

ES 350 – Engineering Design Methods Winter 2015 Syllabus

Instructor

Dr. LeAnn Faidley

LeAnn.Faidley@Wartbug.edu

SC 265

8340

Meeting Times

Class: Thursday 7:45-11:15 in SC 245

Office Hours: by appointment at <http://wartburgesci.simplybook.me/>

Course Description

This course will teach design methods and tools through a semester long, team-based project.

Learning Outcomes

Upon completion of this class the students will be able to:

- Identify a relevant design problem and concept.
- Use six sigma tools to complete an engineering design process
- Perform analysis to target a specific business market
- Create, rank, and eventually satisfy a list of design goals for the developed product
- Incorporate appropriate analysis and optimization tools into the design process
- Schedule and plan multi-faceted tasks, coordinating disparate groups to complete the project
- Present technical material using appropriate written, oral, and graphical techniques

Resources

Textbook:

The Design of Six Sigma Memory Jogger, GOAL/QPC (ISBN 2-57681-047)

My.Wartburg

- Lecture Notes – will be posted before each lecture
- Assignments – giving details of instructions, expectations, and resources.
- Help Board – can be used to ask questions, find answers (from your peers and Dr. LeAnn), share resources, and give Dr. LeAnn feedback on the class
- Team Pages – designed and maintained by each team to assist in collaboration.
- Class schedule & announcements
- Feedback on completed assignments (uploaded to team pages)
- Other resources – links to other resources will be provided

Google Drive

- Teams DMADVR Workbook
- Other Team Documents as desired

Learning and Assessment Exercises

DMADVR Workbook

The project will follow the modified design for six-sigma process as represented in the DMADVR workbook. More information about the expectations for each tab is given in the assignment documents and the ES 350 lectures. An updated version of the DMADVR workbooks should be maintained on the team page on My.Wartburg or as a Google document and will be graded once the deadline for each assignment is passed.

Assignments

A series of assignments will take you through the design process for your concept. More specifics of each assignment will be available on My.Wartburg at least a week before they are due. Some parts of assignments will be done as an individual and some will be done as a team. Some will be completed in class but most will be due the week following the lecture on that material.

Peer Reviews

To assess your ability to work in a team you will be evaluated by your team members 2 times during the semester. Comments, concerns, and affirmations will be shared anonymously so that you can improve your contributions to your team. Grades may be affected by substantial feedback from your peers.

Team Meetings

Teams will meet during class time and most likely regularly outside of class time. Attendance and participation expectations for these meetings will be established by the teams. Minutes and attendance for each of these meetings will be recorded on the team website for review by Dr. LeAnn.

Toll Gate Reviews

Your team will complete 4 toll gate reviews upon the completion of various stages in the design process. Some of these will be presentations to the class and others will be presentations to Dr. LeAnn. More information will be available on My.Wartburg.

Final Report

Your work this semester will culminate with a formal report of your process, decisions, design, analysis, and predictions of the type you might submit at the conclusion of a project in industry. More details will be provided on My.Wartburg. This will be presented during the final time slot.

Expectations

Respect and Professionalism:

Act in a professional manner and show respect for yourself, your classmates, and your instructor by:

- Refraining from behavior that is disruptive, distracting, or otherwise hinders the learning of others.
- Interacting with others in a manner you would expect to see in a professional environment.
- Listening to other's opinions and responding in civil debate and with constructive criticism when you disagree.
- Taking responsibility for your own learning and that of your peers.
- Being timely in your attendance, assignments, and participation.

Attendance and Participation:

You are expected to be present and participate in all meetings and activities of this class. These activities are designed to help you learn and your participation is crucial both to your own education and to that of your classmates. If you must miss class (illness, other school responsibility) you are expected to contact Dr. LeAnn **beforehand** to arrange to make up any lessons.

Wartburg Honor Code: <http://www.wartburg.edu/academics/honorcode.html>

As a matter of personal commitment, students, faculty, and staff of Wartburg College are expected to demonstrate three simple principles:

- 1) All work submitted be your own.
- 2) When using the work or ideas of others, including fellow students, give full credit through accurate citations.
- 3) Maintain academic honesty both on examinations and class assignments.
- 4) If you are uncertain about the ground rules on a particular assignment, ask for clarification.

All are responsible for abiding by these guidelines and opposing academic dishonesty by reporting any act that goes against these guidelines.

Grading

The standard grading scale is:

Meeting Records (T)	25	A	93 – 100%
Self-Assessment (I)	5	A-	90 – 92.9%
Norming (T)	10	B+	87 – 89.9%
Project Brainstorm (I)	20	B	83 – 86.9%
Project Brainstorm (T)	5	B-	80 – 82.9%
Charter/Schedule (T)	30	C+	77 – 79.9%
VoC, CTQ (T)	20	C	73 – 76.9%
Market & QFD (T)	20	C-	70 – 72.9%
Toll Gate 1 (T)	30	D+	67 – 69.9%
Peer Review 1 (I)	20	D	63 – 66.9%
Brainstorming FA (T)	10	D-	60 – 62.9%
Analysis FA (I)	10	F	< 60%
Basic Modeling (I)	20		
Decision Matrix (T)	20		
Toll Gate 2 (T)	30		
DFMEA (T)	20		
Detail Model (T)	25		
Financial Analysis (T)	25		
Fab Plan and BOM (T)	40		
Toll Gate 3 (T)	30		
Testing Plan (T)	25		
Rice Day Poster (T)	25		
Reflection Memo (I)	25		
Final Presentation (T)	30		
Final Report (T)	50		
Peer Review 2 (I)	20		

Late Policy

Assignments will be accepted up to 2 days late but the grade will be reduced 10% per day. Please contact Dr. LeAnn with an explanation if you know that your work will be late.

Students Needing Special Accommodations

Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, and the ADA Amendment Act of 2008 provides protection from illegal discrimination for qualified individuals with disabilities. Students requesting academic accommodations due to disabilities must arrange for such accommodations by contacting Kelly Beck, Pathways Academic Success Associate. She can be reached at the Pathways Office, (319) 352-8230 or by e-mail kelly.beck@wartburg.edu. Accommodations should be requested PRIOR to affected assignment due dates. Accommodations cannot be made retroactively.

ES 350 Course Schedule

Date	Subject	Reference	Due
1/8	Class introduction, Six Sigma, Teams, Project introduction, Problem Brainstorming	p. 1-24	Self Assessment (IC), Team Norms (IC)
1/15	Define: Problem Selection, Project Charter Measure: VOC & CTQ	p. 28-31, 61-64, 74-76, 93-98	Project Brainstorming (HW) Project Schedule (IC)
1/22	Measure: VOC, CTQ (cont), QFD	p. 99-111	Project Charter (HW), VOC, CTQ (IC)
1/29	Toll Gate I (Group Meeting) Analyze: Concept Brainstorming, Functional Analysis	p. 123-142	QFD (HW) Toll Gate Pres. (HW)
2/5	Analyze: Modeling	p. 143-144, 164-170	Concept Brainstorming (HW) Analysis FA (HW) Peer Review 1 (HW)
2/12	Analyze: Concept Evaluation & Selection, Decision Matrix,	p. 144-152	Basic Modeling (HW)
2/19	Toll Gate II (Presentation) Design: Prototype, DFMEA	p. 184-185, 215-219	Decision Matrix (HW) Toll Gate Pres. (HW)
2/26	Design: Specific Modeling, CAD	p. 180-184	DFMEA (HW) CAD Exercises (IC)
3/5	WINTER BREAK		
3/12	CAD Design: Fab Plan,		Detail Modeling (HW)
3/19	CAD Design: Economic Analysis		
3/26	Toll Gate III (Group Meeting) Verify: Testing Plan Report: Posters		Financial Analysis (HW) Fab Plan (HW) BoM (HW) Toll Gate Pres.(HW)
4/2	Report: Formal Reports		Testing Plan (HW) Poster (HW)
4/9	RICE DAY		Reflection (HW)
4/16 8:30 – 10:30 am	FINAL: Final Presentations		Presentation (IC) Report (HW) Peer Review 2 (HW)