MEng Assessment Structure

This need comes out of last year’s Middle States review of Cornell. Undergraduate assessment protocols have been built, a putative generic PhD one exists, the various professional masters programs will need to have an assessment protocol listed and running with data acquisition happening in the 2012-2013 academic year.

**Timeline:**

- **Sept MEC meeting:** reminder of February MEC discussion, clarify homework
- **Oct MEC meeting:** progress reports from fields with suggestions/adjustments
- **Nov MEC meeting:** list of field approved MEng assessment structures delivered
- **Spring 2012:** roll-out by each field
- **Academic year 2012-2013:** MEng assessment in action by each field with central reporting

**Sept meeting:**

1. this* will need to be done, (* = what to assess, how to do it, when to do it -- think serially),
2. each field gets to write their own 'exam' which they (not the MEC) grades,
3. keeping it simple and believable is important (if only for sanity),
4. in the end, each field's 'exam', success, and stated 'improvements' will be somewhat public,
5. attached is a draft sample to act as a springboard -- use if it helps -- more will be added,
6. do engage your field since they will want something they can live with,
7. it could even be useful!
8. quick summary of progress by the Oct meeting (your own samples??)

**Oct meeting:**

1. progress = x have field-approved versions, y have potentially viable drafts waiting for field-approval, z 'are in progress...'
2. complaints, concerns, suggestions, encouragements
3. reminder that field-approved docs will be due by the Nov meeting
List of Core Learning Outcomes
1. Expand/Learn/Master & Apply Core Disciplinary Knowledge
2. Problem Formulation & Organization Approach/Process/Planning
3. Collaborative Problem Solving
4. Communication of Knowledge, Ideas, & Decision Reasoning
5. Self-Directed Learning & Professional Development

Potential General Assessment Tools
1. Student Exit Surveys/Interviews
2. Project Advisors Evaluation
3. Project Sponsor’s Evaluation
4. Job Placement Statistics
5. Recruiter Feedback
6. Alumni Feedback & Involvement (Syr Survey)
7. Student Peer Evaluation
8. Major Course Deliverable Evaluation

Assessment Impact
Analysis of Assessment Information
Feedback into the Program Improvement

Wish List
1. Ethic & Moral Responsibility towards Careers and Community
2. Ensure offering of an appropriate list of courses
3. Learning to become an engaged alum & mentor

Learning Outcome: Expand/Learn/Master & Apply Core Disciplinary Knowledge

Description:
Ability to demonstrate a coherent and fluent understanding of the study of the System Engineering field. Ability to connect field related concepts between courses with regards to their overall relationship within the Systems Engineering process.

Assessment:
- Student Exit Surveys/Interviews
- Job Placement Statistics
- Recruiter Feedback
- Alumni Feedback & Involvement (Syr Survey)
- Student Peer Evaluation
- Major Course Deliverable Evaluation

Learning Outcome: Problem Formulation & Organization Approach/Process/Planning

Description:
Recognition within or the reformulation of engineering challenges/projects as Systems Engineering challenges. Determination of appropriate Systems Engineering techniques, tools and methods as a solution to these challenges. Effective planning and application of those tools toward these challenges. Analyze and efficiently respond to the results of these methods application.

Ability to apply Systems Engineering to a variety of disciplines’ challenges. Ability to objectively compare the requirements, benefits, costs, and risks across the multiple discipline aspects of the same project to the overall goals of that project. Ability to aid experts within various disciplines to determine the requirements, benefits, costs, and risks of the aspects within the experts’ disciplines.
Assessment:
- Project Advisors Evaluation
- Recruiter Feedback
- Major Course Deliverable Evaluation

**Learning Outcome: Collaborative Problem Solving**

Description:
Ability to recognize their own strengths and weaknesses within a team dynamic. Ability to recognize the strengths and weaknesses of others within a team dynamic. Ability to lead a project, when needed, to aid the team in evaluating options and coming to a decision. Ability to perform all of the above in order to help produce a more effective solution than possible by any one team member alone.

Assessment:
- Student Exit Surveys/Interviews
- Project Advisors Evaluation
- Student Peer Evaluation
- Major Course Deliverable Evaluation

**Learning Outcome: Communication of Knowledge, Ideas, & Decision Reasoning**

Description:
Ability to effectively describe and discuss the pros and cons of potential Systems Engineering solutions or approaches. Ability to evaluate and discuss the pros and cons of other’s solutions or approaches. Ability to help others recognize the trade-offs and risks inherent to a potential solution or approach.

Assessment:
- Project Advisors Evaluation
- Project Sponsor’s Evaluation
- Recruiter Feedback
- Student Peer Evaluation
- Major Course Deliverable Evaluation

**Learning Outcome: Self-Directed Learning & Professional Development**

Description:
Demonstrates ability to pull information from multiple sources to formulate improved solutions to traditional problems. Demonstrates ability to seek new knowledge and develop new applications of taught knowledge to solve untraditional and real-world problems.

Recognition of the importance of and commitment to life-long learning. Continued development of skills and abilities. Dedication to sharing experience and aiding colleagues and particularly younger professionals in related fields.

Ability to ascertain the potential moral and ethical implications of their potential actions. Ability to understand and express an understanding of the values and beliefs of multiple diverse cultures as they relate to the challenges and choices being examined. Ability to formulate and enact a responsible solution given the moral and ethical values of everyone involved.

Assessment:
- Student Exit Surveys/Interviews
- Project Advisors Evaluation
- Job Placement Statistics
- Alumni Feedback & Involvement (Syr Survey)
- Major Course Deliverable Evaluation
**List of Core Courses and Most Common Electives**

- SYSEN 5100: Applied Systems Engineering
- SYSEN 5200: Systems Architecture Behavior and Optimization
- SYSEN 5300: Systems Engineering and 6-Sigma for the Design and Operation of Reliable Systems
- CEE 6910: Project Leadership
- CEE 5970: Risk Analysis and Management
- ECE 4450: Computer Networks and Telecommunications
- NBA 5070: Entrepreneurship for Scientists & Engineers
- ORIE 5100: Design of Manufacturing Systems
- ORIE 5126: Supply Chain Management
- SYSEN 5920: Systems Engineering Management for Virtual Teams
- SYSEN 5940: Creativity and Innovation within Systems Engineering

**Table of Learning Outcomes Strongly Targeted by Core Courses and Most Common Electives**

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**Additional Assessment**

- Survey of Companies focusing on Potential Distance Learning Partners

**Analysis of Assessment Information**

The assessment methods listed for each of the learning outcomes will be collected in each of the courses targeting each learning outcome as listed in the table above. This assessment material will be collected on a yearly basis and once collected and organized, the assessment material will be analyzed as part of an annual review. This annual review will include members of the Systems’ executive committee and the faculty who were directly involved with the assessment collection. Individual courses will be analyzed at least based upon their targeted learning outcomes and the entire curriculum program will be analyzed across all courses that target each learning outcome. The result of this analysis will not only be identification of opportunity areas to improve upon, but also highlight current successes and best practices in an effort to not only strengthen the overall program but take full advantage of our current strengths.

**Feedback into Program Improvement**

The results of the assessment analysis will be used to not only redesign both current curriculum and programs but also aid in the creation of new ones. For each identified area of improvement, recommendations will be made by both the executive committee and the faculty of the learning outcome targeted courses as to the lessons, assignments, and activities that should be improved, along with suggestions as to the improvement method. These recommendations will be implemented in specific curriculum and programs during the next year and before the next assessment cycle. Special attention will be given to those areas that were recommended for improvement in the assessment analysis of the next assessment cycle.