Description
An introduction to the business and management aspects of the engineering profession, project management, prioritization of resource allocation, intellectual property protection, management of technical projects, and product/production management. Mechanical Engineering Seniors or by instructor permission only. No audits. Recommended Course Background: EN.660.105

Prerequisites
None.

Instructor
Michael Agronin, mlagronin@gmail.com
Office: 104 Whitehead, 410-207-0096 mobile
Office hours: By appointment only. Note that I work off campus during the day.

Course Assistant
Lara Gatehouse, laramichelle42@gmail.com
Office: 104 Whitehead
Office Hours: TBA

Meetings
Monday 6:15-9:00 p.m., Gilman 132

Textbook
Custom Coursepack downloadable from Harvard Business Publishing, at: https://cb.hbsp.harvard.edu/cbmp/access/28066871

You will need to create an account to purchase and download the cases and simulations. This coursepack contains the following:

- Army Crew Team
- Thomas Green: Power, Office Politics and a Career in Crisis
- Jonah Creighton (A)
- TerraCog Global Positioning Systems: Conflict and Communication on Project Aerial
- Managing Interpersonal Feedback
- Exercising Influence
- HBR Guide to Finance Basics for Managers
- Optional audio version of some of the cases

The total cost of these materials is $33.68

Online Resources
Other readings and class notes will be available on Blackboard.
Course Objectives
Here’s the truth, guys: most engineers spend only a small fraction of their day solving engineering problems. The rest of the day is spent planning, managing, being managed, and then communicating what it is that you’ve planned and managed.

This course is intended to make you more effective at all those non-engineering activities so that at the end of the day you will have solved the right problem, and you will get credit for it. The skills you will require are different from your engineering skills. You will learn frameworks for approaching these non-engineering tasks, apply the frameworks to real-life examples, and practice, practice, practice. The classroom experience will mimic real-world situations as much as possible. You will work in teams on scenarios and case studies, debate your ideas with classmates, and formally present your conclusions.

Our specific learning objectives are:
1. Teamwork:
   - Utilize professional communication skills to manage one’s boss and provide constructive criticism. Implement coaching skills and processes to resolve team conflicts and co-lead self-managed work teams.
   - Identify how team identity, conflict, and trust influences team performance and recognize the leader’s and team-members’ roles in fostering team outcomes
2. Facilitate post-graduate next steps
3. Apply a comprehensive decision-making framework to account for the needs of disparate stakeholders, business objectives and ethical principles and determine how leaders shape team decision-making and performance
4. Conduct a strategic assessment of a business
5. Analyze the economic implications of business decisions, including time to breakeven, cash flow projection, and net present value of contribution
6. Determine how project scope, resources, and schedule interact
7. Identify customer needs and convert these to product specifications
8. Understand the patent and intellectual property process

Course Topics
1. Interpersonal relationships and teamwork
2. Politics, persuasion and influence
3. Product development and strategy
4. Project management
5. Intellectual property
6. Finance
7. Career planning

Course Expectations and Grading
To best absorb this experience, I expect you to:
- **Prepare.** Read the materials, do your assignments, practice your presentations.
- **Participate.** Show up on time, and share your perspectives with your team and with the class. Be generous with your ideas and constructive with your criticism. Collaborating with other students is required.
- **Be a good teammate.** In the real world, all work is teamwork, and we will emulate that practice in class. Teammates are expected to work together and pull their own weight. See Appendix A, best practices for effective teams.
# Deliverables

<table>
<thead>
<tr>
<th>Individual</th>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Business Presentation</td>
<td>P/F 5</td>
<td></td>
</tr>
<tr>
<td>Class Participation</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Teamwork Assessment</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Career Preparation Assignment</td>
<td>P/F 5</td>
<td></td>
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<table>
<thead>
<tr>
<th>Team</th>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thomas Green case write-up</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Jonah Creighton case write-up</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>TerraCog video case</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Project Management problem set</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Finance Assignment problem set</td>
<td>10</td>
<td></td>
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<tr>
<td><strong>Total:</strong></td>
<td><strong>100</strong></td>
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Grading

- A 90-100
- B 80-89
- C 70-79

Plusses and minuses will be used at the discretion of the instructor.

## Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>In-class Topics</th>
<th>Preparation Due</th>
<th>Assignments Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/8</td>
<td>Introduced. Personality typing. Teams assigned.</td>
<td>Read the syllabus. <em>Bring your laptop!</em></td>
<td></td>
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<tr>
<td>9/15</td>
<td>Team performance</td>
<td>Meet as a team, read Amy Crew case</td>
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<tr>
<td>9/22</td>
<td>Conflict, coaching, giving feedback</td>
<td>Read 5 Dysfunctions of a Team (Blackboard), Managing Interpersonal Feedback</td>
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<tr>
<td>9/29</td>
<td>Inter-personal relationships, career planning</td>
<td>Read Managing your Boss (Blackboard)</td>
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<tr>
<td>10/6</td>
<td>Persuasion and influence</td>
<td>Read Neces. Art of Persuasion (Blackboard), Exercising Influence</td>
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</tr>
<tr>
<td>10/13</td>
<td>Persuasion and influence applied, business ethics</td>
<td><em>Jonah Creighton write-up</em></td>
<td></td>
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<tr>
<td>10/16</td>
<td><strong>NOTE: class meets on Thursday.</strong></td>
<td>Read slides on Blackboard</td>
<td><em>Eng.Bus. Pres.–3 stdnts</em></td>
</tr>
<tr>
<td>10/20</td>
<td>Project management, scheduling and estimating</td>
<td>Read slides on blackboard, be able to use assigned project management software</td>
<td><em>Eng.Bus. Pres.–3 stdnts</em></td>
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<tr>
<td>10/27</td>
<td>Product development, business strategy, communication</td>
<td><em>TerraCog video case analysis</em></td>
<td><em>Eng.Bus. Pres.–3 stdnts</em></td>
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<tr>
<td>11/3</td>
<td>Intellectual property</td>
<td>Read IP slides on blackboard</td>
<td><em>Eng.Bus. Pres.–3 stdnts</em></td>
</tr>
<tr>
<td>11/17</td>
<td>Career planning workshop</td>
<td>Read slides on blackboard</td>
<td><em>Eng.Bus. Pres.–3 stdnts</em></td>
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<tr>
<td>11/24</td>
<td><strong>NO CLASS – Thanksgiving holiday!</strong></td>
<td><em>Finance assignment</em></td>
<td></td>
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<tr>
<td>12/1</td>
<td>Wrap-up</td>
<td>Teamwork assessment forms for each teammate</td>
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Assignment Descriptions

Engineering Business Presentation
This is an individual presentation to the class. Approximately three students will present each week at the beginning of class. Your presentation date will be pre-assigned. See Appendix B for detailed instructions.

Class Participation
In the real world, you will seldom receive a grade on your work. Your boss and others will evaluate you based on their perception of your work. That means you need to sell it! Our class is a great place to practice showing that you’re on top of things through your participation.

You are expected to attend class, share your ideas, ask questions, and build your colleagues’ ideas. Points are assigned for: 1. showing up, 2. participating at all in any way, and 3. participating in a way that adds to the quality of the class. You do not get points for speaking up continuously if what you have to say is pointless. You will lose points (and personal credibility) if I call on you and you are obviously unprepared for class.

Teamwork Assessment
In order to enforce your accountability to your team, you will have the opportunity to grade, and be graded by your teammates. These team assessments will be confidential, between you and me. Your score will be based on the input of your teammates, and then filtered by me.

Career Preparation Assignment
You will prepare a resume or CV and receive professional coaching on the resume and/or your interview skills from the JHU Career Center. You will then write a short paper about what you learned. This is a credit/no credit assignment. Appendix D contains detailed instructions.

Thomas Green Team Case Analysis
This is a team written assignment. Everyone on the team is expected to contribute. Appendix E contains detailed instructions.

Jonah Creighton Team Case Analysis
This is a team written assignment. Everyone on the team is expected to contribute. Appendix F contains detailed instructions.

TerraCog Team Video Case Analysis
This is a team video assignment. Everyone on the team is expected to contribute. Appendix G contains detailed instructions.

Project Management assignment
This is a small-team (two or three people) problem set. Instructions will be provided when this project is assigned.

Finance assignment
This is a small-team (two or three people) problem set. Instructions will be provided when this project is assigned.
Administrative Requirements
All written assignments must be submitted at the beginning of class on the due date. If you know you will not be in class on a day an assignment is due, it is your responsibility to contact me prior to class and arrange to email the homework prior to class or by a mutually agreed upon time. Assignments, whether individual or team, turned in late with no prior arrangements will receive a zero.

For extreme illness and other emergency situations: Students are required to obtain documentation from their College's Advising Office or the Health Center for submission to the instructor.

Ethics
The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor.

In addition, the specific ethics guidelines for this course are:

(1) You are strongly encouraged to collaborate with classmates in this course. Collaboration in the context of this course means sharing ideas and knowledge with others to learn more than if you had worked alone. Contrast collaboration with “divide and conquer,” where you share results but not the learning.

You can find more information about university misconduct policies on the web at these sites:
• For undergraduates: http://e-catalog.jhu.edu/undergrad-students/student-life-policies/
• For graduate students: http://e-catalog.jhu.edu/grad-students/graduate-specific-policies/

Students with Disabilities
Any student with a disability who may need accommodations in this class must obtain an accommodation letter from Student Disability Services, 385 Garland, (410) 516-4720, studentdisabilityservices@jhu.edu.

ABET Outcomes
• Ability to function on multidisciplinary teams (d).
• Understanding of professional and ethical responsibility (f).
• Ability to communicate effectively (g).
• The broad education necessary to understand the impact of engineering solutions in a global and societal context (h).
• Recognition of the need for and an ability to engage in life-long learning (i).
• Knowledge of contemporary issues (j).
• Ability to use the techniques, skills and modern engineering tools necessary for engineering practice (k).

Acknowledgements
Many thanks to Illysa Izenberg who developed much of the content for, and has continuously improved this class.
Appendix A. Best Practices for Effective Teams

Adapted from The Five Dysfunctions of a Team by Patrick Lencioni

1. **Establish Trust.** There are two kinds of trust you need to establish – the kind where you know you’re looking out for each other, and the kind where you can count on each other to get a job done. So get to know each other. Share a meal or three. Share your backgrounds, your accomplishments, your aspirations, your strengths and weaknesses. Spend time together and bond.

2. **Don’t Be Afraid of Conflict.** Once you trust each other, you should feel free to share your true opinions without worrying that you’ll hurt someone’s feelings. To make good decisions, you need to have frank and open discussions. Don’t hold back! It’s OK to get mad. You and your team will get over it. (Right, guys?)

3. **Commit to the Team’s Decisions.** Your team will not go along with all of your ideas. But that’s OK, because you had the opportunity to make a passionate case, right? Now you need to be willing to commit fully to the team’s decision and make it work.

4. **Hold Each Other Accountable.** Everyone on the team has to pull his or her own weight. You might need to do some tasks outside of your comfort zone, and that’s OK – that’s what school is about. Don’t dump everything on “the good writer” while the rest of you surf Reddit through the team meetings. It’s OK to call someone out for not doing his or her fair share.

5. **Focus on the objective.** In our case, this is the education of your team. Sometimes individual objectives – minimizing your personal workload, finishing your senior engineering project – are in conflict with the team’s objectives. You need to work out how to align your personal goals with the team’s goals, so when the team wins, you win.
Appendix B. Guideline for writing case analyses

Case studies are intended to be like real life. There is a lot of information, but it’s not always apparent what’s relevant. There is no one right answer. You will need to use good judgment and the frameworks we learn in class to analyze the situation, come to an understanding of the issues, set priorities, and then formulate a plan that will address your priorities.

Your case write-ups will be evaluated on these criteria:

1. **Writing style.** In the real world, your boss will seldom read beyond the subject header of your emails. In this class, we will aspire to a style that I have success with in the corporate world. It will help you hold your boss’s attention before the next tweet from his stock broker tears him away.

   Headline your points like a newspaper article, then provide supporting data. *The reader should get the gist of your report just from skimming the headlines.* Make sure your logic is easy to follow. There is no excuse for poor grammar or spelling; it will erode your credibility and your grade. I strongly encourage you to use graphics and other multimedia to help make your point.

2. **Structure and content.** Your case analysis should follow this format:
   a. **Analysis of the current situation.** What’s going on in the case and why? DO NOT summarize the case – I’ve already read it. Instead, explain *why* the situation is what it is. Demonstrate insights.
   b. **Objectives and priorities.** For the protagonist or other relevant people, create a *prioritized* list of what you think should be the person’s top 3 or 4 objectives. Support your reasoning.
   c. **Action Plan.** What should the person do to address each objective? These actions should be do-able and specific. Provide details. Then explain why each action will achieve the desired objective. *Each action must explicitly map to an objective.*

3. **Format.** I require one hard-copy per team, to be turned in at the beginning of class on the day it is due. Each teammate should have a copy as well – you will want to refer to the paper during class. Papers should have 2 to 5 pages of text plus any graphics. Leave sufficient margins so I can write on the papers. I will return one copy to your team with considerable written feedback. Do not waste paper on cover pages, plastic covers, etc. Do include the name of the case and the name of everyone on your team.

4. **Grading rubric.**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>C</td>
<td>An inadequate job. You did not address all the required questions, the paper is poorly written, your understanding of the issues is shallow, a lack of effort is apparent.</td>
</tr>
<tr>
<td>B</td>
<td>A nominal job. You followed directions and addressed all the issues with adequate insights. Your action plans are adequate for addressing your objectives.</td>
</tr>
<tr>
<td>A</td>
<td>An excellent job. You show a deep, insightful understanding of the situation. Your action plans are creative, detailed, and likely to achieve your objectives.</td>
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</table>
5. **Important tips.** The most frequent reasons for poor grades on case studies are:

a. Each section of the paper was written by a separate team member, with no final edit to tie the sections together. *Don’t do this!* Make sure your write-up makes sense as a whole.

b. Your objectives for the protagonist are not prioritized, or the prioritization is not supported with reasoning.

c. Your action plan does not map explicitly to the objectives. Objectives are what you want to achieve. The action plan is *how* you will achieve them. Sometimes they don’t match up because of poor reasoning, sometimes because you did not work as a team to complete the paper (see 5a.)

d. Your action plans are not specific or actionable. These cases are real-life situations. The point of the case study is for your team to come up with real-life solutions to the situation.
Appendix C. Instructions for your Engineering Business Presentation

This is a 3 minute presentation, with 5-10 minutes of questions from the class. Select a current topic that relates to business and engineering, and is relevant to the members of the class. Your topic may be a news article, something you learned about in another class, or something you just find interesting. Explicitly present the following:

1. A brief, cogent summary of the story. Be sure to mention your references.
2. Your analysis of the situation. What do you think is going on behind the facts of the story. Why?
3. What are the implications of this story to you and your classmates? (Examples: Will it affect your prospects for getting jobs? Is it a cautionary tale of a situation to avoid? A best practice to emulate? An area to invest in? )

Guidelines:
• You will be randomly assigned a week to present. Presentations will occur at the beginning of class. Two to three students will present each week.
• You MUST tell me your topic 2 weeks before you present, to ensure that two students don’t present the exact same story. I will arbitrate any overlaps. I reserve the right to reject your topic for any reason. You are welcome, of course, to coordinate with your classmates yourself to avoid any issues.
• Powerpoint is great but not required, if you have a better way to present your material.
• Make it entertaining and interesting for your classmates.
• Practice, practice, practice!

Evaluation:
This is a credit/no credit assignment. If you followed directions, you get full credit. However, immediately after each presentation we will evaluate it as a class and give you constructive feedback. This will help you to learn the most from the experience, while lowering the stakes of the outcome. You will be evaluated on the quality of your presentation itself, on the quality of the content, and on your ability to engage the class.
Appendix D. Instructions for Career Preparation Assignment

By the due date, either review your resume/CV at the Career Center and/or complete a practice interview. If you intend to go to graduate school, you should have a CV prepared and should expect, and therefore prepare for, an interview. Your assignment is to turn in a ~1 page report describing:

1) What you changed about your resume/CV as a result of this meeting and/or
2) What you learned about interviewing or about yourself as an interviewee that will help you in job or grad school interviews.

I recommend you do both an interview and resume/CV review, but you can choose one to complete this assignment.

This is not due until mid-November. However, I suggest you make your appointment during the first week of class, as the Career Center gets busy. You can turn in your assignment earlier than the due date if you wish. It will be useful if you have interviews before November!

This is a credit/no-credit assignment, but the more effort you put into it, the more you will personally benefit. A grade should be the least incentive you need to crush this one.

Appendix E. Instructions for the Thomas Green Case Analysis

Following the guidelines in Appendix B, analyze the situation and generate an action plan for Thomas Green. Cover these points:

1. Analyze the current situation. How is Thomas performing? Why is he in conflict with his boss, Frank Davis?
2. What should Thomas’s objectives be? Prioritize them.
3. Generate an action plan for Thomas that will help him meet his objectives. Be specific, and explain how and why the actions will lead to achieving his objectives.

Appendix F. Instructions for the Jonah Creighton Case Analysis

Following the guidelines in Appendix B, analyze the situation and generate an action plan for Jonah Creighton. Cover these points:

1. Analyze the current situation. What is the legality of Coulding-Henson’s actions in the US, the UK and Australia? (Remember, the case takes place in 1990.) Is this really a big deal? What are the stakes for the people involved and for the corporation?
2. What should Jonah’s objectives be? Prioritize them.
3. Generate an action plan for Jonah that will help him meet his objectives. Be specific, and explain how and why the actions will lead to achieving his objectives.
Appendix G. Instructions for the TerraCog Video Case Analysis

Special instructions for video case analysis:
It has never been easier to make and disseminate video. This assignment is intended to give you practice in using video for business communications.

This is not intended to be a media project. You will not be graded on the production quality as long as I can see and understand the contents. Smart-phone video and iMovie or MovieMaker editing software should be adequate tools. I don’t need special effects or a soundtrack. However – I DO need to be able to hear and understand what you’re saying. Do a sound check to make sure your video is understandable.

Do not just read a report into the camera. Use the dynamic nature of video to convey your points creatively and compellingly.

The assignment:
You are Emma Richardson and her team. Emma’s boss, Richard Fiero, is working out of his home office on Martha’s Vineyard for the summer, so Emma has decided to make a video to convey her new action plans for project Aerial. She can include anything she likes in this video – input from other team members, clips from team meetings, interviews with customers of competitive products, demonstrations of the prototype, anything that will support her recommendations to Fiero. Note that she needs to sell Fiero and her team on this action plan. Her colleagues will know that she is making a video report (she may not record them in secret). Her team may or may not know what her recommendations are until the video is complete. That’s your choice.

Following the framework in Appendix B, her video should explicitly make these points:
1. Analysis of the situation. Where is Aerial, and the team today? Why? Where is the competition?
2. Objectives and priorities. What should the company look to achieve from this specific product, and from this overall product category?
3. Action Plan. What should the Aerial team do? How will those actions address the objectives?

Format:
Your video should be 5 to 10 minutes long (shorter is better). It should explicitly address the issues described above. Upload your video to YouTube and send me a link on the day the assignment is due. If time permits, we will watch some of the videos in class that day as well.