

Design Nature

EL 1302

Tuesday and Thursday 3:00 pm – 4:50 pm

Room C101

In this course, we will take nature, an important source of inspiration and understanding, as a theme and develop bio-inspired ideas into functional prototypes. Our focus is on the general principles and methods that shape the practice of engineering design. Students complete individual and team projects in a studio environment where we seek to develop a shared practice and understanding of engineering design. Students also gain experience in visualization, experimentation, estimation, fabrication, and presentation as they relate to designing. **Please note that this class is fast paced, thus it requires time management and organization in order to stay on top of assignments.**

1. Learn elements of and management of an engineering design process with an emphasis on taking ideas through to functional prototypes.
 2. Experience the excitement, breadth and power of engineering design.
 3. Learn methods supporting common design activities such as generation, evaluation and selection.
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Course Materials

Required Software:

- Google Documents
- Autodesk Inventor

Required Texts

- Good to Great, Jim Collins
 - Leadership: Theory and Practice 7th Edition, Peter G. Northouse
 - Overcoming The Five Dysfunctions of a Team, Patrick Lencioni
 - What Every Engineer Should Know about Accounting and Finance, Jae Shim
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Instructor Information

Roger Gonzalez, PhD

rvgonzalez@utep.edu

Alondra Martinez

aimartinez3@miners.utep.edu

Cesar Caraveo

Cacaraveo2@miners.utep.edu

Zachary Chanoi

zchanoi@miners.utep.edu

Grading Criteria

Homework	15%
Notebook	20%
Quizzes	15%
Class Participation	10%
Project 1	20%
Project 2	20%

Additional Materials:

In addition to the materials described above, you must allocate \$15 dollars for use in the second half of the semester. We will also be providing you with academic papers to read as well as additional instructional materials.

Attendance

Attendance is mandatory in this course. If you are tardy or absent for a total of three unexcused times you will be dropped from the course.

Disability

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Academic Integrity

The instructors expect a commitment to truthfulness, honor and responsibility, without which you cannot earn the trust and respect of others. Therefore, we will not tolerate plagiarism, lying, cheating, or stealing in any form. Collaboration is encouraged, however, representing other’s work as your own will not be tolerated.

Grading Rubrics

Engineering Notebook (Will be graded twice during semester each time is worth 10% of your final grade)

	Excellent (3)	Competent (2)	Needs Work (1)	Not Present (0)
Project 1				
Project 2				
Notes/Homework				
Organization				

Homework

0	- ✓	✓	+ ✓
Assignment was not turned in	Assignment did not meet standards	Assignment met standards	Assignment exceeded standards

Hopper – Project 1 Grading Rubric:

	Excellent (3)	Competent (2)	Needs Work (1)	Not Present (0)
Design Process (EDP) Bio-Inspiration (BI)				
Inventor Model and Simulation				
Physics Behind Animal and Hopper				
Hopper Functionality, Trigger and Creativity				
Communication, Visual Aids, and Presentation Style				

Group – Project 2 Game Play (30%) - Grading Rubric:

Rate the game on a scale of 1-5 (5 being the highest) on the following components.

Game Aesthetics	5	4	3	2	1
Game Instructions	5	4	3	2	1
Game Components	5	4	3	2	1
Playable/ Fun	5	4	3	2	1

Group – Project 2 Final Presentation (70%) - Grading Rubric:

	Excellent 9 – 10 Points	Good 7 – 8 Points	Met Standard 4 – 6 Points	Poor 1 – 3 Points	Not Present 0 Points
Game (Quality Components Instructions)					
Bio – Inspiration					
Marketing Plan					
Business Canvas					
Hopper/Game Physics					
Lessons Learned					
Company Image					

Course *Tentative* Calendar

	Concept	Date	Class Content	Due before class	Due in class	Homework
Week 1	Biomimicry	1/22/19	<ul style="list-style-type: none"> •Syllabus Review •Course Introduction •Project Descriptions 	Who is (Insert Student Name) Biomimicry Homework	Class and Personal Goals	Good to Great Chapter One Course Contract (HW) Student Goals (HW)
		1/24/19	<ul style="list-style-type: none"> •Good to Great Chapter 1 (Quiz) •Basic Engineering Design Process •Journaling and Documentation •Hopper Examples 	Good to Great Chapter 1 Course Contract Student Goals	Group Design Activity Share Google Document w/ TAs	Google Document Case Study 12.1 (HW)

Week 2	Prototyping	1/29/19	<ul style="list-style-type: none"> •Leadership Case Study 12.1 •The physics of motion, propulsion, and examples in nature •Intro to 3D animation 	Leadership Case Study 12.1	1 sketch of method of motion/propulsion in notebooks and mechanical representation Project Goal Contract	Good to Great Chapter Two 5 methods of motion/propulsion in notebooks and mechanical representations
		1/31/19	<ul style="list-style-type: none"> •Good to Great Chapter Two (Quiz) •Energy and energy transferred explained •Sketches peer reviewed 	Good to Great Chapter Two Project Goals 5 Sketches	Goals for Project Reviewed Peer review of at least 3 peer designs	Leadership Case Study 12.2 3 revised sketches (HW)
Week 3	Simulation	2/5/19	Leadership Case Study 12.2 <ul style="list-style-type: none"> •Rapid Prototype Review •Intro to 3D Printing 	Leadership Case Study 12.2 3 Revised Sketches Turned in on BB (HW)	25% of 3D model complete	Good to Great Chapter Three 3D Model Rapid Prototypes
		2/7/19	<ul style="list-style-type: none"> •Good to Great Chapter 3 •Intro to Simulation •Energy and Energy Transferred Explained 	Good to Great Chapter 3	Practice Simulation Project goals revised	Simulation of Rocket (HW) Case Study 12.3 Rapid Prototypes
Week 4	Sketch Models	2/12/19	<ul style="list-style-type: none"> •Leadership Case Study 12.3 	Leadership Case Study 12.3	Revised Sketch Model	Simulation of 3D Inventor model

			<ul style="list-style-type: none"> •Sketch Model Presentation •TA review 	3 Sketch Models on YouTube Simulation	Peer Review of Sketch Models CAD model and Simulation	1 Revised Sketch Model Video on YouTube Good to Great Chapter Four
		2/14/19	<ul style="list-style-type: none"> •Good to Great Chapter 4 •Studio time •Sketch Model Video Reviews 	Good to Great Quiz Chapter 4 Sketch Model Video Review on YouTube (HW)	80% of Inventor Simulation Complete	Leadership Case Study 14.1 Inventor Simulation on YouTube Channel (HW)
Week 5	Design Iteration	2/19/19	<ul style="list-style-type: none"> •Leadership Case Study 14.1 •Studio time 	Leadership Case study Inventor Simulation on YouTube (HW)	Functioning Prototype	Good to Great Chapter Five
		2/21/19	<ul style="list-style-type: none"> •Good to Great Chapter 5 •Studio time 	Good to Great Chapter Five		Leadership Case Study 14.2
Week 6	Design Iteration Refinement	2/26/19	<ul style="list-style-type: none"> •Leadership Case Study 14.2 •Studio Time 	Leadership Case Study 14.2		Good to Great Chapter 6
		2/28/19	<ul style="list-style-type: none"> •Good to Great Chapter 6 •Studio Time 	Good to Great Quiz Chapter 6		Good to Great Chapter 7
Week 7	Technical Presentations	3/5/19				
		3/7/19				

	Concept	Date	Class Content	Due before class	Due in class	Homework
Week 8		3/12/19	Assign Teams	Good to Great Chapter 7	3 Game Ideas	Case Study 14.3 (HW)

	Target Audience Research		Good to Great Chapter 8 (Quiz) Project Descriptions			Notebook Check
		3/14/19	Case Study 14.3 Team Building Exercise Previous Games Presentations	Case Study 14.3 Notebook Check	Studio Time	Research Behind Target Audience Case Study on Engineering Design (Counts as 3 Homework grades) Read Chapter One of What Every Engineer Should Know About Finance and Accounting

Week 9	Spring Break					
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Week 10	Brainstorming	3/26/19	Target Audience Presentations Chapter One Finance Quiz	Research Behind Target Audience	3 Updated Game Ideas	Good to Great Chapter Eight
		3/28/19	Good to Great Chapter Eight (Quiz) Bio-Inspiration	Good to Great Chapter 8 Case Study on Engineering Design	How will Bio-inspiration be included in your game	Leadership Assignment (HW) Finalized Game Idea Read Chapter Two of What Every Engineer Should Know About Finance and Accounting

Week 11	Company Image/Physics	4/2/19	Team Game Presentations Company Image/Logo Presentation	Finalized Game Idea (Participation)	Company Logo	Good to Great Chapter Nine Company Logo Game/Company Slogan
		4/4/19	Good to Great Chapter Nine (Quiz) Review of Team Logos Physics	Logo, Name and Slogan Due on BB (HW)	Hopper Physics Mapped Out	Physics
Week 12	Packaging/Commercial	4/9/19	Team Presentations on Physics Packaging	Game Physics (Participation)	Sketch of Packaging	Good to Great Essay assigned Packaging Commercial
		4/11/19	Team Presentations on Packaging Instructions Activity		Group Activity	Game Instructions Leadership Assignment Self Assessment 14 (HW)
Week 13	Marketing Plan	4/16/19	Team Presentations on Game Instructions	Instructions (Presentation) and due on BB (HW)		Marketing Plan

			Leadership Chapter 14 Self Assessments			
		4/18/19	Marketing Plan Presentation Given By TAs			
Week 14	Game Building	4/23/19	Finance over game presentations Business Canvas	Good to Great Essay Due	Work on editing commercials	
		4/25/19	Marketing Plan Presentation	Finance assignment due	Commercials Uploaded to YouTube, due at 7:00 am	Marketing Plan
Week 15	Final Stretch	4/30/19	Commercials watched in class	Commercials Uploaded to YouTube, due at 7:00 am		Final Presentation Self Team Evaluation
		5/2/19	No Class Prepare Games			
Week 16	Game Play	5/7/19	Games of bottom three teams will be played (ALL Games Due)			
		5/9/19	Games of top three team will be played			
Final Presentation will take place on time and date of the final						

