

*This syllabus is provided as a general informational guide. Some of the information may vary depending on the specific course section and instructor. Different sections of the same course may require different textbooks. Verify the section specific textbook information in the CUNY's Academic Course Schedule Web Page. Modifications of the grading system presented here will be communicated by the instructors of the sections when they meet the class.*

<b>BOROUGH OF MANHATTAN COMMUNITY COLLEGE</b> City University of New York
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**Department of Science**

**Title of Course Elements of Engineering Design**

**ESC 111 Section \_\_\_\_\_**

**Fall 2017**

**Credits 1**

**Class hours**

**Lab hours 3**

**Instructor Information**

**Name:**

**Office:**

**Room:**

**Email:**

**Course Description**

This course provides an introduction to engineering practice through hands-on investigations, computer applications, and design projects in the fields of structures and robotics. All investigations and design projects are performed in groups and presented in oral and /or written form. Computers are used for documentation, data analysis and robot control.

**Prerequisites/Co-requisites**

*Corequisite:* MAT 206 and either CHE 210 and PHY 215 or permission of the Department

<b>Course Student Learning Outcomes (Students will have.)</b>	<b>Measurements (means of assessment for student learning outcomes listed in first column)</b>
<b>An understanding of the subject matter of each of the major engineering disciplines.</b>	<b>1. Projects done during the course</b>
<b>An appreciation of how math and science are applied in the solution of engineering problems.</b>	<b>2. Projects and homework assignments</b>
<b>Illustration of how analytical computer tools are used as part of a design process.</b>	<b>3. Projects and homework assignments</b>
<b>Ability to work as part of a team and present concepts and ideas to others orally and in written form.</b>	<b>4. Group projects reports.</b>

**Required Text & Readings**

Ghosn, Benenson, Ahn, and Wong: Freshman Design Manual

**Other Resources**

**Use of Technology (if applicable)**

**Evaluation & Requirements of Students**

Written Examinations                      20%

Design Presentations                      80%

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**Below are the college's general education learning outcomes, the outcomes that are checked in the left-hand column indicate goals that will be covered and assessed in this course. (Check at least one.)**

	<b>General Education Learning Outcomes</b>	<b>Measurements (means of assessment for general education goals listed in first column)</b>
<input checked="" type="checkbox"/>	<b>Communication Skills-</b> Students will be able to write, read, listen and speak critically and effectively.	Projects written reports and oral presentations
<input checked="" type="checkbox"/>	<b>Quantitative Reasoning-</b> Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	Effectiveness of bridge design/ robotics arm process
<input type="checkbox"/>	<b>Scientific Reasoning-</b> Students will be able to apply the concepts and methods of the natural sciences.	
<input type="checkbox"/>	<b>Social and Behavioral Sciences-</b> Students will be able to apply the concepts and methods of the social sciences.	
<input type="checkbox"/>	<b>Arts &amp; Humanities-</b> Students will be able to develop knowledge and understanding of the arts and literature through critiques of works of art, music, theatre or literature.	
<input type="checkbox"/>	<b>Information &amp; Technology Literacy-</b> Students will be able to collect, evaluate and interpret information and effectively use information technologies.	
<input type="checkbox"/>	<b>Values-</b> Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.	

### Outline of Topics

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#### WEEK

#### TOPICS

1. Comparison of Human and robot Arms Systems / Understanding Robot Kinetics
2. Work Envelope of a Robot, Hemisphere and Torus
3. Robot Design: Gathering Information and Specifying the Design Process
4. Robot Design: Programming to Robot Perform a Task
5. Robot Project Presentation, Oral and Written Presentation
6. Behavior of Materials and Structural Methods
7. Concepts of Structural Safety / Equilibrium of Bodies
8. Application: Analysis of a Truss Bridge Using SAP-90
9. Design of a Truss Bridge
10. Building of a Truss Bridge Model

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11. Proof-Loading and Testing of Bridge Models / Oral and Written Presentation
12. Understanding Microprocessor, introduction to Arduino
13. Arduino Programming, open source code
14. Programing 8-segment display LED board
15. Microprocessor project Presentation

### **College Attendance Policy**

At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

### **Academic Adjustments for Students with Disabilities**

Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

### **BMCC Policy on Plagiarism and Academic Integrity Statement**

Plagiarism is the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC's web side, [www.bmcc.cuny.edu](http://www.bmcc.cuny.edu). For further information on integrity and behavior, please consult the college bulletin (also available online).