Course Evaluation

The course evaluation provided is broken into multiple areas starting with my assessment of the overall evaluation of the course content in contrast to the overall Systems Engineering Master’s program. From there, the assessment dives into my evaluation of the book, course material, and summary of overall recommendations and what I have taken away from the course material.

It should be noted that each student learns differently and requires different needs. My evaluation and recommendations is from the perspective of a practicing Systems Engineer and Systems Engineering Manager with emphasizes on the lesson learned I have experienced over my ten years in the field in order to develop effective Systems Engineers within my organization.

Course Content:
This course, in regards to the concepts it is teaching (e.g., Program Management vs Systems Engineering Management) is very important and a must know. In fact, my only real comment about the course content is the fact that this shouldn’t be a course “elective” and should instead be a “core” course (more so than EMGT Operations Research in Engineering and Technology Management). The course syllabus is well laid out with the course description hitting on the key topics that are fundamental to the course content. The Specific Goals and Objectives are well thought out; however, I do take exception to item #5, “Learn the thirty key elements of Systems Engineering.” In this case, what about the thirty elements are to be learned and is one to presume that these thirty elements are it? Obviously not; however a new student may take a naïve approach to this concept.

The only other major topic that I would like to have seen more emphasizes on is Risk Management. This was just skimming through; however this plays a major part of any project. Some of the basic topics taught in SYSE 575 “Reducing Risk in Decision Making” should be integrated into this course.

This course is a good follow-on from SYSE591 Systems Engineering Approach and provides a good gateway to the other Systems Engineering courses such as SYSE575, SYSE573 Requirements Engineering, and SYSE595 Hardware-Software Integration. This course has the potential to prepare the student for the courses that are on the horizon.

Last comment is in regards to the course assumptions. It appears that the course is structured (based on the book) with the assumption that the students have Program Management and Systems Engineering Management experience. The book, which I will get into later, does not go into any real depth for much of the subject matter. For me, this book and course material was more of an overview to the concepts than it was as a teaching material to get a good breadth of knowledge if I was new to the subject area. If I were new to the subject matter, much more independent studying would be required.

Book Evaluation:
This book only superficially discusses the fundamental topics of Systems Engineering Management and Project Management leaving the reader to wade through the volumes of references that Eisner leaves at the end of each chapter. The triumvirate discussed is a good concept; however the roles and responsibilities of these three is not necessarily universal across projects; an area I struggled to relate with.

Good concepts that I thought the book did do well on was the discussion of the types of organizations (project, functional, and matrix), earned value analysis, architecture design/synthesis and alternatives, conflict management, situational analysis and leadership, leadership attributes, essentials of an effective communicator, meeting management, motivations and incentives, Cost Estimating Relationships, System Architecting principles, and introduction to the Systems Engineering processes and organizations.

With that said though, this book is not without its faults. The book had a very narrow point of view where its focus was primarily on government development and management. There should have been more focus on the basic principles that can be applied across the industry independent whether the project is government based or in the private sector.

The MIL-STDs are aged; however Eisner focuses on these outdated standards. While it may be good to understand the contents and basic nature of these standards from an evolutionary standpoint, more emphasizes on current trends should have been focused on; instead of leaving this to the reader to figure out in the homework!

Overall, I would not recommend this book being used for this course in the future. Instead the following books should be considered given there more general approach to the subject matter:

- Systems Engineering and Analysis - Ben Blanchard and Wolter Fabrycky
- System Engineering Management - Ben Blanchard
- Systems Engineering Principles and Practice - Alex Kossiakoff

Course Material:
The course material in regards to the reading, journal entries, goal assessments, discussions, and homework are good in regards to the type of learning those types of resources can provide; however the hindrance form this being a successful model are three fold:

The amount of work in regards to the reading, homework, discussions, goal assessment, journal entry, and mid-terms exams keeps the student overly busy to have time to read other student discussions and get more interactive with the course. I would have liked to have spent more time reading other student discussion forums and being able to respond to some of them, but due to the course workload, I was unable to find the motivation to do such a thing. This is a significant issue. Class collaboration is important on sharing ideas and being able to expand ones understanding of the topic area. Without such
collaboration, this course ends up being no more effective than independent studying of a subject matter.

The second hindrance, is consistent professor involvement. For the first two weeks, John did a good job addressing each discussion entry; however this fell off after the third week. There were large period of times with no contact between the student and professor (or teaching assistant). For this type of learning environments to be successful, here is what is needed:

At the beginning of each week, the discussion forum should be kicked off by the professor with a high level overview of the topic area that is going to be learned over the next week. This should not simply be a summary of the reading material, but key points to pay attention to, areas of disagreement, or pin-pointing other resource topics to emphasize certain key points. The way it is now, there’s reference material, the book, and the internet to go find an answer. The student doesn’t really know if they are on topic until after the homework is graded which is too late in the learning process to know that you are wrong (e.g., there’s no time to go back and reflect as you need to jump onto the next subject matter to keep up with the course schedule).

Lastly, idea of the goal assessment, journal entry, and discussions are a good concept; however these require a judicious and weekly assessment and feedback form the professor (or teaching assistant) to ensure that the student is on the right path. To grade these late in the program is detrimental for a student who is learning these concepts for the first time. The input that I did receive on some of the journal, goal assessments, and discussions forums were good and insightful. They helped spark new ideas or ways of thinking about the approach to a problem. My point here is not the quality of feedback, it is simply focused on the timing of when the feedback is provided to the student.

The homework over the last ten weeks was a bit frustrating due to Eisner’s lack of sensitivity of his audience. Skimming a topic area in the reading, and then asking for an ambiguous and narrow scoped homework problem that requires interpretation and research on topic areas not readily available (e.g., government trends, program management tool evaluation, etc) was not an effective approach to learning all of the key topic areas. I did appreciate some of the tailoring to the homework problems that were given; however I do not believe the homework problems are easily solvable for a new student or a non-Systems Engineering or Program Management practitioner.

Summary:
My overall summary is that the topics this course is intending to teach are on par; however from a high level perspective, the source content should be evaluated from what it wants to build on from the Systems Engineering Approach course and how it will lead the student into the next set of courses following this one. As mentioned, this should be a core class as all of the topic areas are instrumental on grasping some of the fundamental Systems Engineering topics.
For this class to be more successful in the future, other books should be evaluated that do a better job at approaching the subject material from a modern and more generalist point of view. When Eisner took this approach, I was better able to understand how to apply the concepts in my own field of study and how it could be applied to other projects or industries.

Lastly, constant professor interaction is key to shepherding the students development and understanding of these important concepts. I would like to see a summary of the material that is going to be learned for the week (ideally, a short video (5 minutes) going over the concepts for the week) to be available to better guide which areas should be focused on. There are times when the author goes on a rabbit trail. For a new student, this may cause confusion or distract from the key concept trying to be taught.

The professor should continue adding weekly input into the discussion forums or provide an overall comment that summarizes the students responses.

The goal assessments and journal entries should also be read and commented on a weekly basis (if not, then stop making these required); otherwise there is no value on doing these. The value of this exercise is dependent on weekly feedback.

Homework should be graded on a weekly basis along with homework solutions (this is needed to ensure that the student is on the right path and to ensure that expectations are communicated early instead of after the fact). I was not a fan of having only two homework assignments posted before going into the mid-term. The homework assignment solutions were good in content and insightful. The homework solutions need to reiterate the questions instead of just providing the answers so that the student does not have to jump between the book and homework solutions.

Expectations of the course need to be clarified. The amount of work that is expected to be in the journals, assessments, and homework is not clear. I went from not having enough to going on the conservative side of having too much (which caused additional strain on my part in terms of the time it took to complete the homework). The expectations also need to be equal between the students and professor. As already mentioned multiple times, if homework, assessments, and journal entries are expected to be completed at the end of the week, so too should be the expectation that this will all get graded within a week (or before major exams).

I see this course as being second in line in the overall master’s program. The portfolio that I am working on has this course being a gateway to the courses that follow. It should provide the student with a good baseline for the courses to come. For more information on my thought process refer to: https://sites.google.com/site/noicesyse590/

Overall, good course. It has a lot of potential and is a necessary course in order to understand the complexity and necessarily of Systems Engineering and Systems Engineering Management.