.jsp

- Current anti-virus software must be installed and kept up to date.

Running the browser check will ensure your internet browser is supported.
Pop-ups are allowed.
JavaScript is enabled.
Cookies are enabled.

- You will need some additional free software (plug-ins) for enhanced web browsing. Ensure that you download the free versions of the following software:
    - Adobe Reader https://get.adobe.com/reader/
    - Adobe Flash Player *(version 17 or later)* https://get.adobe.com/flashplayer/
    - Adobe Shockwave Player https://get.adobe.com/shockwave/
    - Apple Quick Time http://www.apple.com/quicktime/download/

- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu**.**

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each

student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

Brightspace Support

Need Help?

Student Support

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778 or click on the **Live Chat** or click on the words "click here" to submit an issue via email.

System Maintenance

D2L runs monthly updates during the last week of the month, usually on Wednesday. The system should remain up during this time unless otherwise specified in an announcement. You may experience minimal impacts to performance and/or look and feel of the environment.

Interaction with Instructor Statement

The instructor will response to your questions on D2L tools within 24 hours. For urgent questions, and for questions that are not answered within 24 hours, please prefer e-mail correspondence.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

- Some class sessions will be live, while some will be asynchronous. The instructor will let students know in advance if the class session will be live. Attendance is not mandatory to the live sessions. Both live and asynchronous sessions will be recorded and made available for students on D2L.

- All assignments have to be submitted under the designated dropbox at the D2L website. No e-mail submissions for assignments will be accepted.
- Do not forget to title the documents as: yourfirstname_your lastname_assignment number
- Late work is not accepted, unless student has an acceptable excuse proven by a doctor's note or any legal documentation.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.
http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum:
https://www.britannica.com/topic/netiquette

TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

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Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library- Room 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu
Website: Office of Student Disability Resources and Services
http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

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Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

COURSE OUTLINE / CALENDAR

Week	Date	Topics	Reading
1	8/24	Introduction to Manufacturing Support Systems and Computer Integrated Manufacturing	Chs. 1 and 23
	8/26	Manufacturing Operations	Ch. 2
2	8/31	Manufacturing Operations	Ch. 2
	9/2	Manufacturing Metrics and Economics	Ch. 3
3	9/7	Manufacturing Metrics and Economics	Ch. 3
	9/9	Manufacturing Metrics and Economics	Ch. 3
4	9/14	Exam-1	
	9/16	Single-Station Manufacturing Cells	Ch. 14
5	9/21	Single-Model Assembly Lines	Ch. 15
	9/23	Flexible Manufacturing Cells and Systems	Ch. 19
6	9/28	Job shop modeling via Simulation	
	10/30	Job shop modeling via Simulation	
7	10/5	Job shop modeling via Simulation	
	10/7	Exam-2	
8	10/12	Automation and Control Technologies	Chs. 4, 5, 6
	10/14	Industrial Robotics	Ch. 8
9	10/19	Industrial Robotics	Ch. 8
	10/21	Computer Numerical Control	Ch. 7
10	10/26	Computer Numerical Control	Ch. 7
	10/28	Exam-3	
11	11/2	Term Project	
	11/4	Term Project	
12	11/9	Term Project	
	11/11	Term Project	
13	11/16	Term Project	
	11/18	Term Project	
14	11/23	Term Project	
	11/25	Thanksgiving break (University closed)	
15	11/30	Term Project	
	12/2	Term Project	
16		Final Presentation	

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