Course Objective:
Systems engineering (SE) management is responsible for planning and managing all systems engineering activities within an organization that are required to successfully develop products and systems. The SE management team is responsible for ensuring that system elements satisfy customer requirements, are compatible and work together seamlessly, and are available on budget and schedule.

This course addresses the role and activities of the system engineering team in designing and managing product, process and system development applicable to product delivery and service systems. Topics include systems engineering design and planning, system engineering management plan (SEMP) development, DoD acquisition management process / stage-gate design process, axiomatic design of products, processes and systems, risk management, system design documentation, developing effective performance measures, standard work and continuous improvement.

This course is a core requirement for the Systems Engineering focus in the Master of Science in Engineering degree.

Credits: 3

Preparation for Course: Senior or Graduate standing in an engineering or science degree program; SE 51000 or consent of instructor

Level: Dual Level – Undergraduate or Graduate
**Course Outcomes:**

1. Understand the difference between classical systems engineering, large systems engineering and complex systems engineering.

2. Understand the types of system design decomposition. For example, functional decomposition (i.e., IDEF0) and System Design Map / Decomposition (i.e., Axiomatic Design), etc… and their strengths and weaknesses.

3. Understand what the milestones of the SE Acquisition Process / SE Life Cycle are, their content and how to apply them.

4. Learn key definitions regarding systems and systems engineering.

5. Understand and develop a Systems Engineering Management Plan (SEMP) to document the development of your term project.

6. Understand what the strengths and weaknesses of the SE Acquisition Process / SE Life Cycle are relating to products, product delivery systems and service system design.

7. Understand the Scope of what the DoD now calls Earned Value Management (EVM) and the strengths and weaknesses of the approach.

8. Demonstrate how your System Design Map may be used to make effective management and investment decisions during system implementation and operation.

9. Be able to design an organization that applies your System Design Map with Plan Do Check Act (PDCA) methodology to sustain and improve your LD within the mindset/ context of a learning organization.

10. Become current on Lean X implementations in healthcare and the pros and cons of those implementations. Understand why issues in healthcare also occur in Lean X manufacturing implementations.

**Mission of Course Project**

The mission of the course project is to learn by doing the design of some aspect of the health care system and to see parallels in the system engineering methodology across industries and disciplines. Healthcare professionals (from various disciplines and fields) will serve as preceptors for your work and will participate in our classes. Our mission is to test the hypothesis that the management of the SE Life Cycle and System Design process applies to any product, product delivery system or service system design… that the steps are the same, but the content of each step is different.
**Evaluation:**
- 20% Final Project Paper
- 10% Final Project Presentation
- 8% Final Project Poster
- 10% Mid-Term Paper (25% complete with 100% complete outline)
- 5% Mid-Term Presentation
- 12% Project “Sets” – weekly project assignments
- 10% Homework
- 25% Final Exam

**Final Grades:**
SE 53000 may report plus and minus letter-grades.

Project Sets: Course project development will be guided by project-set assignments; each week, a project set will be exchanged between students. Each student will verify whether the project set is complete or incomplete. If complete “1” point will be assigned. If incomplete, you will have the opportunity to re-submit the set on the following week to receive full “1” point, if complete. If incomplete, a Project Set receives “0” points. Project sets will be reviewed in class from 8:15 to 8:45 pm.

Assignment Due Date. All Assignments (including Project Sets) are due by 5:30 pm on the day of the class meeting by email. **All late assignments will receive zero credit.** For every assignment, including presentation and project sets, please bring a hard copy to the class and send an electronic version to the instructor’s campus email.

For Project Sets, **please bring a two hard copies of your project set to class** to give to your colleagues to review and submit an electronic copy by email to the instructor at his campus email.

For Homework, **please bring a hard copy of your homework to the instructor** in class and submit an electronic copy by email to the instructor at his campus email.
For your mid-term presentation and paper, please submit an electronic copy of your paper and presentation to the instructor. Also, bring to class a hard copy of your presentation (full size format) and a hard copy of your paper.

For your FINAL presentation and paper, please submit an electronic copy of your paper and presentation to the instructor by the due date. Also, bring to class a hard copy of your presentation (full size format) and a hard copy of your paper.

**A Note about technical writing:**

1. **Do not use personal pronouns:** I, we, he, she, they, it and also you, me, my, mine, etc.

2. When you have to use the word “this”, please use the form this `<noun>`. For example, correct usage: This information is really good. Incorrect usage: This is really good… as the reader does not necessarily know what this refers to, particularly in a technical document.

3. **Use of Acronyms:** When introducing an acronym state the acronym with initial capital letters, for example, Integrated Logistical Support (ILS) and then put the initial caps in parentheses after the acronym that you are introducing.

**A Note about assignments:**

1. Please number (paginate all documents that are turned in).

2. Please put your name on all of your work and the files that you submit.

3. For presentations, please use at least 18 point type.
**Student Conduct:**
The purpose of these sections is to ensure compliance with IPFW policies and procedures, to minimize disruptions to your classmates and ensure the integrity of the classroom experience.

**A. Cell phone/Blackberry**
*Cell phones should be set to either vibrate or silent*
Do not answer a cell phone in the classroom – If you must answer it, please answer it in the hall.

**B. Be on time:**
A pattern of tardiness will merit discussion.

**C. Food/Drink**
Bottled water is acceptable
No food is allowed in the classroom

**D. Smoking**
Smoking is not allowed in IPFW buildings

**E. Missing an Exam or Late Homework**
You must contact me prior to missing an exam so that alternative arrangements can be made. Please let me know about planned absence as soon as you know that there will be an issue. This will help facilitate a mutually agreeable solution. Contacting me after the fact may result in your not being given an opportunity to retake an exam or receive homework credit.

**F. Missing a Class**
Missing an occasional class for professional reasons is allowable. However, you should contact me as soon as you know that you will be unable to attend the class so that alternative arrangements can be made to provide you with access to the class material and make arrangements for assignments.

**G. Academic Integrity**
Cheating and plagiarism will not be tolerated and consequences will be severe. In the absence of instructions to the contrary, students should assume that homework should be done alone and is not designed to be a group exercise. The university policy on academic honesty and rights and responsibilities is stated in the IPFW Graduate Bulletin.

**H. Disabilities**
If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (Walb Union, Room 113, 260 481-6658) as soon as possible to work out the details. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to me. For more information, please visit the web site at [http://new.ipfw.edu/disabilities/](http://new.ipfw.edu/disabilities/), a text-only version is available at [http://new.ipfw.edu/offices/disabilities/text-version/](http://new.ipfw.edu/offices/disabilities/text-version/).

**I. Diversity and nondiscrimination**
IPFW is committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the university seeks to develop and nurture diversity. The university believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. IPFW prohibits discrimination against any member of the university community on the basis of race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability, or status as a disabled or Vietnam-era veteran.

**J. Military Service**
If you are a student in the military with the potential of being called to military service and/or training during the course of the semester, you are encouraged to contact both me and your advisor immediately.

**K. Proprietary Information**
Do not bring proprietary or company-sensitive information into the classroom. If you have any questions about the proprietary nature of the information you might use in your homework, please talk to your supervisor or the office responsible for releasing data. Any issues should be directed to my attention.

**L. Classified Data**
Do not discuss reference or hint at classified programs or data!