IE 4351 & IE 5351 Homework Assignments

The assignments will be accomplished by teams that are designated during the first class unless otherwise specified as individual assignments. Each team will be responsible for developing and presenting the information requested in the assignment description.

The electronic version of the presentation (Powerpoint) or other requested form of the assignment (e.g., MS Word) must be provided to the instructor the day prior to the assignment due date (before 12pm midnight). The assignment must be uploaded to the designated assignment location in Canvas. For team assignments, only 1 team member should upload the assignment to Canvas. Late assignments will be penalized and may result in a zero score for the student for an individual assignment or for each member of the team for a team assignment depending on the time submitted.

The format for the assignment will be a presentation with (a) a title slide with all of the names of the members of your team and contact information for your team's point of contact for this assignment [if an individual assignment, identify your name only], (b) a slide that restates the assignment tasks, and (c) slides that provide the responses to the questions or tasks. Please present your responses in the same order as asked in the assignment. Any references should be listed using the APA appropriate format in the body of the text and listed at the end of the text in a reference list. Page numbers should be included on each page following the cover page.

Submit your assignments in PowerPoint format, unless otherwise noted, and be prepared to present to the instructor for review and feedback. Section 001 students will present in real-time during the class. Section 002/003 students can elect to present in real time or have their audio embedded in the presentation slides. All team members are expected to be involved with the assignment or project. The oral component of the presentation should be a maximum of 10 minutes unless otherwise noted by the instructor.

The completed assignment will be reviewed by the instructor. The instructor may ask for revisions to be made and revisions will be due before the next class period. Team assignments will be graded on content, presentation readiness, and format.

Each team member will be required to provide a peer evaluation of members of their team at the end of the semester to evaluate their contribution to the team assignments and project. All team members should be involved in the assignment to understand and contribute to it as the assignments are one of the basis for quiz and exam questions.

Assignment # 0 (**Individual Assignment**), Due 8/30/2022 (Upload to Canvas by 8/29/2022 11:59 pm CT), no presentation required.

- Ethics form

Assignment # 1 (**Individual Assignment**), Due 8/30/22 (Upload to Canvas by 8/29/2022 11:59 pm CT), no presentation required.

- This assignment is intended to be worked as an individual assignment and is expected to be prepared in **MS Word document format**.
    - Select an actual example of a systems engineering reference for each of the following reference types:
        - Book
        - Journal paper
        - Conference paper
        - Internet site/web page
    - For each example identify how the reference source will be cited using the APA format (1) in the in-text regular presentation content and (2) in the reference list. This means 2 formats must be shown for each reference.
    - The references must be different than those shown in the class syllabus, reading assignments, and instructor presentations.
    - Each student is expected to have different references. If the references are copied from another student, this constitutes plagiarism with expected follow-through on ethics violation.

Assignment # 2, Due 8/30/2022 (Upload to Canvas by 8/29/2022 11:59 pm CT)

- Develop a team contract/agreement using MS Word based on the following:
    - The contract must, at a minimum, identify ground rules for individual team member participation, communication, problem solving/decision making, how assignments are to be worked, and how conflict is handled. The contract may include consequences (e.g., three strikes and you are out as a team member) for problems such as lack of or insufficient positive team contributions. The contract needs to be developed within the bounds of what is specified by the instructor, documented in the syllabus, and course assignments and projects.
    - All team members should sign the document. Note that the contract does not take effect until it is reviewed and accepted by the instructor.
    - The contract/agreement should be developed in a Word format. However, specifics of the contract (e.g., subsections) should be included in a presentation prepared for the class. Note that both a signed copy in MS Word and Powerpoint presentation must be handed in for this assignment. As part of the presentation, include some level of justification for what is included.
    - This is expected to be a living document, amended by teams as required.
    - There are many examples of course team contracts on the internet. Review the following as a guide for some initial ideas. However, do not replicate any of these.
        - http://www.pmtraining.com.tw/member_pmp/Team%20Contract%202.0.pdf
        - http://www.eng.utah.edu/~ece3940/ECE3940F07_TeamAgreeEx.pdf
        - https://www.georgebrown.ca/sites/default/files/peerconnect/team-contract.pdf
        - http://groups.cs.umass.edu/nmahyar/wp-content/uploads/sites/8/2019/01/Team-Contract-690A.pdf

Assignment # 3, Due 9/6/22 (Holiday Exception: Upload to Canvas by 9/6 noon CT).

- Provide at least five (5) examples of emergent properties related to a cell phone. Hint: think about basic functions.
    - Identify at least two undesirable emergent properties as part of your set.
    - Justify why each example represents the concept of emergence.
- Select a possible problem area related to your cell phone project and develop a causal loop model. In addition to drawing the causal loop model, provide a data dictionary that lists and includes a detailed definition of each of the factors and relationships. Include a minimum of 5 factors in your diagram.

Assignment # 4 – Due 9/13/22

- Develop a detailed context diagram for a cell phone system with a supporting data dictionary that includes a brief definition of each source, sink, input and output. Justify the context for your system.
- Develop an N2 diagram for a cell phone system using the entities from your context diagram. Provide a supporting data dictionary that includes a brief explanation of each of the elements of the diagram.

Assignment # 5 – Due 9/20/22

- Perform a six hats analysis related to a particular aspect of a cell phone/cell phone use. Select a potential problem to be solved or issue/concern to explore. This exercise is expected to be performed together with your group members face-to-face (or virtual interface) in real-time together as a group at one time.
    - Document the exercise including what problem you explored, the process of how you applied the method (e.g., each member rotates through all hats, each member takes a particular hat and wears the hat for entire exercise) and results from your meeting.
    - What did you learn from using the method?
    - What are your team's observations about the use of the method?
    - Anything you would do differently in how you apply the method next time?
- Select one of the following development lifecycle models: waterfall, agile, incremental, evolutionary, spiral and provide 2 slides that provide a summary of important points about the selected model. Make sure that you appropriately cite your references using APA format. Have at least 2 references. The references should be conference papers, journal papers, books, or BoKs. Do not cite consultant, company, Wikipedia, etc. URLs.

Assignment # 6 – Due 10/4/22

- For the Millennium Systems cellphone product:
    - Identify 10 functional system requirements
    - Identify 5 nonfunctional system requirements
- Develop a traceability matrix showing the relationship of these system requirements to their source (e.g., SOW, stakeholder requirements) to demonstrate your understanding of traceability.

Assignment # 7 – Due 11/1/22

- Select a process, design, or technology aspect of your cell phone and perform a trade study.
    - Identify specifically the trade study decision that must be made (if process, what is the process, if product related – what decision must be made related to the product).
    - Identify at least 4 evaluation criteria and provide a definition for each.
    - Identify the weights for each of the evaluation criteria. Use weights from 0 to 100%. Provide a rationale for the selected weights. All weights together should add up to 100%.
    - Select at least 3 alternatives to evaluate and provide a short overview of each.
    - Develop a trade study matrix that shows your evaluation of the alternatives against the criteria. Use a scale of 1-10 for the evaluation of each criteria.
    - Identify the preferred alternative.
    - Provide a justification for the preferred alternative.
    - Identify if a sensitivity analysis should be performed. Why or why not?

Assignment # 8 – Due 11/8/22

- Assume that your cell phone project team has defined an architecture for your phone and your project is working on detailed design tasks. Your project has been asked to update its set of risks and opportunities considering the current status of the project - currently on time and within budget. Consider the rest of the development stage and subsequent lifecycle stages.
    - Identify at least 2-3 risks and/or opportunities for each stage.
    - Analyze each risk and opportunity for likelihood (probability of occurrence) and impact in order to determine the magnitude of the risk and its priority for handling. Identify quantitative values for both likelihood and impact.
    - Select at least 1 significant risk and identify mitigation plan(s). Justify your plan(s).

- As part of the initial planning effort for the cell phone project, you have been asked to identify the items that should be under configuration management over the entire project lifecycle.
    - List the items, per lifecycle stage, that should be under configuration control. Consider what you receive or produce during your project, including any documents. Be thorough.
    - Justify why these items should be placed under configuration management