

The University of Texas at Tyler
Department of Electrical Engineering

EENG 3308.401: Programming Languages for Design Syllabus

Catalog Description:

EENG 3308: Programming Languages for Design

A hands-on course designed to teach students programming languages and tools for design projects. Introduction to high-level programming languages and modern engineering tools for systems modeling, analysis and design: Matlab; Python; NI Labview; basic project implementation using a microcontroller development environment. Three hours of lecture per week.

Prerequisites:

N/A

Credits:

3 (3 hours lecture, 0 hours laboratory per week)

Text(s):

No Textbook

Required Material :

Text: Documentation and reference materials provided by the Instructor.

Software: MATLAB 2013 or later, Python 3 compiler, NI LabVIEW, Arduino IDE.

Hardware: A list of sensors, microcontrollers, and components to build a small robotic and IoT project must be purchased for the group project. Here is an example:

<https://www.amazon.com/VKmaker-Avoidance-tracking-Ultrasonic-tutorial/dp/B01CXVA6IO>

Course Coordinator:

Dr. Fatemeh Kalantari, Assistant Professor

Topics Covered: (paragraph of topics separated by semicolons)

MATLAB: Variables and functions, Basic Arithmetic Operations, Conditional statements, loops, Data Imports and Analysis; **Python 3:** Object and Data Structure Basics, Comparison Operators and Statements, Methods and Functions, Object Oriented Programming, Modules and Packages, Error and Exceptions Handling; **LabView:** Types of data, structures & Loops, Array, Numeric, String, Timing Project, File & Report; **Arduino:** Programming Basics, User Input, Feedback, Sensors, Robotics, The Internet of Things (IoT).

Evaluation Methods: (only items in dark print apply):

1. Examinations/ Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Learning Outcomes¹: By the end of this course students will be able to:

1. Use MATLAB functions to perform mathematical operations and plotting with scalars, complex numbers, matrices and vectors. [1,4]
2. Implement algorithms such as solving sets of simultaneous equations and numerical methods using basic structured programs in MATLAB. [1,4]
3. Import and Export data using MATLAB programming. [4,5]
4. Understand Python object-oriented and functional programming styles in a development environment [1]
5. Apply key Python data structures and algorithms effectively for scientific computing [1,4]
6. Analyze the user input and feedback system in Arduino programming. [1]
7. Implement basic project in the Arduino microcontroller integrated development environment. [5]
8. Analyze the significance of the given programming languages in current market. [3,6]
9. Explore the applications of Arduino in IoT and robotics. [5]

¹Numbers in brackets refer to method(s) used to evaluate the course learning outcome.

Relationship to Student Outcomes (only items in dark print apply)²: This course supports the following Electrical Engineering Student Outcomes, which state that our students will possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics [1,2]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors [4, 6].
3. an ability to communicate effectively with a range of audiences [8]
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts [9]
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives [5]
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions [3]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [7]

²Numbers in brackets refer to course learning outcome(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

| | | |
|----------------------------------|---|-------|
| Mathematics and Basic Sciences: | | hours |
| Engineering Sciences and Design: | 3 | hours |
| General Education Component: | | hours |

Grade Replacement:

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to file an intent to use grade forgiveness will result in both the original and repeated grade being used to calculate your overall grade point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler. (2006-08 Catalog, p. 35)

Prepared By:
Edited By:

Prabha Sundaravadivel, Assistant Professor

Fatemeh Kalantari, Assistant Professor
Fatemeh Kalantari, Assistant Professor

Date:

3 January 2022

10 January 2025
6 July 2025

The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 3308.401 – Programming Languages for Design

COURSE OUTLINE

Course Coordinator:

Dr. Fatemeh Kalantari

Assistant Professor, Department of Electrical Engineering

Office: HEC A205

Email: FKalantari@uttyler.edu

Office Hours: Email and Canvas Discussion Boards.

Class Location/Time: Synchronous online course.

Grading Policy:

| | | |
|--------------------------------|-------------|---|
| Quizzes | 30% | Total 6-7 |
| Mini Projects / Assignments | 20% | Total – 4 |
| Group Project | 40% | |
| Class Participation | 10% | Attendance 5%, Participation in Group Discussion and other activities 5% |
| Total | 100% | |

Semester Schedule (Tentative):

| Week | Date | Topics Covered | Projects |
|------|-----------|--|---|
| 1 | 7- July | <i>MATLAB fundamentals</i> | |
| 2 | 14- July | <i>MATLAB examples</i> | MATLAB OnRamp Certification |
| 3 | 21- July | <i>Python Programming Fundamentals</i> | Mini Project-1 |
| 4 | 28- July | <i>Arduino Programming</i> | Mini Project-2 |
| 5 | 4- August | <i>Labview Fundamentals</i> | Final Group Project Presentations |

Mode of Delivery:

This course will be offered as a synchronous online course in this semester. Students are expected to attend the classes via Zoom. The course materials, including lecture videos, pdfs and other assignment documents will be posted in the **CANVAS** course page. If the student has any concerns or would like to share their feedback on the lectures, email the Instructor anytime.

Flexible Online Office Hours:

Students can email their questions to the Instructor and she will get back to them ASAP.

Quiz:

There will be a total of 6-7 quizzes in the class. This is to keep the students on track with the course content. The quizzes will include auto-graded coding assignments and multiple choice questions.

Mini-lab:

The Mini-lab is to help students test their knowledge of programming language through simple coding labs and certifications. This is to be completed by each student separately and should not be done as a group activity.

Group Project:

The final project will be based on Arduino boards. Using the programming knowledge acquired through the Arduino programming section, students are expected to build a simple robot. Students are expected to form a group of 2-3 for the final project. The robot can be a simple line follower, accelerometer-based robot, time-control robot, object follower or object repeller. The tentative schedule for project completion is:

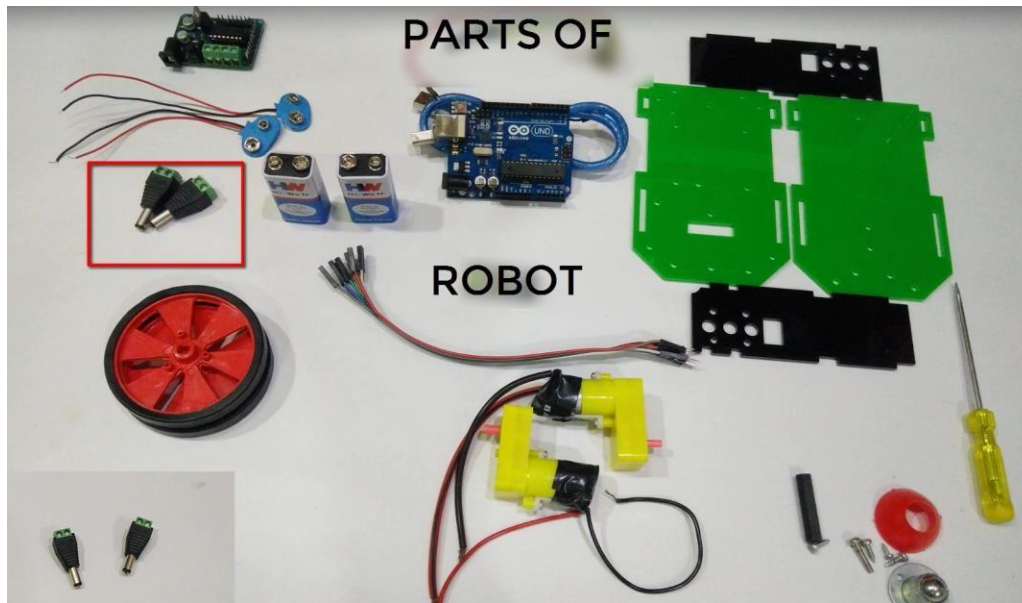
Abstract submission (5%)

Final Report (10%)

Project Presentation (20%)

Project Showcase (5%)

The basic components required for building a moving robot will include a chasis kit, battery, Arduino board and relevant sensors. Though such kits are available in Amazon, students are strongly encouraged to purchase a kit based on their project requirement. The hardware components for such a robot will amount to approximately \$25-\$60. Here is an example: <https://www.amazon.com/VKmaker-Avoidance-tracking-Ultrasonic-tutorial/dp/B01CXVA6IO>



Attendance Policy and Class Participation:

Students are expected to complete all lectures on weekly basis. By signing up for the class it is understood that the student has checked for ANY significant recurring conflicts that might affect completion of the course requirements. Attendance will be monitored through timely completion of the submissions and quizzes. The progressive nature of the class means that perfect attendance is recommended if a good grade is desired. Class participation is graded based on attendance, involvement of student in the class activities.

Final Exam:

There is no final exam for this course.

How to be successful in this course:

As this is about learning 4 different programming languages in 1 semester, the focus will be more on hands-on experiments and lab modules, mini-projects and group projects. Though there are no high expectations for students to be an expert in programming in beginning of this course, regular attendance, active involvement in the class and taking the initiative to learn/ advance programming skills beyond the class lectures is strongly encouraged to complete the course successfully.

Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

Grade Replacement/Forgiveness and Census Date Policies:

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions that students need to be aware of. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability Services

In accordance with federal law, a student requesting accommodation must provide documentation of his/her disability to the Disability Services counselor. If you have a disability, including a learning disability, for which you request an accommodation, please contact the Disability Services office in UC 3150, or call (903) 566-7079.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation:

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Happy Learning!