

Colorado State University – Pueblo Academic Program Assessment Report for AY 2015-2016

Program: Master's of Science in Engineering (MSE)

Date: June 1, 2016

Completed by: N. Jaksic

Assessment contributors (other faculty involved in this program's assessment): Drs. DePalma, Yuan, Wollega, Bedoya-Valencia, and Fraser

Please describe the 2015-2016 assessment activities for the program in Part I. Use Column H to describe improvements planned for 2016-2017 based on the assessment process. In Part II, please describe activities engaged in during 2015-2016 designed to close-the-loop (improve the program) based on assessment activities and the information gathered in 2014-2015. Thank you.

I. Program student learning outcomes (SLOs) assessed in this cycle, processes, results, and recommendations.

A. Which of the program SLOs were assessed during this cycle? Please include the outcome(s) verbatim from the assessment plan.	B. When was this SLO last assessed? Please indicate the semester and year.	C. What method was used for assessing the SLO? Please include a copy of any rubrics used in the assessment process.	D. Who was assessed? Please fully describe the student group(s) and the number of students or artifacts involved.	E. What is the expected achievement level and how many or what proportion of students should be at it?	F. What were the results of the assessment?	G. What were the department's conclusions about student performance?	H. What changes/improvements to the <u>program</u> are planned based on this assessment?
Analyze and/or design a mechatronic system	Spring 2016	Methods: EN 563 Final Course Exam and/or Project Reports Rubrics: Design Strategy, Solutions, and Tools	One MSE first year graduate student who was enrolled in Spring 2016	80% or more of the students should meet or exceed expectations	100% of students were able to analyze and/or design a mechatronic system. Student's design demonstrated correct design strategies (Final), solutions (Final), and	The student's performance was excellent. However, again, the sample size was too small for a valid statistical analysis.	No changes to the program are planned at this time since this is just the third offering of courses in this program. EN 563 was offered in a "flipped classroom"

					<p>the use of computer tools like MATLAB (Projects).</p> <p>Again, exit interviews were not administered since there were no program graduates.</p>		<p>format for the first time and this method will be assessed in the future.</p>
<p>Apply advanced engineering principles in the design and analysis of a system or process to meet specified needs</p>	<p>Spring 2016</p>	<p>Methods: EN 561 Final and/or Homework, EN 513 Final, Homework, and/or Project Reports</p> <p>Rubrics: Design Strategy and Constraints</p>	<p>In EN 561 there were 8 students (two MSE first year graduate students, four senior BSE students, and two unclassified students) who were enrolled in Fall 2015. One unclassified student didn't finish the class.</p> <p>In EN 513 there were 3 graduate students (1 MSISE, one</p>	<p>80% or more of the students should meet or exceed expectations</p>	<p>86% of all the students in EN 561 (not including the one that didn't finish the course), were able to apply correct state-space design strategy under given constraints and demonstrate their knowledge when solving complicated control problems. 100% of the MSE students were successful.</p> <p>100% of the MSE students in EN 513 were able to apply advanced engineering principles in the design and analysis of a system to meet specified needs. This was assessed by a specific project where</p>	<p>All MSE students (100%) in EN 561 and EN 513 performed well. Some non-MSE students had problems in both courses.</p> <p>However, no firm conclusions could be reached due to the small sample size.</p>	<p>No changes to the program are planned at this time, however the engineering faculty are discussing the frequency of course offerings and the mode of delivery.</p>

			unclassified, and 1 MSE) who were enrolled in Spring 2016.		they had to write software to find a route from one specified city to another.		
Communicate effectively in writing and orally.	Spring 2016	Methods: EN 593: Paper Evaluation and/or Presentation Evaluation EN 507: Presentation Evaluation and/or Project report evaluation Rubrics: written: Articulation, organization, neatness, grammar and spelling, writing style, document formatting Oral: Delivery, length and detail, mechanics, dialect, visual aides, appearance, and listening and response to questions	Three (3) MSE first-year graduate students who were enrolled in EN 593 (Fall 2015) EN 507 was cancelled since the faculty teaching the course left the university.	80% or more of the students should meet or exceed expectations	Students in EN 593 wrote proposals for potential thesis topics. All MSE graduate students (100%) met and/or exceeded the expectation for this SLO.	100% of students met or exceeded expectations for this SLO. Again, due to the small sample size no meaningful analysis of the assessment results could be performed.	No changes to the program are planned at this time.

Comments:

II. Follow-up (closing the loop) on results and activities from previous assessment cycles. In this section, please describe actions taken during this cycle that were based on, or implemented to address, the results of assessment from previous cycles.

A. What SLO(s) did you address? Please include the outcome(s) verbatim from the assessment plan.	B. When was this SLO last assessed? Please indicate the semester and year.	C. What were the recommendations for change from the previous assessment?	D. Were the recommendations for change acted upon? If not, why?	E. What were the results of the changes? If the changes were not effective, what are the next steps or the new recommendations?
Analyze and/or design a mechatronic system	Spring 2014	We may need to make exit interviews mandatory	No. I was on sabbatical and there was no institutional knowledge or designated time to other faculty to do this.	There were no results. In 2015-2016 there were no MSE graduates to fill the exit interviews. We plan to place the exit interviews in our MSE and MSISE Advisement Handbook.
Apply advanced engineering principles in the design and analysis of a system or process to meet specified needs	Spring 2014	Further develop exit interviews	Yes. Exit interviews were developed.	There were no results recorded in 2014-2015, and there were no graduates in 2015-2016 to obtain data, so the review of the results will be postponed until there is data.
Communicate effectively in writing and orally	Spring 2014	Consider a general student satisfaction survey dealing with this SLO	Yes. Engineering faculty discussed a general student satisfaction survey dealing with students' communication skills. This was deemed unnecessary.	There is no need to implement any changes to this SLO since it is working well.

Comments:

This is still a young program. Its development is somewhat slowed down due to the program director's sabbatical in 2014-2015 (EN 563 was not offered in Spring 2015) and one faculty leave (EN 507 was cancelled in Fall 2015) in the last two years. Next year, there will be one more sabbatical (EN 563 will not be offered in Spring 2017).

Also, engineering faculty will work on further development of SLOs and their implementation to improve the inclusion of the MSE emphasis in railroad engineering in program assessment.

The on-line mode of course delivery, flipped classroom methodology, and appropriate pedagogical frames are already been discussed among graduate course faculty. One graduate course (EN 563 Intelligent Robotics) has been redesigned (RAGE funding was used) and offered in the flipped-classroom form, while some of the railroad engineering core courses already have a strong on-line component.

Assessment Rubrics

MSE

Analyze and/or design a mechatronic system

	Exceeds expectations 5%	Meets expectations 75%	Does not meet expectations 20%
Design Strategy	Develops a design strategy, including a plan; decomposes work into subtasks, and develops a timetable.	Uses a design strategy with guidance.	No design strategy is attempted.
Solutions	Develops several potential designs and based on the analysis of those designs finds an optimal design solution using the system view approach.	Can develop and compare multiple solutions to a mechatronic design problem, but does not usually arrive at the best result; conducts optimization but neglects one or two key aspects. Does not use the system view approach.	Cannot design a mechatronic system or individual component without a significant amount of help. Only focuses on one solution to a problem; no optimization attempted.
Tools	Uses computer tools and engineering resources effectively to analyze and/or design mechatronic systems.	There is evidence of mostly correct use of computer tools and engineering resources.	There is no evidence of use of computer tools and engineering resources.

Apply advanced engineering principles in the design and analysis of a system or process to meet specified needs

	Exceeds expectations 5%	Meets expectations 75%	Does not meet expectations 20%
Design Strategy	Develops a design strategy, including a plan; decomposes work into subtasks, and develops a timetable.	Uses a design strategy with guidance.	No design strategy is attempted.
Constraints	Develops a solution that includes all realistic constraints.	Develops a solution that fails to include one or more minor realistic constraints.	There is no consideration of realistic constraints.

Communicate effectively in written form

	Exceeds expectations 5%	Meets expectations 75%	Does not meet expectations 20%
Articulation	Articulates ideas clearly and concisely using visual aids where appropriate.	Articulates ideas, but the idea flow is somewhat disjointed. Does not always use visual aids appropriately (e.g. a table and a graph representing the same information are used; a figure is not addressed in the narrative).	Does not develop/articulate ideas well. Makes points that are hard to understand. Does not use visual aids.
Organization	Organizes the material in a logical sequence (paragraphs, subheading, etc.).	In general, organizes the material well; however, occasionally paragraphs combine multiple thoughts. Does not identify sections and sub-sections clearly.	Imposes little or no structure or organization; does not use subheadings or proper paragraph structure.
Neatness	Presents material neatly and professionally.	Occasionally, does not present material neatly.	Does not present material neatly.
Grammar and Spelling	Uses grammar and spelling correctly.	Makes one or two spelling/grammar errors per page.	Makes spelling/grammar errors throughout more than 1/3 of the paper.
Writing Style	Uses professional writing style.	Sometimes uses jargon, improper voice, improper tense, inappropriate style, etc.	Uses inappropriate writing style for the audience and for the assignment.
Document Formatting	Conforms to the prescribed format.	Conforms to the prescribed format in many portions of the assignment.	Does not follow the prescribed format.

Communicate effectively in oral form

	Exceeds expectations 5%	Meets expectations 75%	Does not meet expectations 20%
Delivery	Plans and delivers an oral presentation effectively; applies the principle of "tell them."	Presents key elements of an oral presentation adequately, but does not apply "tell them" clearly.	Organizes the presentation poorly (e.g. no clear introduction or summary is delivered).
Length and Detail	Presents technical content appropriate for the time allowed and the audience level.	Presents excessive or insufficient detail for time allowed and/or the audience level.	Presents for an inappropriately short or long time period; omits key results during the presentation.
Mechanics	Makes eye contact; can be easily heard; speaks comfortably with minimal prompts; does not block the screen; doesn't show any distracting habits.	Exhibits minor difficulties (e.g. makes sporadic eye contact; occasionally is difficult to hear or understand; overuses prompts or does not use prompts enough; occasionally stumbles or loses place; occasionally blocks the screen; occasionally exhibits some distracting habits (um, ah, clicking pointer, etc.)).	Exhibits major difficulties with the presentation (e.g. makes no eye contact; is difficult to hear or understand; reads from prepared script; blocks the screen; exhibits distracting habits (um, ah, clicking pointer, etc.)).
Dialect	Uses proper American English.	Occasionally uses an inappropriate style of English-too conversational; uses understandable English.	Uses poor English and/or poor pronunciation.
Visual Aides	Uses visual aides effectively.	Presents visual aides that have minor errors or are not always clearly visible.	Presents multiple slides that are unclear or incomprehensible.
Appearance	Exhibits professional appearance.	Appears too casual for a professional presentation.	Appears inappropriately dressed for the occasion (e.g. wears shorts, sandals, etc.)
Listening and Response to Questions	Listens carefully and responds to questions appropriately; is able to explain and interpret results for various audiences and purposes.	Sometimes misunderstands questions; does not respond appropriately to the audience, or has some trouble answering questions.	Does not listen carefully to questions; does not provide appropriate answers, or is unable to answer questions about the presentation material.

Sample MSE Exit Interview

Name: xxxxx xxxxxx

Date:

How did you hear about our MSE program?

What other schools and/or degrees did you consider?

What could be done to make the MSE Program at CSU-Pueblo more attractive to potential students in the same circumstance you were when you began?

How was the experience of being a new (International) MSE student?

What do you think of the degree and education you received at CSU-Pueblo?

What are your future plans?

How do you feel your degree and education have prepared you for your intended career?

How do you feel that your education could have been improved?

What's the worst thing that happened to you since you got here?

How confident are you in analyzing and/or designing mechatronic systems using appropriate engineering tools?

How confident are you in applying advanced engineering principles in analyzing and/or designing systems or processes to meet specified needs?

Could you provide any suggestions for changes in the program?