LaGuardia Community College
City University of New York
Mathematics Department – Engineering Science

MAE101: Engineering Lab 1

3 Lab hours; 1 credit

Prerequisite: MAT200

Course Description:

This is the first of two engineering laboratory courses. Students meet once a week and are introduced to engineering design through hands-on laboratory work using computer applications. They are introduced to programming a robot to perform a specific task and to basic structural analysis. Additionally, they work in groups on design projects and are expected to use computers for documentation, data analysis, and for maneuvering robots.

Textbook: Freshman Design Manual I, by Ghosn, Benenson, Ahn, Ganatos.

Evaluations: Lab Reports 70%

Presentations 30%

WEEK	TOPICS
	BRIDGE DESIGN MODULE:
1 -3	Behavior of Materials and Structural Members
4	Concepts of Structural Safety and Equilibrium
5	Analysis of Trusses using SAP2000
5	Application of SAP2000: Analysis of a Warren Truss Bridge
5	Design of a Truss Bridge using SAP2000
6	Building a Model of the Truss Bridge
	Presentation of the Bridge Design Project
	ROBOT DESIGN MODULE:
8	Introduction to Robotics and Kinematics
8	Work Envelope of a Robot
8	Understanding the Robot Arm System
9	Programming the Robotic Arm
9	Programming the Robotic Arm to Perform a Task
9	Robot Design: Implementation and Testing of Programs
10	**Presentation of the Robot Design Project**
	DIGITAL CLOCK DESIGN MODULE
11	Introduction to Binary Digital Electronics
11	Number Systems and Binary Codes
11	Understanding a Binary Counter
12	Designing a Binary to Seven-Segment Decoder
12	Adding a Seven-Segment Display
12	Modulo Counters
12	Digital Clock Design
13	**Presentation of the Digital Clock Design Project**