

**Mechatronic Engineering**  
**Annual Program Improvement Report**  
**2012-2013**

Prepared by  
Chuen H. Hsu  
Professor and Program Improvement Coordinator

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Department of Mechanical and Mechatronic Engineering  
and Sustainable Manufacturing  
California State University, Chico

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## 1. INTRODUCTION

The *Mechatronic Engineering Program Improvement Plan, edition 3* (August 22, 2012) documents the educational objectives, outcomes, and progress to make improvements to the program. With a unanimous decision of faculty at the August-22-2012 meeting, this revised edition of Program Improvement Plan discontinued the direct tie of final course grade to outcome assessment result – the student no longer automatically receives an F for the course solely due to failure to pass the assessment(s) embedded in the course. Also removed is the policy of providing details on Program Outcome assessments in the syllabi of courses designated for assessments. These changes became effective in fall 2012.

This document, the *Mechatronic Engineering Annual Program Improvement Report*, provides a summary of findings and actions for the 2012-2013 academic year resulting primarily from the implementations of the *Mechatronic Engineering Program Improvement Plan*. This report is divided into three main sections: actions taken in 2012-2013 to improve the program, assessment data gathered in 2012-2013, and recommendations for improvements to the Program based on the assessment results. While some detailed data are reported here, more complete data can be found in the assessment files in the file cabinet located in the Department storeroom (OCNL 436A) and in MMEM Department folder on the Chico State Bay server.

## 2. ACTIONS TAKEN IN 2012-2013 TO IMPROVE THE PROGRAM

### 2.1 Areas Recommended for Improvement in 201-2012 Annual Report

The 2011-2012 Annual Program Improvement Report identified five areas to consider for improvements. These areas are faculty performance, courses, labs, program outcome assessment, and degree progress report. Actions taken for program improvement during 2012-2013 in the recommended areas are described in the following.

#### 2.1.1 Faculty

Based on their cumulated experience, some graduating seniors expressed concerns about the large variation of faculty teaching techniques and effectiveness in the spring 2012 Graduating Senior Survey. The observation was supported by the wide rating distribution in Course Outcomes and (Course) Overall Evaluation in the spring 2012 Student Evaluation of Teaching (SET).

This recurring issue was discussed at a faculty meeting and faculty was urged to be more conscientious about class instruction and academic advising. The Department Chair along with the Personnel Committee should work to improve the situation, if the graduating senior written comments are consistent with the faculty member's course evaluation.

#### 2.1.2 Courses

## **EECE 337 Embedded Systems Design**

The EECE 337 had replaced CSCI 221 and EECE 221 as a lower-division course for Electrical Engineering and Computer Engineering majors. Since EECE 337 was a required course for Mechatronic Engineering majors it was decided to follow the change and have it listed as a sophomore level course. The 300-level course number, however, cannot be counted and listed as a lower-division major course requirement in university catalog.

At a MMEM-EECE Chairs discussion on embedded systems design courses, the Chair of the EECE Department stated there had been discussions within his department to change EECE 337 to EECE 237 and revise the course content.

### **Course Content and Grading**

Dissatisfaction about content of technical courses, without specific naming of departments, was expressed in the spring 2012 Graduating Senior Survey. The 2011-2012 Mechatronic Engineering Program Improvement Report suggested a fact finding to see if MECH or MECA courses were implicated.

It is not unusual to see little-changed contents in lower-division fundamental major courses like graphics, statics, dynamics, and materials science, etc. The MMEM Department Chair examined textbook adoptions and course syllabi of upper-division MECH and MECA courses required of Mechatronic Engineering majors, and found no creditable evidence of these courses having outdated contents.

### **2.1.3 Labs**

The 2011-2012 Program Improvement Report recommended (a) a consideration of adding lab component to MECA 482 – Control System Design and (b) locating resources for lab and equipment upgrades.

The general issue of adding lab component to MECA 482 and a couple other courses was discussed at faculty meetings. Faculty felt the lab component that enhances hands-on experience and characterizes the educational values of the program should be carefully implemented pending on (a) the CSU Chancellor's directive of 120-degree-units is cleared and (b) new faculty hiring to improve workload.

Possible resources identified for lab equipment upgrades include Student learning fee (SLF) and Consolidated Course Fee. The faculty has been taking advantages of these resources resulting in funded proposals implemented in 2012-2013 totaled \$22,150. Another \$5,840 has been slated for 2013-2014.

### **2.1.4 Program Outcome Assessment**

## CIVL 495 for Program Outcome Assessment

Associate Dean of the College of ECC was enlisted to help with the acquisition of learning outcome assessment data from CIVL 495 taught by Civil Engineering faculty. No data has been received in 2012-2013.

## EECE 343 for Program Outcome Assessment

As the EECE 343 (Computer Interface Circuits) was removed from the Mechatronic Engineering curriculum and thus removed as a course for program outcome *k* assessment in 2011-2012. The course was further removed from the *Mechatronic Engineering Program Improvement Plan, edition 2* as a course for embedded assessment as recommended in the 2011-2012 Program Improvement Report.

### 2.1.5 Degree Progress Report

The Evaluations Office was not able to include EECE 221 (Processor Architecture and Assembly Language Programming), a required course in the study plans for Mechatronic Engineering before 2012-2013, in the Degree Progress Report for it was no longer documented in the university catalog. For students having completed EECE 221, faculty advisors have been submitting requests to the Evaluations Office to recognize the completed degree requirement.

## 3. ASSESSMENT DATA GATHERED IN 2012-2013

### 3.1 Embedded Assessment of Program Outcomes

Instruments and results of Program Outcomes assessments embedded in selected courses during 2012-2013 are summarized in Table A. A complete list of identified Program Outcomes can be found in Appendix A. Sample Program Outcomes assessment record sheet can be found in Appendix B. The Table A is not complete due to the lack of assessment data from CIVL 495 taught in 2012-2013.

**Table A:** Instruments and results of embedded Program Outcomes assessments in 2012-2013.

Program Outcome	Course	Assessment Instrument	Demonstration of basic competency above a minimum grade or score	Number of MECA majors failing to demonstrate basic competency / Number of MECA majors enrolled in class	
				Fall 2012	Spring 2013
a	MECH 340	Exams (×3)	Average of 60% or better	<i>not taught</i>	1/14
b <sub>1</sub>	MECA 440B	Individual written test plan	Pass/fail assessment	<i>not taught</i>	2/18
b <sub>2</sub>	MECA 380	Lab assignment	C- or better	<i>not taught</i>	1/11
c	MECA 486	Design projects (×3)	Average C+ or better	1/21	<i>not taught</i>
d	CIVL 495	Projects, instructor observation	70% or better	No Data	No Data
	MECA 440A	Individual in group project	Faculty advisor & peer evaluation	0/18	<i>not taught</i>
e <sub>1</sub>	MECA 440A	Individual assignment	Pass/fail grading	0/18	<i>not taught</i>

e <sub>2</sub>	MECA 482	Exams (×3) on system design	Average of C- or better	1/8	<i>not taught</i>
f	CIVL 495	Presentation, memorandums	Score 7 or better out of 10	No Data	No Data
g <sub>1</sub>	MECA 440A	Individual final design review	Pass/fail assessment	0/18	<i>not taught</i>
g <sub>2</sub>	MECH 340	Individual design project memo	C (65%) or better	<i>not taught</i>	3/15
g <sub>3</sub>	MECH 340	Design project drawings	C (65%) or better	<i>not taught</i>	2/15
h	CIVL 495	Reports, instructor observation	Score 7 or better out of 10	No Data	No Data
i	CIVL 495	Projects, presentations	Score 7 or better out of 10	No data	No Data
j	CIVL 495	Reports, instructor observation	Score 7 or better out of 10	No Data	No Data
k	MECA 380	Programming assignment	C- or better	<i>not taught</i>	0/11

As indicated in Table A, all assessments conducted in 2012-2013 have satisfactory pass rates with an exception of MECH 340 for Program Outcome g<sub>3</sub>.

The suitability of the current assessment instrument and suggestions for improving the instrument and the Mechatronic Engineering program are summarized in Table B.

**Table B:** Suitability of current Program Outcomes assessment instruments and suggestions for modifying the instruments and improving the Mechatronic Engineering program in the 2012-2013 assessment cycle.

Program Outcome	Course	Current Instrument Suitable?	Suggestions for Improving Measurement Instrument	Suggestions for Improvement Program
a	MECH 340	Suitable	None suggested	None suggested
b <sub>1</sub>	MECA 440B	Effective	None suggested	None suggested
b <sub>2</sub>	MECA 380	No comments	None suggested	None suggested
c	MECA 486	No comments	None suggested	None suggested
d	CIVL 495	Not assessed	Not assessed	Not assessed
	MECA 440A	Suitable	None suggested	None suggested
e <sub>1</sub>	MECA 440A	Suitable	None suggested	None suggested
e <sub>2</sub>	MECA 482	No comments	None suggested	None suggested
f	CIVL 495	Not assessed	Not assessed	Not assessed
g <sub>1</sub>	MECA 440A	Sufficient	None suggested	None suggested based on data
g <sub>2</sub>	MECH 340	Suitable	None suggested	None suggested
g <sub>3</sub>	MECH 340	Suitable	None suggested	None suggested
h	CIVL 495	Not assessed	Not assessed	Not assessed
i	CIVL 495	Not assessed	Not assessed	Not assessed
j	CIVL 495	Not assessed	Not assessed	Not assessed
k	MECA 380	No comments	None suggested	None suggested

As summarized in Table B, all current assessment instruments used for embedded outcome assessments are considered to be suitable. No suggestions were made by course instructors for modifying the instrument and improving the Mechatronic Engineering program.

### 3.2 Graduating Senior Survey

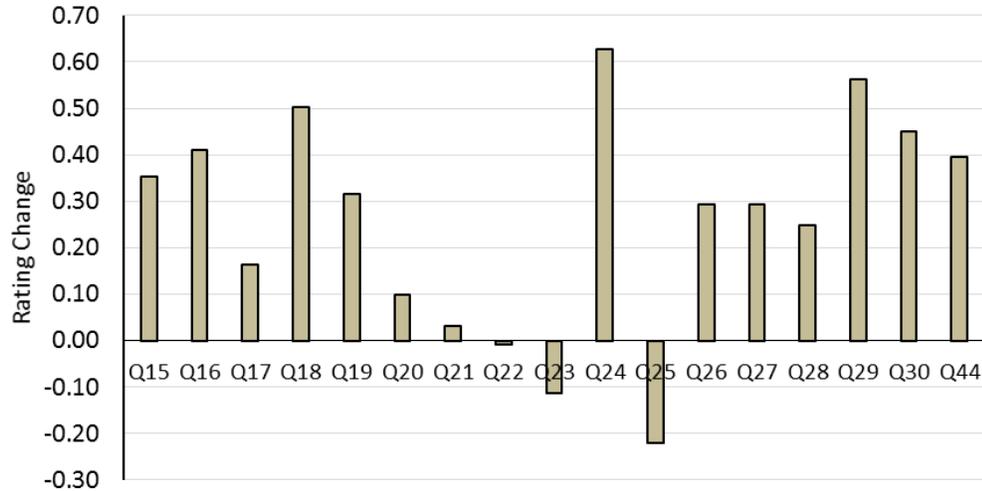
In spring 2013 an anonymous online survey of Mechatronic Engineering graduating seniors enrolled in MECA 440B was conducted. The survey questions are reproduced in Appendices C and D. The survey questions can be grouped into those relating to (1) demographics and post-graduate plans (which will not be discussed further in this report), (2) educational satisfaction, (3) educational outcomes, (4) project management skills, and (5) other outcomes.

#### 3.2.1 Educational Satisfaction

Survey results for questions relating to educational satisfaction from surveys conducted 2008 to 2013 are tabulated in Table C, and changes in average ratings from 2012 to 2013 are summarized in Figure 1.

**Table C:** Response means for survey questions regarding educational satisfaction in Graduating Senior Surveys from 2008 to 2013. (5 level Likert scale: 1 = very dissatisfied and 5 = very satisfied; for question 44 only, 1 = strongly disagree and 5 = strongly agree.)

No.	At Chico State, how satisfied were you with the . . .	2008	2009	2010	2011	2012	2013
<b>Q15</b>	Quality of teaching by faculty in your department	3.75	3.75	3.70	3.65	3.96	4.31
<b>Q16</b>	Quality of teaching by other faculty	3.75	3.63	3.60	3.60	3.59	4.00
<b>Q17</b>	Access to faculty in your department	3.88	4.19	4.10	4.30	4.15	4.31
<b>Q18</b>	Availability of courses in your department	3.25	2.81	3.13	3.50	3.56	4.06
<b>Q19</b>	Quality of courses in your department	3.50	3.69	3.62	3.80	3.81	4.13
<b>Q20</b>	Access to lab facilities and equipment	3.50	3.75	3.38	4.20	4.15	4.25
<b>Q21</b>	Quality of laboratories and equipment	3.00	3.25	3.35	3.60	3.78	3.81
<b>Q22</b>	Access to computer facilities	4.38	4.13	3.87	4.15	4.07	4.06
<b>Q23</b>	Quality of computer facilities	3.88	3.41	3.30	3.55	3.30	3.19
<b>Q24</b>	Academic advising from your major advisor	3.38	3.84	3.60	3.90	3.56	4.19
<b>Q25</b>	Academic advising from the Advising Office	2.88	3.13	3.32	3.60	3.42	3.20
<b>Q26</b>	Career information from your department	3.13	2.77	2.80	3.40	3.37	3.81
<b>Q27</b>	Availability of GE courses	3.63	3.69	3.65	3.50	3.52	3.81
<b>Q28</b>	Quality of GE courses	3.25	3.13	3.20	3.11	3.19	3.44
<b>Q29</b>	Overall quality of your education	3.63	3.88	3.90	3.90	4.00	4.56
<b>Q30</b>	Your overall experience at Chico State	3.75	4.16	4.20	3.95	4.30	4.75
<b>Q44</b>	I would recommend my major at CSU, Chico to others	3.50	4.22	4.08	4.20	4.48	4.88



**Figure 1:** Changes of responses to survey questions regarding educational satisfaction from 2012 to 2013.

According to Figure 1, questions directly related to educational satisfaction in the spring 2013 survey had mostly favorable changes, 14 of the 17 survey questions, comparing with those from 2012 survey.

Of the positive rating changes, most significant ones are in:

“Availability of courses in your department (Q18, +0.50 rating change)”,  
 “Academic advising from your major advisor (Q24, +0.63 rating change)”, and  
 “Overall quality of your education (Q29, +0.56 rating change)”.

Notably, the areas with the greatest improvements (Q18, Q24, and Q29) were also the highest in respective survey area since 2008. Worth mentioning is that the 2013 graduating seniors would also be more inclined to recommend the Mechatronic Engineering program at CSU, Chico to others (Q44, record high rating of 4.88).

On the other hand, Questions 23 on *Quality of Computer Facilities* and Question 25 on *Academic advising from the Advising Office* received lower ratings than those in spring 2012, at  $-0.11$  and  $-0.22$  rating changes, respectively.

### 3.2.2 Educational Outcomes

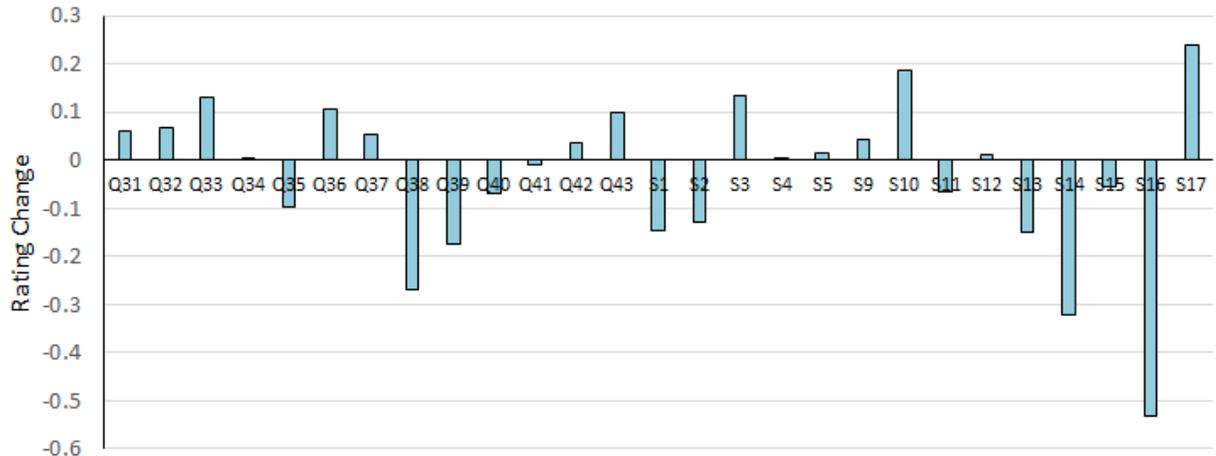
Responses to survey questions relating to educational outcomes and changes from 2012 to 2013 are summarized in Table D and Figure 2, respectively.

In spring 2012, the questionnaire specific to Mechatronic Engineering (S1 to S17) was revised for a broader scope of outcome assessment. Some of the new survey questions are very close to some in 2010 and 2011 (S2, S5, S10, and S11), making a comparison of survey results for the years from 2010 to 2013 possible (Table D). Other new questions have data collected only the second time in 2013.

**Table D:** Mean of responses to survey questions regarding educational outcomes in the spring 2013 graduating senior survey. (5 level Likert scale: 1 = very unprepared and 5 = very well prepared)

No.	Based on your educational experience here at Chico State, how well prepared are you to ...	2008	2009	2010	2011	2012	2013
<b>Q31</b>	Apply knowledge of math, science, engineering, or technology to solve problems	4.13	4.13	4.15	4.30	4.44	4.50
<b>Q32</b>	Design and conduct experiments	4.13	3.69	4.05	4.10	4.37	4.44
<b>Q33</b>	Analyze and interpret data	4.13	4.03	4.05	4.20	4.37	4.50
<b>Q34</b>	Design a component or system to meet desired needs	4.00	4.31	3.95	4.05	4.37	4.38
<b>Q35</b>	Function on a multidisciplinary team	4.13	4.28	4.30	4.25	4.41	4.31
<b>Q36</b>	Identify, formulate, and solve technical problems	4.00	4.31	4.20	4.25	4.52	4.63
<b>Q37</b>	Communicate technical matters in writing	4.13	3.94	3.80	3.50	4.26	4.31
<b>Q38</b>	Communicate technical matters orally	4.13	3.94	4.05	3.70	4.33	4.06
<b>Q39</b>	Understand & apply professional & ethical principles	4.13	4.35	3.80	3.85	4.30	4.13
<b>Q40</b>	Understand contemporary issues facing society	4.13	3.84	3.70	3.55	4.07	4.00
<b>Q41</b>	Use modern tools and technology	3.63	4.03	3.80	3.80	4.26	4.25
<b>Q42</b>	Enter the workplace (I)	4.25	3.90	3.65	3.95	4.15	4.19
<b>Q43</b>	Continue learning	4.25	4.25	4.10	4.47	4.59	4.69
<b>S1</b>	Write verifiable engineering specifications based on customer needs	<i>not surveyed</i>				4.52	4.38
<b>S2</b>	Produce a set of dimensioned engineering drawings	4.50	<i>no data</i>	4.00	3.85	4.19	4.06
<b>S3</b>	Produce a circuit diagram for a printed circuit board	<i>not surveyed</i>				3.93	4.06
<b>S4</b>	Produce a wiring diagram for a particular design	<i>not surveyed</i>				4.37	4.38
<b>S5</b>	Communicate manufacturing needs to a technician	4.00	<i>no data</i>	3.30	4.00	4.11	4.13
<b>S9</b>	Integrate mechanical, electronics, and computing into a subsystem	<i>not surveyed</i>				4.52	4.56
<b>S10</b>	Present information for design review	4.38	<i>no data</i>	3.95	4.16	4.44	4.63
<b>S11</b>	Prepare and execute an experimental test plan	4.38	<i>no data</i>	3.95	4.20	4.44	4.38
<b>S12</b>	Select hardware and develop software for automated data acquisition	<i>not surveyed</i>				4.30	4.31
<b>S13</b>	Select a material for a specific application	<i>not surveyed</i>				4.15	4.00
<b>S14</b>	Solve equations using numerical techniques	<i>not surveyed</i>				4.39	4.07
<b>S15</b>	Simulate or write equations of the performance of a system	<i>not surveyed</i>				4.19	4.13
<b>S16</b>	Select machine parts and lubrication for a particular application	<i>not surveyed</i>				3.89	3.36
<b>S17</b>	Select a motor for a particular application	<i>not surveyed</i>				4.56	4.80

(I) Question number 42 is not a defined Program Outcome



**Figure 2:** Changes of responses to survey questions regarding educational outcomes from 2012 to 2013

Mixed rating changes from 2012 to 2013 surveys on educational outcome-related questions can be observed in Figure 2. The biggest improvements is in the ability to *select a motor for a particular application* (S17, +0.24 rating change) while worst decline is in the ability to *select machine parts and lubrication for a particular application* (S16, -0.53 rating change). The rating mean for responses to S16 (3.36/5.00), however, is the only one below 4.00 on the 5-level Likert scale with 5 being *very well prepared*.

For rating means at or above 4.50 (out of 5.00), Table D also reveals that the 2013 graduates are fairly confident in:

- Q31: *Apply knowledge of math, science, engineering, or technology to solve problems* (4.50/5.00)
- Q33: *Analyze and interpret data* (4.50/5.00)
- Q36: *Identify, formulate, and solve technical problems* (4.63/5.00)
- Q43: *Continue learning* (4.69/5.00)
- S9: *Integrate mechanical, electronics, and computing into a subsystem* (4.56/5.00)
- S10: *Present information for design review* (4.63/5.00)

### 3.2.3 Management Skills

Survey results of questions regarding project management skills from 2008 to 2013 are summarized in Table E. The question numbers (S6, S7, and S8) are among the revised supplemental questions (see Appendix D). These questions, however, are very close to some prior to the 2012 survey, making continuous comparisons possible.

**Table E:** Response means for survey questions relating to project management skills in the Graduating Senior Surveys from 2008 to 2013. (5 level Likert scale: 1 = very unprepared and 5 = very well prepared)

No.	Based on your educational experience here at Chico State, how well prepared are you to ...	2008	2009	2010	2011	2012	2013
S6	Create a Gantt chart for a project	3.75	no data	3.89	3.70	4.22	4.13
S7	Identify the critical path for a project	no data	no data	4.00	3.95	4.22	3.88
S8	Develop a detailed project budget	4.50	no data	3.70	4.10	4.11	4.19
Overall Average				3.86	3.92	4.18	4.07

In comparison, the 2013 graduating seniors generally are slightly less confident as 2012 graduates in project management skills, although confidence in *developing a detailed project budget* has improved slightly.

### 3.2.4 Open-ended Written Comments

Parts of written responses to the open-ended question “please provide additional comments that will help faculty to improve the quality of the education they provide” in the MECA supplemental questions are categorized and summarized in the following. The comments presented here are direct quotes, including possible spelling and grammatical errors.

#### Curriculum and Courses

- “Would have been nice for Mecas to learn more about plastics... get a more refined GD&T background... and have more classes with motors like MECA 486. I had a great 5 years, and wish there was more time to learn. .”
- “I would like to see more emphasis on programming. There are a couple of courses where programming is required (such as MECA 380, MECH 140, MECA 486) but time its not enough to go into depth. Robotics is another area where I would like to see more of .....

#### Faculty

- “I think it would be nice if there was a more even standard of grading with the professors though....”
- “Over all I had a good experience with most of my instructors but I had a couple of instructors that stood out as exceptionally low quality. .... ”

#### Capstone Project

- “I believe that more integration between the Dept of ECE and the Dept. of MMEM, would be beneficial, for instance, , giving the electrical or computer engineering majors an opportunity to work with a team of MECAs and MECHs for their senior project .. .”

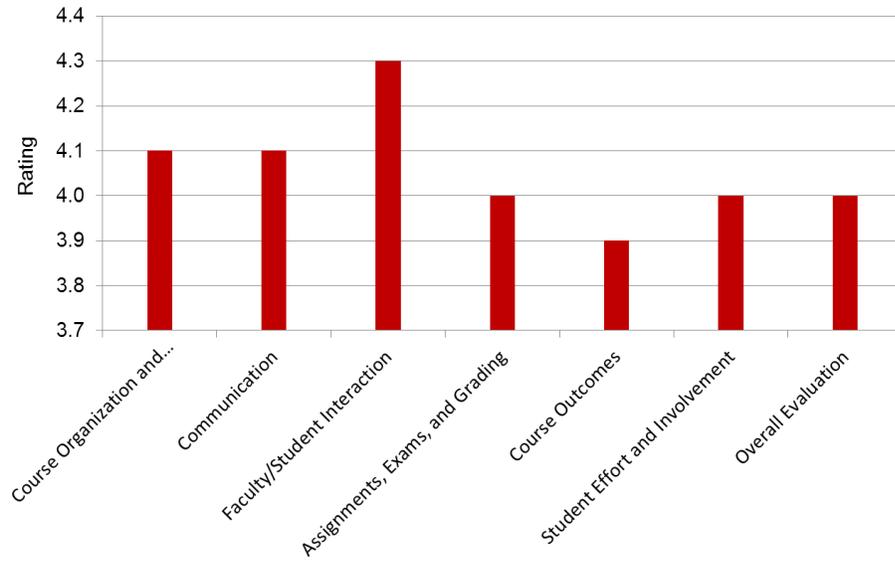
### Lab Experience

- “I really enjoyed the hands-on time we get in lab. It helps make everything more real and less theoretical. ....”
- “It would help if computers were faster on the third and fourth floor. Also, more free student programs would help a lot.”
- “Hands-on experience is superb and absolutely critical for effective technical learning. It would be better to charge students extra for it than to cut it out, should budget issues deem necessary.”
- “More hands on PLC programming. SMFG 386 or similar mandatory for MECA since common in industry.”
- “I learned most from the Classes heavily lab oriented like, MECA 486, EECE 311, EECE 315.”

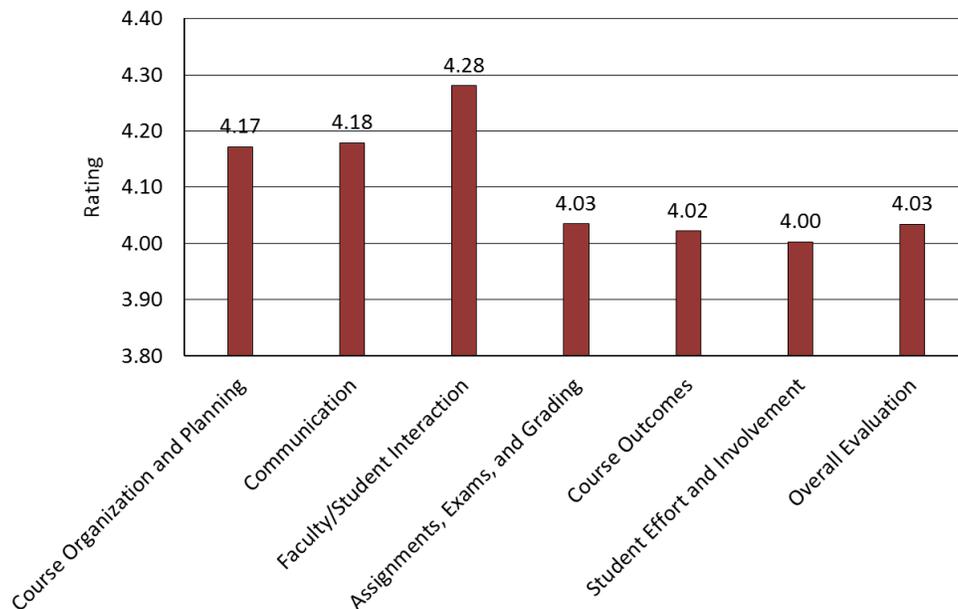
### **3.3 Student Evaluation of Teaching (SET)**

Mechatronic Engineering students take courses taught by the MEM department as well as those by other academic departments. Besides an optional SET in fall semesters, the mandatory SET is conducted in all classes with enrollment of 6 or more in spring semesters. Starting in the spring 2012 SET, a new evaluation instrument, SIR II, was adopted which is more comprehensive comparing with the ones used in the years past. The SIR II questionnaire contains ten categories that each comes with a set of related questions. The ten sets of questions can be found in Appendix E.

Here the average ratings for seven of the ten question sets for MEM courses in the spring 2012 and spring 2013 SETs are summarized in Figure 3. The remaining categories did not generate quantifiable data for evaluation purpose. Rating distributions for each of the seven categories are also collected in Appendix F.



(a)

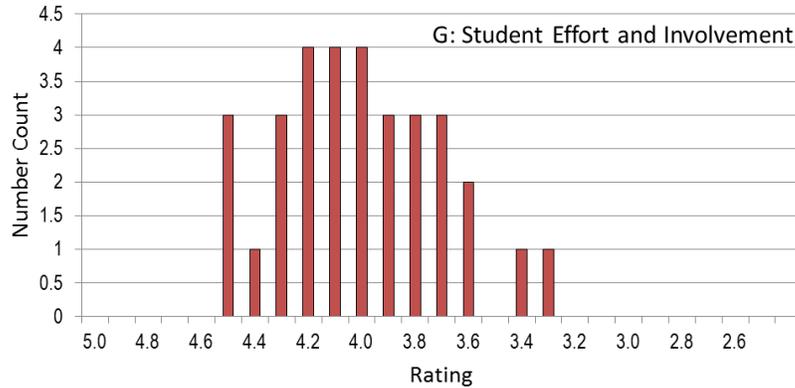


(b)

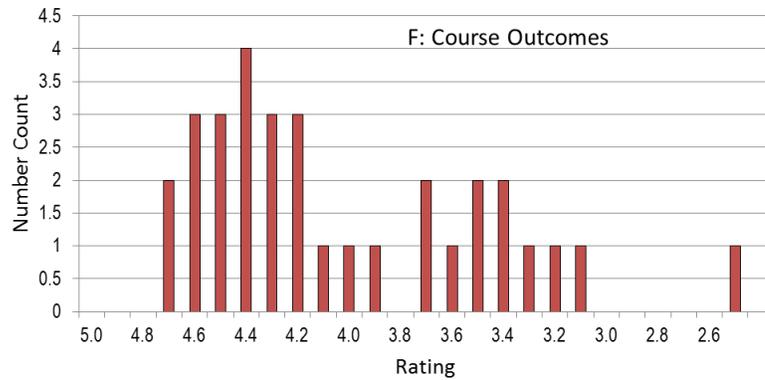
**Figure #** – Average ratings for seven surveyed categories from (a) spring 2012 and (b) spring 2013 SETs. The rating scale is 1 to 5 with 5 being the “most effective”.

In the spring 2013 SET, as can be seen in Figure 3(b), all evaluated categories received ratings at or above 4.0, which is encouraging on a scale of 1 to 5 with 5 being the “most effective”. The highest rating (4.28) is for the “*interaction between faculty and students*” – a tradition the department is well known for. The lowest rating (4.00) is for “*student effort and involvement*”. Interestingly, this category also has the most concentrated ratings, Figure 4(a), of the seven presented in this section.

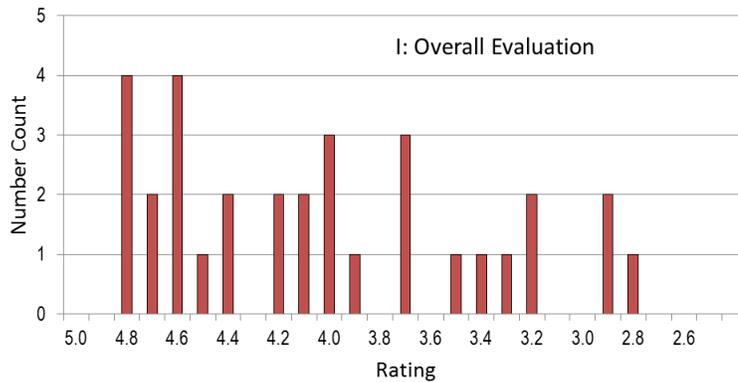
As seen in Figure 4, the *Course Outcomes* has the widest distribution from 2.5 to 4.7 , Figure 4(b), followed by *Overall Evaluation*, from 2.8 to 4.8 in Figure 8(c). These wide distribution of response means points to a large variation in instructional skills and effectiveness of faculty.



(a)



(b)



(c)

**Figure 4 – Rating distribution for three evaluation categories of the spring 2013 SET.**

## 4. Recommendations for Program Improvement

### 4.1 Courses

#### **4.1.1 EECE 337**

As the EECE Department is considering changing EECE 337 to EECE237 and revising course content, the MEM department should consider phasing in EECE 237 accordingly and placing it in the lower-division for the Mechatronic Engineering major.

#### **4.1.2 Course Contents**

A student written comment in the spring 2013 Graduating Senior Survey suggested more programming for MECH and MECA courses required of Mechatronic Engineering majors. A similar comment was also recently made by a Mechatronic Engineering instructor at a faculty meeting. The department faculty may consider looking into the merit of the suggestion.

#### **4.2 Labs**

Students, particularly graduation seniors based on their multi-year experience, always enjoy and recognize the value of hands on exercises in the labs. At the same time, they express dissatisfaction with the aging equipment. As the state financial support for facility and equipment continues was never adequate, faculty should be constantly encouraged to continue the effort of utilizing Consolidated Course Fee and applying for Student Learning Fee and campus grants, in addition to external funded projects.

#### **4.3 Program Outcome Assessment**

##### **4.4.1 CIVL 495 for Program Outcome Assessment**

The course outcome assessment data from CIVL 495 (Professional Issues in Engineering) continues to be a missing major piece for completing the Mechanical Engineering program outcome assessments. For two years, the data was either not available (2010-2011) or only partially available (fall 2011) to the MEM department. Since five of the Program Outcomes are assessed in CIVL 495, the voids left in the outcome assessments may adversely affect in the next round of ABET accreditation. As the MEM faculty tried but were unable to identify a suitable MECH course to replace CIVL 495, the department should try again request help of the Associate Dean or Dean to obtain the data for the missing semesters.

## Appendix A

### Statement of Mechatronic Engineering Program Outcomes\*

*Mechatronic Engineering Program graduates must have:*

- a. An ability to apply knowledge of mathematics, science, and engineering*
- b<sub>1</sub>. An ability to design experiments to evaluate the performance of a mechatronic system or component with respect to specifications*
- b<sub>2</sub>. An ability to conduct experiments, as well as analyze and interpret data*
- c. An ability to design a mechatronic system, component, or process to meet desired needs*
- d. An ability to function effectively as members of multidisciplinary teams*
- e<sub>1</sub>. An ability to define engineering problems*
- e<sub>2</sub>. An ability to solve engineering problems*
- f. An understanding of professional ethical responsibility*
- g<sub>1</sub>. An ability to communicate technical matters effectively in oral form*
- g<sub>2</sub>. An ability to communicate technical matters effectively in written form*
- g<sub>3</sub>. An ability to communicate technical matters effectively in graphical form*
- h. The broad education necessary to understand the impact of engineering solutions in a global and societal context*
- i. A recognition of the need for, and an ability to engage in, life-long learning*
- j. A knowledge of contemporary issues*
- k. An ability to use the techniques, skills, and modern mechatronic engineering tools necessary for engineering practice*

\* From Mechatronic Engineering Program Improvement Plan, edition 2 (October 23, 2008)

## Appendix B

### Sample Program Outcome Assessment Record Sheet

### Mechatronic Engineering Program Outcome Record-sheet

<b>Course:</b>		<b>Semester:</b>	
<b>Program Outcome:</b>		<b>Instructor:</b>	
<b>Description of instruments used in this course to measure attainment of program outcome:</b>	1		
	2		
	3		
	4		
	5		
	6		
<b>How instruments are used to measure achievement of program outcome:</b>	1		
	2		
	3		
	4		
	5		
	6		
<b>Number of students in class achieving program outcome:</b>			#VALUE!
<b>Number of students in class not achieving program outcome:</b>			#VALUE!
<b>Comments on the suitability of the instruments used to measure achievement the program outcome:</b>			
<b>Suggestions for possible changes of how achievement of the program outcome can be measured:</b>			
<b>Suggestions for improving the program:</b>			

*Note: Shaded fields are to be fill-in.*



## Appendix C

### ECC Graduating Senior Survey Instrument Spring 2013

## ECC Graduating Senior Survey

### College of Engineering, Computer Science, and Construction Management CSU, Chico

Dear Graduating Senior,

The College of ECC has developed this Survey to give you a forum for letting us know what you think of your experience at CSU, Chico, and to help us to continually improve the curriculum and services we offer. We care a great deal about the programs and your feedback is essential to helping us provide the highest quality education we can deliver. Thank you in advance for your time and attention to this survey.

We hope the years you have spent with us have enriched your life and provided you with the foundation for a successful career. Please stay in touch!

With best wishes, The College of ECC Faculty

1. Major:

2. Graduation Date

Semester

Spring  Summer  Fall

Year

2011  2012  2013  2014

3. Did you come to Chico State as a ...

First-time freshman  Transfer

4. How many semesters did you attend Chico State?

1-3  4-6  7-9  10-12  13+

5. What is your Overall GPA?

Below 2.25

2.25-2.49

2.50-2.74

2.75-2.99

3.00-3.24

3.25-3.49

3.50-3.74

3.75-4.00

6. If you had an internship, co-op, or job related to your major while in school, how valuable was the experience?

Did not have internship, co-op, or job

Very Valuable

Valuable

Somewhat Valuable

Not Valuable

7. If you were involved in any student/professional society, activities, or clubs, how valuable was the experience?

Was not involved in societies, activities, or clubs

Very Valuable

Valuable

Somewhat Valuable

Not Valuable

8. Immediately after graduating are you planning to...

Attend graduate School

Yes  No

Begin Working

Yes  No

If you are **NOT** planning to work full-time, or if you have not begun looking for a job, please skip to Question 13.

9. How many job offers have you received?

None  One  Two  Three  Four +

10. Do you currently have a job offer that you are likely to accept?

Yes

No

11. If you interviewed through the campus Career Planning & Placement Office, how helpful was it?

Did not interview through campus office

Very Helpful

Helpful

Somewhat Helpful

Not Helpful

12. If you found a job that you are likely to accept, how did you find it?

Campus Career Planning & Placement Office

Faculty/department referral

Online Posting

Mailed resume

Personal Connections

Other

13. Did you take a comprehensive exam (FE, CMdgT, MFT or other) for your discipline?

No, did not take

Yes, and passed

Yes and did not pass

Yes and waiting for results

14. If you took a comprehensive exam, did you also attend a review course to prepare you for the exam?

Yes

No

Next

For Survey Content Questions,  
contact Lynn Abbiati: [labbati@csuchico.edu](mailto:labbati@csuchico.edu)

For Technical Questions,  
contact Paul Weatherby: [pweatherby@csuchico.edu](mailto:pweatherby@csuchico.edu)

Educational Satisfaction Questions

At Chico State, how satisfied were you with the...

	Very Dissatisfied				Very Satisfied
15. Quality of teaching by faculty in your department	<input type="radio"/>				
16. Quality of teaching by other faculty	<input type="radio"/>				
17. Access to faculty in your department	<input type="radio"/>				
18. Availability of courses in your department	<input type="radio"/>				
19. Quality of courses in your department	<input type="radio"/>				
20. Access to laboratory facilities and equipment	<input type="radio"/>				
21. Quality of laboratories and equipment	<input type="radio"/>				
22. Access to computer facilities	<input type="radio"/>				
23. Quality of computer facilities	<input type="radio"/>				
24. Academic Advising from your major advisor	<input type="radio"/>				
25. Academic Advising from the University Advising Office	<input type="radio"/>				
26. Career information from your department	<input type="radio"/>				
27. Availability of General Education courses	<input type="radio"/>				
28. Quality of General Education courses	<input type="radio"/>				
29. The overall quality of your education	<input type="radio"/>				
30. Your overall experience at Chico State	<input type="radio"/>				

Program Outcomes Questions

Based on your educational experience here at Chico State, how well prepared are you to...

	Very Unprepared				Very Prepared
31. Apply knowledge of math, science, engineering, or technology to solve problems	<input type="radio"/>				
32. Design and conduct experiments	<input type="radio"/>				
33. Analyze and interpret experimental data	<input type="radio"/>				
34. Design a component or system to meet desired needs	<input type="radio"/>				
35. Function in a multidisciplinary team	<input type="radio"/>				
36. Identify, formulate and solve technical problems	<input type="radio"/>				
37. Communicate technical matters in writing	<input type="radio"/>				
38. Communicate technical matters orally	<input type="radio"/>				
39. Understand and apply professional and ethical principles	<input type="radio"/>				
40. Understand contemporary issues facing society	<input type="radio"/>				
41. Use modern tools and technology	<input type="radio"/>				
42. Appreciate impact of your solutions on society and environment	<input type="radio"/>				
43. Continue learning	<input type="radio"/>				
	Strongly Disagree				Strongly Agree
44. I would recommend my major program at CSU, Chico to others.	<input type="radio"/>				

[Next](#)

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For Technical Questions,  
contact Paul Weatherby: [pweatherby@csuchico.edu](mailto:pweatherby@csuchico.edu)

45. How satisfied are you with the department support you received while enrolled at Chico State?

- Very dissatisfied
- Somewhat dissatisfied
- Neutral
- Somewhat satisfied
- Very satisfied

46. How often did you meet with someone in the University Advising Office?

- More than once a semester
- Once a semester
- Once a year
- Less than once a year
- Never

47. How often did you meet with your major (departmental) advisor?

- More than once a semester
- Once a semester
- Once a year
- Less than once a year
- Never

48. How would a requirement for your major to purchase a laptop have impacted your decision to come to Chico State?

- Would not have impacted my decision to come
- Minor financial difficulty, but I would have still come
- Major financial difficulty, but I would have still come
- May have prevented me from coming
- Would have definitely prevented me from coming

49. How has the quality of your educational experience varied over the time period you were enrolled at Chico State?

- Quality improved significantly
- Quality improved somewhat
- Quality stayed fairly consistent
- Quality declined somewhat
- Quality decline considerably

50. Permanent e-mail Address ( so we can keep in touch )

You Have 3500 Characters Remaining.

[Next](#)

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contact Lynn Abbiati: [labbati@csuchico.edu](mailto:labbati@csuchico.edu)

For Technical Questions,  
contact Paul Weatherby: [pweatherby@csuchico.edu](mailto:pweatherby@csuchico.edu)



## Appendix E

### Student Evaluation of Teaching (SET) Questions Spring 2013

# STUDENT INSTRUCTIONAL REPORT



Class Report  
 Subunit: ECC - Mech Engr,  
 Mechatronic Engr, Manufact Tech  
 Course: Measurements and  
 Instrumentation  
 Instructor:  
 Enrollment:  
 Survey Period: Spring 2012

## Assessing Courses and Instruction

PERCENTAGES reported below are based on the total number responding, which is: 7\*

A. Course Organization and Planning	Omit	Not Applicable	5 Very Effective	4 Effective	3 Moderately Effective	2 Somewhat Ineffective	1 Ineffective	Mean
1. The instructor's explanation of the course requirements								
2. The instructor's preparation for each class period								
3. The instructor's command of the subject matter								
4. The instructor's use of class time								
5. The instructor's way of summarizing or emphasizing important points in class								
<b>Overall Mean</b>								

B. Communication	Omit	Not Applicable	5 Very Effective	4 Effective	3 Moderately Effective	2 Somewhat Ineffective	1 Ineffective	Mean
6. The instructor's ability to make clear and understandable presentations								
7. The instructor's command of spoken English (or the language used in the course)								
8. The instructor's use of examples or illustrations to clarify course material								
9. The instructor's use of challenging questions or problems								
10. The instructor's enthusiasm for the course material								
<b>Overall Mean</b>								

C. Faculty/Student Interaction	Omit	Not Applicable	5 Very Effective	4 Effective	3 Moderately Effective	2 Somewhat Ineffective	1 Ineffective	Mean
11. The instructor's helpfulness and responsiveness to students								
12. The instructor's respect for students								
13. The instructor's concern for student progress								
14. The availability of extra help for this class (taking into account the size of the class)								
15. The instructor's willingness to listen to student questions and opinions								
<b>Overall Mean</b>								

D. Assignments, Exams, and Grading	Omit	Not Applicable	5 Very Effective	4 Effective	3 Moderately Effective	2 Somewhat Ineffective	1 Ineffective	Mean
16. The information given to students about how they would be graded								
17. The clarity of exam questions								
18. The exams' coverage of important aspects of the course								
19. The instructor's comments on assignments and exams								
20. The overall quality of the textbook(s)								
21. The helpfulness of assignments in understanding course material								
<b>Overall Mean</b>								

E. Instructional Methods and Materials	Omit	Not Applicable	5 Very Effective	4 Effective	3 Moderately Effective	2 Somewhat Ineffective	1 Ineffective	Mean
22. Problems or questions presented by the instructor for small group discussions								
23. Term paper(s) or project(s)								
24. Laboratory exercises for understanding important course concepts								
25. Assigned projects in which students worked together								
26. Case studies, simulations, or role playing								
27. Course journals or logs required of students								
28. Instructor's use of computers as aids in instruction								
<b>Means are not reported (***) for Instructional Methods</b>								

F. Course Outcomes	Omit	Not Applicable	5 Very Effective	4 Effective	3 Moderately Effective	2 Somewhat Ineffective	1 Ineffective	Mean
29. My learning increased in this course?								
30. I made progress toward achieving course objectives?								
31. My interest in the subject area has increased?								
32. This course helped me to think independently about the subject matter...								
33. This course actively involved me in what I was learning?								
<b>Overall Mean</b>								

G. Student Effort and Involvement	Omit	Not Applicable	5 Very Effective	4 Effective	3 Moderately Effective	2 Somewhat Ineffective	1 Ineffective	Mean
34. I studied and put effort into the course?								
35. I was prepared for each class [writing and reading assignments]?								
36. I was challenged by this course?								
<b>Overall Mean</b>								

H. Course Difficulty, Work Load, and Pace	Omit	Very difficult	Somewhat difficult	About right	Somewhat elementary	Very elementary
37. For my preparation and ability, the level of difficulty of this course was?						
	Omit	Much heavier	Heavier	About the same	Lighter	Much lighter
38. The workload for this course in relation to other courses of equal credit was?						
	Omit	Very fast	Somewhat fast	Just about right	Somewhat slow	Very slow
39. For me, the pace at which the instructor covered the material during the term was?						

I. Overall Evaluation	Omit	5 Very Effective	4 Effective	3 Moderately Effective	2 Somewhat Ineffective	1 Ineffective	Mean
40. Rate the quality of instruction in this course as it contributed to your learning (try to set aside your feelings about the course content):							
<b>Overall Mean</b>							

J. Student Information	Omit	A major/minor requirement	A college requirement	An elective	Other			
41. Which one of the following best describes this course for you?								
	Omit	Freshman-1st year	Sophomore-2nd year	Junior/3rd year	Senior/4th year	Graduate	Other	
42. What is your class level?								
	Omit	Better in English		Better in another language		Equally well in English and another language		
43. Do you communicate better in English or another language?								
	Omit	Female		Male				
44. Sex								
	Omit	A	A-	B+	B	B-	C+	Below C
45. What grade do you expect to receive in this course?								

Appendix F  
Summary of Student Evaluation of Teaching (SET) Ratings  
Spring 2013

## MMEM SET (SIR II) Summary Spring 2013

