Department of Mechanical Engineering
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Uttyler.edu/engineering

MENG 5399 - Independent Study
Course Syllabus

Semester / Year	Spring / 2024
Catalog Description	Independent study in specific areas of Mechanical Engineering not covered by organized graduate courses. A maximum of six credit hours may be used for graduate credit on the MSME degree. One to three hours of course meeting per week.
Prerequisites	CI.
Section Number	002
Instructor Name	Chung Hyun Goh
Contact Information	3900 University Blvd., RBN 3007, Tyler TX. 75799 Phone: 903-566-6256 Email: chgoh@uttyler.edu
Class Type / Instruction Mode / Location	Independent / In person / Tyler
Class Time	Weekly meeting with a faculty advisor (one to three hours on Thursday)
Office Hours	M/Tu/W: 10:00 AM – 11:00 AM or by appointment
No. of Credits	3 credits
Required Textbook	Design of Embedded Robust Control Systems Using MATLAB/Simulink (Control, Robotics and Sensors), Petko H. Petkov, Tsonyo N. Slavov and Jordan K. Kralev, 2018, The Institution of Engineering and Technology.
Optional References	MATLAB Deep Learning with Machine Learning, Neural Networks and Artificial Intelligence, Phil Kim, 2017, Apress.
Additional Rules and Requirements	N/A
Evaluation Method	Assignments (literature review, MATLAB programming, etc.): 40% Written Reports (progress and final technical reports): 50% Independent study meeting participation: 10%
Grading Policy / Scale	Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60
Important Events / Dates	Census date: 01/29/2024. First drop for non-payment: 01/24/2024. Last date to withdraw from one or more 15-week courses: 03/25/2024. Final report submission date: 04/25/2024.
Attendance / Makeup policy / other rules	No makeup, regular attendance is required.
Course Learning Objectives / ABET & PEOs Relation	By the end of this course, students will be able to: 1. Demonstrate an understanding of basic knowledge for machine learning applications through independent research. 2. Utilize hands-on skills using machine learning tools to perform optimal design in embedded robust control systems. 3. Develop self-motivation and discipline to identify a problem, analyze data, and explore the solution space. 4. Communicate effectively with an engineering audience.

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	For the topic assigned, by the end of this course the student should be able to: 1. Apply machine learning techniques to provide robot-assisted rehabilitation device (RoboREHAB) with optimal gait motion in daily activities such as walking, running, sit-to-stand, stand-to-sit, and step-up/down etc. 2. Utilize machine learning tools for predicting the motion and loading characteristics of gait through predictive gait simulation, specifically for the asymmetric gait. 3. Enhance optimal design and prototyping capabilities through machine learning in embedded robotics. 4. Improve writing skills to make a publishable draft paper.
Tentative Topics / Course Plans	1. Asymmetric gait rehabilitation for individuals with strokes. 2. Design of embedded robust control systems using MATLAB/Simulink. 3. Case study: deep learning and reinforcement learning applications in the asymmetric gait simulations using RoboREHAB. 4. Machine learning in embedded robotics.
University Policies	https://www.uttyler.edu/academic-affairs/files/syllabus_information_2021.pdf