

ENGI 316 SPRING 2023-2024 PROJECT ASSIGNMENT

General Information About The Project

- The deadline for the Project is 30.05.2024 until midnight.
- The project defenses (Question-answer sessions in which each group member will need to answer the course instructor's questions about the project) will be held later, on an announced date.
- The project will be done in groups. Each group will have two members (except one group which will have three members). Students will choose their groups via "Project Group Selection Forum" posted on moodle, which is already available.
- The groups should be formed until 14.05.2024. If not, the students will be automatically grouped based on their student numbers, and that groups will be announced on moodle.
- Each group should design an engineering problem (or series of problems related to a similar concept) to be solved by using Matlab.
- **Penalties**
 - Students should make sure that their Matlab codes/program work and they are able to see the results, as if the matlab codes do not work, the total grade of the project will be degraded by a considerable amount.
 - Any attempt of cheating/copying Matlab codes, using someone else's codes/program or ready-written codes from internet, etc. will be severely penalized.

Required Project Documents

Each group should submit their project documents via moodle. The following should be existing in the submitted files:

- Word document that contains:
 - The student numbers, names, surnames, and departments of the group members/program developers
 - A title for your project
 - The problem definition and formulation
 - Explanation of the problem
 - Definitions of the variables used in the problem
 - Descriptions of the tasks that need to be performed to solve the problem
 - The solution method
 - The calculations required to solve each task of the problem
 - The equations used to solve the problem
 - The definitions of the symbols used in that equations
- Programming in Matlab
 - Structure chart of the program
 - The names of the students responsible from each part shown in the structure chart should be provided
 - Pseudocode of the program
 - Flowchart of the program

- The list of the matlab codes and figures submitted for the project, in a table format
 - Their names should be provided
 - The input variables and the output variables of each Matlab code should also be stated, with their respective definitions
- Explanation on how the related matlab codes and designed GUI (Graphical User Interface) work
 - The explanation should not exceed 1 paragraph (7-8 lines)
 - Matlab files
 - Written script files and function files in .m file format
 - Figures produced when running that matlab files
 - All the figures should have proper labels, a title, and a legend
 - All the figures have grid lines
 - The figures should be saved in jpeg/jpg format
 - The excel files used as data feeders (or storage media)
- Extra/report files
 - Report of the main matlab code/script (showing the results of the project) obtained by using the “publish” command shown in classroom
 - The report should be in pdf format

Rules About Project Implementation With Matlab

- Each matlab code should be written in a structural and organized manner. Specifically,
 - You must use descriptive and consistently-formatted names for your functions, variables, and constants.
 - Any constant values that are used repeatedly in your code, or values that need explanation, must be assigned names. For example, if you have a value that is the maximum number of plot lines in a graph, give it a name like Maximum_plot_lines,
 - In general, no function should be longer than 50 lines of code and each function should perform a specific task.
 - Use the smart-indent feature to properly align your code.
 - Group statements that are performing similar tasks by leaving a single blank line between such statement groups.
 - Your code should contain no statements that are wider than your printed page when printed with a 10pt font. Use the light red line as your guide for when to start a new line. Remember that strings can generally be split with multiple fprintf or sprintf (with concatenation) statements
- A GUI should also be designed for the project
- The Matlab program should include function files, and script files calling/utilizing these function files.
 - Each group member should write at least one function/script file.

- Written matlab codes/program should include the functions/concepts listed below. If groups need to use more functions for their implementation, they can also use some other functions/concepts that are not listed below. However, the ones listed below should be used for sure. The other ones picked by groups should be extra. In the functions/concepts listed below: “/” refers to “or”, which means you can use either of them, or if you need more than one, some of them. For example, “vectors/matrices” means “use either vectors or matrices or both, but at least one of them”.
 - Vectors / Matrices
 - max/min/sum/length/size/find
 - poly/roots/conv/deconv/polyval/Cell arrays/Structure arrays
 - xlsread/xlswrite
 - If-elseif structure/Switch structure
 - For loop / While loop
 - disp/fprintf
 - input/menu
 - plot/fplot/loglog/semilogy/subplot
 - publish
 - plot3/mesh/meshc/meshz/contour/surf/surfc/waterfall
 - strcat/strvcat/strcmp/strcmpi/strncmp
 - solve/simplify/factor/expand/limit/int/diff/quad/quad1/trapz/dblquad/triplequad
 - GUI (Graphical user interface)