



**IE 444.001 – Systems Engineering  
Course Syllabus: Spring 2017  
TR 11:00 AM – 12:15 PM, AGIT 211**

**Instructor:** Dr. Marty Yaqub, Department of Engineering & Technology

**Office Location:** Charles J. Austin Engineering & Technology Building, Room 220

**Office Hours:** M 2:00pm – 5:00pm T 9:00-11:00am

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**COURSE INFORMATION**

**Class Meeting Time and Room:** TR 11:00AM - 12:15PM AGIT 211

**Course Textbook (Required):**

Blanchard, B. S., and Fabrycky, W. J. (2006). Systems Engineering and Analysis (5th Ed).  
Pearson Prentice Hall: Upper Saddle River, NJ. [ISBN 978-0-13-221735-4]

**Course Description:**

A study of the systems acquisition life cycle, alternatives and models in decision making, project cost estimation, project schedule and tracking techniques, reliability analyses, trade off analyses, models for economic evaluation, design for sustainability, design for manufacturability, design for manageability.

The emphasis of this course is on the process of bringing systems into being, beginning with the identification of a need and extending through requirements, determination, functional analysis and allocation, design synthesis, evaluation, and validation, operation and support, phase-out, and disposal. Additional emphasis is placed on the improvement of systems now in existence. An iterative process of analysis, evaluation, feedback, and modification will be emphasized to show how most systems in existence can be improved in their effectiveness, and stakeholder satisfaction. Co-Requisite: IE 495 Industrial Systems Design.

## **Student Learning Outcomes:**

After successfully completing the course, students should be able to do the following:

1. The student will demonstrate an understanding of systems terminology, definitions, and the design process.
2. The student will demonstrate the ability to solve systems engineering problems from information/data provided and from information/data developed during the course.
3. The student will demonstrate critical analysis skills by applying tools, methodologies, and procedures specified during the course to solve selected systems engineering problems.
4. The student will demonstrate an understanding of systems engineering processes involved in developing effective systems solutions for large-scale industrial systems.
5. The student will be able to evaluate alternative methods for improving systems designed for human and non-human use.
6. The student will demonstrate the ability to analyze existing (and proposed) processes to support safe, efficient, and reliable human-centered designs.
7. The student will demonstrate a knowledge of systems engineering terminology as it applies to the design, operation, maintenance, and support of modern technological systems.
8. The student will demonstrate an understanding of the positive aspects and limitations associated with using derived and embedded constraints while attempting to satisfy customer requirements.
9. The student will be able to employ systems engineering analytical tools, techniques, methodologies, and processes to assist development teams in designing efficient and cost-effective design solutions.
10. Students are expected to demonstrate their understanding of current issues in Systems Engineering discipline with readings and research on current issues and presenting their findings to their classmates.

## **COURSE REQUIREMENTS**

### **COURSE EVALUATION**

The final grade will be based on the following factors:

#### ***Examinations:***

The midterm examination plus the final examination. If a student misses the midterm examination, then that missed examination will be assigned 85.0% of that student's Final Exam grade, regardless of the reason(s) for missing the examination. An examination grade equal to "0" because of a violation of the student expectation or academic dishonesty policy stated earlier counts as a missed examination, but the grade cannot be replaced. If a student misses the Final Exam, then that student will be assigned a final grade "F" for the course, regardless of the reason(s) for missing the Final Exam. Students are required to use 8.5"x11" sheets of green engineering paper handwritten front and back. Any graphical requirements will be done on the

green engineering paper. Students will need a four-function calculator for each exam---unless the instructor states otherwise, it is the only computing electronic device and NO storage or other electronic devices are allowed during the exams. All cell phones will be silenced and placed at the front of the class room prior to taking the examinations.

***Class Participation:***

It is expected that the student will do the course's assignments for the student's benefit. The Class participation component of the course will be derived from the instructor's evaluation of these assignments, case studies, and projects. The reviewed assignments will account for 10% of the student's course grade. The instructor selectively chooses 4 or 5 assignments for scoring of a regular assignment (Check minus, Check, Check plus). Check minus indicates the student needs to acquire a better understanding of the assignment subject matter. The other assignments will be given a cursory review---- (as Check minus or Check).by the instructor.

Each student will be expected to prepare these assignments, presentations of special topics and solutions of problems related to topics of the course and turn these assignments or presentations in on time. Late submittals will be subject to a late grade penalty. Further, late submittals will not be accepted if the student has already had more than two late submittals for the semester.

Evaluation Factors:	Values
Midterm Examination:	25%
Final Examination (cumulative):	25%
Class Participation:	10%
Homework Assignment	10%
Case Study	10%
Project	20%

Students are expected to participate in class presentations and any problem sessions. Each student will be expected to present if called on by the instructor their understanding of assigned topics and/or solutions to assigned problem to the class. Non participation in these exercises will be counted against the student's Class Participation component of the course grade.

***Grading Scale:***

A = 90-100%  
B = 80-89%  
C = 70-79%  
D = 60-69%  
Fail < 60%

## TECHNOLOGY REQUIREMENTS

The following technologies will be required for this class.

- A scientific calculator for exams.
- Microsoft Excel
- Internet access to download class notes, assignments, and readings from the course Web site (if applicable).
- Computer software will be freely available for students in the computer labs on campus.

## COURSE AND UNIVERSITY PROCEDURES/POLICIES

### Course Specific Procedures:

1. Students are expected to attend all class periods and be fully prepared for each class.
2. While in class, please turn off your cell phone, iPods, and other music devices.
3. Assignments must be turned in at the beginning of the class on the day it is due. Late assignments will not be accepted.
4. As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

### Academic Dishonesty

Texas A&M University-Commerce will not allow plagiarism in any form. The students' course works should be their own. Plagiarism represents disregard for academic standards and is strictly against University policy. If you have a question regarding academic dishonesty and integrity, please talk to the instructor or refer to the *Code of Student Conduct* from Student Guide Handbook.

## UNIVERSITY SPECIFIC PROCEDURES

### Students with Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

**Office of Student Disability Resources and Services**

**Texas A&M University-Commerce**

**Gee Library**

**Room 132**

**Phone (903) 886-5150 or (903) 886-5835**

**Fax (903) 468-8148**

[StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)

## **Non-Discrimination Statement**

Texas A&M-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation based on race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination based on sexual orientation, gender identity, or gender expression will be maintained.

## **Surveys/Course Evaluations**

Your feedback may be requested by Texas A&M University-Commerce during the semester/term regarding your course. *It is important that you take a serious and constructive approach to this activity.* The information gained from you will assist in course evaluation by the university/college/department to ensure that effective learning is taking place within the existing course structure. If changes are indicated, this will help with course re-design and/or other revisions that will make the course more relevant for future students.

## **Student Conduct**

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from the Student Guide Handbook*).

Students are expected, at all times, to recognize constituted authority, to conform to the ordinary rules of good conduct, to be truthful, to respect the rights of others, to protect private and public property, and to make the best use of their time and effort toward the educational process.

At no time is a student allowed to exchange dialog with, make requests of, or make implications to a member of faculty that could be construed as a request for, or expectation of, preferential or differential treatment among members of a class. A student may not place an instructor in a position in which there is an expectation by the student that (s)he will be evaluated, assessed, or given consideration in a manner inconsistent with that of the entire class. All students within a class will be held to an identical standard of expectation and assessment, within the law.

## **Campus Concealed Carry**

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to (<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>) and/or consult your event organizer). Pursuant

to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 911.

### Course Outline / Calendar

Week	Date	Topics	Reading
1	1/17	Introduction to Systems Engineering	Ch. 1
	1/19	Bring Systems into Being	Ch. 2
2	1/24		
	1/26	Conceptual System Design	Ch. 3
3	1/31		
	2/2	The System Design Process	Ch. 4,5
4	2/7	Preliminary and Detail Design Review	
	2/9	Alternatives and Models in Decision Making	Ch. 7
	2/14	Models for Economic Evaluation	Ch. 8
	2/16		
6	2/21	Models for Economic Evaluation	Ch. 8
	2/23		
7	2/28	Control Concepts and Methods	Ch. 11
	3/2		
8	3/7	Statistical Process Control	Ch. 11
	3/9		
	3/14	Spring break	
	3/16		
9	3/21	Midterm Exam	
	3/23	Optimization in Design and Operations	Ch. 9
10	3/28	Design for Sustainability	Ch. 16
	3/30		
11	4/4	Design for Reliability	Ch. 12
12	4/11-4/13	Case Studies	Handouts
13	4/18-4/20	Projects	
14	4/25	Case Studies Presentations	
15	5/2	Projects Presentations	
	5/4	Projects Presentations	
16		Final Exam	

### Syllabus Changes

The instructor has made every effort to provide the students with an accurate syllabus. However, the course outline/ calendar table is only a guidance. If students miss a class, it is their responsibility to find out if any changes have been made.