**SAE 560: Economic Considerations for Systems Engineering**

**Syllabus Date: 7/16/2018**

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| **Semester:** | **Fall 2018** |
| **Lecture:** | **Monday, 6:40 to 9:20 PM, OHE 120** |
| **Instructor:** | **Dr. Jairus Hihn,** [**hihn@usc.edu**](mailto:hihn@usc.edu)**, checked once per week** |
| **Office Hours:** | **Are basically as needed via phone, email or a tool such as Skype. Send email to schedule a time to link up.**  **Office Phone: N/A, Best way to reach me if you need a fast answer is this email as it is always on**  [**Jhihn53@gmail.com**](mailto:Jhihn53@gmail.com) |
| **TA:** | **TBD** |

**Course Texts:**

1. Contemporary Engineering Economics, 6th Edition, Park, C.S., Menlo Park, CA, Addison Wesley Publishing Company, 2016.

**Course objectives:** This course is intended to give the systems architect or systems engineer insight into the impact of economic factors in their programs and help them to develop tools to gain an in-depth understanding of these factors. The fundamental terms involved in quantitative analysis of cash flow will be covered. Insight into cost estimating techniques will also be covered. The relationship of software and its cost implications will be included. Building on the work that has been done in software cost modeling we will look at its application to systems engineering. Specific goals include:

1. Understanding time value of money and interest rate concepts.
2. Ability to evaluate series of cash flows in determining investment decisions.
3. Ability to create and understand parametric cost models such as COSYSMO.
4. Understanding of the practical aspects of justifying projects in an organization.
5. Creating heuristics related to cost and value aspects of systems architecting and engineering.
6. Risk analysis
7. Conducting trade studies
8. Experience writing a technical paper or doing a project.

**If you have any problems with getting things in on time YOU MUST KEEP ME INFORMED. Especially with the paper. Course Grading**

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|  | ***Percentage*** | ***Points*** |
| **Homework (includes presentation)** | 15% | 60 |
| **Midterm Exam** | 35% | 140 |
| **Final Project** | 50% | 200 |
| **Total** | 100% | 400 |

**Homework:**

* Assignments are due by midnight of the date due.
* Point value of each assignment is listed in the course syllabus.
* Assignments should follow the file naming convention (last\_name, first\_name HWX.doc or .ppt or .xls). “X” should be replaced with the corresponding assignment number.
* All submissions should be in Microsoft Word (.doc), PowerPoint (.ppt), Excel (.xls) or PDF (.pdf). PDF should only be used if assignment is handwritten.
* It is expected that submitted homework is the work of the submitting student and was completed independently; plagiarism detection software (TurnItIn.com) will be used on some assignments and the final project.
* Email homework to [hihn@usc.edu](mailto:hihn@usc.edu), especially the first few weeks, unless instructed differently in the class
* DO NOT email submissions to DEN (denhw@usc.edu), they will not be accepted.
* Assignments will be posted through the course website.
* If I have a grader or TA then please submit through Turn It In on the DEN site.
  + To submit an assignment, click on the link for the specific assignment and follow the instructions to attach and submit your file.
  + Students are strongly encouraged to verify each assignment was successfully submitted to the DEN system. You are responsible for ensuring your submissions are correctly submitted to and recorded by the DEN system. To confirm your assignment was received, go to “Tools” > “My Grades”. All your submissions will be recorded here, if you do not see a link to a “score” or a “!” symbol, your submission was not successful. If you have any technical issues with the submission process, email the TA immediately.

**Midterm Examination:** The midterm examination will cover all of the course material covered prior to the exam. It is open book, open note. If you are a DEN student, it is your responsibility to coordinate your exam time/location with the DEN office.

**Final Paper:** The major portion of this course is the final paper/project that is submitted. It is to be completed as a single person effort and is expected to be the work of the submitting student with proper documentation of referenced sources. A guaranteed ‘A’ paper is such that it could be submitted to an appropriate conference in the systems engineering or cost area. The final project will be graded down 20% for each day late.

**Course Schedule**

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| ***Week*** | ***Subjects*** | ***Reading*** | ***Homework*** |
| **1) August 20** | ***Introduction,* Time value of money/ equivalence**  **Paper Ideas to consider** | **PARK Ch. 1, 3,**  **4 up through 4.13** | **HW #1 assigned** |
| **2) August 27** | **Present and annual worth analysis** | **PARK**  **Ch. 5-6** | **HW #1 due**  **(10 points)**  **HW #2 assigned** |
| **3) September 3** | **Labor Day - No Class** |  |  |
| **4) September 10** | **Rate of Return analysis** | **PARK Ch. 7**  **Posted Readings** | **HW #2 due**  **(10 points)**  **HW #3 assigned** |
| **5) September 17** | **Decision Evaluation Theory**  ***and AHP*** | **Posted Readings** | **HW #3 due**  **(10 points)**  **HW #4 assigned** |
| **6) September 24** | **No Class** |  |  |
| **7) October 1** | **Intro to Cost Estimation Parametric Cost Estimation** | **Posted Readings** | **HW #5 assigned**  **HW #4 due**  **(10 points)** |
| **8) October 8** | **Software Cost Estimation** | **Posted Readings** | **HW #5 due**  **(10 points)** |
| **9) October 15** | **MidTerm Review** |  | ***Draft abstract due (Recommended)*** |
| **10) October 22** | ***MidTerm*** |  | ***140 points*** |
| **11) October 29** | **Midterm Results**  **Systems Cost Estimation** | **Posted Readings** | ***Final abstract due (Required)*** |
| **12) November 6** | **Concurrent Engineering Methods and Practices** | **Posted Readings** | ***No Homework*** |
| **13) November 13** | **Risk Identification and Analysis** | **Posted Readings** | ***No Homework*** |
| **14) November 20** | ***Student Presentations*** |  | ***Presentation Due (10 points)*** |
| **15) November 27** | ***Student Presentations*** |  | ***Presentation Due (10 points)*** |
| **16) December 6** | ***Final Paper Due*** | ***Final Paper Due*** | ***Final Paper Due (200 points)*** |

**Academic Integrity**

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| We know that as students of systems architecting and engineering, you hold yourselves to the highest standards of conduct and we, too, will expect that from you. We also expect you to abide by the expectations of the University; to familiarize with those, please see the USC publication ***SCampus***, which can be found online at [www.usc.edu/dept/publications/SCAMPUS](http://www.usc.edu/dept/publications/SCAMPUS). The provisions of this publication will be explicitly enforced. If you have questions about what is allowed, please discuss it with the professor or TA. |

**Students with Disabilities**

Any Student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the professor (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213)740-0776.