**The University of Texas at Tyler**
**Department of Electrical Engineering**

# Course: EENG 3308 Programming Languages for Design

Syllabus

Catalog Description:

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.

Credits: (3 hours lecture, **0** hours laboratory per week)

**Text**: Documentation and reference materials provided by the Instructor.
**Software:** MATLAB 2013 or later, Python 3 compiler, NI LabVIEW, Arduino IDE.
**Hardware:**

**Project Requirements:**

- This semester, we are going to build a robot that can be programmed using an Arduino software for the final project in this course. Some ideas about the project like build a robot, smart screen, or house automation. For the robot, robot can either be a Line follower or a security robot or obstacle avoidance.
- We have two options:
  - collect or parts separately, like the cards; Micro-Processor board (ESP32 WROOM boardLinks to an external site.), the motor controllerLinks to an external site. plus the chassis (Robot Smart Car Chassis Kit with Speed EncoderLinks to an external site.).
  - Or get all in one model, where the boards, cables, sensors and all the accessories included like hereLinks to an external site..

For additional components, a list of sensors, microcontrollers, and components to build a small robotic and IoT project could be purchased for the final project:
https://www.sparkfun.com/wish_lists/155452

Required Material(s):

Course Coordinator: Dr. Alyas Almaawi, Assistant Professor, Electrical Engineering

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

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]

Course Objectives[1]: By the end of this course students will be able to:

[1] Numbers in brackets refer to method(s) to evaluate the course objective.

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:

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]

[2] Numbers in brackets refer to course objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

| | | |
|---|---|---|
| Mathematics and Basic Sciences: | 0 | hours |
| Engineering Sciences and Design: | 3 | hours |
| General Education Component: | 0 | hours |

Prepared By: Alyas Almaawi, Assistant Professor

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