**IEE 456 / 556 – Introduction to Systems Engineering**

* **Fall 2013 - Line Numbers : 85225 / 86642 / 86646**
* **Location BYAC 210**
* **Time: Mondays and Wednesdays from 10:30 until 11:45am**
* **Course Overview, Directions and Timelines -**

Welcome to IEE 456 / 556 – Intro to SE. Here is the plan for the semester:

* + All of my charts are posted on Blackboard for this course.
    - All of the students should have access to the Power Point slides and all the readings I will require.
  + The course syllabus follows. This syllabus contains the course description, learning objectives and recommended timeline for the semester.

**Course Foundation**

This course is the introductory course to our Systems Engineering curriculum at ASU. As such it must address all of the concepts needed for a successful systems engineering process. The foundation for the course is based upon the following notions:

* The course must be directly related to EIA 632 as the standard of choice.
* The course must be directly related to INCOSE as the handbook of choice.
* The course must be based upon IEEE 1220 as the foundation of choice.
  + I have all of the above if you wish to review them.
* The course must be timely and relevant to the practicing Systems Engineer.
  + Yet highlight the solid, analytical foundation needed for success.
* The course must be engineering-oriented.
* The course must take a complete systems engineering view.

**Course Delivery Mechanism**

During the semester the fundamental delivery mechanism will be lecture, being captured on-line in an ASU studio. But I hope to incorporate the following concepts into the course as well:

* Visiting Lecturer series with colleagues such as Dr. Dan McCarville will provide valuable insight.
* Case studies of systems engineering allowing students to really apply the concepts in the classroom.

**Prerequisite Topics:**

This is an overview graduate course. We do expect the student to be literate in the current systems engineering environment and have an engineering / scientific background.

**Instructor:**

Dr. Dan L. Shunk, 480-965-6330, Fax 965-8692, email: dan.shunk@asu.edu

Office Hours Call or email for an appointment.

Office Location Brickyard Room 360, Downtown Tempe

**IEE 456 / 556 – Introduction to Systems Engineering**

* **Fall 2013 - Line Numbers : 85225 / 86642 / 86646**
* **Location BYAC 210**
* **Time: Mondays and Wednesdays from 10:30 until 11:45am**
* **Course Overview, Directions and Timelines -**

**Learning Objectives:**

Upon successful completion of the course the student should have mastered the following concepts and capabilities:

1. a deep understanding of the Systems Engineering concept, scope and scale
2. a deep understanding of the applicable standards and foundations
3. a deep understanding of how the professional association of INCOSE applies Systems Engineering principles
4. an introduction to Large Scale Systems and all the phases needed for success
5. an introduction to CMM and CMMI.
6. an introduction to a modern New Product Development process
7. a deep understanding of developing a complete systems view
8. a deep understanding of static and dynamic modeling techniques
9. an introduction to the modern cost estimation technique of CoSYSMo
10. an introduction to variability and making decisions under uncertainty.

**Course Grading Plan:**

The course grade will be determined based upon the total points each individual students achieves in the following categories:

* Team Presentation in-class 50 points
* Quiz #1 – Midterm 200 points
* Quiz #2 – Final 200 points
* Total Available Points for All Students 450 points
* PLUS Lit Review for IEE 598 100 points
* Total Available Points for Grads 550 points

**IEE 456 / 556 – Introduction to Systems Engineering**

* **Fall 2013 - Line Numbers : 85225 / 86642 / 86646**
* **Location BYAC 210**
* **Time: Mondays and Wednesdays from 10:30 until 11:45am**
* **Course Overview, Directions and Timelines -**

1. Absence & Make-Up Policies

Accommodations will be made for religious observances provided that students notify the instructor at the beginning of the semester concerning those dates. Students who expect to miss class due to officially university-sanctioned activities should inform the instructor early in the semester. Alternative arrangements will generally be made for any examinations and other graded in-class work affected by such absences.

1. Classroom Behavior

Cell phones and pagers (must be/or state alternative rule) turned off during class to avoid causing distractions. The use of recording devices (is/is not) permitted during class. Any violent or threatening conduct by an ASU student in this class will be reported to the ASU Police Department and the Office of the Dean of Students.

1. Academic Integrity

All students in this class are subject to ASU’s Academic Integrity Policy (available at <http://provost.asu.edu/academicintegrity>) and should acquaint themselves with its content and requirements, including a strict prohibition against plagiarism. All violations will be reported to the Dean’s office, who maintain records of all offenses.

1. Disability Accommodations.

Suitable accommodations will be made for students having disabilities and students should notify the instructor as early as possible if they will require same. Such students must be registered with the Disability Resource Center and provide documentation to that effect.

**IEE 456 / 556 – Introduction to Systems Engineering**

* **Fall 2013 - Line Numbers : 85225 / 86642 / 86646**
* **Location BYAC 210**
* **Time: Mondays and Wednesdays from 10:30 until 11:45am**
* **Course Overview, Directions and Timelines -**

**ANSI Standards Access**

Dear Professor,

I have added your account and the requested document(s) to your University Outreach account on the ANSI Site License Portal.  You can access the site via the following:  
  
<http://slportal.ansi.org/>

Username: uo\_asu\_ds72213\_slportal

Password: ansi

To download files, click on the document designation and then click Download File.

You can distribute these credentials accordingly to your students.  Please note, our PDFs have DRM applied to them (Digital Rights Management).  The following restrictions apply to documents downloaded through ANSI’s University Outreach Program:

* Adobe Reader (version 5 or newer) [<http://get.adobe.com/reader/>]  and the Fileopen DRM Plug-in [<http://plugin.fileopen.com/>] are required – both are available as free downloads
* Each document can be downloaded multiple times (to multiple computers)
* Each document instance will be locked to the first computer it is accessed on and will not be accessibly from another system
* Each document instance can be printed a maximum of 3 times
* Electronic copies of the documents will automatically expire 1 year from the date of first access

These settings are managed automatically by the Fileopen DRM plug-in.

(Please note that there are separate log-ins for each class. We ask that you share each log-in with the particular class for whom it was established only, as we make every effort to control the amount of content distributed. We thank you in advance for your co-operation.)

If you have any questions, please direct them to Kim Bullock ([kbullock@ansi.org](mailto:kbullock@ansi.org)) who manages the University Outreach Program here at ANSI.  Requests for additional standards can also be directed to Kim.  
  
Regards,

Sharon Roth

For Bob Hager

Director, Production

ANSI

[bhager@ansi.org](mailto:bhager@ansi.org)

212-642-4917

**IEE 456 / 556 – Introduction to Systems Engineering**

* **Fall 2013 - Line Numbers : 85225 / 86642 / 86646**

**Recommended Timing for the Semester – R5 September 2013**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Module | Speaker | **Topic** | Worth |
| Aug 26 | 1 |  | **Introduction to SE:**  Scope, Scale, Syllabus Review and Desired Learning Outcomes |  |
| Aug 28 | 2 |  | Role of SE, Process of SE, Outcomes of SE, Course Foundation: EIA 632 Standard Review, Taking a Complete Systems View, The Value of Rigor, Strategic Positioning |  |
| Sept 2 |  |  | **No Class – Labor Day Holiday** |  |
| Sept 4 | 3 | \* | Course Foundation: ISO 1220 and ISO 15288 and DoDI 5000.02 Review |  |
| Sept 9 | 4 |  | Course Foundation: INCOSE Handbook Version 3.1 |  |
| Sept 11 | 5 |  | **Large Scale Systems Design:** NPD Process**,** Desired Customer Outcomes |  |
| Sept 16 | 6 | \* | Stage Gate |  |
| Sept 18 | 7 | \* | Requirements Definition |  |
| Sept 23 | 7 |  | Requirements Volatility, Detailing and Finalization |  |
| Sept 25 |  |  | **No Class – IIE Keynote** |  |
| Sept 30 | 6a |  | Idea Generation |  |
| Oct 2 | 6b |  | **Innovation and Creating an Innovative Culture – On Your Own – No Class but We Will Discuss in Detail on October 7** |  |
| Oct 7 | 8a |  | CD / PD / DD / FSD with Baby Boomer Housing Workshop |  |
| Oct 9 | 9 | \* | Configuration Management, EIA 649, |  |
| Oct 14 |  |  | **No Class – University Holiday** |  |
| Oct 16 | 10,11 | \*, \*, | DoDAF and SYSML ,Why Systems Fail – CMM Intro, a complete systems view of these maturity models |  |
| Oct 21 | 12 | \*, \* | From CMM and CMMI – putting CMMI into practice |  |
|  |  |  | (Midterm Exam covers material to here!!!) |  |
| Oct 23 | 13 | \* | Integration of R&D with SE |  |
| Oct 28 | 14 |  | Risk in Systems Engineering with Dr. Dan McCarville |  |
| Oct 30 | 15 | \*, \* | **Program Management of Large Scale Systems:** PM Tools, e.g. Microsoft Project\*, Primavera\*, et.al. with Zhen Zhao |  |
| Nov 4 |  |  | **MIDTERM –** Exam will be posted on the web Sunday, 11/3 and due close of business on Tuesday, 11/5 – covers material through 10/22 so **NO CLASS on Monday, November 4** | 200 points |
| Nov 6 | 16 | \* | **Modeling a System:** Taking a Complete Systems View, IDEF Overview |  |
| Nov 11 |  |  | **No class – University Holiday** |  |
| Nov 13 | 16a |  | Total Cost of Quality |  |
| Nov 18 | 17 | \* | UML and Use Cases using UML |  |
| Nov 20 | 18 | \* | BPM and BPMN , Static and Dynamic Enterprise Modeling |  |
| Nov 25 | 22 | \* | **Predicting Costs:** the COCOMO\* Model for software |  |
| Nov 27 | 23 | \* | Expanding COCOMO into CoSYSMo\* for total systems |  |
| Dec 2 | 24 | \*, \* | Earned Value (EV), Cost as an Independent Variable, Using CoSYSMo in an SE environment |  |
| Dec 4 | 26 | \* | **Managing Variability and Risk:** Identifying Sources of Variability, FMEA |  |
| Dec 9 |  |  | **LIT REVIEW –** submitted electronically by start of business | 100 pts |
| Finals 8-14 |  |  | **FINAL** – Exam will be posted on the web on 12/10and due close of business on Saturday, 12/12 – covers material from 10/21 on. | 200 points |

**IEE 456 / 556 – Introduction to Systems Engineering**

* **Fall 2013 - Line Numbers : 85225 / 86642 / 86646**
* **Class Presentation Topics List – R1 – July 2013**

Please select your class presentation topic from the following. Other topics addressed during the semester may be selected by the student ~ with the consent of the instructor. Max teams of 3 students.

|  |  |  |
| --- | --- | --- |
| **Module** | **Topic** | **Speaker** |
| 3 | ISO 15288 |  |
| 6 | Stage Gate Process |  |
| 7 | Requ’ts Volatility |  |
| 9 | Config. Management |  |
| 10 | DoDAF |  |
| 10 | SySML |  |
| 11 | Why Systems Fail |  |
| 12 | CMM |  |
| 12 | CMMI |  |
| 13 | Greiner paper |  |
| 15 | MS Project |  |
| 15 | Primavera |  |
| 16 | IDEF |  |
| 17 | UML and Use Cases |  |
| 18 | BPMN |  |
| 22 | CoCoMo |  |
| 23 | CoSysMo |  |
| 24 | EV |  |
| 24 | Cost as Indep. Variable |  |
| 26 | FMEA |  |
| 27 | “dmaic” |  |
| 29 | GRC |  |