ENGR 5201 Major Assignments

Winter 2024

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# ASSIGNMENT OVERVIEW AND CONTEXT

## Assignment Breakdown

The following table breaks down the key assignment criteria and deadlines for this course:

| **Course Assignments** |
| --- |
| **Assignment** | **Weighting** | **Length** | **Deadline** |
| [Participation/ In-Class Writing Exercises and Discussions](#_60o9j8jecgv4) | 8% | Completed during class time | Ongoing; Students must attend and participate in 8 classes (1% per class) - the final two weeks of presentations are excluded from the participation grade |
| [Academic Integrity and AI Quiz](#_cufg6blepzx4) | 4% | 30 multiple choice, true/false, multiple answer or matching questions; 1 hour, 15 min (2 attempts allowed) | Assigned between Weeks 2 and 3Due Week 3The quiz can be taken any time between January 18th at 8:00 am until January 24th at 5:00 pm. |
| [Proposal and Annotated Bibliography](#_8166qeizwilm) | 16% | ~1000 words total(The proposal is ~400 words total and the annotated bibliography is ~600 words total, or ~150 words per source for 4 sources) | Due Week 5 (February 7th at 11:59 pm) |
| [Analytical Report - Draft](#_nhwjthol6i5i) | 26% | ~8-10 pages (excluding front and end matter) ~2000 words total | Due Week 8 (March 6th at 11:59 pm) |
| [Peer Review Exercise](#_xwd6piuu9sh0)  | 5% | Completed Peer Review Form (~300-600 words) | Due Week 10 (March 20th) at 5:00 pm (BEFORE CLASS) |
| [Report Summary Presentation and Peer Feedback Exercise](#_5vlfnlybevo6) | 17% | 5-8 minutes presentation with visual and outlineThe completion of two short feedback rubrics for peers during class | All presentation visuals and outlines: Due Week 11 (March 27th) BEFORE class – by 5:00 pm! (Even if you are presenting the following week, your presentation visuals and outline should be in by March 27th before class).Presentations will be given in Weeks 11 and 12.Peer Feedback Exercise: Completed during class in Weeks 11 and 12, depending on when you are scheduled to present. Must be submitted in class. |
| [Analytical Report - Final Version and Revision Reflection Exercise](#_ot1ccxiyjovc) | 24% | Total: 11-14 pages (~2600 words total)Final Analytical Report:~8-10 pages (excluding front and end matter) or ~2000 words totalRevision Reflection Exercise:~3-4 pages, or ~600 words total | Due April 12th by 11:59 pm |

## Main Assignment Overview and Context

The course assignments have been scaffolded in a way that each assignment builds on the previous one. The various stages of the main assignments will be discussed in more detail throughout the course lectures; however, it is vital that you read these instructions carefully and as soon as possible. You will want to refer back to these instructions frequently.

The major assignment is an analytical report focused on a technically complex, realistic problem that might or is occurring within an organization. The organization can be public or private, and it can be in any sector. The goal of the major assignments is to mimic the writing and revision processes that occur in an organization.



Each stage of the major assignment builds on the work and feedback from the previous stage. You are required to develop a scenario that reflects a possible professional trajectory.

To complete this assignment, you will need to:

* Develop a plausible scenario as if you are already three to five years into your career;
* Place yourself in a non-managerial role; and
* Consider the course professor as your manager/ supervisor.

You will receive general feedback on each assignment from the instructor in the form of a summary of strengths and areas for improvement, as well as annotated comments written directly on your assignment submission. Make sure to review the submission carefully and check all the annotated comments. They will look like this:



For some assignments, you will also receive peer feedback. To be successful in this assignment, you will need to review your assignment feedback carefully and revise your future assignments accordingly.

## Your Problem

Envision a realistic problem for a company or organization that demands action. The following are some examples (though you are not limited to these examples and can certainly develop your own problem, provided it fits the assignment criteria – ask the instructor if you are unsure!):

* A piece of equipment is causing accidents or inefficiencies.
* A new technology has been developed that could benefit your organization and/or customers, etc.
* Aging infrastructure and equipment are causing breakdowns in the company, leading to production delays, increased maintenance costs, and reduced efficiency.
* Your organization is vulnerable to cybersecurity threats.
* Your company is determining an ethical framework related to the rapid advancement of technology in fields like AI, robotics, or biotechnology.
* The company struggles to meet stringent environmental regulations, leading to potential legal consequences, increased costs, and reputational damage.
* Inefficient resource utilization in the company’s manufacturing process leads to higher operational costs and environmental concerns about waste generation.
* The company faces logistics challenges due to transportation system congestion, causing delays in product delivery, increased fuel consumption, and higher operational costs.
* Limited accessibility to advanced technologies in the company’s services impacts service quality and customer satisfaction, necessitating engineering solutions to enhance accessibility.

You should choose an industry or field related to your engineering concentration (automotive, mechatronics, electrical, computer science, software, energy, nuclear, mechanical, manufacturing, etc.). Begin by researching the tools and processes created or used by that industry or field. Read news sites, magazines, and trade publications to get started.

Use your imagination to develop a scenario that necessitates an analysis of your chosen technology, process, or internal service. Your organization can be real or it can be fictional, and it can be private or public. Your organization can be a huge multinational corporation or a small start-up. It could be a government entity, a research institution, or a non-profit. Whatever you decide, keep yourself in a junior occupation – a job you might have shortly after graduation where it is plausible that you would actually be asked to complete an analytical report.

The following are some examples of companies or organizations you could consider:

* **Green Energy Solutions Provider:** A company specializing in renewable energy technologies, such as solar or wind power, aiming to improve efficiency or expand their services.
* **Healthcare Facility:** A hospital or healthcare organization looking to redesign its layout to minimize disease transmission among patients or improve overall patient care, or create efficiencies in streamlining the collection of patients’ records.
* **Municipal Government:** A city council interested in implementing alternative fuel vehicles for their public transportation system to reduce carbon emissions.
* **Technology Company:** An IT firm or software company seeking to standardize software/hardware across the organization for better compatibility and efficiency.
* **Waste Management Company:** An organization focused on waste disposal methods (landfill, incineration, gasification) aiming to adopt more environmentally friendly and efficient techniques.
* **Educational Institution:** A university or college transitioning from hardcopy textbooks to electronic books as a part of a sustainable and cost-effective initiative.
* **Space Exploration Agency:** A space agency working on developing crafts or technologies for long-duration space travel, focusing on sustaining human life during missions to Mars or beyond.
* **Agricultural Company:** A farming enterprise exploring the use of biosolids (human waste) in agriculture for sustainable and eco-friendly crop production.
* **Security Technology Firm:** A company specializing in security tools and technologies aiming to upgrade their systems to enhance cybersecurity measures.
* **Entertainment Venue:** A performance venue interested in integrating new music-related technologies or innovative designs to enhance audience experience.

Again, note that these are just examples to get you thinking, but you do not need to choose from these examples and can certainly come up with your own, especially as they pertain to your own interests and background. Keep in mind that these company ideas are very general – you will need to be substantially more specific when describing your problem.

You are free to be as creative as you want with this. Whatever you choose, I recommend that you select an option that is (1) interesting to you; and/or (2) might be useful in building your portfolio for professional employment.

## Key Criteria

Whatever company you choose to work with, the scenario you devise, and the technology, process or service you offer as your solution, you will need to ensure that it is sufficiently complex so that you have enough material to complete the formal analytical report. At the same time, you will want to ensure that your problem is narrow enough that the options to solve the problem can be reasonably explained in 8-10 pages and that these solutions are mutually exclusive (that is, you should analyze competing options and recommend one).

**In other words, you will need to ensure the following criteria are met for your final report:**

* **Relevant, realistic, suitable:**
	+ The problem should be realistic for a company or organization related to your engineering concentration or field of study.
	+ Ensure it is a realistic issue that a company or organization might face, demanding action or resolution within that industry.
	+ The problem should be realistic and feasible for someone in a junior, non-managerial role. This ensures that the tasks, responsibilities, and challenges associated with the problem are suitable for someone at an early career stage within the engineering field.
	+ The proposed solution must be practical and implementable within the industry or field. Avoid far-fetched or speculative solutions that lack feasibility or practicality unless they are carefully explained, supported by evidence, and made plausible within the existing technological or industry constraints.
		- In other words, ensure that the solution aligns with the current state of technology, industry standards, and existing practices within the chosen field or industry. It should be something that, while potentially innovative, could reasonably be implemented or integrated into real-world scenarios without requiring substantial leaps in technology or infrastructure.
	+ While the company or organization can be fictional, it should exist within a realistic setting and context. Avoid creating an entirely fictitious or implausible company (such as a company building agricultural farm on Mars). Instead, develop a hypothetical company or organization that operates within the parameters and norms of the chosen industry or field, ensuring its credibility and relatability to real-world scenarios. Make sure you have a concrete understanding of your selected company, whether real or imagined.
* **Sufficiently detailed and yet appropriately narrowed:**
	+ Avoid broad or generalized issues that cannot be adequately addressed within the 8-10 page report (which is the end goal for the final assignment).
	+ Narrow down the scope to a level that allows for an in-depth analysis within the assigned report limit. Narrowing the scope will allow for a more detailed and comprehensive analysis of the ***specific*** problem.
	+ Focus on a specific aspect or technology rather than examining multiple complex solutions.
	+ Provide comprehensive insights into the selected topic without oversimplifying or overwhelming the report. (For instance, you will want to cover various aspects related to the chosen problem, such as technical feasibility, cost implications, environmental impact, maintenance, scalability, and integration challenges, as relevant). Ensure a comprehensive examination that provides nuanced insights into the problem’s intricacies.
	+ The report should be convincing, detailed, and comprehensive while remaining sufficiently focused.
	+ Provide explanations that are accessible to readers who might not possess specialized knowledge in the field but ensure enough depth for those with technical expertise. Articulate technical details clearly.
	+ Recognize the limitations of the 8-10 page report in accommodating exhaustive discussions on multiple facets or intricate technical details. Strive to provide a thorough analysis within the constraints of the available resources, avoiding the inclusion of overly detailed technical data that might exceed the report's scope.
* **Mutually exclusive:**
	+ The end goal of the final report is to:
		- Identify and outline different solutions or approaches to address the problem. Each proposed solution should offer a unique methodology, technology, or strategy distinct from the others.
		- Provide a comprehensive overview of each proposed solution. Detail the characteristics, advantages, disadvantages, technical specifications, feasibility, potential challenges, and anticipated outcomes for each option. Emphasize the inherent differences between each option.
		- Conduct a comparative analysis among the different options. Highlight the distinguishing features, pros and cons, costs, benefits, risks, and implications associated with each solution.
		- Evaluate the options based on predefined criteria, such as feasibility, cost-effectiveness, technical viability, environmental impact, scalability, compatibility with existing systems, and alignment with the company's goals and constraints (not all of these will be relevant to you, but focus on the criteria that make the most sense for your problem and proposed solutions).
		- Based on the comparative analysis and evaluation criteria, recommend and justify the selection of the most appropriate solution. Clearly articulate the rationale behind choosing one option over others, considering its strengths, compatibility, feasibility, and overall alignment with the problem statement and company objectives.
		- Outline an implementation strategy or roadmap for deploying the selected solution. This could involve highlighting key steps, resources required, timeline, potential challenges, and expected outcomes to facilitate its successful execution.
	+ Keep this end goal in mind when brainstorming and completing the initial stages of the project.
* **Adequately researched:**
	+ A key part of this assignment involves reviewing existing literature research to support your analytical findings, conclusions and proposed solutions effectively. If you are unable to find suitable existing literature on your chosen topic, you may want to select a different topic.
	+ Conduct thorough research using various resources such as academic literature, industry-specific publications, news sites, and trade publications.
	+ Explore different tools, processes, and existing solutions relevant to the identified problem.
	+ Provide evidence, data, or case studies to support the chosen solution's feasibility and effectiveness. Justify why the selected option best addresses the identified problem while meeting the organization's needs and constraints.
	+ Follow the assignment instructions for the types of sources to include, along with the number of sources, and ensure that the sources are appropriately integrated and cited within the report.
* **Follows the** [**AI Policy and Writing Process Documentation for ENGR 5201**](https://docs.google.com/document/d/16dduv1wH0E7G_pRZKUmegFbh8JxCTUvHlEVeSxi_iM8/edit?usp=sharing): Documenting the writing process from outline to draft is crucial for demonstrating your understanding of the writing process. It is also important, in the age of AI, to demonstrate that you have independently completed your assignments.
	+ For each assignment, you will keep track of your writing process and will be asked to submit a documentation package along with your final submissions. (Review the full AI Policy Instructions before submitting your assignments to ensure you follow all the required steps).
	+ For each assignment, you must also use the IEEE citation style to appropriately cite sources within the assignment. Keep track of all sources consulted, including articles, books, websites, or any other references used. Document this by maintaining a bibliography or reference list with complete citations for each source consulted.
	+ Follow the guidelines provided regarding the use of AI tools in the course. Ensure proper acknowledgment and citation of any AI-generated content or assistance used during the writing process (and only use AI as permitted in this course). Document the use of all AI tools and their contributions to your work.
	+ Failure to provide proper attribution or citations for AI-generated content could lead to severe consequences, such as having to rewrite and resubmit the assignment or immediate failure of the assignment. The severity of consequences will depend on the discretion of the instructor and the nature of the violation.
	+ By maintaining records of outlines, drafts, and sources consulted and appropriately citing all sources, as well as AI use, students can ensure transparency and credibility in their assignments while avoiding potential academic integrity violations related to plagiarism and AI tool usage.

## Narrowing Your Topic – An Example

One of the key requirements for the final assignment will be to select a topic that is feasible to address in an 8-10-page report. The following example provides an overview of how to sufficiently narrow your topic:

*Example: Renewable Energy Implementation in a Manufacturing Plant*

**Scenario:** A manufacturing plant aims to transition to renewable energy sources for sustainability and cost-efficiency. Initial assessments reveal various areas of concern:

1. Solar panel installation on the plant’s rooftop.
2. Wind turbine installation on the factory premises.
3. Integration of biomass technology to power specific operations.

Writing about all three of these options within one (8-10 page) report would be inappropriate for several reasons:

* **Scope and Depth:** Each of the options—solar panel installation, wind turbine installation, and biomass technology integration—requires in-depth analysis to cover technical feasibility, cost implications, environmental impact, maintenance, scalability, and integration challenges. Further, each of the three options could be pursued differently, necessitating multiple options for each of the three problem areas. Within 8-10 pages, it would be challenging to thoroughly examine and provide detailed insights into all three options adequately.
* **Complexity and Technicality:** Renewable energy technologies, such as solar panels, wind turbines, and biomass technology, are highly technical and complex subjects. Covering all three options in a concise manner while maintaining depth and technical accuracy within a limited report size would result in a superficial treatment of each option.
* **Resource Constraints:** Discussing multiple options extensively within a short report might demand more data, case studies, technical specifications, and analyses than the available resources and page limit can reasonably accommodate.

To provide a more reasonable overview and a focused analysis, one could select just one option based on certain criteria:

* **Relevance and Suitability:** Evaluate the options based on the manufacturing plant's specific requirements, available resources, geographical location, energy needs, and long-term goals. Choose the option that aligns most closely with the plant's objectives and feasibility.

For instance, if the plant is situated in a region with ample sunlight and roof space availability, prioritizing solar panel installation might be more suitable. In this case, the report would solely focus on the technical aspects, cost implications, energy output estimations, environmental impacts, and potential long-term benefits of implementing solar panels on the plant's rooftop.

Concentrating on one option—such as solar panel installation in this case—within the report allows for a deeper dive into the selected technology, ensuring a comprehensive analysis that explores various facets without spreading thinly across multiple options, thus providing a more reasonable and detailed overview within the 8-10 page limit.

You will also want to ensure that your analysis presents a **mutually exclusive option** that you will recommend the company to take. (Again, the goal is to analyze competing options and recommend one).

Given the solar panel example, when conducting your research, you may find that there are different types of solar panel options. For instance:

* *Option 1: Conventional Monocrystalline Solar Panels*
	+ These panels are known for their high efficiency and power output per square foot.
	+ Pros: High efficiency, longer lifespan, perform well in high temperatures.
	+ Cons: More expensive due to manufacturing process, appearance may be less uniform.
* *Option 2: Thin-Film Solar Panels (Amorphous Silicon)*
	+ These panels are lightweight and flexible, allowing for installation in various configurations.
	+ Pros: Lower cost due to simpler manufacturing, better performance in low light conditions, aesthetically pleasing.
	+ Cons: Lower efficiency compared to monocrystalline panels, shorter lifespan.

In this scenario, the mutually exclusive options within solar panel installation for the manufacturing plant would be the choice between conventional monocrystalline solar panels and thin-film solar panels (amorphous silicon). Both options offer distinct characteristics, advantages, and drawbacks, but selecting one precludes the simultaneous implementation of the other due to their differing technologies, performance metrics, and suitability for the plant's specific requirements.

The analysis within the report would thoroughly evaluate and compare these different options based on criteria such as efficiency, cost-effectiveness, lifespan, performance in different conditions, installation flexibility, and overall alignment with the manufacturing plant's objectives. Ultimately, the report would recommend one of these mutually exclusive options based on the findings and the plant's specific needs and constraints.

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# PARTICIPATION/ IN-CLASS WRITING EXERCISES AND DISCUSSIONS

The ongoing In-Class Writing Exercises will allow you to collaborate with other students to hone your communication skills. Each week, you will work in groups or independently to complete short writing exercises. You will share your answers on our class discussion board.

* The discussions and activities will help prepare students with the writing principles needed to complete the main assignments in the course.
* To receive full credit, students must attend and participate in 8 lectures and submit thoughtful contributions for our class exercises (1% per class for 8 classes = 8% of the total grade).

Note: the final two weeks of the course are dedicated to presentations and will not be considered toward the participation grade. In other words, students must attend at least 8 classes throughout Weeks 1-10 of the course. Students are already expected to attend the final two weeks of class to share their presentations and provide feedback to their peers, but Weeks 11 and 12 will not be considered for attendance/participation.

(Students are allowed up to 2 absences during the semester to account for illnesses or other personal circumstances that may occur during the term. If you anticipate missing more than two classes over the term, please be proactive and contact the instructor right away).

# ACADEMIC INTEGRITY AND AI QUIZ

The quiz is a foundational guide to support students’ understanding of maintaining academic integrity standards within our university's framework. It also acquaints students with the specific policies concerning AI usage in this course. The purpose of the quiz is to familiarize students with the prerequisites for success in the course assignments.

The quiz content is primarily drawn from the Week 2 lecture and the assigned readings. It encapsulates key elements related to academic integrity principles and elucidates the policies governing the utilization of AI resources within this course.

This quiz carries a weightage of 4 percent of your total grade for the course. It is time-bound and should be completed within 75 minutes. Students are allowed up to two attempts to complete the quiz. The quiz contains a mix of multiple-choice, true/false, matching, and multiple-answer questions.

By engaging with this quiz, students will:

* Gain a robust understanding of academic integrity principles.
* Acquire familiarity with the specific policies governing the use of AI resources in this course.
* Grasp essential insights contributing to their success in the course's assignments.

Prepare adequately by revisiting the Week 2 lecture materials and readings to excel in this quiz and fortify your understanding of academic integrity standards and AI usage policies.

# PROPOSAL AND ANNOTATED BIBLIOGRAPHY

You will submit a proposal and annotated bibliography that is around 1000 words combined.

**Proposal Instructions:**

Create a proposal that:

* Identifies the problem in your organization;
* Gives some indication of the organization background, but ensure you are providing company background in a way that is appropriate for your insider audience;
* Describes in a brief, even tentative way three possible options to resolve the problem;
* Estimates staffing, timeline and budget needs to complete the analytical report (NOT to implement the solutions);
* Does not yet make a recommendation on which option to pursue; and
* Requests authorization to complete a full analytical report.

Remember, the focus of the proposal is identifying a problem at a chosen organization. As part of the proposal, you are requesting approval to complete a full analytical report in which you will analyze the possible solutions and make a recommendation.

Your proposal will be written as a memo as if you are currently working in the organization. Your proposal is, therefore, to be an internal memo. The proposal should provide your workplace supervisor (the course instructor) with a clear sense of the problem and the direction and content of the proposed analytical report.

In giving some indication of your company, remember that in this hypothetical scenario, the instructor works at the same organization; avoid generic background info and instead try to integrate details of the organization in a subtle way as it relates to the problem.

The proposal will NOT make a recommendation on which option to adopt. You are encouraged to identify in a preliminary way any possible options, but to actually make a recommendation in the proposal prior to completing your research and a thorough analysis of the options would be premature and calls into question your professional judgment.

* Your proposal should be no more than 400 words in length. Follow the following guidelines for [**formatting your memo/proposal**](https://owl.purdue.edu/owl/subject_specific_writing/professional_technical_writing/memos/format.html#:~:text=The%20format%20of%20a%20memo,concise%20and%20easy%20to%20read.).
* For the proposal submitted as a memo, you do not need “front matter” (e.g. title page, table of contents).
* You do need “back matter” (e.g., bibliography). Neither front matter nor back matter is included in the 500-word count for the proposal. See details below for the “Annotated Bibliography” portion of this assignment and the specific word count required for your annotations.

**Annotated Bibliography Instructions:**

In addition to the 400-word proposal, you will submit an annotated bibliography that is 600 words in length (150 words per source, with four annotated sources, plus two additional sources that do not require annotations).

An annotated bibliography is a reference list that provides a summary of each of the entries within the bibliography. In other words, the source is cited as expected in a bibliography, but each citation is followed by a brief (usually about 150 words) descriptive and evaluative paragraph, the annotation. The purpose of the annotations is to provide the reader with a summary and an evaluation of each source. You want to inform the reader of the relevance, accuracy and quality of the sources cited so the reader can better understand how the source will be used by the author.

The annotated bibliography will be a list of the sources you used in your research.

You must use a minimum of SIX sources in your bibliography, including:

* One reliable book (electronic or print) written within the last 8 years
* Three reliable, recent (within the past 8 years) academic journal articles (electronic or print)
* Three of any of the following:
	+ An additional academic article
	+ An additional reliable book
	+ Academic conference proceedings
	+ A reliable, professionally acceptable, credibility-building website (not Wikipedia or similar sites)
	+ A magazine article (electronic or digital, but the article must be substantial in length and content)
* NOTE: Online encyclopedias and informational sites – including Wikipedia, Answers.com, and How Things Work – should be avoided in academic research. In general, encyclopedias are not considered academic sources. They are fine as a starting point leading you to sources but do not use them as sources.

Key Points:

* You should only provide annotations for four sources. Choose the four sources that best help you understand your proposal.
* In addition to the four annotated sources, include at least two other sources that inform your research; however, you do not need to write annotations for those additional sources. You can simply list these sources in your bibliography (and cite them in your in-text citations).
* You can have more than six sources but focus on quality over quantity and only provide annotations for four sources. In other words, any additional sources you wish to share can simply be cited in the bibliography (without including the annotation).
* Cite your sources using the IEEE Style Guide, including both in-text citations and bibliographic citations.
* You MUST properly cite in the body of your proposal where you use your sources. This is called in-text citing.
* The annotated bibliography will be formatted according to IEEE Style Guidelines, so the sources will be listed in numbered order based on where they first appear in the text. In other words, the sources will be enumerated from [1] to [n] based on the order in which they appear within the proposal.
* The sources with annotations will have the annotations follow immediately after the citation is given on the reference page, and the sources without annotations can just be listed in the order that they appear in the in-text citations.

 For example:

[1] J. K. Author, “Title of chapter in the book,” in Title of His Published Book, xth ed. City of Publisher, (only U.S. State), Country: Abbrev. of Publisher, year, ch. x, sec. x, pp. Xxx–xxx.

This book provides a comprehensive overview of […]. The key themes are […]. The major conclusions of the work are […]. The book can be considered a reputable and authoritative source because[…]. The book will be useful for my research because […].

[2] J. K. Author, “Title of paper,” in Abbreviated Name of Conf., X. Editor, Ed. (location of conference is optional), year, pp. xxx-xxx.

[3] J. K. Author, “Name of paper,” Abbrev. Title of Periodical, vol. x, no. x, Abbrev. month, year, Art. no. xxx.

This academic article discusses the recent development of […]. It concludes that […]. While the article provides data and graphs that help to understand […], the methodology is incomplete because […]. The article does not address […]. At the same time, this article will be useful in providing a framework for […].

In this example, sources [1] and [3] include annotations, but source [2] does not.

For each annotation, be sure to:

* + Summarize.
		- Remember, summaries present the key points of the original author’s work but not necessarily everything they said.
		- When summarizing, consider the central theme or scope of the source. (Identify the author’s purpose, approach/method, goals, outcomes).
		- If relevant, comment on their intended audience.
		- What major conclusions or arguments does the author make, and how are they supported?
	+ Evaluate.
		- Briefly evaluate the authority or background of the author or source, and evaluate the strengths and weaknesses of the source.
		- If relevant, explain any assumptions the researcher(s) seem(s) to be making or any potential biases.
		- Explain what makes the arguments or ideas convincing or persuasive.
		- What was the basis of your selection criteria?
		- In your annotation, define whether you have selected a scholarly article, a book, a government document, an industry document, etc. If relevant, explain why you chose this type of source over others.
	+ Connect:
		- Be sure to write a short statement on how this work can be used to support your own proposal.
		- How does this source help you? What additional questions does it raise? If relevant, how does it fit with the other works you are reading?
		- Be sure the reader understands the basis for your source selection. They should be able to read the annotation and have a good understanding of why you selected this particular source (and not others) to best understand your research.

You can find examples of annotated bibliographies here (note, these may not all follow IEEE citation style, but they provide an overview of what an annotation looks like):

* <https://guides.library.queensu.ca/apsc/annotated_examples>
* <https://libguides.unomaha.edu/c.php?g=100374&p=5209920>
* <https://libraryguides.unh.edu/c.php?g=326949&p=5129713>

Be sure to follow the citation guidelines for IEEE shared in class when formatting your reference list. You are also expected to review the IEEE guidelines on your own, as we will not be able to review every possible source type in class.

In addition to the instructions in this document, ensure you carefully review the grading rubric and additional instructions discussed in class.

Further, be sure to include your “Documentation Package,” as outlined in the [**AI Policy and Writing Process Documentation for ENGR 5201**](https://docs.google.com/document/d/16dduv1wH0E7G_pRZKUmegFbh8JxCTUvHlEVeSxi_iM8/edit?usp=sharing).

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# ANALYTICAL REPORT - DRAFT

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After the proposal is submitted, you are to complete the draft of your analytical report. You will develop a formal report that identifies a problem and analyses the possible solutions (i.e., options) you identified through your research. You may revise or change your proposed solutions from the proposal based on feedback from the instructor, additional research, and/or further reflection. If you are thinking of changing your project, please first speak with the instructor.

The analytical report should first summarize the problem carefully and succinctly. Then, it should provide a recommendation or recommendations based on a comprehensive analysis of the possible solutions (e.g. cost, function, ease of use, impact on the environment, economic impact, complexity, risk, organization impact, feasibility, etc.). You are required to present evidence on the pros and cons of each of the solutions you identify. Make your criteria of evaluation clear and consistent.

The overall goal is to make a case for the adoption of one of your solutions by your particular organization. In the report, indicate how your proposed solution will solve the problem and provide tangible benefits. Specifically, indicate how it will meet the objectives and abide by the constraints outlined in the problem definition. Give specific examples. If possible, show the specific differences between “how things are now” and “how they could be.”

Please carefully review the following document, which provides a breakdown of the different components required for a formal analytical report: [**Formal Analytical Report Components**](https://docs.google.com/document/d/1Syx98rWgAWKp597yDTfIYlQChUHhOX3W_vbET9aniI0/edit?usp=sharing). This document shows a step-by-step breakdown of what must be submitted in your report.

Be as empirical as possible, but appeal to all appropriate persuasive strategies. Emphasize the results, benefits, and feasibility of your proposed solution. The goal is to persuade the reader to accept the writer’s recommendation (that is is worth the time, energy, and expense necessary to implement or see through). “Convincing” makes many engineers uncomfortable because they think good evidence should be convincing by itself; however, you must still persuade the reader that your evidence is good. Convince the reader that you have thought through the problem and the possibilities, and have a workable solution.

In your scenario, your full report is helping your organization’s senior decision-makers (i.e., those above your course instructor/manager) to choose one course of action over another. You are the expert on the technologies/processes, but you must present the information in a way that a non-expert would understand, as the report may be shared with others (for example, non-engineers) within the company. Make sure you consider the audience you are addressing. You need to explain the problem clearly and provide enough background to give context to your solution. Also, use strategies to guide the reader through the document so they know what you are doing and can understand your approach. (Reflect on the strategies we have discussed throughout the course to make your report readable and clear to the reader).

* Be sure to write in the tone of a formal report. Be professional, convincing, logical and credible and avoid colloquial language.
* Your report is to be around 8-10 pages (2,000 words) in length. Word count does not include your “front matter” (e.g., transmittal memo, executive summary, title page, table of contents) or “back matter” (e.g., bibliography and appendices).
* You must follow IEEE style guides for formatting your document and citations/ references.
* The bibliography will list the sources you used in your research. You SHOULD NOT include annotations for this bibliography (those were only required in the annotated bibliography assignment).
* You MUST also properly cite in the body text where you use your sources to show where your information is coming from. Your in-text citations should help you establish credibility by demonstrating your research and critical appraisal skills.

 You must use a minimum of eight sources for the draft, including the following:

* One reliable book (electronic or print) written within the last 8 years
* Three reliable, recent (within the past 8 years) academic journal articles (electronic or print)
* A reliable, professionally acceptable, credibility-building website (not Wikipedia or similar sites)
* A magazine article (electronic or digital, but the article must be substantial in length and content)
	+ The other sources are up to you, but they should be reliable, reputable sources appropriate for a professional report. (Again, online encyclopedias, including Wikipedia, Answers.com, and How Things Work, should be avoided in academic research. In general, encyclopedias are a good place to start but are not considered appropriate academic or professional sources).
	+ You may choose to use more than eight sources if you have identified other sources that have aided you in your research process.

Ensure that you use good quality, authoritative sources. It is okay to use some other sources (such as newspaper articles or websites) to inform your reportl; however, the substance of your research should be established by peer-reviewed or technical sources or governmental reports/ research.

If you need help identifying sources and navigating the university database, be sure to check out the library resources shared on Canvas or [book an appointment with the subject librarian for engineering](https://ontariotechu.ca/sites/library/about/subject-librarians.php#:~:text=Subject%20Librarians%20deliver%20customized%20information,select%20materials%20for%20Library%20collections).

When selecting your sources, consider the following:

* Ensure that your sources show different perspectives or views on the topic you are investigating.
* Consider if there are any conflicting theories, results or methodologies in the different sources you have reviewed.
* Explain if there are any gaps in the research or scholarship, inconsistencies in the findings, difficulties you came across, or any areas or issues pertinent to further study.

When explaining your sources within the text:

* Paraphrase, summarize and quote appropriately.
* If needed, return to the original source and insert appropriate quotations as necessary.

Please review the marking guide carefully.

Further, be sure to include your “Documentation Package,” as outlined in the [**AI Policy and Writing Process Documentation for ENGR 5201**](https://docs.google.com/document/d/16dduv1wH0E7G_pRZKUmegFbh8JxCTUvHlEVeSxi_iM8/edit?usp=sharing).

# PEER REVIEW EXERCISE

After you have completed your draft, you will be asked to share it with another student in the course. You will be assigned your partner by the course instructor.

When you submit your draft in Week 8, you must also email it to your assigned peer. If you do not receive the draft from your peer by the deadline, please let the course instructor know right away.

For this assignment, you will provide constructive feedback on your peer's "Analytical Report - Draft" assignment, evaluating its content, structure, adherence to guidelines, clarity, and persuasiveness. This exercise aims to enhance the quality of the reports and assist peers in refining their work based on comprehensive feedback.

Note that your job is to not act as an editor or corrector. (In other words, your primary focus should not solely be on fixing grammatical errors, typos, or formatting issues). Instead, the main objective is to evaluate the content, structure, adherence to guidelines, clarity, coherence, and overall quality of the assignment. You will provide this feedback based on the grading criteria and template form provided.

**Main Instructions for the Reviewer:**

* **Read Carefully:**
	+ Thoroughly read your assigned peer's "Analytical Report - Draft" assignment.
* [**Fill out the Peer Review Feedback form**](https://docs.google.com/document/d/1pZpX61jkCeKnjf84hj-G8Oy0RxFIa6vgjiDt5LLi5Ng/edit?usp=sharing)**:**
	+ When completing the review, engage with the assignment rubric. Refer to the assignment instructions and criteria provided by the instructor to guide your review and ensure you cover all essential aspects.
* **Submit Your Feedback Review form:**
	+ Submit your compiled feedback both to your assigned peer and to the instructor.
	+ If you do not receive your peer feedback from your peer by the required deadline, please contact the course instructor right away.

You can find the [**Peer Review Feedback Form here**](https://docs.google.com/document/d/1pZpX61jkCeKnjf84hj-G8Oy0RxFIa6vgjiDt5LLi5Ng/edit?usp=sharing) (please make a copy for yourself for the assignment).

* **Evaluate Content:**
	+ Assess the clarity and coherence of the problem statement, ensuring it is well-defined and explained concisely.
	+ Evaluate the proposed solutions/options presented by the peer. Assess whether they are adequately researched, distinct from each other, and thoroughly analyzed in terms of feasibility, cost-effectiveness, and alignment with the problem statement.
	+ Determine whether the recommendations are clearly justified and explained.
	+ Ensure the report demonstrates a deep understanding of the chosen topic and presents evidence from reliable sources to support arguments and conclusions.
* **Assess Structure and Formatting:**
	+ Check if the report adheres to the IEEE style guide for formatting, citations, and references.
	+ Evaluate the structure of the report, assessing the introduction, body, and conclusion for logical flow and coherence.
	+ Assess the use of headings, subheadings, and transitions to guide the reader through the document effectively.
* **Review Clarity and Professionalism:**
	+ Evaluate the report's language for professionalism, avoiding colloquialism and maintaining a formal, persuasive tone.
	+ Assess the clarity of explanations, ensuring technical information is conveyed in a manner accessible to non-experts.
	+ Check for any instances of ambiguity or unclear statements that might hinder understanding.
* **Provide Constructive Feedback:**
	+ Offer specific feedback on strengths and areas for improvement, supporting your comments with examples from the report.
	+ Provide suggestions on how the peer can enhance the report's clarity, depth, or persuasive elements.
	+ Be constructive, respectful, and specific in your feedback.

# REPORT SUMMARY PRESENTATION AND PEER FEEDBACK EXERCISE

You will be tasked with making a short presentation to the class and sharing a relevant accompanying visual aid, such as a slideshow presentation.

Pretend that the class is composed of key members from your organization and you are making a presentation to persuade the audience to adopt your solution for the identified problem. Some of the audience members may have an engineering background, but others in the audience may have a different background (for instance, they may have a project management or business background).

The goal is to provide a succinct overview of the main themes found in your analytical report and persuade your audience.

The basic outline template shared in class (see Irish and Weiss 288 and our Week 9 lecture for an overview) and the visual accompaniments must be submitted on Canvas BEFORE our class in Week 11.

You will either present in Week 11 or in Week 12 (the presentation list will be shared during class). For the week you are not required to present, you are expected to attend and provide feedback on two of your classmates’ presentations.

**Presentation Overview and Outline:**

The goal of the presentation is to communicate your understanding of the problem, offer the possible solutions (and evaluate them carefully by very briefly outlining the research you have conducted), explain your recommendation, and highlight the potential positive impact of your solution on your company. This must be done succinctly and persuasively.

This assignment serves as a valuable exercise in distilling complex concepts into a brief, but compelling and accessible presentation, while reinforcing a strong central message. The presentation should be between 5 to 8 minutes in length.

Your presentation should include a suitable **outline following the outline template shared in class**. I cannot assign a grade without the outline template. The outline will help you organize the following elements of the presentation:

* **Introduction:**
	+ State your purpose and introduce your problem.
		- Present a compelling argument for how you intend to address the problem. Make sure your argument is clear and succinct. (Have a single, clear statement to lay out your key argument).
		- The pitch aims to convince you that you understand the problem and can recommend the most appropriate solution.
	+ Establish credibility
		- The speaker should establish credibility to speak on the topic in the introduction.
	+ Engagement
		- The speech uses appropriate devices/ an opening strategy to engage the audience and provides reasons why the audience should listen.
	+ Preview/ foreshadow the key ideas
		- Use a preview statement to outline the key themes or points that will be addressed throughout the speech.
		- Ensure it is an appropriate length. (Remember, you are previewing what is to come, not yet providing the full details; the statement can be short but clear).
	+ Other considerations
		- The introduction should be concise and focused.
		- The different components of the introduction should be linked together carefully.
* **Main Body:**
	+ Provide a concise overview of the possible solutions, weighing each solution carefully.
		- Provide enough detail so the audience will understand the problem and your possible solutions.
		- Be brief: focus on the key details/ “big picture” only. (Consider the MOST important information you need to provide, as you do not have time to review all of the details that will be found in the analytical report).
		- You may decide to explain your recommended solution right away, or wait until you have outlined all of the options before making the recommendation. Ensure your strategy makes the most sense for your selected problem.
	+ Include supports/ evidence
		- Include appropriate supports, as required, to buttress your points.
		- Be sure to “cite” sources (either on your visuals or address them verbally in your presentation).
		- Avoid logical fallacies.
	+ Connect your ideas
		- Use appropriate signposts, transitions, and/or internal summaries to help the audience follow your thinking.
		- The main points should be organized in a thoughtful manner so the speech maintains a logical flow, moving from general to more specific points.
		- A clear rhetorical pattern is used to arrange the ideas.
* **Conclusion:**
	+ The conclusion should do just that, conclude. The goal is to provide closure to your ideas.
	+ Establish your recommendation as the best choice for moving forward.
	+ Reinforce your claim (you can use a therefore statement).
		- You want to restate your key points, but with emphasis now on the important points you highlighted during the main body of your speech.
	+ The conclusion should be an appropriate length.
	+ It should not introduce new material.
	+ The conclusion should be memorable and appropriate and signal the end of the speech.
	+ Ideally, the conclusion should offer something of value to the audience, and the audience should leave with a strong takeaway.

**Visual Aid:**

The visual aid is not a mere supplement; it is an integral component of your presentation, and it elevates your ability to connect with your audience.

* You will be asked to create, at minimum, an accompanying slideshow presentation for your speech. (Aim for 1-2 slides per minute).
* Make sure visual elements are thoughtful, serve a purpose, and are clear, legible and concise.
* Visuals should lend to the professionalism and clarity of the presentation (they should not distract from the presentation).
* Slide layout, text, and images should be carefully considered and should follow the instructions outlined in our course lecture on visual communication.
* Images or video elements that have been taken from elsewhere should be open-access resources (to avoid copyright), and they must be cited if they are not taken from the slideshow image/ stock photo database. (For short presentations such as this, it is often best to avoid video elements unless they are very short).
* If relevant, you may decide the use other visuals, handouts, or samples, but these are not required.
* Be sure to follow the key criteria for visual aids described in class.

**Delivery and Audience Considerations:**

You will be evaluated not just on the content of your presentation but also on your delivery and audience considerations. Consider the following:

* **Communication Style:**
	+ The presenter should speak clearly, maintain a steady and understandable pace, and speak in a confident manner.
	+ The speaker should maintain composure (controlling posture, fluency, silence).
	+ The presentation should be dynamic (making use of controlled gestures, eye contact, pitch, inflection and rhythm, rate and volume, etc.).
	+ The speaker should convey trustworthiness, confidence, and competence through delivery (using eye contact, posture, voice, appropriate dress, etc.).
* **Revision and Practice:**
	+ Practice, practice, practice!
	+ The speaker should appear familiar with the material and not need to read the notes verbatim.
	+ The speaker should be able to improvise in delivery (rather than necessarily memorizing the entire speech).
	+ Always remember the differences between written and spoken communication and reflect on the key principles for oral communication discussed in class.
	+ Presentations MUST be between 5 to 8 minutes in length. The instructor will end the presentation if it exceeds 8 minutes. This is to ensure that everyone has adequate time to present.
	+ Ensure that you spend the right amount of time on each element of the presentation. Do not elaborate too long on some parts while rushing through others.
	+ Have everything you need set up and ready to go. You will only have a minute to get your presentation opened and ready to present. Taking too long with setup will cut into your presentation time.
* **Audience Considerations:**
	+ Build your idea with familiar concepts that the audience already understands.
	+ Avoid jargon and highly technical language.
	+ Communicate to an audience who may not know the intricacies of your report/ background but do not “dumb down” or devalue your report; communicate clearly why your report is important.
	+ The project should be communicated in language appropriate to a non-specialist audience, and any specific terminology used should be elaborated on carefully with appropriate background information, definitions, or examples.
	+ Ask yourself:
		- Does the presentation help the audience understand the need for the project?
		- Does the presenter clearly outline the aims of the project?
		- Does the presenter follow a logical sequence that the audience can understand?
	+ As necessary (and within the time parameters provided), use examples, illustrations, facts, etc., to engage with the audience.
	+ The presentation should answer preliminary questions and should make the audience want to know more.
	+ The presentation should convey enthusiasm for the work while remaining professional and objective in tone.
	+ Use transitions and signposts carefully and strategically to help the audience follow along.

**Peer Feedback:**

You will be assigned a presentation day. For the day you are not presenting, you will still be required to attend. Here, you will receive the names of two specific classmates whose presentations you need to provide feedback on. This means you will be evaluating the presentations of these classmates.

Part of your presentation grade will be determined based on the quality and depth of the feedback you provide to your peers. This means you will need to thoroughly assess and critique the presentations based on the rubric provided to you.

To excel in this part of the assignment, you will need to:

* **Pay Attention:** Focus attentively on the presentations of your assigned classmates.
* **Use the Rubric:** Follow the rubric provided to evaluate various aspects of the presentations.
* **Be Constructive:** Offer constructive criticism, pointing out both strengths and areas for improvement.
* **Be Specific:** Provide specific examples or instances from the presentations to support your feedback.
* **Be Respectful:** Maintain a respectful and encouraging tone in your feedback.

This part of your grade for the assignment will reflect your ability to analyze presentations critically, provide insightful feedback based on the rubric, and help your classmates improve their presentation skills.

**Other Considerations:**

* If you are sick or there is an emergency, and you are unable to present during the day of the scheduled presentations (or you are sick for the day you are required to provide feedback), please message me IN ADVANCE of the class to let me know.
* Please provide a reason for your absence.
* If the reason is determined to be appropriate and reasonable, I will follow up with instructions on how we will make up the presentation.
* Note, that if the absence is not warranted, the grade may result in a zero.

# ANALYTICAL REPORT - FINAL VERSION AND REVISION REFLECTION EXERCISE

Your task is to revise your Analytical Report based on the feedback provided on your original entry (you will incorporate both the instructor’s feedback and the feedback received during your peer review). Be sure to engage with the general feedback provided on the assignment, the grading rubric, and the specific annotated comments written directly on your submitted draft. The feedback aims to guide you in enhancing the overall quality, structure, and content of your report.

Remember, this assignment is all about revision – the goal is to revise, and this is what will be emphasized in the grading criteria. You may have received a good grade on the initial submission, but if you do not engage with the feedback provided by the instructor and your peers, and you simply submit a draft very similar to the original draft, you will not receive high marks for this assignment. You must revise your paper according to the feedback provided in order to receive a strong grade on this assignment.

You will then be asked to write a short reflection explaining your writing process and how you incorporated our class learnings into your revision. The goal is to reflect on the key principles we have been addressing in this class to further develop your academic writing skills.

The revised final analytical report and revision reflection should be submitted as two separate documents.

Note that you will not receive any substantive feedback on the final version. Detailed feedback will be provided on the proposal and draft.

**Final Report:**

You will revise your report based on feedback from the course instructor and your peer reviewers.

You must use track changes and comments (using Google Docs) to show where you have responded to edits and critiques.

Your revisions might involve adding a section or sections, integrating further research, eliminating typos and issues with writing mechanics, improving paragraph design, adding appendices to support high- and low-context readers, elevating the formality of the writing, reviewing guidelines for formatting and citations, and generally seeking to make your final document as professional as possible.

If you choose not to make some of the suggested revisions, use the Comment tool to explain why.

The final report should remain around 8-10 pages (or ~2000 words).

**Revision Reflection Exercise:**

Following the final report, write a short 3-4 page (double-spaced) reflection of the revision process. Use an essay structure (introduction, main body, and conclusion) when writing this reflection.

* Note: Since this is a reflection, it is okay to write in the first person when explaining your writing process.
* Be sure to provide specific examples from your analytical report when explaining your writing process and justifying your decisions about what to include in the revised version. These examples will help demonstrate your understanding of the revision process.
* Also, it would be a good idea to review Irish and Weiss and our lecture slides for an overview of the different writing principles that you will discuss in your reflection. When possible, bring in relevant citations from our textbook to explain your writing process.

Include the following sections in your reflection:

* **Introduction:**
	+ Reflect on the strengths and weaknesses of your original analytical report. In what areas did you feel most confident, and where did you face challenges?
	+ How did you approach the revision process? Describe the strategies that you used.
	+ How did the feedback you received help you “see anew” for the revision process?
	+ In your introduction, be sure to set the context for the reflection. Give brief background information orienting the reader to the purpose of the reflection. Also, be sure to provide an overview of the document’s organization.
* **Main body (note: you do not need to title it “main body,” as that is a bit rigid):**
	+ Discuss changes you made to the content or research to better support the background, problem, possible solutions, or recommendations.
		- Reflect on specific alterations made to the content. Explain how these changes strengthen the paper.
		- If sections remain unchanged, explain why these sections were deemed adequate in the original draft and justify why changes were unnecessary.
	+ Discuss the changes you made to the organization and structure of your analytical report.
		- How did you ensure a logical flow of ideas?
		- Here, you can also reflect on your use of paragraphs and transitions:
			* Paragraphs:
				+ How did you design and revise your paragraphs to ensure a clear and logical progression of ideas? What decisions did you make about paragraph length to enhance readability? Were there instances where you cut unnecessary details, added more explanation, or re-phrased sentences in your paragraphs for clarity? Did you experiment with different paragraph structures or rhetorical patterns during the revision process?
			* Making transitions:
				+ How did you use transitions to enhance the flow of the writing and ensure that the reader understood the connection between your ideas? Provide examples of how you used transitions to connect different paragraphs or sections together. (Note: If I gave an example of how to make a transition in the feedback you received, you cannot use my example. Choose an example that you have written yourself).
	+ Framing Knowledge and Moving from Known to New:
		- During the drafting and revision stages, what decisions did you make to frame the knowledge being introduced to the reader?
		- How did you apply the principle of “moving from known to new” to orient the reader to new information? And, how did you take advantage of the “power positions” to aid understanding and memory?
	+ Style, Flow, and Formatting (Tone, Writing Style, Modifying Matters, Citations and Formatting):
		- Discuss the steps you took to improve the clarity and professionalism of your writing style. Were there specific language choices or sentence structures (or sentence lengths) that you revised for better readability?
		- How did you ensure an overall academic tone in your writing?
		- How did you use strategic word choices (such as adjectives, adverbs and other modifying constructions) to achieve precision and clarity in your writing?
		- How did you achieve flow in your writing? \
		- Briefly explain why it is important to adhere to a style guide for formatting and citations. If relevant, explain the changes you made to improve the accuracy and consistency of in-text citations, the reference list, and overall document formatting.
* **Conclusion:**
	+ Identify key lessons you learned from the peer review (feedback) and revision process. How will these lessons inform your future approach to writing analytical reports or academic writing in general?
	+ Consider any surprising discoveries you made during the revision process that influenced your understanding of your problem/solution.
	+ What aspects of your analytical report do you think could still be improved? How could you address these areas?
	+ Reflect on the skills you developed during the revision process and how you plan to apply them to your future academic or professional writing.

Further, be sure to include your “Documentation Package,” as outlined in the [**AI Policy and Writing Process Documentation for ENGR 5201**](https://docs.google.com/document/d/16dduv1wH0E7G_pRZKUmegFbh8JxCTUvHlEVeSxi_iM8/edit?usp=sharing).