Systems Engineering  
MANE 6348-01R

Reduced Seat Time - Three Hours of Graduate Credit
Engineering Room 1.250
Call Number 26845
Wednesday, 7:20 pm to 10:00 pm
Fall 2017

Instructor:
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Edinburg, TX 78539-2999 alley.butler@utrgv.edu

Course Description:
Today’s complex products including ships, aircraft, missiles, space vehicles, and electronic systems that require an interdisciplinary approach to development and deployment. The Systems Engineer must translate customer needs into product requirements and coordinate the design synthesis effort, by managing the interface and interaction of systems and subsystems. This includes coordination of design reviews, analysis of alternatives, consideration of component testing and verification, within cost and schedule constraints. Additional issues managed include the interface with the human user, system reliability, logistic support, and system safety. This course provides an overview of Systems Engineering processes, and it discusses tools that help the Systems Engineer to complete the development of complex projects with success and within budget and schedule.

Manufacturing Engineering General Learning Outcomes
The educational outcomes were derived from the Accreditation Board for Engineering and Technology (ABET) program education objectives, and are the skills students acquired by the time of graduation. It will be demonstrated that the student:

1. is able to use knowledge of mathematics, basic sciences and engineering to analyze problems in manufacturing engineering,

2. is able to design and conduct experiments and interpret the results,

3. is able to design devices, systems or processes that meet given specifications,

4. is able to use computers and software for analysis, design and documentation,

5. is able to communicate ideas effectively in graphical, oral and in written media,

6. is able to function as a team member to solve engineering problems,

7. understands the professional responsibility of an engineer and how engineering solutions impact safety, economics, ethics, politics, society and cultural issues,

8. understands the need for life long learning to keep abreast of current practice.
**Manufacturing Engineering Specific Learning Outcomes**

Students graduating from the manufacturing engineering department will have proficiency in the areas of

- **A. materials and manufacturing processes**
  
  o A1. understands the effect of processes on the properties of materials,
  
  o A2. has the ability to design and conduct experiments to measure the performance of materials, components and systems, and to communicate results,
  
  o A3. has the ability to select and evaluate materials and specify manufacturing steps for manufacturing processes.

- **B. process and product engineering**
  
  o B1. has the ability to create and annotate two dimensional drawings, and generate three dimensional computer based solid models of components and assemblies,
  
  o B2. has the ability to design products, tooling or equipment,
  
  o B3. has the ability to design manufacturing process and specify the process plan.

- **C. manufacturing productivity and quality**
  
  o C1. has the ability to analyze and improve the methods used in the manufacture of products,
  
  o C2. has the ability to do designed experiments and apply statistical concepts of quality to all aspects of manufacturing.

- **D. manufacturing systems engineering**
  
  o D1. has the ability to build and analyze models of manufacturing systems,
  
  o D2. has the ability to design control systems for manufacturing,
  
  o D3. has the ability to establish systems to plan and control the manufacturing of products using modern methods.
Student Learning Outcomes for this Course
Students will be able to:

Prerequisites:
Two courses are considered prerequisite for the material in this course. The two UTRGV courses include:
  MANE 3337 – Engineering Economics
  MANE 3332 – Engineering Statistics (with Calculus)
Courses taken elsewhere with the same content can satisfy the prerequisite requirement.

Textbook (Required):

Systems Engineering Textbook:

Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/30</td>
<td>Course Introduction, Introduction to Systems Engineering</td>
<td>Ch 1, PPT</td>
</tr>
<tr>
<td>2</td>
<td>9/6</td>
<td>Introduction to Systems Engineering</td>
<td>Ch 1, PPT</td>
</tr>
<tr>
<td>3</td>
<td>9/13</td>
<td>Methodological Frameworks and Life Cycle Models</td>
<td>Ch 2, PPT</td>
</tr>
<tr>
<td>4</td>
<td>9/20</td>
<td>Methodological Frameworks and Life Cycle Models</td>
<td>Ch 2, PPT</td>
</tr>
<tr>
<td>5</td>
<td>9/27</td>
<td>Formulation of Issues</td>
<td>Ch 3, PPT</td>
</tr>
<tr>
<td>6</td>
<td>10/4</td>
<td>Formulation of Issues</td>
<td>Ch 3, PPT</td>
</tr>
<tr>
<td>7</td>
<td>10/11</td>
<td>Analysis of Alternatives</td>
<td>Ch 4, PPT</td>
</tr>
<tr>
<td>8</td>
<td>10/18</td>
<td>Exam 1</td>
<td>Ch 1-4</td>
</tr>
<tr>
<td>9</td>
<td>10/25</td>
<td>Interpretation of Alternatives and Decision Making</td>
<td>Ch 5, PPT</td>
</tr>
<tr>
<td>10</td>
<td>11/1</td>
<td>Interpretation of Alternatives and Decision Making</td>
<td>Ch 5, PPT</td>
</tr>
<tr>
<td>11</td>
<td>11/8</td>
<td>Systems Engineering Management</td>
<td>Ch 6, PPT</td>
</tr>
<tr>
<td>12</td>
<td>11/15</td>
<td>Systems Engineering Management</td>
<td>Ch 6, PPT</td>
</tr>
<tr>
<td>13</td>
<td>11/22</td>
<td>Systems Engineering – DoD and IEEE</td>
<td>PPT</td>
</tr>
<tr>
<td>14</td>
<td>11/29</td>
<td>Systems Engineering – NASA</td>
<td>PPT</td>
</tr>
<tr>
<td>15</td>
<td>12/6</td>
<td>Project Presentations</td>
<td></td>
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<tr>
<td>16</td>
<td>12/13</td>
<td>Exam 2</td>
<td>Ch 5-6, Plus</td>
</tr>
</tbody>
</table>

Because this is the sixth time that this instructor has taught this course, the schedule provided in the above table should be viewed as a goal which is most likely to be altered based on class progress. Therefore, please consider this schedule as approximate. It is a beginning of the semester estimate as to what can be accomplished.
Last Day to Drop: The last day to receive drop without the course showing on your record or change to non-credit is Wednesday, September 13, 2017. The last day to drop a course is Wednesday, November 15, 2017. Please keep these deadlines in mind, if you are considering dropping the course.

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>30%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>30%</td>
</tr>
<tr>
<td>Project</td>
<td>20%</td>
</tr>
<tr>
<td>Participation</td>
<td>5%</td>
</tr>
</tbody>
</table>

Grades on quizzes and exams are based on a rigorous process in which the parts to the solution or answer to the problems are assigned a specific number of points to each component of the solution. So, if the solution is essentially the same as the posted solution, then full credit is given. If a part of the solution is incorrect or missing, then the partial credit points assigned to the part of the solution that is incorrect or missing are lost, and the score of the problem or question is reduced accordingly.

Exams:
Exams are structured on a 0 to 100 percent basis. If scores are lower than “traditional grades” for this course, scores are scaled by the instructor to produce a “normal curve” for the class. Therefore, test grades are relative in nature. Students with the highest grades on tests should receive an “A” and those with lower grades should receive lower grades, accordingly.

Make Up Examinations: Every attempt should be made to complete examinations when they are scheduled. In the event that an emergency arises which prevents taking a scheduled exam, a written response should be provided with documentation, as soon as possible. If the nature of the emergency is considered a valid reason for the missed exam, a make-up exam can be administered.

Grading Basis: Grading of examinations, homework, and other assignments is based on technical considerations (method correctness, appropriateness of stated assumptions, modeling methods, etc.) and non-technical considerations (neatness, professional appearance/substance, grammar, spelling, etc.)

Cut and Paste Not Allowed: A significant quantity of material is provided as PowerPoint or in other formats that allow direct or indirect extraction of ideas. If an assignment includes material available through a cut and paste utility, then the student can simply use the cut and paste utility to extract the verbiage to answer a question directly. Of course, this completely defeats the purpose of the question on the assignment, because anyone can use the cut and paste utility with almost no effort to learn and respond in a way that reflects that learning.
Because cut and paste of textual material “short circuits” a normal learning process, it is not counted as an appropriate answer to a question or assignment. Instead, the student is expected to read the textual material and respond to the question or assignment in their own words. This act of reading and reproducing even a paraphrased response significantly improves the chance that the student learns the material. For this reason, answers that are clearly developed by cut and paste or other means of direct extraction and reproduction of material are not counted as valid answers. In other words, students that only provide an answer that is directly extracted from other material are to receive no credit for that response to a problem or assignment.

**Reduced Seat Time Course Administration:**

The goal is to have the Systems Engineering course provide the same course material and learning experience as a completely on-site version of the course. However, because this course is partially delivered over the internet as a reduced seat time course, some differences must exist because of the nature of the means of transmitting the course. There are important similarities, and these are:
- Blackboard is used to provide: 1) PowerPoint lecture material, 2) Course information including old homework and exams, and 3) Handouts, and
- Exams are the same.

So, much of the course content is very similar to a completely on-site course. The key differences are:
- Lectures are transmitted over the internet,
- Weekly quizzes are administered through the Blackboard interface, and
- Weekly Blackboard Collaborate sessions are provided using the Blackboard utility.

This reduced seat time administration reduces commute time for students that travel to/from campus. It also allows for class administration similar to a completely on-line course in Systems Engineering.

**Patience and Understanding:**
This is the sixth time the Systems Engineering (MANE 6348) course has been given. So, some patience and understanding may be needed. Please communicate problems directly and cooperate with further development of this course. We have the potential to have a very good course!

**Blackboard:**
The instructor provides information regarding the course through the UTRGV Blackboard software in current use. Every effort is be made to employ the Blackboard software on an aggressive basis to allow students to easily obtain course material and information. The course is principally PowerPoint based, and the lectures that are in PowerPoint are placed on the UTRGV Blackboard. Lectures are provided by internet delivery, PowerPoint is narrated and provided to the students using Camtasia Studio software.
Answers to examinations are available on the Blackboard system. Grades are posted through Blackboard, and handout material is also available. Additionally, other information for the course is placed on the Blackboard system. When an exam is completed, the solution is posted on Blackboard. As a result, all exam solutions are viewable over the internet, using Blackboard.

**Grades on Blackboard:**
Blackboard has the ability to record and maintain records of student grades. This grade information is available to the instructor, the student, and the Center for Learning, Teaching, and Technology who monitor the course only. So, the student’s privacy is maintained by the software. The grade utility is employed in this course for use by the students. The grade utility is used to keep students aware of their grades on assignments and tests as the course continues.

Adobe Reader Many of the files used in this course are Portable Document Format or PDF files that can be read using Adobe software. To obtain a free copy of the Adobe reader for PDF files, please visit [http://www.adobe.com/products/reader/](http://www.adobe.com/products/reader/)

Computer Systems Support: The university help desk is available to help students with computer software and hardware problems by telephone from 8:00 am to 5:00 pm Monday through Friday. The help desk can see you in person Monday through Friday from 8:00 am to 5:00 pm. The help desk can be contacted as follows:

- 956-665-2020
- [https://apps.utrgv.edu/it/it-help/](https://apps.utrgv.edu/it/it-help/)

The Center for Learning, Teaching, and Technology also assists students with software and its operation with a specific emphasis on distance learning. Their staff includes specialists with the expertise to help you with problems. Their hours are 7:30 am to 6:00 pm, Monday through Friday. They can be contacted as follows:

- Center For Learning, Teaching & Technology
  Education Complex-(EDCC) 2.202 (2nd Floor)
  1201 W University Dr., Edinburg TX, 78401
  (956) 665-2979
  [https://colttapps.utrgv.edu/helpme/](https://colttapps.utrgv.edu/helpme/)

**Weekly Quizzes:** Weekly quizzes are posted on Blackboard in a Weekly Quiz folder. Each quiz is provided using the Blackboard assessment tools, and each quiz must be completed before the quiz due date. No quiz can be taken after the due date, so you receive a zero if you do not take the quiz before the due date. The lockdown browser must be used to take a quiz.
E-mail Use: The computer network at UTRGV represents current technology that can save time and work for all involved. To this end, electronic mail (or e-mail) is used to communicate with the class on matters of class administration, assignment clarification, and for other purposes. Information sent by e-mail is assumed to be received by all. This means that each student should make sure that the instructor has a current and valid e-mail address for the student, and that e-mail is checked on a regular basis.

To avoid duplication of e-mail systems, the e-mail system within Blackboard is disabled. Students are expected to use the University of Texas – Rio Grande Valley e-mail system instead. E-mail sent to the instructor using Blackboard is ignored.

Internet Connectivity: Past experience with software and connectivity has led to some conclusions about connection to the internet. There are different ways to connect to the internet each with its own speed and file size constraints. If video is included the system bandwidth requirements are even more aggressive. Guidance from the one organization divides connectivity into three groups:

**Dial Up** – okay for slow file transfer, but UTRGV experience is that dial-up is often problematic for Blackboard Collaborate classroom participation

**DSL, cable modem, and wireless** – okay for file transfer and Blackboard Collaborate classroom participation, sometimes problems can occur with latency (system delays) and/or video transmission, but DSL, cable modem, and wireless is usually okay

**T1 and LAN** – works well for rapid file transfer and Blackboard Collaborate with video, but most corporations with a LAN also have a firewall. Getting through the firewall is usually a major challenge without good IT support. UTRGV can only assist students with university systems and cannot support students with corporate firewall interaction.

Software Available to the Student: There are multiple software packages available to the student to help with learning. As the principle course platform, the Blackboard software package is available for multiple purposes (electronic bulletin board, discussion board, chat, computer managed assignments and assignment drop box, computer provided quizzes, management of other software interfaces like Blackboard Collaborate, etc.). So, Blackboard is the first of several packages that help student access and learning. Additionally, Blackboard Collaborate is used as a learning tool, and Camtasia provides videos that represent lecture modules in a computer video (flash player) format. The lecture modules in Camtasia are broken into appropriate modules by subject matter, and a rewind/pause/fast forward control is available to the student.

Software Available to the Instructor: The instructor has multiple software packages available for reading and printing student assignments. However, it is possible to send an assignment that the instructor cannot print and grade. With this in mind, students should consult the list of software available to the professor, and make sure that the assignment can be accessed and printed with the software available to the instructor. Otherwise, the assignment is returned for conversion to conform to a software package compatible with the instructor’s software.
The instructor’s software packages include:
   Operating System is Microsoft Version 7
   Adobe Professional Version 9.0 (included Adobe reader)
   Microsoft Office 2013 (Word, Excel, PowerPoint, Access, Picture Manager)
   Microsoft Windows Journal
   Microsoft Notepad and Wordpad
   Microsoft Project 2000
   Microsoft Windows Media Player

Class Policies for a Productive Semester:

Collaboration on Assignments: Quizzes are assigned as a learning experience. It is anticipated that each student does his or her own quiz, and because the quizzes are a major part of the grade, collaboration among students is discouraged. Quiz questions are randomized from a pool of questions, so collaboration among students on quizzes is not easy. Additionally collaboration on quizzes and other assignments is a matter of Academic Honesty.

Scholastic Integrity: As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

Sexual Harassment, Discrimination and Violence: In accordance with UT System regulations, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.
Copyright: Material provided on Blackboard is made available for student use in this course, only. Copyright laws protect the authors and publishers with regard to this material, and these legal provisions require that the material made available to you for this course not be distributed, disseminated, or otherwise used outside of this course. This includes transmission to individuals that are not officially enrolled in this class, and it includes use after the course is completed. Violation of these provisions may constitute violation of copyright laws and may be punishable through legal recourse by the copyright owner. Additionally, copyright violations may be considered a violation of UTRGV policy, and therefore, subject to disciplinary procedures.

Students with Disabilities: If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time. Brownsville Campus: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at accessibility@utrgv.edu. Edinburg Campus: Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at accessibility@utrgv.edu.

Mandatory Course Evaluation Period: Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Online evaluations will be available Nov. 15 – Dec. 6, 2017. Students who complete their evaluations will have priority access to their grades.

Office Hours: Classical in office, office hours are Tuesday 1:30 pm to 2:45 pm, and Wednesday 3:15 pm to 6:30 pm. Additional office hour services are provided using the Blackboard Collaborate software, at student request. To obtain assistance from the instructor using the Collaborate software, simply call the instructor’s office during office hours, and the Collaborator software can be employed to provide instructor – student contact.

Additionally, office and home phone numbers are provided on this syllabus (along with e-mail), and students are encouraged to contact the instructor by any means between 8:00 am and midnight, seven days per week, as needed for assistance. Each phone line has voice mail, and messages are returned as soon as possible. E-mail can also help in reaching the instructor for assistance. Since the professor’s residence is close to campus, meeting the professor for assistance on campus in the evening or weekends at a mutually convenient time is a service available for students. Appointments are also scheduled upon request.

Phone Messages: Due to a high volume of calls that include solicitations, wrong numbers, and unwanted traffic, calls are often not answered when the phone rings.
Therefore, it is imperative that you speak clearly and leave your name, phone number, date, and time when you called. This allows your instructor to return your call as promptly as possible.

Late Quizzes: Quizzes must be completed by the due date given for the quiz. The Blackboard system does not allow for quizzes to be taken after the due date, and the instructor cannot change the due date of a quiz. So, your time should be carefully managed to ensure you cover the material over which the quiz is given, and take the quiz before the due date. Failure to take a quiz before the due date results in a zero for you for that quiz.

Signatures on E-mail: To avoid confusion, students are requested to provide their complete names as the signature on e-mail. Signing an e-mail message, “Juan” is not helpful when there is more than one “Juan” in the class. So, please use your first and last name on all e-mail transmissions to provide clarity and to avoid ambiguity.

Grading Concerns:
Every effort is made by the instructor, Teaching Assistants or TA’s, and graders to correctly understand, interpret, and respond properly to each question on each exam or assignment. However, each class includes a significant number of students, and it is possible that mistakes might be made. Course policy for the response to concerns about grading begins with a WRITTEN response from the student to the instructor. This WRITTEN response can be an e-mail which is easily reduced to a writing. Further, the complete exam or assignment should also be returned by the student so that the entire examination or assignment can be re-graded by the instructor.

Mistakes on Assignments The material in this course has been presented by this instructor in four previous semesters. Some of this material is made available to the students through the Blackboard system for use in improving problem solving skills, and the availability of problems from a textbook has been exhausted. So, many of the problems in this course are “home grown” for the class. Given this situation, some level of mistakes and problems are inevitable. As a reward for spotting mistakes and helping to get them corrected, additional points are given to the first student that finds a mistake on a homework assignment or exam. Major mistakes receive several “extra bonus” points, and minor mistakes may receive one or more “extra bonus” points. This is only true for the first person finding and correctly identifying a real mistake. The validity and value of finding a mistake is evaluated by the instructor.