Syllabus

Thomas J. Watson School of Engineering and Applied Science
Department of Mechanical Engineering

ME 212 – Mechanical Engineering Programming
Summer 2018
Kirill Zaychik

Duration: May 29th – August 3rd, 2018.
Learning Modules: Uploaded weekly
Office hours: On-demand (Skype preferred).
E-mail: kzaychik@binghamton.edu
Phone (work): 607-777-3982

Suggested reading:

Grading (approximate scale):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>A</th>
<th>95-100</th>
<th>C+</th>
<th>77-79</th>
<th>B+</th>
<th>87-89</th>
<th>C-</th>
<th>70-73</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>30%</td>
<td>90-94</td>
<td></td>
<td>C</td>
<td>74-76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>84-86</td>
<td></td>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>80-83</td>
<td></td>
<td>F</td>
<td>0-59</td>
</tr>
</tbody>
</table>

Homework is due 1 week after assignment. Late homework will be accepted until solutions are distributed. The penalty for late homework will be minus 5 (five) points for each day late. Students are encouraged to work together on assignments in order to better understand the material. However, a student must not submit another’s student work as his or her own. **Academic dishonesty can result in course failure and dismissal from the University**

Students are responsible for all readings listed on the syllabus and lecture(instructional videos) material unless explicitly excluded.
Course objective:
Upon completion of the course students should be able to perform basic problem solving using Matlab environment. The main thrust of this course is to dissipate any fear of programming, develop some basic Matlab coding skills and foster the algorithmic approach to problem solving in general.

CODE OF ETHICS OF ENGINEERS (as formulated by ASME)
THE FUNDAMENTAL PRINCIPLES
Engineers uphold and advance the integrity, honor, and dignity of the Engineering profession by:

- using their knowledge and skill for the enhancement of human welfare;
- being honest and important, and serving with fidelity the public, their employers and client;
- striving to increase the competence and prestige of the engineering profession.

NB: “Mycourses” will be the main method of communication. Students are advised to check for announcements, assignments and instructional videos regularly.

Student learning outcomes
Upon completion of this course, students shall acquire the following basic programming skills, which include but not limited to: problem solving strategies, simple algorithm development and interpretation of mathematical concepts in Matlab environment.

Course outline (Modules)
M1. Introductory remarks
   - History.
   - Philosophy.
   - Course objectives.
   - Course structure.
   - Student work evaluation and grading policy.

M2. Working with the MATLAB user interface. Entering commands and creating variables
   - Matlab GUI components.
   - Saving and loading variables.
   - Plotting data.
   - Customizing plots.
   - Exporting graphics for use in other applications.
   - Entering commands.
   - Creating variables.
   - Getting help.
   - Accessing and modifying values in variables.

M3. Analyzing vectors and matrices. Visualizing vector and matrix data
• Calculations with vectors.
• Basics of linear algebra.
• Plotting vectors.
• Basic plot options.
• Annotating plots.
• Size and dimensionality.
• Calculations with matrices.
• Statistics with matrix data.
• Plotting multiple columns.
• Reshaping and linear indexing.

M4. **Working with data files. Working with data types**
• Importing data.
• Mixed data types.
• Cell arrays.
• Numbers & strings.
• Exporting data.

M5. **Automating commands with scripts**
• A modeling example.
• Command History.
• Creating script files.
• Running scripts.
• “Cell” mode.

M6. **Advanced plotting.**
• Graphics structure.
• Multiple figures, axis, and plots.
• Plotting equations.
• Using color.
• Customizing plots.
• 3-D plotting – surf & mesh.

M7. **Writing programs with logic and flow control**
• Solving system of linear equations.
• If-else construct.
• For loops.
• While loops.

M8. **Writing functions**
• Inline functions.
• Function scripts.

M9. **Symbolic computations**
• Basic operations and useful commands.
• Symbolic differentiation and integration.
• Plotting.