

SYSE 590 Integrative Workshop

Systems Engineering



Portfolio: Suzanne Ward
Record of Classes Taken
Reflections on Coupling Technical Specialties
and Systems Fundamentals
Demonstration of Systems Engineering Process

December 2008

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The MASEEH COLLEGE OF ENGINEERING AND COMPUTER SCIENCE at PORTLAND STATE UNIVERISTY ...

Creates an inspiring educational and research environment for students, faculty, and staff to expand knowledge and improve lives through innovation in research and engineering education.

The hallmark of the college is a locally relevant and globally significant impact, demonstrated by:

- A diverse portfolio of collaborative and cross-disciplinary research
- Exceptional students who apply cutting-edge research to current issues and who are sought after in the global market.
- Strong partnership with industry, government, and non-profit organizations that promote economic opportunities and contribute to the economic develop of the region.



Excerpts and photos taken from <http://www.pdx.edu/cecs/>

Systems Engineering at PSU (SYSE)

Welcome to Systems Engineering

Systems Engineering at Portland State University (PSU) offers an accessible distance learning masters program for engineers and applied scientists who practice design, product development, or process engineering.

What can PSU Systems Engineering Program Offer Me?

- An anywhere, anytime, distance-learning environment: All required SYSE courses and many elective courses are available online. Despite the online nature of the program, students do not lose out on the valuable peer to professor interaction that graduate classes provide.
- The opportunity to study under leading experts in the Systems Engineering field: Instructors are recognized around the world in the field of Systems Engineering.
- A variety of lectures in Systems Engineering: The PSU Systems Engineering program has partnered with world-renowned system engineers to present System Engineering concepts and tools and their applications in multiple engineering disciplines.
- The ability to develop your educational plan to fit your interests and goals: The PSU Systems Engineering program is available both to practicing engineers who wish to pursue a masters in Systems Engineering and to those who wish to take specific courses to gain an understanding of a certain area of systems engineering.

How is PSU Systems Engineering Program Different?

- Graduate courses can be taken on an audit bases for professional education purposes
- Completion of four core courses may earn the formally-recognized PSU Graduate Certificate.
- A professionally-oriented Masters degree.
- Program is flexible to meet different educational needs.
- Web instructors are experts located in the Internet.

Excerpts from: <http://www.eas.pdx.edu/Systems/>
<http://www.eas.pdx.edu/Systems/program/about.php>
<http://www.eas.pdx.edu/Systems/program/index.php>.

What is Systems Engineering?

- Many of us already practice systems engineering, but call it something else: design or development of product, process, and service. Systems Engineering enables practicing engineers to integrate their specialties in the development of complex products and processes. It focuses on customers' needs throughout the product lifecycle of design, testing, manufacturing, operation, and future product planning. Systems Engineering enhances time, cost and performance by enabling the engineer to function in an interdisciplinary team and by providing quantitative methods for business and technical decision making.
 - A Product Development View of Systems Engineering

- Systems Engineering focuses in an interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem: Operations — Performance — Test — Manufacturing — Cost & Schedule — Training and Support — Disposal. Systems Engineering integrates all the disciplines and specialty groups into a team effort forming a structured development process that proceeds from concept to production to operation. Systems Engineering considers both the business and technical needs of all stakeholders with the goal of providing a quality product that meet the user's needs.
 - International Council on Systems Engineering (INCOSE)

Excerpts from: <http://www.eas.pdx.edu/Systems>
<http://www.eas.pdx.edu/Systems/program/about.php>
<http://www.eas.pdx.edu/Systems/program/index.php>

- An interdisciplinary collaborative approach to derive, evolve, and verify a life-cycle balanced solution which satisfies customer expectations and meets public acceptability. The Systems Engineering Process provides a focused approach for product development which attempts to balance all factors associated with product life-cycle viability and competitiveness in a global marketplace. This process provides a structured approach for considering alternative design and configurations. The systems engineering process is applied recursively one level of development at a time. Initially, it is applied to identify the best concept for making an incremental improvement to an already established product. The second application of the process adds value to the concept by fully describing the product/system definition and establishing a configuration baseline. This application provides the basis for accomplishing the more detailed engineering development of subsystems, components, and elements of a total system; or the appropriated parts of an established product undergoing incremental improvement during the next application.
 - IEEE P1220 Standard for Application and Management of the Systems Engineering Process [Final Draft] 26 September 1994

- A logical sequence of activities and decisions transforming an operational need into a description of system performance parameters and a preferred system configuration.
 - MIL-STD-499A Engineering Management 1 May 1974.

- A comprehensive, iterative problem solving process that is used to: transform validated customer needs and requirements into a life-cycle balanced solution set of system product and process designs, Generate information for decision makers, and Provision phase. The problem and success criteria are defined through requirements of those alternatives, selection of the best life-cycle balanced solution, and the description of the solution through the design package are accomplished through synthesis and systems analysis and control.
 - MIL-STD-499B Systems Engineering [Draft] 6 May 1992.

Excerpts from: <http://www.eas.pdx.edu/Systems>
<http://www.eas.pdx.edu/Systems/program/about.php>
<http://www.eas.pdx.edu/Systems/program/index.php>

Introduction: e-Portfolio

This e-portfolio is a required deliverable for the systems engineering masters degree program. The masters of engineering in systems engineering is one of the academic areas of study in the Maseeh College of Engineering and Computer Science of Portland State University located in Portland OR. The degree requirements for the masters of engineering in systems engineering are defined below (taken from the web based catalogue).

ePortfolio Objective

From the catalogue: Integrative Workshop

<http://syse.pdx.edu/courses/syl/intwksp.php>

A total of four credits of interactive workshop between faculty advisor and student are required. The student will be guided to consolidate their project experience and knowledge from elective courses with concepts from their systems engineering core courses. This interaction could be conducted on-line in SYSE 590 Integrative Workshop (IW). Two important concepts in Systems Engineering are integration and management of interfaces, related to both physical components and product development process. The objective of IW is for the student to exercise these concepts as applied to their course work and project work. The workshop will span the student's entire program under the guidance of an advisor, thus giving the time to achieve several goals.

- One, the student is given feedback as they apply discipline skills in systems settings.
- Two, the student will be asked to reflect on past approaches as it relates to newer more advanced systems skills.
- Third, the IW will review systems topics over several terms, thus reinforcing their use. In this way, behavioral change, from engineering specialty thinking to systems engineering thinking, will be achieved.

Masters of Engineering in Systems Engineering

Systems Engineering focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, then continuing with design synthesis and system validation while considering the complete problem: Operations -- Performance -- Test-- Manufacturing -- Cost & Schedule--Support--Disposal. Systems Engineering integrates all the disciplines and specialty groups into a team effort forming a structured development process that proceeds from concept to production to operation. Many of us already practice systems engineering, but call it something else: design or development of product, process, and service. This course of study will enable the engineer to function in an interdisciplinary team and apply their area of engineering specialty toward the development of a product, process, or service.

Learning Objectives: Improve students' ability to engineer complex products, processes, or services.

- Develop students' understanding of basic systems concepts and their application to the engineering life-cycle.
- Develop students' understanding of key systems engineering skills, including team building, communication, synthesis & creativity, problem solving, management of time and resources, database management, and life-cycle viewpoints.
- Build on students' existing knowledge and project experiences by providing additional domain specialization or project management tied to systems engineering skills.

Core Courses (16 Credits)

[SYSE 591](#) Systems Engineering Approach

[SYSE 573](#) Requirements Engineering

[EMGT 540](#) Operations Research in Engineering & Technology Management
and One of 3 Modeling Classes:

[SYSC 514](#) System Dynamics

[SYSC 527](#) Discrete System Simulation

[SYSC 529](#) Process Modeling and Simulation

Elective Courses (16 Credits): Each student will be under the advisement of the Director of Systems Engineering. Elective courses come from any PSU departments based on a plan of study agreed upon by advisor and the student. Courses from other universities and PSU courses taken before admission may be acceptable, as evaluated on a case by case basis, and up to a limit of 15 credits. A transfer or pre-admission course may be acceptable only if the course was not used toward any other degree.

Systems Engineering courses available on-line as electives:

[SYSE 575](#) Reducing Risk in Decision Making

[EAS 561](#) Reliability Engineering

[SYSE 595](#) Hardware-Software Integration

Projects (9 Credits): Each student will participate in an industrial project (SYSE 506). These industrial experiences will involve the student, faculty advisors and an industrial advisor. The project must encompass systems level considerations as applied to a product, process or service requiring knowledge from multiple engineering disciplines.

Integrative Workshops (4 Credits): A total of four credits of interactive workshop are required. Registration for some or all credits may be done any term, but workshop activities are continuous over the entire masters program. The student will be guided to consolidate their project experience and knowledge from elective courses with concepts from their systems engineering core courses. This interaction could be conducted on-line in [SYSE 590 Integrative Workshop](#) (IW). Two important concepts in Systems Engineering are integration and management of interfaces, related to both physical components and product development process. The objective of IW is for the student to exercise these concepts as applied to their course work and project work. The workshop will span the student's entire program under the guidance of an advisor, thus giving the time to achieve several goals. One, the student is given feedback as they apply discipline skills in systems settings. Two, the student will be asked to reflect on past approaches as it relates to newer more advanced systems skills. Third, the IW will review systems topics over several terms, thus reinforcing their use. In this way, behavioral change, from engineering specialty thinking to systems engineering thinking, will be achieved. The program also benefits because students continuously assess how well all courses INTEGRATE to achieve Systems Engineering education goals.

Course Scheduling Plan: Suzanne Ward

Class	Term	Core	Elective	IntWksp	IndProj
SYSE 591	Fall 2005	4			
EMGT 540	Fall 2005	4			
SYSE 573	Spring 2006	4			
SYSC 514	Winter 2006	4			
SYSC 595	Summer 2007		4		
SYSE 575	Winter 2008		4		
EGMT 510UCI	Spring 2007		4		
EGMT 510FEM	Fall 2007		4		
SYSE 590	Spring 2008			4	
SYSE 506	Summer 2008/ Fall 2008				9
TOTAL	45 req'd	16	16	4	9

Core Course: Systems Approach SYSE 591

Course Description

Engineering of complex hardware, software systems encompasses quantitative methods to understand vague problem statements, determine what a proposed product/system must do (functionality), generate measurable requirements, decide how to select the most appropriate solution design, integrate the hardware and software subsystems and test the finished product to verify it satisfies the documented requirements. Additional topics that span the entire product life cycle include interface management and control, risk management, tailing of process to meet organizational and project environments, configuration management, test strategies and trade-off studies.

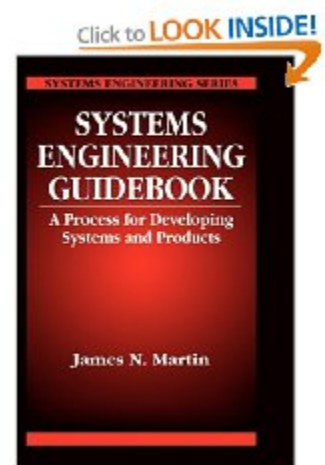
Reflections on the Course

SYSE 591 is an introduction to the development and engineering of complex systems and provides an in depth explanations of what Systems Engineering is, in terms of its concepts and supporting tools and applications. The book could serve as a BOK (book of knowledge) on systems engineering. Prior to the class I had just finished a training and certification in project management and had experience reading and working with BOKs Being a type of BOK, the text can appear to be very rigid in defining what systems engineering is and what it encompasses. The best quote in the text was in the introduction: "Any process can appear to be sterile, devoid of flexibility, and an inhibitor to creativity. Quite the contrary. A process, if properly implemented will greatly enhance the application of creativity to the right problem (page xvi)".

I enjoyed this class as the first and introductory class to the world of systems engineering. I had to constantly ask myself where does this fit with new product development, project management and product management. An additional class that aids in the understanding of the systems engineering role as it relates to project/program management, development management and product management would be a welcome addition. Everything was new and therefore interesting.

This must be a required first semester class in the program, as the degree and classes that follow are the meat behind this introductory class and at some point in every class the question arises: "how does this fit with the systems engineering approach".

*Text: Systems Engineering Guidebook,
A process for Developing Systems and Products
by James N Martin, (1997)*



Core Course: Requirements Engineering SYSE 573

Course Description

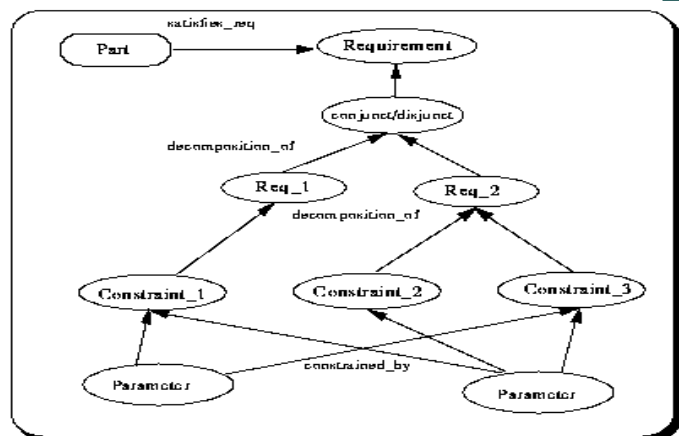
This course provides the knowledge and skills necessary to translate needs and priorities into system requirements and develop derived requirements, which together form the starting point for engineering of complex hardware, software systems. The student will develop an understanding of the larger context in which requirements for a system are developed, and learn about trade-offs between developing mission needs or market opportunities first versus assessing available technology first. Techniques for translating needs and priorities into an operational concept and then into specific functional and performance requirements will be presented. The student will have opportunities to assess and improve the usefulness of requirements, including such aspects as correctness, completeness, consistency, measurability, testability and clarity of documentation. Additional topics that will be addressed include the relationship between interface definitions and requirements, risk management of requirements issues, and involving all stakeholders in the requirements engineering process to increase the prospects for project success.

Reflections on the Course

This course was integral to my work and to the core of degree program plan. As a traditional product manager I am responsible for collecting voice of the customer and generating the first level requirement documents for new product development projects.

This class relied exclusively on documents from the instructor. Classwork centered around questions and a project (attached). The lack of a text that I could have on my shelf at work or could recommend to others is a weakness.

[Click to view case study.](#)



Core Course: Operations Research EGMT 540

Course Description

The use of operations research techniques in making Engineering and Technology Management decisions; application and interpretation of linear programming and goal programming problem formulations; mathematical model building; the basic principles behind the Simplex algorithm and multiple objective linear optimization; post optimality analysis from the viewpoint of technology management; other operations research techniques such as queuing models; a term project involving an actual operational problem.

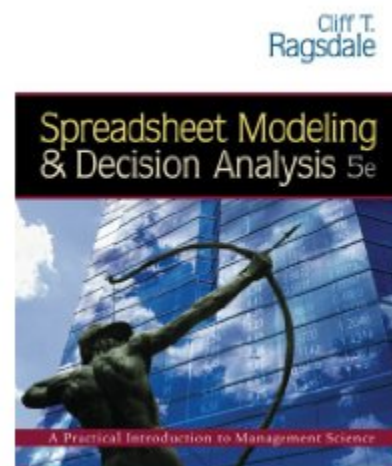
Reflections on the Course

I found this course to be extremely interesting. It was a different take on operations management than the class I took in my MBA program. Through problem solving and a project devoted to operations research concepts were learned.

This is the only Engineering Management course that is available remote as well as through in class participation. This was very helpful to me due to extended stay in Asia during the semester for work. The class was available online simultaneously with the class and did allow some limited interaction with the main class and also available for later reviewing online. I would highly recommend this arrangement for all/other Maseeh College of Engineering and Computer Science classes.

Text:

Spreadsheet Modeling and Decision Analysis,
Cliff T. Ragsdale,
2007, 5th Edition, South-Western: Thomson Publisher:



Core Course: System Dynamics SYSC 514

Course Description

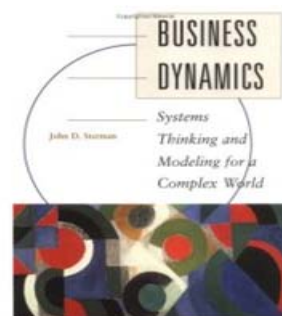
Building computer models of feedback systems and using the models to study the dynamic behavior of the modeled system in order to enhance understanding, predict how the system might behave under different circumstances, or find ways to improve the "performance" of the system. Such models are often used for forecasting, planning, and process analysis in business systems; for studying growth and homeostatic processes in various scientific disciplines; and for studying feedback control systems in engineering. The models are continuous in nature, and are expressed mathematically as a set of differential equations for various "state" variables. These equations are numerically integrated by the software package in order to simulate behavior over time. The student's time is spent learning how to formulate, calibrate, and explore the dynamic behavior of such models. Although designed as a core Systems Science course, it may also serve as an elective course in the Business School, Engineering Management, Systems Engineering, Biology, Environmental Sciences, etc

Reflections on the Course

This simulation course, unlike optimization driven simulation courses (See SYSE 575), is mostly applicable to the analysis of policy changes. It allows the modeler and the client to better understand the impact of a corporate decision on selected variables of an organization. The intent here is not to save millions of dollars but more geared towards the better implementation of policy changes within an organization. To do so, the student studies the dynamic behavior of systems. This course is quite an eye opener and I see great benefits from completing it.

This class was part remote, part lab. The bulk of the systems engineering program is available online and remote. This class, which due to work I had to completely remote, was very difficult. The lab was required to fully grasp the content and utilize the simulation program. This needs to be stressed to future students.

Text: John Sterman, Business Dynamics
Irwin-McGraw Hill, 2000



Elective: Reducing Risk in Decision Making SYSE 575

Course Description

This course will examine the concepts, techniques and tools for managing risk and making decision as key components of the systems engineering process. In this course, risk connotes a measure of the probability and severity of an undesired event. This course begins with an overview of the risk management (identifying, assessing, monitoring, and mitigating) and decision process. Differences between mission critical and non-mission critical programmatic risk will be emphasized. Other topics include the limits of expected value-based risk analysis, decision making strategies such a max/min, min/max and regrets. Formal methods in risk analysis, elementary decision analysis and decision trees, multi-objective decision making, pareto techniques, optimality, and trade-off analysis will be covered. Risk and decision techniques will be contrasted with the interfacing processes of program management and software engineering, from both the government (DOD) and industrial perspectives.

Reflections on the Course

I took this class hoping to learn how to handle the risks that are inherent in the decisions you make every day at work. What I learned was that it still is a crap shoot, you just use the tools and the best judgment you have at the time and choose the decision that best meets your criteria. As a product manager I am responsible for making decisions about products and roadmaps that might be years in the making. It is nice to know that there are tools out there to graphically depict the risk inherent in the decision and support decisions with analysis rather than just hunches.

TEXT:

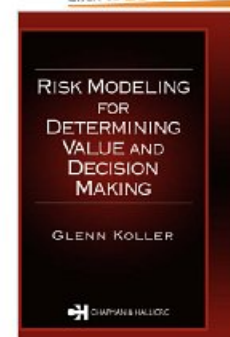
Making Hard Decisions: An Introduction to Decision Analysis
(2nd Ed), Clemen, ISBN 0534260349

Risk Modeling for Determining Value and Decision Making,
Koller, ISBN 1584881674

Click to **LOOK INSIDE!**



Click to **LOOK INSIDE!**



Elective: Hardware-Software Engineering

Course Description

Systems Engineering is applied to the integration of hardware-software systems, focusing on embedded computer products development and information technology systems. Factors that affect the selection of hardware and software solutions in design will be examined, as well as the use of trade studies to optimize the efficiency of integration issues. Techniques for partitioning of system-level functions and requirements to hardware/software components will be provided, as will practical guidance, through case studies, process templates and design check-lists.

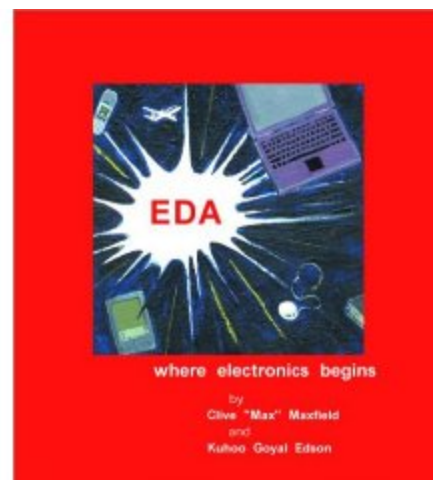
Prerequisite: Basic understanding of hardware and software development.

Reflections on the Course

I really enjoyed this class as it had some real world assistance in my daily life. As product development product manager I am called upon to lead engineering effort and project management. The engineering team takes requirements and inputs from my and goes off to their side of the world and a few months later show me a first prototype. As project lead it is difficult to not be involved throughout the entire process, but when it came to HW and FW development I was at a lost until this class. The reading was fun and enjoyable and I learned the key words and definitions and even set up a PCB review meeting that I ran while in this class. This class allowed me to gain a much better understanding of the Hardware and Software Engineering field and the countless interface issues the industry has to address.

I do wish that there had been more hands-on activities – like how to read a PCB board etc. I sit in manufacturing meetings and they all pass around the PCB, look at it carefully and know just what to contribute I still don't have that skill.

Text: EDA Where Electronics Begins
by Clive Maxfield and Kuhoo Goyal Edson,
2001



Elective Course: User Centered Innovation EGMT 510UCI

Course Description

This course introduces the students to the various approaches to innovation and the strengths and weaknesses of each of them. It then focuses on a customer-driven methodology. It also introduces the students to the increasingly prominent role of creating memorable experience, and emotional connection with a product and/or a company. Students will learn how to identify opportunities; the latest methods of user research (such as rapid ethnography) and how to transform these findings into product concepts that casts an optimum balance between usefulness, usability, and desirability. The management of such projects at a company/division level and the changes it requires in processes, organization, and people skills will also be covered. Students will actually use the learned methodology to define an innovative product concept in a team environment. The course will be supported by case studies. Several industry guest speakers with strong credentials in developing innovative products will come share their experience

Reflections on the Course

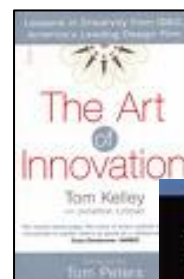
I loved this class, then again it is right up my alley ... product development and having to create the just right product for the customer and find an innovation that leads to success for your company. In this class the major activity was a innovation design. Our project was the: Paper or Plastic Debate and is there a better solution. Of course using your own bags is the real solution, but what is stopping people from using these reusable "bring your own" bags and is there a solution that might be a better innovation. The class required use models and personas, requirements and specifications development. Attached are the persona, the presentation and the paper for the class.

Click to view Persona and Project Paper.

TEXTBOOKS:

Jonathan Cagan & Craig M. Vogel, **Creating Breakthrough Products**, Financial Times/Prentice Hall, 2002, **ISBN-13: 978-0139696947**

Tom Kelley, **The Art of Innovation**, Doubleday/Random House, 2000, ISBN 0-385-49984



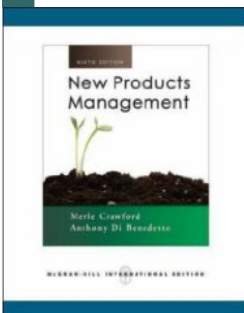
Elective Course: Fuzzy Front End of New Product Development EGMT 510FEM

Course Description

This course introduces the students to the various approaches to innovation and the strengths and weaknesses of each of them. It then focuses on a customer-driven methodology. It also introduces the students to the increasingly prominent role of creating memorable experience, and emotional connection with a product and/or a company. Students will learn how to identify opportunities; the latest methods of user research (such as rapid ethnography) and how to transform these findings into product concepts that casts an optimum balance between usefulness, usability, and desirability. The management of such projects at a company/division level and the changes it requires in processes, organization, and people skills will also be covered. Students will actually use the learned methodology to define an innovative product concept in a team environment. The course will be supported by case studies. Several industry guest speakers with strong credentials in developing innovative products will come share their experience.

Reflections on the Course

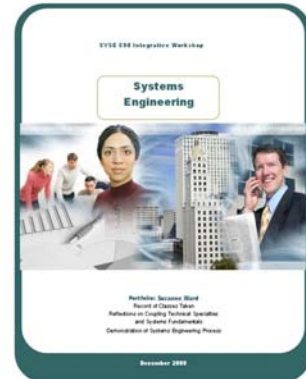
This was another class that was right up my alley; it joined by two halves – my business/marketing half with my engineering/development half. All companies struggle with the Fuzzy Front End, those endless months of R&D to find a marketable solution. This class set out to introduce tools and concepts to lead to smart use of the Fuzzy Front End. The class also provided a structured process for the Fuzzy Front End and how it tied into road map management, product management, and development activities. I was offer the opportunity to present a new method/tool – I chose TRIZ not even knowing what it was. But after some happenstance encounters I found myself bombarded with TRIZ examples including at the PDMA conference and SIT in Israel. Attached is the group presentation made on TRIZ for the class. The professor (Dr Harmon) stated he never saw a use for TRIZ, but after the presentation he was interested in exploring the tool. Click to view TRIZ presentation.



Text: New Products Management 9th Edition,
C Merle Crawford and C Anthony DiBenedetto,
2008 McGraw-Hill

Course: Integrated Workshop SYSE 590

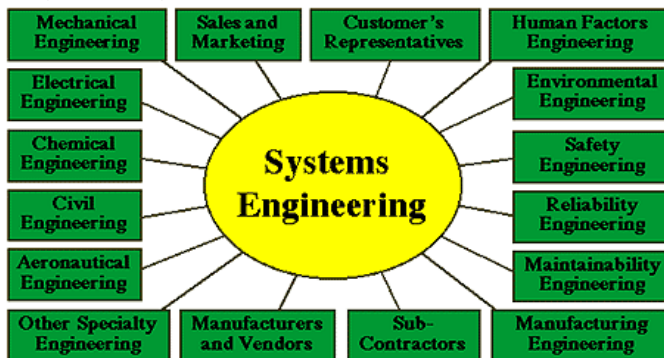
Systems Engineering is an acquired behavior to be developed throughout the Masters degree program. Students and faculty advisors will engage in creative workshop activities integrating technical specialty skills and project experience invoking systems engineering applications of communication, synthesis and creativity, team building, problem solving, management of time and resources, and system life-cycle thinking. A student portfolio will document the program plan and document that the desired behavioral change is taking place. The final product is an e-portfolio which will be posted on the systems engineering web site.



This document you are reading now is the culmination of this workshop/project.

Course: Masters Project SYSE 506

The nine credits of SYSE 506 are a capstone experience that exercises systems engineering concepts in a comprehensive project of interest to student and advisors. The student may work on a project potentially in their area of domain knowledge and potentially for their current employer, but the project must encompass: a) systems thinking, b) a systematic approach, c) identification of customer and stakeholder needs, d) requirements management, d) validation and verification, e) formal interface management f) assessment of results. The scope of the project is well defined and must satisfy objectives related to technical engineering, student learning, and systems engineering areas.



The topic of my Masters Project is the analysis of the various stakeholders of the organization over products and development efforts in order to map Systems Engineering to Portfolio Management to Road Map Development/Management to Project Management to Product Management. See project.

Student Background, Suzanne Ward



My name is Suzanne Ward and I am presently a senior level product development manager. I have over 10 years of product/project/program management, marketing and development experience in fields as varied as women's wear to HVAC (heating, ventilation, air conditioning) to OTC and ethical drugs, cosmetics to medical devices to government agencies and nonprofits. My educational background began with a bachelors degree in economics (University of South Florida) coupled with a masters degree in public administration (Florida State University) and masters degree in business administration (Drake University).

Having moved myself professionally from the purest administrative and marketing management professional to a more engineering/product development position I found myself serving as project manager, program manager, requirements manager, engineering supervisor. When my boss was asked "why is a marketing person running new engineering development" – he replied, "Suzanne is a product manager on steroids". What he meant to say was, whether due to necessity or lack of anyone else, I had found my way outside the marketing silo and began to bridge the gap between marketing and engineering. I was given the title Senior Product Development Manager, Asian Development Initiatives and was shipped to Asia where I managed both a contract engineering and manufacturing group in Korea and an in-house engineering group in Singapore. It was through perseverance and trial and error that I was able to make successful the efforts in Korea and Singapore and what sparked my interest in finding specific and advanced engineering training that I could apply day one in my job.

I found that in the Systems Engineering program at Portland State. I started the program Fall 2005 with the intent to try it out and if I liked what I was gaining from the work and experience, to work towards the Systems Engineering Certificate program. In Fall 2006 I received the graduate certificate in Systems Engineering. Afterwards I chose to continue the program with the goal of a masters of engineering degree in systems engineering with an emphasis on the fuzzy front end of innovation. The background and education that the degree requirements and electives provided me allowed me to not only serve as product development manager from a market perspective but also serve as engineering manager over the new product development, sustaining and test engineers and technicians. Without the degree I would not have had the ability to be recognized for the work that I was not only capable of but was already performing.

Suzanne Ward, MBA, PMP

Senior Level Product Management

E-Mail: smward@att.net

Mobile: 503-969-2250

- Strategic & Tactical Marketing Planning
- New Product Architecture & Specification
- Market-Based Pricing Strategies & ROI
- Strategic Alliances, Joint Ventures, Partnerships
- International Development, Sales, Marketing
- OEM/ODM Technical Marketing & Sales
- Revitalizing Stagnant & Declining Sales
- Market Evaluation, Penetration & Expansion
- Product Line/Pricing Rationalization
- New Product Introduction & Launches
- Portfolio Management & Customer Retention
- Product Refinement & Life Cycle Management
- Product Development Management
- Project, Program, Engineering Management
- Contract Engineering Management
- Competitive Analysis, Positioning, Pricing
- Requirements Management
- User Research, User Interface Design

KEY CAREER ACCOMPLISHMENTS

- Product, Brand, and Marketing Management in diverse range of markets and industries, with P&L responsibilities up to \$100 million annual sales.
- Quick Learner of new industries/product offerings with results-oriented achievements. Created excitement around a static accessories category in condensed timeframe. Created full line of support, educational, training, and presentation materials. Impact of efforts increased sales from \$16.4M to \$37.2M in 24 months.
- Program management for multiple high tech/electronic development projects, averaging \$3 million annual budget. Serve in project manager and product manager capacities. Two successful worldwide launches in 3 years. \$1M annual OEM/B2B sales and \$10M annual sales.
- Combine demonstrated product management leadership experience with strong hands-on technical background. Equally comfortable delving into product requirements with hard-core engineers as well as presenting to executive level decision makers.
- Uniquely skilled at fostering new ideas, building successful cross-functional teams, and nurturing a culture of consumer-driven product development and user experience innovation. Experience working in and managing cross-functional, cross-division, cross-geographic and multi-cultural sales, marketing and engineering organizations.
- International program management, sourcing, engineering, OEM/ODM management/development experience. Overseas work assignments in EU and Asia with extended stay in Asia.

EMPLOYMENT

Director, Product & Marketing Management, Medical Electronics 2008 - Present

- Direct the development, management and implementation of the corporate business and marketing plan. Responsible for the management of \$1.1M marketing activities budget.
- Led corporate executive team through strategic marketing analysis, portfolio and road map development. Highly praised by senior executive team and board of directors.
- Provide product management and product development expertise to the R&D and Sustaining Operations groups. Develop design requirements and V&V requirements.
- Oversee product management and marketing management staff of 4.

Senior Product Manager, Energy and Power Meters, Veris Industries 2006-2008

International Business Development Manager, HVAC Sensors

- Managed P&L for growing \$25M energy and power meters division. Serve as product and project manager on development projects. Responsible for life cycle management of product offering.
- Created dynamic lead time system. Created analysis tool for evaluating special project business case/feasibility analysis. Part of management team developing new product introduction staged gate processes.
- Managed sustaining and test engineering departments, supervising 6 engineers.
- Business development activities and plan developed for growing international penetration. Worked with sales, business units, and product management teams to create product offerings, marketing campaigns, quality and regulatory needs for the international market. Set up regional office and distribution network.

Senior Product Manager, Asian Development Initiatives, Medical Electronics, Welch Allyn 2003-2005

- Managed, monitored, implemented development projects. Generated detailed product specifications, drove development, strategic planning and refining market specifications and customer requirements. Created and participated in global market research activities. Research needs from key stakeholders and competitive trends, globally and by region for use in defining design inputs and future development activities.
- Responsible for product life cycle management of \$6 Million OEM business. Worked to revitalize the business, from sales to operations to service to manufacturing to better support a growing business. Developed and executed global communication strategies. Increased revenues by 35%, in a business that was shrinking for the last 3 years. Created a new product line offering, private-labeled products, first year revenue \$1 Million with a limited market release.
- Managed the development of global business partners in compliance to FDA and international quality/regulatory standards including over-site of internal and supplier audits, training in QSIT, QSR, cGMP processes; CAPA closures; stage-gate, procedure development and process management.

Global Product Manager, Medical Electronics & Accessories, GE/Critikon/J&J 1999-2002

- Profit and loss responsibilities for managed products equating to \$100 million in revenues. Led the 3-Year Planning and Analysis Cycle for the division including collecting and analyzing voice of customer, market research, new product design, budgeting and forecasting for \$150 million business with \$12 million base costs.
- Conduct new product feasibility analysis by performing competitive, customer and cost/benefit analysis. Work with R&D to assess feasibility. Advise and develop plans and strategies for introduction to corporate management on emerging market trends, which may lead to product innovation.
- Led product development and team, from market identification to product introduction launch, providing a new product introduction to open new/underdeveloped markets, 15% share growth. Duties included design goals and specifications, project management, vendor selection, consumer research/focus groups, industrial design, engineering architecture, software programming, prototype/simulation testing, and design for manufacture.
- Evaluated brand profitability. Implemented product line, SKU, and pricing rationalization strategy based on standard cost, volume, customers and competitors. Increased profitability 7% first year, additional 5% second year. Developed, recommended, and monitored the implementation of sourcing and cost improvement programs, leading to \$1.2 million cost improvement in production, packaging and distribution.

Consultant, Business & Marketing Plan Development, Small Business Consulting 1995-1998

- Drafted business and marketing plans for start-up technology organizations, coordinated meetings with venture capitalists and Small Business Administration organizations.

Product Manager, Pharmaceuticals, Ethical and OTC, & HBAs, Bausch & Lomb, Tampa, Florida 1993-1995

- Responsible for P&L, market trending, operations, and production needs for 250 SKUs/products equating to \$100 million in sales. Responsible for monthly supply-demand meeting, reporting and analysis for over 100 SKUs. Responsible for mid-year and quarterly reforecasts, annual Operating Plan development and submission, and three-year ARP, class of trade, SKU, and competitor analysis.

Previous Work Experience:

Contract Manager/Program Manager (Govt/Services/NonProfit), Retail Buyer/Operations Manager (HBA, Fashion)

EDUCATION/ADVANCED TRAINING

MS Systems Engineering, Portland State University, Portland OR (Dec 2008)

Specialization: Fuzzy Front End of Innovation; Additional coursework in Engineering & Technology Mgmt

MBA, Honors, Specialization: Systems Analysis, Drake University, Des Moines IA

BA, Economics, University of South Florida, Tampa FL

Certified, Project Management Professional, PMI; Six-Sigma Green Belt, Dual Certification: DMAIC & DFSS/p

IN ADDITION

Professional Assets: Enthusiastic self-starter with professional experience showing the ability to accept increasing levels of responsibility in diverse business settings. Strong command of analytical skills. Self-motivated. Self-sufficient. Goal Driven.

Communication Skills: Customer service oriented. Excellent communication skills - oral, written, presentation. Effective with people at all levels, internal and external to the organization, consumers to board members.

International Market Exposure: Western Europe (United Kingdom, France, Germany, Spain, Norway, Sweden), Eastern Europe (Slovenia, Poland), Asia (China, Korea, Singapore), and North America (USA and Canada). International manufacturing, supply, sourcing, and distribution exposure in Mexico, Germany, United Kingdom, China, Singapore, and Korea. International engineering development, project management, and design experience in Korea and Singapore.

Build Your Career with Professional Memberships

Whether product manager, systems engineer or development manager, there are parts of your individual responsibilities that center around: engineering expertise, project/program management, and product management/product development. Below are numerous professional associations which seek to provide expertise, shared knowledge, and certification in these areas. [Note: For brevity, only US based organizations are listed. List is not meant to be exhaustive.]

International Council on Systems Engineering

A “not-for-profit membership organization whose mission is to advance the state of art and practice of systems engineering in industry, academia, and government by promoting interdisciplinary, scalable approaches to product technologically appropriate solutions that meet societal needs.” <http://www.incose.org/>



EMCI or Engineering Management Certification International, is a certification program that establishes global standards in engineering management among qualified engineers, scientists and technologists. Established in conjunction with ASME, ASCE, AICHE, and AIME. The standard by which to evaluate engineers’ knowledge and skills in managing activities and allocation of resources in an engineering and/or technically driven business environment. <http://www.engineeringcertification.org/>



PMI or the Project Managers Institute is the “leading membership association for the project management professional. For almost 40 years, PMI has advanced the careers of practitioners who make project management indispensable for business results.” <http://www.pmi.org/>



PDMA, Product Development Management Association, is the “premier advocate and comprehensive resource for the professional of product development and innovation.” “The PDMA New Product Development Professional (NPDP) Certification confirms mastery of new product development principles and best practices, enabling continual improvement in job performance and helping corporations identify those individuals with the knowledge and experience to move into leadership positions in the area of new product development.” <http://pdma.org/>



The **Product Development Benchmarking Association (PDBA)** is a “free association of new product development organizations within major corporations. PDBA conducts benchmarking studies to identify practices that improve overall operations of the members. <http://pdba.org/>



The **Society for Marketing Professional Services (SMPS)** was created to recognize the need to “sharpen skills, pool resources and work together to create business opportunities.” The association has over 5300 “marketing and business development professionals from architectural, engineering, planning, interior design, construction, and specialty consulting firms located throughout US and Canada” <http://www.smeps.org/>



American Marketing Association, one of the largest associations for marketers, has over 38,000 members worldwide in every area of marketing. For over six decades AMA has been an essential resource providing relevant marketing information that experienced marketers turn to every day.” <http://www.marketingpower.com/>



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IEEE, Institute of Electrical and Electronics Engineers, is the “world’s leading professional association for the advancement of technology”. IEE is a “leading authority on areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electrical power and consumer electronics”. <http://www.ieee.org/>



The **Association of International Product Marketing and Management (AIPMM)** is “where product professionals go for answers. It is the world’s largest product managers, brand managers, product marketing managers” who “manage the entire product life-cycle throughout any industry.” <http://www.aipmm.com/>



The **Management Roundtable** is the “leading knowledge and networking resource for product developers. Practitioner-oriented and unbiased, our focus is on providing actionable information about new strategies and processes that enable speed, innovation, profitability, and overall competitive advantage. <http://www.roundtable.com/>



American Society for Engineering Management

Engineering Management is the art and science of planning, organizing, allocating resources, and directing and controlling activities which have a technological component. Engineering Management is rapidly becoming recognized as a professional discipline. Engineering managers are distinguished from other managers by the fact that they possess both an ability to apply engineering principles and a skill in organizing and directing technical projects and people in technical jobs. www.asem.org



IAPPM, International Association of Project and Program Management, is a



leading project and program organization representing thousands of individual members in more than 30 countries. Membership is comprised of all levels of business professionals--executives, analysts, management and practitioners--all of whom are dedicated to the promotion of advanced project, program and portfolio governance, control and management.

IAPD, International Association for Product Development, is a network where product development practitioners come together to share across industry lines their experiences in executing improvement in the continuously evolving world of product development.

www.iapdonline.com



American Management Association is a world leader in professional development, advancing the skills of individuals to drive business success.





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