ENED1100 Learning Objectives

Use the links below to access the specific learning objectives for the various topics covered in ENED1100:

A. Introduction to Design
B. Academic and Professional Ethics
C. Project Management
D. Systems Thinking and Concepts
E. Basic Skills for Team Effectiveness
F. Structured Problem Solving
G. Dimensions, Units, Conversions
H. Measurements and Estimations
I. Modeling Data
J. Spatial Visualization
K. Flowcharting
L. Excel
M. LabVIEW
N. Python

- Study Strategies

Remember	Understand	Apply	Analyze	Evaluate	Create		Learning Objectives Categories
						1100.A INTRODUCTION TO DESIGN	
●						**3**	***List*** the major steps (empathize, define, ideate, prototype, test, implement) in the design process.
●						**4**	Empathize: a. ***Describe*** the major question areas (users, societal context, customer requirements, constraints) that a designer would ask about in order to better understand the problem.
●						**5**	Define: a. ***Define*** what is meant by goals, criteria, and specifications within a design context.
		●					b. ***Convert*** goals and criteria into measurable specifications.
			●				c. ***Choose*** simple target values for a specification.
				●			d. ***Determine*** whether a specification is appropriate (precise, measurable, relates to goals and criteria).
					●		a. ***Generate*** a robust set of potential solutions to a problem using proven methods, such as vertical and lateral thinking and morphological charts.
		●					b. ***Implement*** a decision matrix.
●						**7**	Prototype: a. ***Define*** the role of prototyping with the design process.
					●		b. ***Develop*** a Functional Block Diagram, including all inputs and outputs, for simple object of interest.
●						**8**	Test: a. ***Describe*** the role of goals, criteria, and specifications in the testing of a completed design.

	●					**9**	Implement: a. ***Explain*** the role of an engineer once a product has been brought to market.
						1100.B ACADEMIC AND PROFESSIONAL ETHICS	
●						**4**	***List*** basic principles of professional ethics and academic ethics.
	●					**5**	***Explain*** how the principles of professional ethics apply within an academic setting.
						1100.C PROJECT MANAGEMENT	
					●	**9**	Based on a WBS, PN, and CPM analysis, ***develop*** a Gantt Chart for a given process or project.
				●		**10**	***Assess*** a Gantt chart for appropriateness.
						1100.E BASIC SKILLS FOR TEAM EFFECTIVENESS	
●						**12**	***State*** the key components of a Code of Cooperation (COC).
	●					**13**	***Discuss*** the role that a COC plays in team functioning.
		●				**15**	***Utilize*** a COC to effectively manage team functioning.
						1100.F STRUCTURED PROBLEM SOLVING	
	●					**4**	***Translate*** a written problem into an appropriate series of steps using the problem presentation method.
		●				**5**	***Implement*** the problem presentation method in solving a complex problem.
						1100.G DIMENSIONS, UNITS, CONVERSIONS	
		●				**6**	***Carry out*** a dimensional analysis using the mathematical rules governing dimensions.
	●					**9**	***Explain*** the difference between a dimension and a unit.
		●				**11**	***Utilize*** the concept of dimensional homogeneity to ensure agreement of units within a relationship.
			●			**12**	***Change*** between different systems of units.
		●				**13**	***Solve*** problems through the application of knowledge of dimensions and units, and related conversion rules.
						1100.I MODELING DATA	
●						**2**	***Describe*** the different scales that can be used in a standard graphing procedure (linear, semi-log, log-log).
	●					**5**	***Explain*** the relationship between the different axis scales and linear, power, and exponential data sets.
		●				**6**	***Implement*** standard graphing procedures using linear, semi-log, and log-log scales by hand and using computer tools.
		●				**8**	***Carry out*** the procedure to linearize a power and exponential function.
		●				**9**	***Utilize*** the appropriate axis scale to linearize a linear, power, and exponential function or data set.
●						**10**	***List*** the procedure for Method of Selected Points (MSP).
		●				**12**	***Carry out*** the MSP on linear, power, and exponential data sets.

						1100.J SPATIAL VISUALIZATION	
●						**1**	***Define*** the rules of orthographic projection.
●						**2**	***Describe*** the various ways that surfaces (normal, inclined, curved) project orthographically.
			●			**3**	***Change*** between 2D and 3D representations of an object.
●						**4**	***Recognize*** different corner views of an object.
	●					**5**	***Explain*** the right-hand rule for object rotations.
		●				**6**	***Construct,*** through sketches, various views of an object, i.e., isometric, top, front, and right side.
		●				**7**	***Construct,*** through sketches, rotated views of objects.
		●				**8**	***Construct,*** through sketches, reflections of objects.
●						**9**	***Identify*** planes of symmetry for simple objects.
						1100.L EXCEL	
●						**5**	***Describe*** the main parts of an Excel file (cells, worksheets, workbook).
●						**6**	***Describe*** how values and formulas are entered into Excel cells.
●						**7**	***Describe*** how values and formulas are referenced in Excel.
	●					**8**	***Explain*** the primary arithmetic operators in Excel (+, -, *, /, ^) and the order of operations.
●						**9**	***List*** the commonly used mathematical commands (trigonometric functions, PI, square root, absolute value, etc.) in Excel.
		●				**10**	***Implement*** mathematical expressions using primary and advanced mathematical commands to manipulate data.
	●					**11**	***Explain*** the difference between relative and absolute cell addressing.
	●					**12**	***Explain*** how to reference a range of cells within an Excel command.
		●				**13**	***Implement*** Excel formulas using constant values and relative and absolute cell references.
		●				**14**	***Utilize*** appropriate Excel referencing so that a copied formula calculates correctly.
						1100.N PYTHON	
●						**1**	***Define*** what an identifier is and be able to list the rules that apply to create one.
●						**2**	***Recall*** what “keywords” are and be able to list them.
●						**3**	***State*** the different basic data types that will be used.
		●				**4**	***Implement*** identifier rules as well as “keywords” to declare variables and initialize them.
			●			**5**	***Differentiate*** arithmetic hierarchy and perform arithmetic operations (i.e. addition, subtraction, multiplication, division, and exponentiation).
		●				**6**	***Carry out*** a Python program that outputs variables of any type to the screen and includes inputs from the users.

●						**9**	***State*** how to "import" the math module (or other modules created by the student).
		●				**13**	***Construct*** logic operations (e.g. comparison, membership, and logical operators) to generate control flow statements.
		●				**14**	***Implement*** conditional flow (if-elseif-else) constructs.
		●				**15**	***Implement*** nested conditional flow constructs.
●						**16**	***Identify*** the basic construction rules and recall the syntax of for and while loops in Python.
			●			**19**	***Employ*** for loops to conduct repetitive operations on the collection data type.
			●			**20**	***Employ*** while loops to conduct repetitive operations.
		●				**21**	***Implement*** nested loop flow constructs when necessary.

Study Strategies

	Cognitive Process	**Example Behavior**	**Study Strategies**
REMEMBER	Recall or recognize information, ideas, and principles in the approximate form in which they were learned.	You are able to state provide the basic syntax for a for loop in Python	Read textbook; Review power point slides; Review class notes; Make flash cards; Make mnemonics to help me remember facts and equations.
UNDERSTAND	Translate, comprehend, or interpret information based on prior learning	You are able to explain under what circumstances a for loop might be used in Python and use a for loop in a circumstance similar to an example or homework problem.	Review homework problems and activities and be able to explain the underlying concepts used to solve the problems; Be able to re-work the problems without the aid of having a published solution; Make diagrams or draw mental pictures of the concepts.
APPLY	Select, transfer, and use data and principles to complete a problem or task with a minimum of direction.	You are able to implement a for loop in Python in a problem you previous have not seen or worked.	Work problems from the course resources (e.g., books and book chapters) with minimum help/direction or looking at the solutions; Review each concept you have learned and then ask yourself: What would happen if you increase or decrease a component in the system or what would happen if you alter the activity of a component in the system?
ANALYZE	Distinguish, classify, and relate the assumptions, hypotheses, evidence, or	For a problem you have previously not seen or worked, you are able to	Work problems from the course resources (e.g., books and book chapters) or those

	structure of a statement or question	decompose a more complex problem into component parts and based on the evidence and/or structure of the problem you determine that a Python for loop is the best repetition structure to use.	you find on-line without any help or never having to look at the solution.
EVALUATE	Appraise, assess, or critique on a basis of specific standards and criteria.	Given a Python script not written by you, determine if a for loop was correctly implemented and was the most appropriate structure to use for the given situation.	Analyze and interpret data in primary literature or a textbook without reading the author's interpretation and then compare the authors' interpretation with your own; Analyze a situation and then identify the assumptions and principles of the argument.
CREATE	Put parts together in a new way, or synthesize parts into something new and different creating a new form or product.	Design a system that requires a complex application of Python that unto itself requires the use of a design process.	Write a report on a particular topic; Revise a process to improve the results; Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.