

GENERAL STUDIES COURSE PROPOSAL COVER FORM

Course information:

Copy and paste current course information from Class Search/Course Catalog.

College/School	Ira A. Fulton Schools of Engineering	Department/School	School of Biological and Health Systems Engineering
Prefix:	<u>BM</u>	Number:	<u>490</u>
	<u>E</u>	Title:	<u>Biomedical Engineering Capstone II</u>
			Units: <u>4</u>

Course description:

Is this a cross-listed course? No If yes, please identify course(s): _____

Is this a shared course? No If so, list all academic units offering this course: _____

Note- For courses that are crosslisted and/or shared, a letter of support from the chair/director of each department that offers the course is required for each designation requested. By submitting this letter of support, the chair/director agrees to ensure that all faculty teaching the course are aware of the General Studies designation(s) and will teach the course in a manner that meets the criteria for each approved designation.

Is this a permanent-numbered course with topics? Yes

If yes, all topics under this permanent-numbered course must be taught in a manner that meets the criteria for the approved designation(s). It is the responsibility of the chair/director to ensure that all faculty teaching the course are aware of the General Studies designation(s) and adhere to the above guidelines. MUC (Required) Chair/Director Initials

Requested designation: (Choose One) **Mandatory Review: (Choose one)**

Note- a separate proposal is required for each designation.

Eligibility: Permanent numbered courses **must** have completed the university's review and approval process. For the rules governing approval of omnibus courses, contact Phyllis.Lucie@asu.edu.

Submission deadlines dates are as follow:

For Fall 2018 Effective Date: October 1, 2017

For Spring 2019 Effective Date: March 10, 2018

Area(s) proposed course will serve:

A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

Checklists for general studies designations:

Complete and attach the appropriate checklist

- Literacy and Critical Inquiry core courses (L)
- Mathematics core courses (MA)
- Computer/statistics/quantitative applications core courses (CS)
- Humanities, Arts and Design core courses (HU)
- Social-Behavioral Sciences core courses (SB)
- Natural Sciences core courses (SQ/SG)
- Cultural Diversity in the United States courses (C)
- Global Awareness courses (G)
- Historical Awareness courses (H)

A complete proposal should include:

- Signed course proposal cover form
- Criteria checklist for General Studies designation being requested
- Course catalog description
- Sample syllabus for the course
- Copy of table of contents from the textbook and list of required readings/books


It is respectfully requested that proposals are submitted electronically with all files compiled into one PDF.

Contact information:

Name Keli Palmer Greenhagen E-mail Keli.Palmer@asu.edu Phone 727-6212

Department Chair/Director approval: (Required)

Chair/Director name (Typed): Dr. Michael Caplan, Program Chair Date: Jan 9, 2018

Chair/Director (Signature): 

Arizona State University Criteria Checklist for
LITERACY AND CRITICAL INQUIRY - [L]

Rationale and Objectives

Literacy is here defined broadly as communicative competence—that is, competence in written and oral discourse. **Critical inquiry** involves the gathering, interpretation, and evaluation of evidence. Any field of university study may require unique critical skills that have little to do with language in the usual sense (words), but the analysis of written and spoken evidence pervades university study and everyday life. Thus, the General Studies requirements assume that all undergraduates should develop the ability to reason critically and communicate using the medium of language.

The requirement in Literacy and Critical Inquiry presumes, first, that training in literacy and critical inquiry must be sustained beyond traditional First Year English in order to create a habitual skill in every student; and, second, that the skill levels become more advanced, as well as more secure, as the student learns challenging subject matter. Thus, two courses beyond First Year English are required in order for students to meet the Literacy and Critical Inquiry requirement.

Most lower-level [L] courses are devoted primarily to the further development of critical skills in reading, writing, listening, speaking, or analysis of discourse. Upper-division [L] courses generally are courses in a particular discipline into which writing and critical thinking have been fully integrated as means of learning the content and, in most cases, demonstrating that it has been learned.

Notes:

1. ENG 101, 107 or ENG 105 must be prerequisites
2. Honors theses, XXX 493 meet [L] requirements
3. The list of criteria that must be satisfied for designation as a Literacy and Critical Inquiry [L] course is presented on the following page. This list will help you determine whether the current version of your course meets all of these requirements. If you decide to apply, please attach a current syllabus, or handouts, or other documentation that will provide sufficient information for the General Studies Council to make an informed decision regarding the status of your proposal.

Revised April 2014

Proposer: Please complete the following section and attach appropriate documentation.

ASU - [L] CRITERIA

TO QUALIFY FOR [L] DESIGNATION, THE COURSE DESIGN MUST PLACE A MAJOR EMPHASIS ON COMPLETING CRITICAL DISCOURSE--AS EVIDENCED BY THE FOLLOWING CRITERIA:

YES	NO		Identify Documentation Submitted
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>CRITERION 1: At least 50 percent of the grade in the course should depend upon writing assignments (see Criterion 3). Group projects are acceptable only if each student gathers, interprets, and evaluates evidence, and prepares a summary report. <i>In-class essay exams may not be used for [L] designation.</i></p>	<p>80% of the course grade depends on these writing assignments.</p> <p>Although these are team-written reports, a section in each report delineates which sections were written by each student. Thus, individual writing can be (and is) assessed. Individual students' grades are adjusted by a combination of instructor grading based on this delineation and team peer evaluation (see Appendix A) in which the students can recommend increasing or decreasing their peers' grades based on relative contributions to the project work and these reports.</p>

1. Please describe the assignments that are considered in the computation of course grades--and indicate the proportion of the final grade that is determined by each assignment.

2. **Also:**

Please **circle, underline, or otherwise mark** the information presented in the most recent course syllabus (or other material you have submitted) that verifies **this description** of the grading process--and label this information "**C-1**".

C-1

ASU - [L] CRITERIA

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>CRITERION 2: The writing assignments should involve gathering, interpreting, and evaluating evidence. They should reflect critical inquiry, extending beyond opinion and/or reflection.</p>	<p>Each Design Task and the semester-end PDR requires students to gather information about their design, interpret how their design compares to other designs already available in the market, and evaluate the added value provided by the team's design. This requires the team to conduct critical inquiry of the literature by applying their engineering intuition to understand the function of the existing devices vis-à-vis their prototype.</p>
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1. Please describe the way(s) in which this criterion is addressed in the course design.

2. **Also:**

Please **circle, underline, or otherwise mark** the information presented in the most recent course syllabus (or other material you have submitted) that verifies **this description** of the grading process--and label this information "C-2".

C-2

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>CRITERION 3: The syllabus should include a minimum of two writing and/or speaking assignments that are substantial in depth, quality, and quantity. Substantial writing assignments entail sustained in-depth engagement with the material. Examples include research papers, reports, articles, essays, or speeches that reflect critical inquiry and evaluation. Assignments such as brief reaction papers, opinion pieces, reflections, discussion posts, and impromptu presentations are not considered substantial writing/speaking assignments.</p>	<p>There are 7 assignments that meet this criterion (above and beyond the requirement of 2 such assignments).</p> <p>Each DT is approximately 20-30 pages in length (each student on the team writes approximately 5-10 pages in each DT). The PDR is approximately 100-200 pages in length (each student on the team writes approximately 30-50 pages of the PDR).</p> <p>Each of these DTs and PDR is similar to a research paper in which students must perform literature research (to critically evaluate existing technologies relevant to the problem the team is attempting to solve) and lab research (to conduct high quality verification and validation tests on their prototype).</p>
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ASU - [L] CRITERIA

1. Please provide relatively detailed descriptions of two or more substantial writing or speaking tasks that are included in the course requirements

2. **Also:**

Please **circle, underline, or otherwise mark** the information presented in the most recent course syllabus (or other material you have submitted) that verifies **this description** of the grading process--and label this information "**C-3**".

C-3

ASU - [L] CRITERIA

YES	NO		Identify Documentation Submitted
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>CRITERION 4: These substantial writing or speaking assignments should be arranged so that the students will get timely feedback from the instructor on each assignment in time to help them do better on subsequent assignments. <i>Intervention at earlier stages in the writing process is especially welcomed.</i></p>	<p>Each bi-weekly DT is graded in approximately 1 week so that students receive feedback before their next DT is due. Because the PDR is a review of all work on the project, students have an additional opportunity to improve upon their work and their writing at the end of the semester.</p>
<p>1. Please describe the sequence of course assignments--and the nature of the feedback the current (or most recent) course instructor provides to help students do better on subsequent assignments</p>			
<p>2. Also:</p> <div style="border: 1px solid black; border-radius: 50%; padding: 20px; margin: 10px auto; width: 80%; text-align: center;"> <p style="background-color: yellow;">Please circle, underline, or otherwise mark the information presented in the most recent course syllabus (or other material you have submitted) that verifies this description of the grading process--and label this information "C-4".</p> </div> <p>C-4</p>			

Course Prefix	Number	Title	General Studies Designation
BME	490	Biomedical Engineering Capstone II	L

Explain in detail which student activities correspond to the **specific** designation criteria.
Please use the following organizer to explain how the criteria are being met.

Criteria (from checklist)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
L	Bi-weekly Design Tasks	Design tasks (DTs), due approximately every two weeks, are team written reports (with individual contributions delineated by the team, ensuring that each member of the team writes a substantial portion of each DT) that are approximately 20-30 pages long. These describe team progress on the project in general and responses to specific requests for information (action items) from the instructor about the content of the ongoing project.
L	Comprehensive Capstone Product Development Report (PDR)	This is a semester-end, team-written report (with individual contributions delineated by the team, ensuring that each member of the team writes a substantial portion of the PDR) that is approximately 100-200 pages long. This document describes all work that has been conducted on the project, the project's current state, and responses to specific requests for information (action items) from the instructor about the content of the project.
L	Poster Creation and Presentation	The team prepares and presents a poster describing their project to a public audience.

Course Catalog Description

Individual projects in medical systems or medical device design and development.

Enrollment Requirements

Fulton Engineering undergraduate student; BME 417 with C or better.

Course Overview

ABET accreditation criteria state that students must have "a culminating major engineering design experience that 1) incorporates appropriate engineering standards and multiple constraints, and 2) is based on the knowledge and skills acquired in earlier course work." These projects should incorporate engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political. The two-semester bioengineering capstone design sequence allows you the opportunity to gain a yearlong, hands-on, major independent design experience in the form of a self-selected capstone design project. Biomedical Engineering Capstone Design I (BME 417) is the first of a two-semester capstone design course sequence where the independent capstone design project is initiated as a 'paper and pencil' design exercise that is then followed by a series of physically translational, design activities implemented in BME 490. Together, this major design experience culminates in a physically realizable, functional prototype device that can be verified and, to some extent in certain circumstances, validated for its ability to fulfill a pre-determined set of specifications for its intended clinical use. Like BME 417, the culminating event in BME 490 capstone is team presentations at our annual BME Spring Symposium, typically held in late April or early May (date to be announced later). Also, there will be additional opportunities to present/submit your capstone projects including entrepreneurial medical device competitions, such as NIH Debut/ Venture Well (BMEStart), which is a requirement in BME 490, among numerous other voluntary entrepreneurial medical device competitions.

Student Learning Outcomes

Students completing BME490 will be able to:

- (a) Translate the product metrics you established in your previous 'paper and pencil' design and development procedures (Phase I / Capstone I) via a formal 'design transformation' process, i.e., prototyping, into a physically realizable medical device prototype or finished medical device that can be verified and validated by accepted quality product manufacturing procedures.
- (b) Describe relevant existing and emerging medical device and related health care technology manufacturing processes and practices.
- (c) Conduct and participate in design reviews in a multidisciplinary design team environment.
- (d) Define and appropriately use product design and development standard practices and procedures required of the bio-industry, i.e., using the established manufacturing product standards, such as, Quality Systems Regulations (QSR), and, in particular, Design Controls to demonstrate the validity of your medical device design as a FDA acceptable medical product, i.e., approval to market & commercialize in the US.
- (e) Employ basic, relevant engineering business practices (e.g., business models and plans) and related commercialization strategies.
- (f) Describe the culture of innovation and entrepreneurship and related strategies and practices.
- (g) Prepare a formal FDA submission requesting approval to market your device.
- (h) Describe how the MDDI and related bio-industries as a whole carry out various design activities, such as, medical device product design and manufacturing methods using the FDA Quality Systems Regulations, as well as, how these practices and procedures are implemented by selected local MDDI Industry and how they are overseen by the FDA.

Assignments

Overview:

- Bi-weekly Design Tasks → represents ~ 40% of your grade (normalized to individual performance, see below for rubric on team peer evaluations).
Design tasks (DTs), due approximately every two weeks, are team written reports (with individual contributions delineated by the team, ensuring that each member of the team writes a substantial portion of each DT) that are approximately 20-30 pages long. These describe team progress on the project in general and responses to specific requests for information (action items) from the instructor about the content of the ongoing project.
- Comprehensive Capstone Product Development Report (PDR), ~split between design instructor/facilitator and design mentors*) → ~ 40% of your grade (20% Mentor/20% Instructor/Facilitator-15% PDR + 5% DR) (normalized to individual performance, see below for rubric on team peer evaluations).
This is a semester-end, team-written report (with individual contributions delineated by the team, ensuring that each member of the team writes a substantial portion of the PDR) that is approximately 100-200 pages long. This document describes all work that has been conducted on the project, the project's current state, and responses to specific requests for information (action items) from the instructor about the content of the project.
- Poster Creation and Presentation ~ 5% of your grade (individual and team performance, see below for rubric on team peer evaluations)
The team prepares and presents a poster describing their project to a public audience.
- Instructor Assessment ~15% of your final performance assessment is related to the following individual performance metrics over the course of BME 490 Capstone Design Phase II
 - level of concerted effort (average time expended relative to expected efforts)
 - level of technical quality based upon ability to meet or exceed expectations over phase II
 - level of professional quality based upon ability to meet or exceed expectations over phase II
 - a,b,c (above) normalized to professional behavior in expected formats as measured by individual attendance, participation and contributions in lecture, facilitation, prototype lab, team meetings, (among others) and team assessment of individual member contributions (see below for rubric on team peer evaluations).

BME 490 Capstone II Design Tasks: Similar to BME Capstone I, other than DT#1, all DTs span approximately two week cycles (except for DT#1). For BME 490 Capstone II, electronic copies of weekly design reports are due every Monday by 10:00pm via the Blackboard digital drop box that is made available via myasu.edu Blackboard course portal. Hard copies of biweekly design reports are due at the very beginning of the Tuesday design session that the design tasks is due. In addition, BME Capstone Design Teams must submit a signed written permission form to present their year end product design and development posters to the course instructor/facilitator no later than on April 14. Based on the state of progress made by the date specified (April 14), the course instructor/facilitator along with the team's design mentor(s) will determine if permission will be given for each capstone design student to present their project to the Bioengineering faculty and student body in a forum open to the university and local industry community on BME Poster Symposium Day, (TBD). Students who do not receive permission to present their projects will receive an automatic letter grade reduction (e.g. 'A+' to 'B+', or a 'B' to 'C', or a 'C' to 'D', or 'D' to 'E') for BME 490.

BME 490 Late Submission Policy:

Design Task (DT) Electronic Copy:

1. The electronic version of your capstone design tasks is considered FINAL.
2. Late submission of the electronic copy will result in a deduction (See Late Policy).

Design Task (DT) Hard Copy:

1. If no electronic copy is submitted - your hard copy will not be assessed. Note: you are still responsible for completing the work associated with the weekly design task(s) at hand.
2. The hard copy is the only version of the design task that will be graded; however please note that since the electronic copy is considered the final version, there should be no discrepancy between the two versions. Electronic copies will be examined at random to verify this.
3. Submission policy- the hard copy is considered late if it is not submitted at the beginning of the biweekly design session. Late submission of the hard copy may be allowed if (a) a prior notification was provided in time to be approved by design instructor and/or one of the BME 490 TA's, (b) in the event of a genuine and verifiable emergency. In addition, all late hard copies (excused and unexcused) must include a stand-alone, typed justification via a LoT.
4. Grading- late hard copies will receive an automatic 10 pts. deduction/day unless waiver is justified.

BME 490 Capstone II Ancillary Course Materials

Need to have the following items:

- A Design Notebook – use existing Design Notebook until filled; order new one from ASU Bookstore
- BME 490 Design Logbook – available on BME 490 Blackboard site
- Three-ring binder(s) – new binder(s) required for BME 490. A white 5" binder size in size & white in color

Team peer evaluations: will be conducted bi-weekly asking students to rate their teammates on the rubric included as Appendix A. These will be reviewed by instructors and mentor(s) to check for accuracy of the team's assessments.

Required Primary and Secondary Materials

Required textbook:

Product Design and Development, Karl T. Ulrich and Steven D. Eppinger. 5th edition. McGraw Hill, 2012. Assigned readings are all conducted during the BME417 pre-requisite course, so there are no official assigned reading deadlines in BME490. However, students should be referring frequently to this material in the conduct of their project and in their reporting on the project.

Lab supplies:

Students are provided access to the SCOB290 biomedical prototyping facility and use of its resources on request. Additional prototyping supplies are available upon request during BME490 when the team completes the prototyping purchase request process. Approximately \$250 per team is available (although still must be fully justified) with exceptions in addition to this amount approved on an ad hoc basis.

Course Itinerary

BME490 meets Tuesdays and Thursdays 9:00am-10:15am for lecture and active learning. The course also meets for a laboratory for an additional 2.5 hours per week in two sections.

Timeline for project activities and reports:

Week	Project activities	Reports / Assignments due
1	Finalize concept evaluation process from BME417	
2	Finalize engineering analysis from BME417	DT#1 Criterion 4
3	Finalize alpha (virtual) prototype, prepare purchase forms	Team peer evaluation #1
4	Begin beta prototyping	DT#2
5	Trouble-shoot initial beta prototype	Team peer evaluation #2
6	Finalize beta prototype and develop testing procedures	DT#3
7	Verification/validation on beta prototype	Team peer evaluation #3
8	Concept generation for gamma prototyping	DT#4
9	Begin gamma prototyping	Team peer evaluation #4
10	Trouble-shoot gamma prototype	DT#5
11	Finalize gamma prototype and refine testing procedures	Team peer evaluation #5
12	Verification/validation on gamma prototype	DT#6
13	Finalize verification/validation results	Team peer evaluation #6
14	Finalize business plan / economic analysis	Poster
15	Finalize PDR with Design History File (DHF) and QSR	PDR (with DHF and QSR)

Commented [MC1]: Criterion 4:
 Each bi-weekly DT is graded in approximately 1 week so that students receive feedback before their next DT is due. Because the PDR is a review of all work on the project, students have an additional opportunity to improve upon their work and their writing at the end of the semester.

Grading

- Bi-weekly Design Tasks: 40% Criterion #1 and Criterion #3
- Comprehensive Capstone Product Development Report (PDR): 40% **Criterion #1**
 - 20% Mentor – 15% PDR + 5% DR
 - 20% Instructor/Facilitator – 15% PDR + 5% DR
- Poster Creation and Presentation: 5%
- Instructor Assessment: 15%

Commented [MC2]: Criterion 1:
 80% of the course grade depends on these writing assignments.

Although these are team-written reports, a section in each report delineates which sections were written by each student. Thus, individual writing can be (and is) assessed. Individual students’ grades are adjusted by a combination of instructor grading based on this delineation and team peer evaluation (see Appendix A) in which the students can recommend increasing or decreasing their peers’ grades based on relative contributions to the project work and these reports.

Commented [MC3]: Criterion 3:
 There are 7 assignments that meet this criterion (above and beyond the requirement of 2 such assignments).

Each DT is approximately 20-30 pages in length (each student on the team writes approximately 5-10 pages in each DT). The PDR is approximately 100-200 pages in length (each student on the team writes approximately 30-50 pages of the PDR).

Each of these DTs and PDR is similar to a research paper in which students must perform literature research (to critically evaluate existing technologies relevant to the problem the team is attempting to solve) and lab research (to conduct high quality verification and validation tests on their prototype).

Appendix A: Team peer evaluation rubric

		Peer Evaluation					Section Number _____ Team Number _____	
		<p>← Write the names of the people on your team including your own name.</p> <p>This self and peer evaluation asks about how you and each of your teammates contributed to the team during the time period you are evaluating. For each way of contributing, please read the behaviors that rating. Then confidentially rate yourself and your teammates by placing a mark in the relevant box.</p>						
	<u>Your name</u>							
Contributing to the Team's Work								<ul style="list-style-type: none"> Does more or higher-quality work than expected. Makes important contributions that improve the team's work. Helps to complete the work of teammates who are having difficulty.
								Demonstrates behaviors described in the row just above and just below.
								<ul style="list-style-type: none"> Completes a fair share of the team's work with acceptable quality. Keeps commitments and completes assignments on time. Fills in for teammates when it is easy or important
								Demonstrates behaviors described in the row just above and just below.
Interacting with Teammates								<ul style="list-style-type: none"> Asks for and shows an interest in teammates' ideas and contributions. Improves communication among teammates. Provides encouragement or enthusiasm to the team. Asks teammates for feedback and uses their suggestions to improve.
								Demonstrates behaviors described in the row just above and just below.
								<ul style="list-style-type: none"> Listens to teammates and respects their contributions. Communicates clearly. Shares information with teammates. Participates fully in team activities. Respects and responds to feedback from teammates.
								Demonstrates behaviors described in the row just above and just below.
Keeping the Team on Track								<ul style="list-style-type: none"> Interrupts, ignores, bosses, or makes fun of teammates. Takes actions that affect teammates without their input. Does not share information. Complains, makes excuses, or does not interact with teammates. Accepts no help or advice.
								Demonstrates behaviors described in the row just above and just below.
								<ul style="list-style-type: none"> Watches conditions affecting the team and monitors the team's progress. Makes sure that teammates are making appropriate progress. Gives teammates specific, timely, and constructive feedback.
								Demonstrates behaviors described in the row just above and just below.
Expecting Quality								<ul style="list-style-type: none"> Notifies changes that influence the team's success. Knows what everyone on the team should be doing and notices problems. Alerts teammates or suggests solutions when the team's success is threatened.
								Demonstrates behaviors described in the row just above and just below.
								<ul style="list-style-type: none"> Is unaware of whether the team is meeting its goals. Does not pay attention to teammates' progress. Avoids discussing team problems, even when they are obvious.
								Demonstrates behaviors described in the row just above and just below.
Expecting Quality								<ul style="list-style-type: none"> Motivates the team to do excellent work. Cares that the team does outstanding work, even if there is no additional reward. Believes that the team can do excellent work.
								Demonstrates behaviors described in the row just above and just below.
								<ul style="list-style-type: none"> Encourages the team to do good work that meets all requirements. Wants the team to perform well enough to earn all available rewards. Believes that the team can fully meet its responsibilities.
								Demonstrates behaviors described in the row just above and just below.
								<ul style="list-style-type: none"> Satisfied even if the team does not meet assigned standards.

						<ul style="list-style-type: none"> • Wants the team to avoid work, even if it hurts the team. • Doubts that the team can meet its requirements.
Having Relevant Knowledge, Skills, and Abilities						<ul style="list-style-type: none"> • Demonstrates the knowledge, skills, and abilities to do excellent work. • Acquires new knowledge or skills to improve the team's performance. • Able to perform the role of any team member if necessary.
						Demonstrates behaviors described in the row just above and just below.
						<ul style="list-style-type: none"> • Has sufficient knowledge, skills, and abilities to contribute to the team's work. • Acquires knowledge or skills needed to meet requirements. • Able to perform some of the tasks normally done by other team members.
						Demonstrates behaviors described in the row just above and just below.
						<ul style="list-style-type: none"> • Missing basic qualifications needed to be a member of the team. • Unable or unwilling to develop knowledge or skills to contribute to the team. • Unable to perform any of the duties of other team members.

Appendix B: Example rubric for grading bi-weekly design tasks and PDR (this one is for DT#2)

BME 417 (Fall 2017) Design Task #1 Report Grade Sheet

Name:			Grade	
Front Matters				
	Exceed	Met	Did Not Meet	Non-Responsive
Electronic Document Submission	Submitted on time Sept 6 @ 10 PM	N/A	N/A	Not submitted on time
Hard Copy Submission	Submitted on time Sept 7 @ 9 AM	N/A	N/A	Not submitted on time
Grade Sheet	Filled out, paper clipped to front of report	N/A	*Not filled out completely *Not paper clipped to the front *No grade sheet found	N/A
Letter of Transmittal (Refer to LoT Template on BB)	* Satisfied all letterhead, address, date, name, title, address, email, and formatting requirements. * All requirements from #1 – 10 are satisfied * Properly signed	* few formatting issues * few requirements from #1 – 10 are not satisfied * Properly signed	* some formatting issues * some requirements from #1 – 10 are not satisfied * no signature	No LoT
Cover Sheet	With correct dates, titles, names, and signatures	N/A	Missing proper dates, titles, names, or signatures	N/A
SubTasks (weight)	Excellent	Good	Needs Improvement	Non-Responsive
1A – Introduction	*Explains the needs, goals, scope, expectations...etc of MD&DI with introductory sentences leading to relevant industry metrics Criterion #2	*Only some aspects defined in "Excellent" category were discussed	*No aspects defined in previous category discussed * Introductory paragraph is vague and fails to grasp the big picture of MD&DI	*No Introduction was found or extremely poor job was performed.
1B – US MDDI Size	*The significance behind the relative comparison to other industries and overall US industry is well discussed *The future growth is well discussed	*Lists out the statistics regarding the size of US MDDI with little discussion about its significance or comparison to other industries *The future growth is discussed	*Lists out statistics without any discussion	*Completely missed this section
1C – Location/Distribution	*The significance behind the relative comparison to other industries and overall US market is well discussed *Contains future projections	*Only list out the locations and distributions but talks little about their significance *The future projection is discussed	*Only list out the statistics without any discussion	*Completely missed this section
1D – Product Types	*The major types and significance of medical devices are described and insights were given.	*Product types are listed and described but no further insight was given	*Lists out the product types but no discussion or descriptions	*Completely missed this section
1E – Product Classifications	*The meaning and significance of at least 2	*Lists out the NAICS and CIS codes without much	*Lists out the NAICS and CIS codes without much explanation or discussions.	*Completely missed this section

Commented [MC4]: Criterion 2: Each Design Task and the semester-end PDR requires students to gather information about their design, interpret how their design compares to other designs already available in the market, and evaluate the added value provided by the team's design. This requires the team to conduct critical inquiry of the literature by applying their engineering intuition to understand the function of the existing devices vis-à-vis their prototype.

	<p>classification codes/ways are discussed</p> <p>*The benefits and potential problems of at least 2 classification codes/ways are discussed</p> <p>*Contains a table summarizing the different ways of classification</p>	<p>explanation or discussions.</p> <p>*Contains the summary table</p>	*Contains no summary table	
1F – Employment Data and Trend	<p>*The significance of employment data is well discussed</p> <p>*The significance of employment trend is well discussed</p>	*Lists out statistics but little discussion was given regarding the significance of these numbers	*Lists out statistics but no discussion was found	*Completely missed this section
1G – Market Values	*The market values and significance of the major types of medical devices are well discussed	*Numbers were given but few insights were given	*Numbers were given but no insights were given	*Completely missed this section
1H – International Trade	*The significance, values, trends, statistics...etc of the international trade of medical devices are well discussed	*Numbers were given but few insights were given	*Numbers were given but no insights were given	*Completely missed this section
1I – Other Pertinent MDDI Information	<p>*Discuss 2 or more industry related metrics that are not yet mentioned</p> <p>*The significance of such metrics are well discussed</p>	*Discuss 1 or more industry related metrics that are not yet mentioned	N/A	*Completely missed this section
1J – Overall MDDI Assessment (2)	<p>*Provide a summary of all metrics described above</p> <p>*The assessment and significance of MDDI is well discussed</p>	*Numbers were given but little insights were given	*Numbers were given but no insights were given	*Completely missed this section
2- Summary Table (2)	<p>*The summary table is well formatted</p> <p>*Contains proper Table # and captions</p> <p>*Covers all highlights mentioned in subtask 1</p>	<p>*The summary table is well formatted</p> <p>*Missing proper Table # and captions</p> <p>*Covers all highlights mentioned in subtask 1</p>	<p>*The summary table is poorly formatted</p> <p>*Missing proper Table # and captions</p> <p>*Missing some highlights mentioned in subtask 1</p>	*Completely missed this section
3A – Introduction of the Selected Company	*Explains the need, goals, visions...etc of the selected company and why you picked it	*The company is selected but few reasons or background are given	*Lists the company's name	*Completely missed this section
3B – Identify Key Factors of Corporate Culture	*Elaborates the significance key factors of corporate culture and their pros and cons	*Lists key factors of corporate cultures but little insight is given	*Lists out the key factors of corporate cultures without much insight	*Completely missed this section
3C – Company's Size and location	*The significance of the company's size, location, its past and future growth trend, or expansion...etc are well discussed	*Numbers were given but little insights were given	*Numbers were given but no insights were given	*Completely missed this section
3D – Company's Disruptive/Iconic Technology	<p>*Introduce and describe the disruptive/iconic technology</p> <p>*The comparison of the disruptive/iconic technology to state of the art is well described</p>	*Lists and describes the disruptive/iconic technology but no further insight was given (novelty, how does it compare to others...etc)	*Lists the company's disruptive/iconic technology	*Completely missed this section
3E – Company's Products Lines and Classifications	*The overall product lines and their associated classifications	*Only identified their product lines and	*Lists out product lines and classifications but no	*Completely missed this section

	are well described and discussed.	classifications but little description/discussion was given	description/discussion was given	
3F – Product Sales	*The overall product sales, trends, growths...etc are well described *The significance or insights of their product sales, trends, and growths are well discussed (i.e. why do/don't they sell well, how well did they perform compare to others)	*Numbers were given but little insights were given	*Numbers were given but no insights were given	*Completely missed this section
3G – International Trade	*The trade partners, trends, and additional insights are described and significance discussed.	*Numbers were given but little insights were given	*Numbers were given but no insights were given	*Completely missed this section
3H – Employment Data and Trend	*The overall employment data and trend (salary, # of hires, growth...etc) are well discussed and their significance well explained	*Numbers were given but little insights were given	*numbers were given but no insights were given	*Completely missed this section
3I – Design Activities Utilized	*Describe 3 design activities the company utilized to generate product ideas	*Describes only 2 design activities the company used to generate product ideas	*Describes only 1 design activities the company used to generate product ideas	*Completely missed this section
3J – Other Pertinent Information	*At least 2 more additional metrics or bonus information about the company is discussed *The significance of such info is well discussed	*Discuss 1 more industry related metrics or bonus information that are not yet mentioned *The significance of such info is well discussed	N/A	*Completely missed this section
Overall Formatting (2)	*All Figures and Tables are clearly labeled and captioned *Page numbers are included	*Some Figures and Tables are not labeled and captioned *page numbers are included	*All Figures and Tables are not labeled and captioned *No page numbers	N/A
Back Matter				
	Excellent	Good	Needs Improvement	Non-Responsive
Appendix A: Gantt Chart	N/A	N/A	N/A	N/A
Appendix B: Design Review Minutes	N/A	N/A	N/A	N/A
Appendix C: Scanned Notebook Pages	*Good scanning quality *Documents all the activities and meetings by leaving sufficient details to understand topics discussed and conclusions drawn.	*Good scanning quality *Documents some the activities and meetings only. *Sometimes lack sufficient details to understand topics discussed and conclusions drawn.	*Good scanning quality *Insufficient details to understand the topics discussed, conclusions drawn, or activities performed.	*No notebook pages were scanned
Appendix D: Scanned Design Logbook	*Good scanning quality *Documents all the design activities *Spent more than 20 hours a week *Includes work code	*Good scanning quality *No work codes *Documents most of the design activities *Spent 11 – 20 hours a week	*Poor scanning quality *Some activities weren't documented *No work codes *Working less than 10 hours a week	*Poor scanning quality *Insufficient details to understand the topics discussed, conclusions drawn, or activities performed.
Appendix E: Scanned Weekly Hours Logbook	*Good scanning quality *Documents all the design activities	*Good scanning quality *Documents most of the design activities	*Poor scanning quality *Some activities weren't documented	*Poor scanning quality *Insufficient details to understand the topics

	*Spent more than 20 hours a week	*Spent 11 – 20 hours a week	*Working less than 10 hours a week	discussed, conclusions drawn, or activities performed
Appendix F: Reference Section	*Proper formatting, such as all tables and figures are properly number and captions provided. *Uses primary reference sources where appropriate *Cited all the things that needs to be cited	*few formatting issues *Uses some secondary reference sources when primary sources are available *Some things that needs to be cited weren't cited	*many formatting issues *Put down URLs directly without proper citation formatting *Uses some secondary reference sources when primary sources are available *Some things that needs to be cited weren't cited	*many formatting issues *Put down URLs directly without proper citation formatting *Uses some tertiary reference sources such as Wikipedia *many things that needs to be cited weren't cited

Any Work Product not sufficiently meeting the specific requirements set forth in the DT Memorandum, templates, and grade sheet can be marked as non-responsive (NR). Reports that receive 3 NR's will reduce the report by 1 letter grade. Another half letter grade will be taken off for each NR above three.

Design Task	Summary Evaluation: Report Formatting		Summary Evaluation: Technical Quality	
NR Tally:	Did Not Meet		Did Not Meet	
	Met		Met	
	Exceed		Exceed	