NORTHWESTERN POLYTECHNIC

DEPARTMENT OF SCIENCE

COURSE OUTLINE –Winter 2023

EG1050 (A3): Engineering Design – 3.8 (3-0-1.5) UT
67.5 Hours for 15 Weeks

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

INSTRUCTOR:	**Braden Kelly**	**PHONE:**	780-539-2963
OFFICE:	J218	**E-MAIL:**	bkelly@nwpolytech.ca
OFFICE HOURS:	TBA		

CALENDAR DESCRIPTION:
Engineering science and design problem solving using Python.

PREREQUISITE(S)/COREQUISITE:
Restricted to Engineering Students.

REQUIRED TEXT/RESOURCE MATERIALS:
Information on recommended material will be provided in class.

DELIVERY MODE(S):

- Lectures and labs

COURSE OBJECTIVES:

This course is designed to teach engineering students basic computer concepts and terminologies as well as to develop reasonable proficiency in the Python programming to solve engineering problems. A student is expected to design and develop several well-structured programs as solution to given assignments and Labs.

LEARNING OUTCOMES:

- Upon successful completion of this course a student should be able to:
    1. Use Python to perform a range of matrix and vector operations
    2. Use Python programs to solve mathematical models of engineering systems.
    3. Write short Python programs to solve introductory level engineering/scientific problems.
    4. Use Python (matplotlib) to plot data and mathematical function
    5. Use Python to solve systems of linear equations
    6. Use Python skills in the context of a design process which leads to a modeling tool useful for engineering analysis purposes
    7. Understand when and how to use numpy, scipy, sympy, and pandas libraries.
    8. Understand the basics protocols of professional coding best practices
    9. Be introduced to version control via Git.

TRANSFERABILITY:

University of Alberta, Augustana Faculty, Concordia University College, King's University College, Burman University.

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page http://www.transferalberta.ca.
** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

EVALUATIONS:

Evaluations are subject to change. Final syllabus will be uploaded to D2L by the end of the second week.

Assignments	5%	Due at start of Seminar each week
Labs	25%	Attendance required
Midterm Exam	30%	TBD
Final Exam (Comprehensive)	40%	TBD

GRADING CRITERIA: (The following criteria may be changed to suite the particular course/instructor)

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines		Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100		C+	2.3	67-69
A	4.0	85-89		C	2.0	63-66
A-	3.7	80-84		C-	1.7	60-62
B+	3.3	77-79		D+	1.3	55-59
B	3.0	73-76		D	1.0	50-54
B-	2.7	70-72		F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

Week	Subject	Assignment
1	Course outline, introduction to computing. Basic Python.	No lab or assignment
2,3	Understanding fundamentals: variables, lists, tuples, operators, repetition, conditional programming, input/output	Assignment
4	Program architecture, design, development. Built in Methods.	Assignment
5,6	Logicals, matrices & arrays with numpy and scipy. Linear equations	Assignment
7	Loops, errors, unit tests	Assignment
8	Graphics with Matplotlib	Assignment
9	Arrays & structures, classes, methods, sorting.	Assignment
10	Working with data in Pandas	Assignment
11,12	Applications and simulations using Python	
13	Introduction to Git and review for final exam.	No lab or assignment

The schedule is subject to change. Updates will be made to the online course outline found on D2L.

LABORATORY WORK:

Labs are mandatory and are every Wednesday 4-5:20 pm in room E306.

STUDENT RESPONSIBILITIES:

Students are responsible for all lecture, lab material, and readings.

CALCULATOR POLICY: Calculators are not allowed in either the Midterm or Final examinations.

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the Northwestern Polytechnic Calendar at https://www.nwpolytech.ca/programs/calendar/ or the Student Rights and Responsibilities policy which can be found at https://www.nwpolytech.ca/about/administration/policies/index.html.

**Note: all Academic and Administrative policies are available on the same page.

Additional Information (Optional):

Engineers Rule The World (ERTW).