Allan Hancock College Program Review
2014-15 **Annual Update**

Program and Department:	**ENGINEERING / Mathematical Sciences**
Date submitted:	11/18/15 (started 4/10/15)
Submitted by:	Dom Dal Bello

SLOS report update □ Revised Plan of Action ☒

The Annual Update is conducted by all programs at the college and consists of an analysis of changes affecting the program as well as significant new funding needs for staff, resources, facilities, and equipment. It should be submitted or renewed every year by the end of the second week in April in anticipation of budget planning for the following year, which begins at the planning retreat in November. *Note that if there is no change from the previous year, you may simply resubmit the information in that report (or any portion that remains unchanged) from the prior year.

Programs and units should support their planning efforts with quantifiable data, conduct appropriate analyses, and make supportable conclusions. For your use, standardized IT data reports will be provided and sent to departments under separate cover. You may also report on your own internally-generated data. Labor market data is required for all vocational programs at least every two years.

Place your responses in the expandable text boxes below each question.

I. Program Mission (must align with college mission)

Describe the need that is met by the program or the purpose of the program. (Sample: *The Health, Physical Education, and Recreation Division is committed to providing excellent education opportunities to our students for their affective, cognitive and psychomotor development as they pursue sport, recreation, physical education, health education and wellness. We will encourage our students to further and sustain their individual endeavors toward the regular, lifelong pursuit of physical activity and a healthy lifestyle.)* In addition, for vocational programs only, data must show need and that "the program does not represent an unnecessary duplication of other vocational or occupational training programs in the area."

The educational mission of the AHC Engineering Program is as follows:

1. To prepare students to transfer to, and succeed at, a four-year undergraduate engineering program.
2. To provide courses that enable students to complete lower division engineering requirements for transfer to a four-year university, and/or to complete an Associate's Degree in Engineering.

The program seeks to produce transfer-ready students who are technically competent in sophomore-level engineering subjects, who can communicate and work effectively in diverse teams, and who are responsible citizens. The program also seeks to promote student interaction with faculty, industry, student organizations and professional societies.

II. Progress on Comprehensive Program Review Final Plan of Action

Review the final plan of action (post validation) from the last comprehensive program review and any previous annual updates. Summarize the progress the program has made on recommendations targeted for this last year as well as any outstanding or incomplete items from previous years. What is the status of these recommendations? Include the original target date, action taken and results, and reasons for any changes.

Revised - Plan of Action (Annual Update) – for AY 2014-2015

During the academic year, 2005 , 2006 completed program review. The self-study and validation teams developed a final plan of action-post validation based on information in the self study and the recommendations of the validation team.

(If any plan was made and action not taken, please state the rationale for not pursuing that particular item. If action was delayed or postponed, provide an explanation and a new target date.)

CHANGES AND MODIFICATIONS

PLAN OF ACTION	ACTION TAKEN, RESULT AND STATUS
	Spring 2011 updates in Courier Font April 2012 status, if changed, in Arial Font **April 2013 status, if changed, in Century Schoolbook, Bold** **May 2014 Update in Bold Arial** April 2015 Courier Font
1. Formally establish learning outcomes and assessment measures	SLOs courses & program done. **April 2013: at least one outcome has been assessed in each course during the past year.** S15 at least one outcome was assessed in each course in Fall 2014, more will be assessed in F15
2. Create/distribute engineering program brochure and packet for students, prospective students, parents. etc	Brochure done (F2007). **Packet not done.** **S11 Brochure needs revision.**
3. Develop more formal larger-view academic program for engineering students to follow (e.g., create general tracks for Mechanical/Civil/Aerospace and Electrical/Computer Engineering)	Study of other engineering programs in the state (F2010) conducted by AHC Engr. Faculty. **S11: Sac, City has three "tracks." It is currently (S2011) uncertain how transfer degrees (AS-T) may affect Engineering, if at all.** April 2012: AS-T discussion at state-level has put AHC AS-T on hold. **May 2014: More AHC students are applying for more majors at more universities. Statewide Engineering has several MC (Model Curricula) tracks (Mechanical/Civil/Aero; Electrical; Computer Engr), but no TMCs (Transfer Model Curr.).** S15 the Intersegmental Model Curriculum (ISMC) has been approved at state-level. This will provide focus to create more formal tracks in engineering.
4. Implement formal advising/mentorship procedures; require SEP for all engineering students; work with	Presentation to Counseling Department on Engineering and Science transfer issues in F09,S11,**F11**, **F12**. CSU LDRP, UC ETC are stalled/unfinished at those levels.

Counseling Department to communicate changes in requirements of engineering students (e.g., CSU LDRP-Lower Division Transfer Pattern, and UC discussed ETC-Engineering Transfer Curriculum)	**S11: Local university (Cal Poly and UCSB) advice does not change much, and continues to be primary focus on articulation. SEP projects done in ENGR 100, but not required for all Engineers. Engr. faculty is a member of CCC engineering faculty group discussing new transfer degrees.** **April 13: New S-STEM grant and DOE HSI-STEM grants both have components that encourage all STEM students to get SEPs. New state regulations also will encourage/require SEPs.**
5. Coordinate with math, science, computer science, engineering technology (drafting), and English department (technical writing) to more effectively offer classes	Ongoing—continue to work with summer Engl 104 (tech writing) instructor to help recruit summer course. Meetings need to be re-implemented to ensure non-overlap of core courses (Math, Physics, CS, Engineering), especially in the shortened semester/"block-scheduling" format–Nothing on the Drafting and English front.
6. Continue to participate in outreach activities	Ongoing – time permitting **F13-S14: Friday Night Science; S-STEM Open House; Cal Poly's Engineering Night.** S15 S-STEM Open House, F14 Career Day.
7. Continue to support MESA and Society of Women Engineering Interest Group	Ongoing: SWEIG defunct, **although local SWE professional group interested in renewing efforts at CC level.** April 2012. As needed **May 2014. Ongoing.** S15 S-STEM Open House, F14 Career Day.
8. Support creation of general engineering club to encourage professional growth	Students have many other STEM clubs/activities. Informal study groups and MESA, SACNAS fills void. No time to organize. All STEM students are invited to see Engr 100 guest speakers. April 2012. Not pursued **May 2014. MESA Club suspended for 2014-15 to review its goals/purpose. This may provide opportunity for a STEM Club that serves a wider audience and is more productive.** S15 Fall 14 saw creation of Science and Engineering Club, in which the Engineering Faculty is a Co-Advisor. The primary goal of the club is to encourage professional development activities and connections (as recommended by the AHC Engineering staff).
9. Modify Engr 172/173 to better articulate with Cal Poly and UCSB	Completed S2006 S15 Course has not been offered in several years due to lack of enrollment (it only makes sense for Electrical and Computer Engineering majors). Engr 172/173 will likely need to be sunsetted.

10. Modify or create new courses as necessary to improve articulation	On-going. Engr126 (MATLAB) currently articulates directly to UCSBs Engr3. A three-unit course in MATLAB will eventually need to be created as more engineering departments at universities switch to MATLAB as the "programming language" for Engineers. April 2012 course not yet developed.
11. Rewrite A.A. requirements to reflect changes in Computer Science and other disciplines	Completed S2010
12. Communicate with Cal Poly and UCSB on a regular basis to ensure articulation or courses and ease transitions for students	Ongoing
13. Develop contacts with local industry: guest speakers, internships, mentorships, and financial and equipment donations	Started to work on some contacts during a grant-writing process. Also, past students are applying for local jobs. However, nothing formal has been established other than basic contacts. There are three guest speakers in Engr 100 who have been long-term supporters but not major decision makers in their companies. **April 2013: Recent grant awards should increase ability/need to make contacts.** **May 2014 – Two new speakers spoke to Engr100 in Spring 2014.** S15 – Fall 2014 and spring 2015: more recent transfers are speaking at Engr. 100.
14. Create Engineering Advisory Council	No need—as needed basis advice from CC Engr Faculty, UC/CSUs. S2006.
15. Create engineering program fund through AHC Foundation for Equipment and Scholarships	Completed S2008. Efforts need to be reenergized. April 2012: Needs to be reviewed/reenergized. **May 2014: Account used as pass-through for Engineering Liaison Council conference, hosted at AHC. More donations should be sought through this account for scholarships, special projects, etc.**
16. Move office to new science building to be near lab	Completed F2008 (from building K to M). **May 2014: in M-309A since Fall 2011 (Dept. Chair for Math.Sciences)**
17. New classroom/lab (room ~~208~~ **M-212**, new building)	Room M-212 is used for labs and classes. **Engr. has primary control of room. Also used for Physics, AgBusiness, Electronics and Math.** **May 2014: M-212 has three math courses scheduled in it for Fall 2014.**
18. Obtain equipment to support program objectives: • Tablet Laptop Computer for Instruction/Outreach, • LaserJet Printer for Engineering Lab, • Tensile Testing Machine, • Rotation Beam Balance, • Injection Molding Apparatus, • Sand-casting Equipment, • Heat-treatment Furnace	Six of seven items acquired. • Tablet Computer: 21 Tablets acquired via HP Grant written by Engineering Instructor, F2008. • LaserPrinter/Engr Lab: Acquired as part of new science building, F2007. • Tensile Testing Machine: Equip. Prioritization, F2009. • Rotating Beam Fatigue Machine, new science building, S2008. • Injection Molding Apparatus: spring instructional funds, S2006. • Sand-casting Equipment: program funds, F2008-F2009.

	• Heat-treatment Furnace, not acquired. **April 2013: Tensile Tester needed to be fixed in Fall 2012 (broke during testing in S2012).** **May 2014: no furnace yet**
19. Locate impact tester (stored on campus???) and find location to set up.	**Fall 2011/spring 2012** **April 2014: Target: summer 2014. With "Old" Building O being "vacated" by Industrial Technology, a location for the impact tester may be found, but Engr. Program must be proactive.**
20. Generate part-time Engineering Instructor pool	**Part time instructor to be hired for F2011 Engr 152 Statics. Need PT for Spring semester for Dynamics; Materials Science Lab. $4000+ per course.** **April 2012: 3 part-timers were hired in S2012 to teach 4 sections,** **April 2013: 1 PT hired in S13; 1 PT will be hired in F13.** S15; 1 PT hired in Spring 2015 (2 sections). A larger pool still needs to be created.
2. Seek opportunities to hire lab technician/support staff for engineering, electronics, and physics.	$25,000-$30,000. **Lab techs for Chemistry and Physics have been helpful in Science building. Retirement of Electronics instructors leaves Electronics labs without technical support other than Engr Instructor and Part-time Faculty.** **April 2013: Paper work submitted for Engineering lab tech, March, 2013.** **May 2014: Paperwork submitted and there is a possibility of hiring for such a position.**
21. Heat treatment furnace (listed as equipment to purchase in program review but has not been funded)	$10,000. **Dropped, S2011.** **April 2013: After discussions with Engineering instructors as various colleges, a heat-treatment furnace is needed…. Re-add.** **May 2014: no furnace yet** S15 no furnace yet.
22. Replacement work stations **(DC Power Supply, desktop DMM, Function Generator, Oscilloscopes, test leads, etc.). for circuit labs. Possibly 10 stations) Clarified S2011.**	$5,000 each = $50,000 **April 2012: Future of Electronics program/labs a discussion item.** **May 2014: No replacement stations yet. Future of Electronics program and the location of the electronics labs (lab??) continue to be unanswered questions/uncertain issues.**
23. Replacement Rockwell Hardness Tester. **Added: S2011**	**$3000. Second hardness tester in lab (est. 30-40 yrs old) finally broke. Replacement need; preferably Dial readout, and possibly second hand (less than $1000).** **April 2012: Purchased by HSI-STEM grant (~$2000)** **April 2013: Arrived in Fall 2012, installed by D.Dal Bello, Spring 2013.**
24. Rockwell Test Blocks **Added: S2011**	**Need 8+ replacement test blocks (~$50 each on eBay, ~$90 retail).** **April 2012: Purchased by HSI-STEM grant (~$75 each…. ~$600)** **April 2013: Arrived Fall 2012.**

ADDITIONS

PLAN OF ACTION	TARGET DATE
25. Do 6-year program view (4 years late)	Fall 2015 – Spring 2016

RESOURCES NEEDED

LINE NO./RESOURCE	APPROXIMATE COST
1.3D Printer + supplies Added Spring 2015	$3000

III. Program SLOs/Assessment

☐ Check here if any SLO's have changed since the last comprehensive program review and/or update.

What are your program student learning outcomes? Which of these have been assessed since the last comprehensive program review and/or update? How are they measured? What did the assessment data indicate about the strengths and weaknesses of your program? What changes have you made/do you plan based on these data? (You should report assessment information on page 4.)

The Program Student Learning Outcomes are as follows:

- **PSLO 1:** Apply fundamental concepts of mathematics (through calculus), science and engineering.
- **PSLO 2:** Identify, formulate, and solve basic engineering problems.
- **PSLO 3:** Conduct experiments and analyze and interpret data.
- **PSLO 4:** Make basic design decisions concerning appropriate-level engineering problems.
- **PSLO 5:** Communicate effectively both orally and in writing, using symbols, graphics and numbers.
- **PSLO 6:** Recognize the need for, and an ability to engage in, lifelong learning.
- **PSLO 7:** Function professionally and ethically as an individual and within diverse teams.
- **PSLO 8:** Use techniques, skills and modern engineering tools necessary in engineering education and practice.

The PSLO are modelled after those that the four-year Engineering Programs follow, i.e., the Accreditation Board for Engineering and Technology (ABET) Engineering Criterion 3, Outcomes a-k, in addition to the outcomes for AHC in general.

All CSLOs, PSLOs and ISLOs have been linked. See "ISLO/PSLO Summary Map by Course", attached at the end (February 2015)

IV. Course SLOs/Assessment

☐ Check here if any SLO's have changed since the last comprehensive program review and/or update.

What are your course student learning outcomes? Which of these has been assessed since the last comprehensive program review and/or update? How are they measured? What did the assessment data indicated about the strengths and weaknesses of your program? What changes have you made/do you plan based on these data? (You should report assessment information on page 4.)

More SLOs need assessment. This will be a focus during the upcoming year (2015-16).

Fall 2015 update: significant progress was made in assessment of SLOs at the start of Fall 2015 (jumped from 35 to 55% SLOS assessed). More still needs to be done.

Several courses have too many SLOs (Engr. 161 has 9, and Engr. 162 has 11), some of which are essentially repeats within the same course, and others which seem to have been put in the wrong course (e.g.,. one in Engr. 161 should be in Engr. 162).

General comments.

Students tend to do well in the basic concepts of each course, but have difficulty applying advanced concepts (e.g., acceleration as a function of velocity, combined loading in a structure, etc.). This is not surprising in sophomore-level engineering courses. Students need opportunity to practice the topics in the course. This can be done within the class session (although students have long been given in-class practice in the Engineering Program), and need to study more outside of the classroom. Emphasis on students learning on their own and group work should continue to be encouraged, more so than in the past.

One of the solutions to "practice time" is to "flip" the classroom. The course particularly targeted is dynamics. Much of the lecture material for this class can be provided online, while homework and practice problems can be done in class.

V. Internal/External Conditions

What external conditions have influenced the program in the past year? Have there been disciplinary or regulatory changes, changes in technology, advisory board recommendations, employer, or accreditation recommendations, demographics, labor market analyses, articulation changes, etc.? Summarize the major trends, challenges, and opportunities that have emerged in the program since the last comprehensive program review and /or annual update.

Reduced take-rate of Universities

CSU's and UC's have cut back on enrollments (partly due to the state-wide budget crisis, partly due to larger freshman classes). It has long been recommended by the AHC Engineering Faculty and the MESA Counselor/Coordinator that all students apply to **at least** two (or more) universities. Students that apply to a wider net of schools tend to get into at least one of them.

Intersegmental Model Curriculum (ISMC) - s2015

An A.S. Transfer Degree, as authorized by SB 1440, continues to be discussed for Engineering across the state.
However, all proposed Engineering ***Model Curricula*** (Mechanical/Civil/Aero Engineering, Electrical Engineering and Computer Engineering) exceed the "60-unit" lower-division box that SB 1440 prescribes. The statewide-FDRG (Faculty Discipline Resource Group) for Engineering has therefore forwarded to the next higher level ***Intersegmental Model Curricula*** **(ISMC)** – **NOT** "Transfer Model Curricula" – as the result of their work. These ISMC's are 70-80 units at the Community College.

Course Identifier system (C-ID)

The development of C-ID (course identifier) courses has been much more successful than the TMC-development. The content of specific engineering courses is essentially the same throughout the state (nation). The C-ID system, the replacement for the CAN-system, should be useful in the future in terms of ensuring/validating a common course content throughout the state, which will make articulation (and transfer) easier.

Some challenges exist in that some universities teach certain engineering courses at the sophomore level, while others teach them at the junior level; e.g., *Dynamics*; *Strength of Materials*; *Materials Science*. Fortunately for AHC students, Cal Poly schedules all three in the sophomore year, and UCSB schedules *Dynamics* and "*Strengths*" in the sophomore year (*Materials Science* in the junior year at UCSB).

AHC Engineering Faculty Dom Dal Bello wrote the C-ID descriptor for *Strength of Materials*.

UC's taking Community College courses as upper-division credit.

At the Fall Engineering Liaison Council meeting in UCI, it was announced that UC's would be allowed, if not encouraged, to accept coursework taught at a community college for upper division coursework at the university. Feedback from some transfers has already indicated that they received both content and unit credit (!) for taking Engr. 161 (Materials Science). This may help more students in their transfer process.

Cal Poly Change from Quarter- to Semester-System

It is said that Cal Poly is scheduled to change from the quarter-system to the semester-system by 2020. This is several years out, so changes in curriculum are unknown. However, what likely may happen is that – due to consolidation of courses in the current Cal Poly curriculum – one or more Engineering courses currently taught at the sophomore-level may be moved to the junior-level, potentially reducing the number of courses AHC will be able to offer.

What internal conditions that have influenced the program in the past year? What are the program success and retention rates? (Include certification exam rates, if appropriate.) Degrees and certificates awarded? Have there been trends in SLOs/assessment or IT data; changes in technology, budget, staffing or resources; enrollment management or facilities issues; etc.?

Change in Pre-requisite to Engr 170/171 Electric Circuit Analysis

It has been noted in previous program reviews, and PCA reviews, that the physics pre-requisite for Engr. 170/171 Electric Circuits, should be changed from Physics 161 (mechanics) to Physics 163 (Electricity and Magnetism). The reasons are:

1. to ensure articulation. Nearly all of our transfer universities require "Physics 163" as a pre-req to "Engr. 170".
2. Peer community colleges have "Physics 163" as a pre-req.
3. the general lessons of Electricity and Magnetism should come before the engineering circuits class.
4. It's the right thing to do.

The change was processed in AP&P in 2014-2015, but unfortunately will not take effect until Fall 2017.

The change in pre-requisite required changes in the scheduling of classes:

1. The physics program was asked to flip semester offerings of Physics 162 and Physics 163. In Fall 2014, Physics 163 was switched from spring to fall, and Physics 162 to spring. Physics 163 has to be taken before Engr. 170.
2. The engineering semester offerings of Engr 161/2 and Engr. 170/171 also were were flipped. In Fall 2015, Engr. 161/2 was switched to fall, Engr. 170/1 to spring.

The effect of moving Engr. 170/171 is as follows:

1. Engr. 170/171, Engr. 154 and Engr. 156 are now all in the same semester (spring). They are generally considered the most difficult of the 5 AHC Engineering courses. All need to be taken by Mechanical Engineers (the largest engineering major at AHC). Since Engr. 154 and Engr. 156 are not required to transfer, enrollment in Engr. 154 and/or Engr. 156 may be adversely affected. This potentially affects our ability to offer the classes due to not reaching a minimum enrollment.
2. Engr. 161/162 was offered in the Spring. Many students had met the pre-requisite to take Engr. 161/162 by spring semester of the year before they were to transfer (i.e., they still had one year before transfers). Thus, a student could have the following schedule:
    - 3 semesters: Spring 2011: Engr. 161/2; Fall 2011: Engr. 152 and 170/171; Spring 2012, Engr. 154 and 156

   With the new format, a student taking all classes in "typical sequence" will have a shortened sequence of engineering:
    - 2 semesters: Fall 2016: Engr. Engr. 152 and 161/162 ; Spring 2017: Engr. 154, 156, and 170/171.

3. Engr. 172/173 (Circuits 2) will likely need to be sunsetted. AHC is the only community college to my knowledge that offers this course. Engr. 172/173 articulates to both UCSB and Cal Poly. These neighboring universities seem to be the only universities to offer this course in the sophomore year, so AHC has been in a good position to offer it. However, only Electrical Engineers and Computer Engineers need the course, and historical enrollments has been low (usually below 2-digits). Engr. 172/3 has not been offered since Spring 2007, so it on the "sunset list" regardless. Since Engr. 170/171 is now in spring, students who likely would have taken Engr. 172/3 would have transferred after the spring semester of Engr. 170/171.

Engineering Duplicate Enrollment (**D.E.**) and **FTES** (***Table Va***)

1 year change, '13-'14 to '14-'15"

- Engineering D.E. and FTES have both *decreased* 26% and 32%, respectively (Fall and Spring semesters only)
- College D.E. has essentially stayed the same and college FTES has *increased* 3% (Fall and Spring semesters only)

6-year change, '08-'09 to '14-'15:

- Engineering DE and FTES have both *increased* 10% and 12%, respectively (Fall and Spring semesters only)
- College D.E. and FTES have both *decreased* 4% and 17%, respectively (Fall and Spring semesters only)

Note: In Fall 2011, both *Statics* and *Electric Circuits* courses were both at 36 students (room capacity), 2011-'12 was a peak year. The program – measured by the two fundamental engineering courses (Statics and Circuits) – was essentially at capacity.

Being a small program, Engineering percent changes can be large for a small change in absolute numbers. Engineering enrollment can also be cyclic, as has been noted in conversations with other community college engineering faculty. One-year trends and 6-year trends are both single measures, and more has to be culled out. The one-year data for Engineering is disappointing, but the 6-year trend is positive.

AA degrees in Engineering decreased from 16 in '13-14 to 10 in '14-15 (***Table Vb***). However the general trend in Engineering AA degrees has increased. From Summer 2006 through Spring 2015, 90 Engineering AA's were awarded, or 10 per year.

It should also be noted that due to their course requirements, Engineering students typically earn 3 or more AA degrees; e.g.: Mathematics (physics), Math (computer science), Physics, Chemistry, Transfer, etc. Individual Engineering students have earned as many as 6, 7 or 8 degrees in recent years. From summer 2006 through Spring 2015, the 90 Engineering AA- recipients received 335 other AA, AA-T and AS-T degrees (AHC IRP request, 11/18/15). This gives a grand total of 425 for the 90 Engr AA recipients, or 4.7 degrees per Engineering AA recipient. Of the 6819 AA,AA-T and AS-T degrees awarded in that period, 90 engineering students earned 6.2% of the degrees.

Note that there is no AS-T for Engineering. Current state-wide curriculum models, which the AHC FT Faculty has helped to create, are 70-80 units (exceeding the 60-unit-requirement of an AS-T).

Demographics

In terms of **Ethnicity**, the percentage of Hispanic/Latino students in Engineering has long been ***greater than*** in the College as a whole (***Table Vc***). This has typically been the case for over 12 years. For example, in Spring 2013, 60% of engineering students were Hispanic, compared to 47% in the college (a ratio of 1.28 = 60/47; i.e., the "60%" is 28% greater than "47%"). From Fall 2009-Spring 2013, the ratio of Hispanic Engineering Enrollment to Hispanic College Enrollment has been at least 1.21. In recent years, Hispanic enrollment at the College has increased, so the college is "catching up" to the Engineering program. Much of the success in recruiting Hispanic student to Engineering can be attributed to the successful MESA program that works in cooperation with Math and Science departments.

The **typical Engineering student**:

- is **Male (~80% engineering** vs. ~50% college-wide**)**,
- goes to school **Full-time (~70%** vs. ~30% college-wide, pre-S2012 data**)** and
- is **under 24 years of age (~80%** vs. ~60%, college-wide**)** (*Table Vd*).
- is likely **Hispanic (~57%** vs. ~51%-college-wide**)**.

The **female population** in Engineering has varied between 12% and 28% over the past 14 semesters (***Table Vc***). A female engineering population of 15-20% is typical at the university level across the nation. The College is approximately 50%-50% female-male.

In terms of full-time vs. part-time enrollment (***Table Vc***), Engineering students are exactly the opposite of the College… 70% of Engineering students attend school full-time, only 30% of all AHC attend school full-time. This difference in attendance pattern suggests Engineering – and STEM – students will have different needs than the typical AHC student, which the college should consider.

Data in Table V is extracted from AHC Data using Tableau.

Table Va. Duplicate Enrollment and FTES; ***Fall-Spring Only***, 2006-2015

	'06-07	**'07-08**	**'08-09**	**'09-10**	**'10-11**	**'11-12**	**'12-13**	**'13-14**	**'14-15**	**1-yr Change**	**6-yr Change**
Enrollment										**'13-'14 to '14-'15**	**'08-'09 to '14-'15**
Engineering	246	202	212	239	282	329	321	316	235	(26%)	+10%
College	56,715	58,612	60,729	62,319	65,320	60,207	58,167	57,981	58,137	0%	(4%)
FTES											
Engineering	18.1	15.5	15.9	19.0	24.7	29.2	26.2	26.1	17.8	(32%)	+12%
College	?	?	9,621	8,724	8,401	7,784	7,588	7,720	7,984	+3%	(17%)

Table Vb. AA, AA-T, and AS-T Degrees, 2006-2015 (summer-spring) - Engineering has not AS-T degree.

	'06-'07	'07-'08	'08-'09	'09-'10	'10-'11	'11-'12	'12-'13	'13-'14	'14-'15	Total
Engineering, A.A.	6	8	7	4	15	10	14	16	10	90
College, AA, AA-T, AS-T	837	757	740	632	732	627	682	849	922	6,814*

*6,819 in a email from A.Cortez, 11/18/15

Total Engr. AA degrees: 90 (1.3%) of 6,819.
Total degrees earned by the 90 Engr. AA recipients: 425 (6.2%) of 6,819. … 1 in 16 AA/Ax-Ts go to an engineering student.

Table Vc. Ethnicity, F09-S15 Percentage ENGR Program / Percentage AHC

	F08	S09	F09	S10	F10	S11	F11	S12	F12	S13	F13	S14	F14	S15
Engr. Headcount	**70**	**68**	**84**	**80**	**83**	**96**	**100**	**94**	**97**	**108**	**94**	**111**	**95**	**73**
AHC Headcount	**11,687**	**12,096**	**11,251**	**12,713**	**12,121**	**12,674**	**10,951**	**11,732**	**10,881**	**11,358**	**10,922**	**11,292**	**11,083**	**11,248**
	ENG/AHC	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**	**ENG/AHC**
Asian	4/3	3/3	4/3	4/3	6/3	1/3	3/3	1/3	2/3	6/3	6/3	8/3	6/3	8/3
Black	4/3	4/3	1/3	0/3	0/3	1/3	2/4	4/4	1/4	2/4	1/4	2/4	1/4	0/3
Filipino	3/2	7/2	5/2	3/2	5/3	3/3	4/3	4/3	5/3	0/3	4/3	4/3	3/3	4/3
Hispanic (ratio of percentages)	43/38 **1.13**	47/38 **1.24**	57/41 **1.39**	55/39 **1.41**	58/43 **1.35**	63/43 **1.47**	64/47 **1.36**	57/45 **1.27**	58/48 **1.21**	60/47 **1.28**	51/50 **1.02**	56/49 **1.14**	60/52 **1.15**	55/51 **1.08**
Native American	1/1	0/1	4/2	3/2	0/2	1/2	2/2	0/2	1/2	2/2	2/1	1/2	2/2	4/2
Other	0/1	0/1	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Pacific Islander	0/0	3/0	1/1	0/1	0/1	0/1	0/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
Unknown	9/5	3/6	4/3	3/3	0/2	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
White	36/46	32/45	25/45	34/47	31/44	31/44	25/42	35/43	32/40	29/42	34/39	29/39	27/36	27/38

Table Vd. Gender, Full-time/Part-time, Age*, F09-S15

	F08	S09	F09	S10	F10	S11	F11	S12	F12	S13	F13	S14	F14	S15
Engr. Headcount	**70**	**68**	**84**	**80**	**83**	**96**	**100**	**94**	**97**	**108**	**94**	**111**	**95**	**73**
AHC Headcount	**11,687**	**12,096**	**11,251**	**12,713**	**12,121**	**12,674**	**10,951**	**11,732**	**10,881**	**11,358**	**10,922**	**11,292**	**11,083**	**11,248**
Gender	**F/M**	**F/M**	**F/M**	**F/M**	**F/M**	**F/M**	**F/M**	**F/M**						
Engineering	17/80	28/72	26/74	23/78	14/86	17/83	21/79	21/79	23/82	23/77	12/88	14/86	22/77	15/85
College	53/47	51/48	53/46	47/52	51/49	48/52	53/47	49/51	51/49	49/51	52/48	50/50	51/49	50/50
FT/PT	**FT/PT**	**FT/PT**	**FT/PT**	**FT/PT**	**FT/PT**	**FT/PT**	**FT/PT**	**FT/PT**						
Engineering	78/21	70/30	61/39	69/30	67/33	75/24	69/30	71/28	?	?	?	?	?	?
College	31/68	26/73	32/67	27/72	32/67	29/70	31/68	29/70	?	?	?	?	?	?
Age*														
Engineering	73/19/9	72/16/12	82/11/7	70/21/9	76/13/11	71/21/8	86/6/8	84/7/9	81/12/6	81/8/10	78/15/7	78/13/9	82/12/6	74/18/8
College	58/13/29	55/14/30	61/13/26	55/15/30	59/14/27	54/15/31	61/14/25	58/14/28	62/13/24	59/14/27	63/13/24	59/14/27	64/14/23	59/15/26

*Ages data are broken into three ranges: **≤24 / 25-29 / ≥30 years old**

ASIDE: We note two items from the overall-College demographic data over the past 4 academic years (F11-S15) that may be of interest. These items are beyond the scope of this report.

(1) from Fall-to-Spring, the ratio of female-to-male flips; e.g., there are more female students than males in Fall, and more males than females in Spring.

(2) from Fall-to-Spring, the ratio of Hispanic students drops slightly.

If statistically significant, these responses in themselves are somewhat interesting. Perhaps they are linked; and speak to the retention of Latina (Hispanic females) from Fall into the Spring semester (i.e., the ability to continue education over at least one full-year).

The **Retention and Success Rates (R & S Rates) for sophomore-level Engineering lecture courses** since Fall 2006 are listed in *Table Ve*. The 9-yr Engineering Program R & S rates from Fall '06 to Spring '15 are **88% and 76%, respectively**. The average section size over the 9-year period is 22.

The Engineering R & S Rates compare favorably with the 7-year R & S Rates for the College overall from Fall '08 to Spring '15 (86% and 70%, respectively). While engineering courses are considered among the most difficult on the campus, the students who reach these courses are (1) highly motivated; and (2) have already made it through a difficult set of courses.

Table Ve. Enrollment, Retention Rates (%) and **Success Rates (%)** in Sophomore-Level Engineering Lecture Courses, 2006-2015

		Term	'06-'07	'07-'08	'08-'09	'09-'10	'10-'11	'11-'12	'12-'13	'13-'14	'14-'15	9-year History	Ave Section Size
ENGR 152	Statics	Fall	26 77% 73%	22 91% 91%	26 77% 73%	28 89% 75%	32 94% 69%	35 91% 89%	27 81% 78%	30 77% 70%	24 83% 67%	250 85% 76%	28
ENGR 170	Electric Circuits	Fall	25 88% 84%	22 82% 73%	20 95% 85%	24 79% 67%	26 88% 73%	36 75% 69%	35 80% 77%	38 79% 66%	35 88% 69%	261 83% 73%	29
ENGR 154	Dynamics	Spring	19 95% 89%	16 100% 94%	11 100% 82%	12 67% 50%	25 88% 60%	27 93% 85%	18 89% 61%	16 81% 75%	15 80% 80%	159 89% 75%	18
ENGR 156	Strength of Materials	Spring	15 93% 73%	14 86% 79%	10 90% 80%	15 100% 47%	20 90% 75%	24 96% 67%	14 93% 57%	14 100% 100%	9 89% 78%	135 93% 72%	15
ENGR 161	Materials Science	Spring	14 93% 86%	11 91% 91%	14 86% 86%	23 96% 65%	28 93% 86%	32 84% 81%	36 94% 86%	26 96% 85%	14 79% 79%	198 91% 82%	22
	Enrollment Ave. Retent. Ave. Success		99 88% 81%	85 90% 85%	81 88% 80%	102 87% 64%	131 91% 73%	154 87% 79%	130 87% 75%	124 85% 76%	97 84% 72%	1003 88% 76%	22
	Average Section Size	20	17	16	20	26	31	26	25	19	20	22	

Staffing

Staffing - Instructional

The Engineering Program is staffed by one (1) full-time instructor. The typical FTEF load is ~1.0 in Fall semester ~6 sections), and ~1.2 in Spring (~7 sections). The Engineering faculty member is currently serving as Chair of Mathematical Sciences (Mathematics, Computer Science and Engineering), which is a 0.4 load (actual work is more than 0.4 load).

- In Fall 2013, the FT Faculty taught 5 of 6 sections. In Spring 2014, he taught 7 of 8 sections. Two part-time instructors taught in the Engineering Program in 2013-14, and both are AHC alumni. The F2013 PT instructor (*Statics*) is a graduate of Cal Poly (BSME) and UCSB (MSME), and works locally. The S2014 PT instructor (*MATLAB*) is a graduate of UCSB (BSME) and UCI (MSME), and also works locally (and teaches physics labs for AHC during the fall semesters); he has since left the area for another job.
- In Fall 2014, the FT Faculty taught all 6 sections. In Spring 2015, the FT Faculty taught 4 of 6 sections. The new part-time faculty who taught 2 sections in Spring 2014 (*Materials Science Lab, MATLAB*) is an AHC alumnus and Cal Poly graduate student.
- In Fall 2015, the FT Faculty is teaching 3 sections; with part-time instructors teaching 3 others. The F2013 PT instructor is again teaching *Statics*, and the PT instructor who taught in Spring 2015 is teaching *Materials Science Lab* and *Excel*.

In general, continuity of PT Engineering faculty is a challenge.

Graduate programs are excellent sources for part-time faculty. Graduate students tend to be in-tune with current engineering education requirements, are close in-time to being undergraduates, are looking for (teaching) experience, etc.

The closest university is Cal Poly San Luis Obispo, about 30 miles away. Cal Poly can only grant Master Degrees, so Cal Poly graduate students are not available for an extended period before graduating and often leaving the area. Also, because Cal Poly graduate students have yet to earn their master's degree, they fall under the Faculty Internship program, which requires a faculty mentor – who is likely the same person the part-timer is supposed to be replacing.

UCSB offers a potentially larger pool of part-time faculty, many with master's degrees while still pursuing a doctorate. However, UCSB is approximately 70 miles one-way. Travel eats up a lot of the meager pay that AHC can offer to part-time faculty. A Teaching Assistant in Engineering at UCSB is better compensated than a part-time faculty member teaching one course at AHC (even using pre-2000 UCSB rates). Finding UCSB students who <u>want</u> to teach as a career, and who have sufficient time to commit away from their own courses and research, is difficult. The 2-hour round-trip is a high cost.

Working or retired engineers are another source of part-time faculty (several teach Algebra-level courses at AHC). Those working are only available at night, but the engineering curriculum rotates between evening and day. When engineering course are only during the day, it is a challenge to staff engineering courses with part-time faculty. Those who have practiced engineering for some time are years away from being students, and their understanding/approach to teaching may likely be different than what the university is expecting.

The college should consider hiring a full-time faculty member to teach in Engineering and Electronics. This would provide for a full-time champion in the Electronics Program (2-year program), as well as provide instructional support for transfer-level engineering electric circuits courses (which tend to be the most enrolled engineering courses).

Support Staff - Technical

There is currently no lab support technician dedicated to Engineering. The Physics/Geology Lab Technician often supports basic engineering needs, but cannot support the circuits laboratory. The Chemistry Lab Technical supports one of the materials science experiments that requires chemicals. The Engineering Faculty serves as the Engineering Lab Technician – ordering equipment and supplies, maintaining the equipment, doing basic lab prep-work, and lab clean up.

Before they retired, Electronics full-time faculty received a summer stipend to keep the electronics lab updated and in good repair. I do not believe this practice has been continued except for summer 2015, when the electronics lab needed to be cleaned out in anticipation of the move of the laboratory to the O-building; this seemed to be more of a "clean-up" of the lab than maintaining the equipment, proper.

A Lab Technician to support engineering is needed. Perhaps this person can be shared with electronics, machining and other industrial technology areas.

Support Staff - Administrative

Engineering is in the Mathematical Sciences Department, which also houses Mathematics and Computer Science. There is one full-time Academic Support Specialist (secretary) for, currently, 15 full-time faculty and ~32 part-time faculty. Mathematical Sciences is the largest department on campus.

Administrative staff should be extended to 11 months to support this large department.

Facilities

Most Engineering lecture courses and the Materials Science Lab are generally taught in Room M-212 in the new Science Building. The Electrical Circuits Lab is taught in the Electronics Lab in M-433. The Mathematical Sciences Department controls M-212, the Industrial Technology Department controls M-433.

M-212 - Engineering Lab.

This room was originally designed to be used as the engineering classroom and Materials Science Laboratory, as well as an overflow for physics and viticulture.

Use of M-212 as a Math classroom:

Since Fall 2013, M-212 has accommodated math classes, which is not an ideal situation. Up to five mathematics sections per semester have been scheduled in the engineering lab. This is not a great situation for a math classroom.

- Fall 13: two sections (two Algebra 2)
- Spring 14: one section (Algebra 2)
- Fall 14: four sections (three Algebra 2, one Calculus)
- Spring 15: three sections (two Algebra 2, one Calculus)
- Fall 15: four sections (two Algebra 2, one Statistics, one Calculus)
- Spring 16: five sections (two Algebra 2, one Statistics, one Calculus, one trigonometry)

M-212 Environment: it is historically cold and loud.

From Spring 2013:

The primary challenge with M-212 is that the blowers tend to be on with some force, so the room can get unreasonably cold and loud. The room has been recorded to be as low at 13 to 14°C (about 56-58°F). Because of the noise, students have trouble hearing the instructor, and the instructor has trouble hearing student comments and questions. The temperature and noise were a problem throughout the Fall 2011 semester, and part-way into Spring 2012. Currently (April 2013) the blower can be on and the classroom somewhat chilly. However, the climate inside the room itself is not consistent; it can be warmer than average on some days. Different parts of the building can be "hot" and "chilly" on the same day and at the same time.

2015 and 2014:

There seems to have been some improvement in 2013-2015, but during most of Spring 2014 and 2015 semesters, the blowers continue to be somewhat loud (blow forcefully during the time they are on), and the room tended to run cool (although not as cool as in previous years). It is not always easy to hear the instructor, especially when sitting in the back of the room. I can speak to this as I have sat in the back of the room to evaluate part-time instructors and to listen to guest speakers. It is also difficult for the instructor to hear the student.

There are cracks in the floor of M-212, as there are in other second-floor rooms.

M-433 (**Electric Circuits Laboratory**). This laboratory room has electronics equipment on par with those at the university level. The equipment officially belongs to the Electronics Program, which is housed in the Industrial Technology Department. The Engineering Program has no desktop electronics equipment of its own (i.e., no power supplies, function generators, digital multi-meters, oscilloscopes), which are need to run a circuits lab. Although the equipment is satisfactory, many pieces are old and are beginning to fail. The college should invest in at least 13 (12 + 1 one spare) work stations; each station could run approximately $4000-5000.

It is a constant worry as to what will become of the Electronics Program and the electronics lab. The College has not hired a faculty member to replace the two full-time Electronics instructors who retired. The laboratory space itself is scheduled to move into the "Old Building O". The timeline for the move is uncertain.

M-212 (Materials Science Laboratory). The equipment for the **Materials Science laboratory** is generally sufficient.

- The lab has an up-to-date tensile tester (Instron 3382). However, funds should be budgeted for service. In the past $500 was budgeted for the Engineering Program for "Maintenance". This line item no longer exists. The Instron was fixed about three years ago for about $2500, parts and labor, if not more.
- The majority of instructional funds for engineering is spent in Materials Science, as Materials Science has a significant amount of consumables (tensile specimens, models to construct, etc.).
- The HSI-STEM grant funded a new hardness tester and several hardness specimens, received in Fall 2012.
- An impact tester is stored somewhere on campus. The impact tester was not installed in the laboratory as it needs to be imbedded in 6 inches of concrete; the thickness of the slab of the second floor of the Science Building is 3 inches thick. The second floor of the science building has already exhibited evidence of cracking. Finding the Impact Tester and a location to put it should be a priority in the coming year; such might be related to the electronics laboratory.

Equipment Currency

- To ensure the program remains up-to-date, electronic test equipment should be purchased to support the engineering lab, as mentioned above. At ~$5,000/station, for 13 stations, this is $65,000, which should be considered a conservative estimate.
- In addition, the manufacturing component of the materials science lab should be kept up to date. A 3D-printer to support a rapid-prototyping experiment would help keep AHC engineering on the cutting edge of technology. It can also be used as an outreach platform – literally (Friday night Science, etc.). Estimated cost with supplies, ~$3,000.

VIa. Update to Final Action Plan

If you change or modify a previous recommendation, provide an explanation for the change and a new target date. For new recommendations, provide target dates and data for support. For all items, show how they are related to assessment results where possible and provide approximate costs for resources requested. Resources may include budget, facilities, staffing, research support, professional development, marketing, etc. Not all recommendations will require resources. (Plan may cover period up to the next scheduled comprehensive program review.)

n/a

2014-15 PROGRAM REVIEW
VIb. Revised - Plan of Action (Annual Update)

During the academic year, 2005 , 2006 completed program review. The self-study and validation teams developed a final plan of action-post validation based on information in the self study and the recommendations of the validation team.

(If any plan was made and action not taken, please state the rationale for not pursuing that particular item. If action was delayed or postponed, provide an explanation and a new target date.)

CHANGES AND MODIFICATIONS

PLAN OF ACTION	ACTION TAKEN, RESULT AND STATUS
n/a	

ADDITIONS

PLAN OF ACTION	TARGET DATE
Do 6-year program view (4 years late)	Spring 2016

RESOURCES NEEDED **(**Be sure there is sufficient justification and data contained in the narrative to support each of the items on your list.)

TYPE OF RESOURCE	LINE NO./SPECIFIC RESOURCE	APPROXIMATE COST
Facility Needs		
Technology Needs	3D Printer and supplies	$3000
Staffing Needs		
Equipment (non-technology)		
Other Resources		

Program Review SLOs Report **Annual Update**	**Program:**_____	page _____of _____

Use one row for each course or program SLO

SLO	Semester conducted	Assessment collection process	Assessment method (s)	Review team	Date review completed	Recommendations for additional resources needed, staffing, program changes**

**DO NOT LEAVE FINAL COLUMN BLANK

CSLOs, PSLOs and ISLOs

See attached report.

ISLO/PSLO Summary Map by Course

Outcomes for: **Engineering Program Outcomes (Engineering Program Outcomes)**

Course Group: **Engineering Courses**

List of ISLOs/PSLOs:

A ENGR PSLO - Apply fundamental concepts of mathematics (through calculus), science and engineering.

B ENGR PSLO - Identify, formulate and solve basic engineering problems.

C ENGR PSLO - Conduct experiments and analyze and interpret data.

D ENGR PSLO - Make basic design decisions concerning appropriate-level engineering problems.

E ENGR PSLO - Communicate effectively both orally and in writing, using symbols, graphics and numbers.

F ENGR PSLO - Recognize the need for, and an ability to engage in, lifelong learning.

G ENGR PSLO - Function professionally and ethically as an individual and within diverse teams.

H ENGR PSLO - Use techniques, skills and modern engineering tools necessary in engineering education and practice.

	Engineering Program Outcomes								
	A	B	C	D	E	F	G	H	**Totals:**
ENGR100				1	1	3			**5**
ENGR124	2		1		1			2	**6**
ENGR126	3				2			2	**7**
ENGR152	2	5							**7**
ENGR154		4							**4**
ENGR156		5							**5**
ENGR161	2	7							**9**
ENGR162	2		7					2	**11**
ENGR170		5							**5**
ENGR171		1	5					1	**7**
Totals:	**11**	**27**	**13**	**1**	**4**	**3**		**7**	

Assessments by Program

Program: Engineering

Terms: Fall 2014, Spring 2014 Show results as: Percentages

Assessment Scores By Level

Course - ENGR100 - Introduction to Engineering	NS	0	1	2	3	Total
Default Achv Area for Catalog Course ENGR100 - Course-ending Assessment						
ENGR100 SLO3 - Describe academic requirements, attitudes, and skills that lead to success in the study of science and of engineering.						
Fall 2014	2.6%	0.0%	21.6%	46.0%	32.4%	100% (37)
Spring 2014	2.4%	0.0%	32.5%	35.0%	32.5%	100% (40)
Subtotals for Term(s):	2.5%	0.0%	27.3%	40.3%	32.5%	100% (77)
ENGR100 SLO4 - Create a schedule of courses for their next 2-4 academic terms at AHC (and/or transfer institution).						
Fall 2014	0%	0.0%	18.4%	47.4%	34.2%	100% (38)
Spring 2014	2.4%	0.0%	27.5%	27.5%	45.0%	100% (40)
Subtotals for Term(s):	1.3%	0.0%	23.1%	37.2%	39.7%	100% (78)
ENGR100 SLO5 - Explain in oral and written forms how a piece of technology works.						
Fall 2014	10.5%	0.0%	47.1%	35.3%	17.6%	100% (34)
Spring 2014	14.6%	0.0%	28.6%	51.4%	20.0%	100% (35)
Subtotals for Term(s):	12.7%	0.0%	37.7%	43.5%	18.8%	100% (69)
Grand Totals - All Term(s):	**5.5%**	**0.0%**	**29.0%**	**40.2%**	**30.8%**	**100% (224)**

Course - ENGR124 - Excel in Science/Engineering	NS	0	1	2	3	Total
Default Achv Area for Catalog Course ENGR124 - Course-ending Assessment						
ENGR124 SLO1 - Input a set of data in Excel, and perform mathematical operations on it.						
Fall 2014	23.1%	0.0%	0.0%	100.0%	0.0%	100% (10)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	23.1%	0.0%	0.0%	100.0%	0.0%	100% (10)
Grand Totals - All Term(s):	**23.1%**	**0.0%**	**0.0%**	**100.0%**	**0.0%**	**100% (10)**

Course - ENGR152 - Statics	NS	0	1	2	3	Total
Default Achv Area for Catalog Course ENGR152 - Course-ending Assessment						
ENGR152 SLO1 - Generate appropriate Free Body Diagrams.						
Fall 2014	2.5%	0.0%	41.0%	35.9%	23.1%	100% (39)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	2.5%	0.0%	41.0%	35.9%	23.1%	100% (39)

Assessments by Program

Program: Engineering

ENGR152 SLO2 - Formulate and solve problems involving statically applied forces in two and three dimensions.

Fall 2014	0%	0.0%	45.0%	40.0%	15.0%	100% (20)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	45.0%	40.0%	15.0%	100% (20)

ENGR152 SLO3 - Analyze trusses, frames and simple machines.

Fall 2014	0%	0.0%	30.0%	45.0%	25.0%	100% (20)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	30.0%	45.0%	25.0%	100% (20)

ENGR152 SLO4 - Locate mathematically the centroids of areas.

Fall 2014	0%	0.0%	35.0%	45.0%	20.0%	100% (40)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	35.0%	45.0%	20.0%	100% (40)

ENGR152 SLO5 - Calculate internal forces and bending moments in beam systems.

Fall 2014	2.5%	0.0%	18.0%	61.5%	20.5%	100% (39)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	2.5%	0.0%	18.0%	61.5%	20.5%	100% (39)
Grand Totals - All Term(s):	**1.2%**	**0.0%**	**32.9%**	**46.2%**	**20.9%**	**100% (158)**

Course - ENGR170 - Electric Circuit Analysis	**NS**	**0**	**1**	**2**	**3**	**Total**

Default Achv Area for Catalog Course ENGR170 - Course-ending Assessment

ENGR170 SLO1 - Analyze resistive circuits utilizing basic techniques of circuit analysis and network theorems.

Fall 2014	0%	0.0%	21.7%	34.8%	43.5%	100% (23)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	21.7%	34.8%	43.5%	100% (23)

ENGR170 SLO2 - Analyze op-amp circuits.

Fall 2014	0%	0.0%	21.7%	73.9%	4.4%	100% (23)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	21.7%	73.9%	4.4%	100% (23)

ENGR170 SLO4 - Determine natural and forced responses of second-order RLC circuits.

Fall 2014	0%	0.0%	26.1%	60.9%	13.0%	100% (23)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	26.1%	60.9%	13.0%	100% (23)

ENGR170 SLO5 - Analyze steady-state AC circuits, including power calculations, using complex notation and phasors.

Assessments by Program

Program: Engineering

Fall 2014	0%	0.0%	26.1%	52.2%	21.7%	100% (23)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	26.1%	52.2%	21.7%	100% (23)
Grand Totals - All Term(s):	**0%**	**0.0%**	**23.9%**	**55.4%**	**20.6%**	**100% (92)**

Course - ENGR171 - Electric Circuit Lab	**NS**	**0**	**1**	**2**	**3**	**Total**
Default Achv Area for Catalog Course ENGR171 - Course-ending Assessment						
ENGR171 SLO1 - Analyze circuits using standard circuit analysis techniques.						
Fall 2014	0%	0.0%	4.8%	95.2%	0.0%	100% (21)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	4.8%	95.2%	0.0%	100% (21)
ENGR171 SLO2 - Build circuits on breadboards with resistive, capacitive and inductive elements.						
Fall 2014	0%	0.0%	0.0%	95.2%	4.8%	100% (21)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	0.0%	95.2%	4.8%	100% (21)
ENGR171 SLO3 - Generate electric signals using DC voltage sources and function generators.						
Fall 2014	0%	0.0%	0.0%	95.2%	4.8%	100% (21)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	0.0%	95.2%	4.8%	100% (21)
ENGR171 SLO4 - Measure voltage, current, and resistance using various meters.						
Fall 2014	0%	0.0%	0.0%	95.2%	4.8%	100% (21)
Spring 2014	0%	na	na	na	na	100%
Subtotals for Term(s):	0%	0.0%	0.0%	95.2%	4.8%	100% (21)
Grand Totals - All Term(s):	**0%**	**0.0%**	**1.2%**	**95.2%**	**3.6%**	**100% (84)**

Totals by Term - All Courses	**NS**	**0**	**1**	**2**	**3**	**Total**
Fall 2014	2.2%	0.0%	23.4%	57.6%	19.0%	100% (453)
Spring 2014	6.5%	0.0%	29.6%	37.4%	33.0%	100% (115)
Grand Totals - All Terms - All Courses:	**3.1%**	**0.0%**	**24.6%**	**53.5%**	**21.8%**	**100% (568)**

SLO Achievement Report: ISLOs/PSLOs Overall for Courses

Outcomes for: **Engineering Program Outcomes - Engineering Program Outcomes**
Academic Term: **Fall 2014, Spring 2014**
[X] CSLOs [ ] Assigned SLOs [ ] Named SLOs

List of Performance Categories:

A Institutional Exceeds Standards

B Institutional Meets Standards

C Institutional Below Standards

Competency Description	A	B	C	# Total Scores
Engineering Program Outcomes				
ENGR PSLO - Apply fundamental concepts of mathematics (through calculus), science and engineering.				
Fall 2014	17 (22%)	32 (41%)	30 (38%)	79
ENGR PSLO - Communicate effectively both orally and in writing, using symbols, graphics and numbers.				
Fall 2014	6 (18%)	12 (35%)	16 (47%)	34
Spring 2014	7 (20%)	18 (51%)	10 (29%)	35
Totals:	13 (19%)	30 (43%)	26 (38%)	69
ENGR PSLO - Conduct experiments and analyze and interpret data.				
Fall 2014	3 (5%)	60 (95%)		63
ENGR PSLO - Identify, formulate and solve basic engineering problems.				
Fall 2014	35 (18%)	112 (58%)	45 (23%)	192
ENGR PSLO - Recognize the need for, and an ability to engage in, lifelong learning.				
Fall 2014	25 (33%)	35 (47%)	15 (20%)	75
Spring 2014	31 (39%)	25 (31%)	24 (30%)	80
Totals:	56 (36%)	60 (39%)	39 (25%)	155
ENGR PSLO - Use techniques, skills and modern engineering tools necessary in engineering education and practice.				
Fall 2014		10 (100%)		10
Report Totals by Term				
Fall 2014	86 (19%)	261 (58%)	106 (23%)	453
Spring 2014	38 (33%)	43 (37%)	34 (30%)	115
Grand Totals:	124 (22%)	304 (54%)	140 (25%)	568

Course Statistics and Evidence

Course Group: **Engineering Courses**
Outcomes Group: **Engineering Program Outcomes**

Statistics		
# Catalog Courses:	10	ENGR100, ENGR124, ENGR126, ENGR152, ENGR154, ENGR156, ENGR161, ENGR162, ENGR170, ENGR171
# Catalog Courses with CSLOs:	10	ENGR100, ENGR124, ENGR126, ENGR152, ENGR154, ENGR156, ENGR161, ENGR162, ENGR170, ENGR171
# Catalog Courses without CSLOs:	0	
# Catalog Courses whose CSLOs are mapped to PSLOs:	10	ENGR100, ENGR124, ENGR126, ENGR152, ENGR154, ENGR156, ENGR161, ENGR162, ENGR170, ENGR171
# Catalog Courses whose CSLOs are NOT mapped to PSLOs:	0	
# Catalog Courses whose CSLOs are mapped to ISLOs:	10	ENGR100, ENGR124, ENGR126, ENGR152, ENGR154, ENGR156, ENGR161, ENGR162, ENGR170, ENGR171
# Catalog Courses whose CSLOs are NOT mapped to ISLOs:	0	
# Catalog Courses with Planned Assessments:(Term-specific)	5	ENGR100, ENGR124, ENGR152, ENGR170, ENGR171
# Catalog Courses without Planned Assessments(Term-specific)	5	ENGR126, ENGR154, ENGR156, ENGR161, ENGR162
# Catalog Courses with Assessment Data:(Term-specific)	5	ENGR100, ENGR124, ENGR152, ENGR170, ENGR171
# Catalog Courses without Assessment Data:(Term-specific)	5	ENGR126, ENGR154, ENGR156, ENGR161, ENGR162
# Catalog Courses with a Completed CIP:(Term-specific)	10	ENGR100, ENGR124, ENGR126, ENGR152, ENGR154, ENGR156, ENGR161, ENGR162, ENGR170, ENGR171
# Catalog Courses without a Completed CIP:(Term-specific)	0	

Active Courses

Course: 1.	ENGR100 Introduction to Engineering
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT, MESA Courses
CSLOs:	• ENGR100 SLO1 - Explain the basic differences between the various engineering branches, and how these branches relate to fields in science. • ENGR100 SLO2 - Describe the engineering design process; i.e., the steps of problem solving. • ENGR100 SLO3 - Describe academic requirements, attitudes, and skills that lead to success in the study of science and of engineering. • ENGR100 SLO4 - Create a schedule of courses for their next 2-4 academic terms at AHC (and/or transfer institution). • ENGR100 SLO5 - Explain in oral and written forms how a piece of technology works.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Make basic design decisions concerning appropriate-level engineering problems. • ENGR PSLO - Communicate effectively both orally and in writing, using symbols, graphics and numbers. • ENGR PSLO - Recognize the need for, and an ability to engage in, lifelong learning.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 1 - Communication • ILO 1 - Communication: Communicate effectively using verbal, visual and written language with clarity and purpose in workplace, community and academic contexts. ILO 2 - Critical Thinking & Problem Solving • ILO 2 - Critical Thinking & Problem Solving: Explore issues through various information sources; evaluate the credibility and significance of both the information and the source to arrive at a reasoned conclusion. ILO 3 - Global Awareness & Cultural Competence • ILO 3 - Global Awareness & Cultural Competence: Respectfully interact with individuals of diverse perspectives, beliefs and values being mindful of the limitation of your own cultural framework. ILO 7 - Personal Responsibility & Development • ILO 7 - Personal Responsibility & Development: Take the initiative and responsibility to assess your own actions with regard to physical wellness, learning opportunities, career planning, creative contribution to the community and ethical integrity in the home, workplace and community.

Planned Asmts:(Term-specific)	• Fall 2014 Sec A SEP Assignment • Fall 2014 Sec A Puzzle Cube • Fall 2014 Sec A Homework • Spring 2014 Sec A SEP Assignment • Spring 2014 Sec A Puzzle Cube • Spring 2014 Sec A Homework • Spring 2014 Sec B Puzzle Cube • Spring 2014 Sec B Homework • Spring 2014 Sec B SEP Assignment
Terms with Scores:(Term-specific)	• Spring 2014 • Fall 2014
Course Analysis:(Term-specific)	**Fall 2014** • [What did the assessment data indicate about the strengths of your course?]More students seem to do very well (3) on puzzle cube, but more can do better. • [What did the assessment data indicate about the weaknesses of your course?]We only met 14 weeks this term due to holidays, so less in-class instruction on drawing was done. • [What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?]Revise drawing instructions to make clear/emphasize details. More practice in class. **Spring 2014** • [What did the assessment data indicate about the strengths of your course?]Students enjoy puzzle project and learned about engineering drawing • [What did the assessment data indicate about the weaknesses of your course?]More refinement of puzzle instructions is needed. • [What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?]Refine instructions to better explain how to make drawings.
Course: 2.	ENGR124 Excel in Science/Engineering
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT
CSLOs:	• ENGR124 SLO1 - Input a set of data in Excel, and perform mathematical operations on it. • ENGR124 SLO2 - Plot a set of data in Excel, format and display it in a professional manner with appropriate annotations and graphics, and integrate it into a Word document. • ENGR124 SLO3 - Sort data, apply conditional formatting and utilize an Excel spreadsheet as a database. • ENGR124 SLO4 - Solve algebraic equations and systems of linear equations. • ENGR124 SLO5 - Create a spreadsheet in Excel to perform numerical differentiation and integration. • ENGR124 SLO6 - Solve science and engineering problems using Excel's engineering and statistical functions.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Apply fundamental concepts of mathematics (through calculus), science and engineering. • ENGR PSLO - Conduct experiments and analyze and interpret data. • ENGR PSLO - Communicate effectively both orally and in writing, using symbols, graphics and numbers. • ENGR PSLO - Use techniques, skills and modern engineering tools necessary in engineering education and practice.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 1 - Communication • ILO 1 - Communication: Communicate effectively using verbal, visual and written language with clarity and purpose in workplace, community and academic contexts. ILO 4 - Information & Technology Literacy • ILO 4 - Information & Technology Literacy: Define what information is needed to solve a real-life issue then use appropriate technologies to locate, access, select and manage the information. ILO 5 - Quantitative Literacy • ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems. ILO 6 - Scientific Literacy • ILO 6 - Scientific Literacy: Use scientific knowledge and methodologies to assess potential solutions to real-life challenges.
Planned Asmts:(Term-specific)	• Fall 2014 Sec A Module 1
Terms with Scores:(Term-specific)	• Fall 2014
Course: 3.	ENGR126 Matlab for Science/Engineering
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT
CSLOs:	• ENGR126 SLO1 - Operate within the MATLAB environment to utilize scalar, vector, and matrix functions. • ENGR126 SLO2 - Program script files in MATLAB to solve numerical problems and present results in a professional manner. • ENGR126 SLO3 - Import data sets into MATLAB and create 2 dimensional and 3 dimensional plots of data sets. • ENGR126 SLO4 - Create m-files in MATLAB. • ENGR126 SLO5 - Perform curve fitting and interpolation on data sets. • ENGR126 SLO6 - Solve ODE problems utilizing MATLAB's built-in solvers. • ENGR126 SLO7 - Export data set from MATLAB into Excel, and integrate it into a Word document.

PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Apply fundamental concepts of mathematics (through calculus), science and engineering. • ENGR PSLO - Communicate effectively both orally and in writing, using symbols, graphics and numbers. • ENGR PSLO - Use techniques, skills and modern engineering tools necessary in engineering education and practice.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 1 - Communication • ILO 1 - Communication: Communicate effectively using verbal, visual and written language with clarity and purpose in workplace, community and academic contexts. ILO 4 - Information & Technology Literacy • ILO 4 - Information & Technology Literacy: Define what information is needed to solve a real-life issue then use appropriate technologies to locate, access, select and manage the information. ILO 5 - Quantitative Literacy • ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems.
Course: 4.	ENGR152 Statics
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Architectural Drafting (A.S. & Certificate), Engineering (A.A.), Engineering Courses, Engineering Technology: Civil Engineering (A.S.), MATHEMATICAL SCIENCES DEPTARTMENT
CSLOs:	• ENGR152 SLO1 - Generate appropriate Free Body Diagrams. • ENGR152 SLO2 - Formulate and solve problems involving statically applied forces in two and three dimensions. • ENGR152 SLO3 - Analyze trusses, frames and simple machines. • ENGR152 SLO4 - Locate mathematically the centroids of areas. • ENGR152 SLO5 - Calculate internal forces and bending moments in beam systems. • ENGR152 SLO6 - Calculate cable loads and fluid forces. • ENGR152 SLO7 - Formulate and solve static problems involving frictional forces.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Apply fundamental concepts of mathematics (through calculus), science and engineering. • ENGR PSLO - Identify, formulate and solve basic engineering problems.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 5 - Quantitative Literacy • ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems.
Planned Asmts:(Term-specific)	• Fall 2014 Sec A Final Exam • Fall 2014 Sec A Final Exam b
Terms with Scores:(Term-specific)	• Fall 2014
Course Analysis:(Term-specific)	**Fall 2014** • [What did the assessment data indicate about the strengths of your course?]n/a • [What did the assessment data indicate about the weaknesses of your course?]n/a • [What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?]More practice in class on drawing FBDs. More comments on HW.
Course: 5.	ENGR154 Dynamics
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Engineering (A.A.), Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT
CSLOs:	• ENGR154 SLO1 - Formulate and solve problems involving the kinematics of particles in 2- and 3-dimensions, including relative and constrained motion problems. • ENGR154 SLO2 - Formulate and solve problems involving the kinetics of particles in 2- and 3-dimensions, using Newton's 2nd Law, energy and impulse-momentum methods. • ENGR154 SLO3 - Formulate and solve problems involving the planar kinematics of rigid bodies. • ENGR154 SLO4 - Describe analytically the rotational motion of rigid bodies.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Identify, formulate and solve basic engineering problems.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 5 - Quantitative Literacy • ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems.
Course: 6.	ENGR156 Strength of Materials
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Engineering (A.A.), Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT

CSLOs:	• ENGR156 SLO1 - Determine the internal loads (forces and moments) in each structural member of an engineering system, given an external loading condition. • ENGR156 SLO2 - Identify the applicable theory, and apply the appropriate equations to calculate the internal stresses, strains and/or displacements in axial members, torsion members, beams, pressure vessels and bolted connections. • ENGR156 SLO3 - Determine the stresses, strains and displacements in members subjected to combined loading. • ENGR156 SLO5 - Determine if a structural system meets its design specifications, and/or determine how the system will fail, given or having calculated the stresses, strains and displacements. • ENGR156 SLO6 - Determine the buckling loads of various columns.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Identify, formulate and solve basic engineering problems.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 5 - Quantitative Literacy • ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems.
Course: 7.	ENGR161 Materials Science
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Architectural Drafting (A.S. & Certificate), Engineering (A.A.), Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT
CSLOs:	• ENGR161 SLO1 - Distinguish between the various types of atomic bonds. • ENGR161 SLO2 - Solve diffusion problems. • ENGR161 SLO3 - Solve problems relating to the elastic and plastic deformation of materials. • ENGR161 SLO4 - Solve problems relating to basic fracture and fatigue. • ENGR161 SLO5 - Associate mechanical properties of metals with their structure, defects and mechanical and thermal processing. • ENGR161 SLO6 - Use phase diagrams to determine composition. • ENGR161 SLO7 - Describe the role that corrosion plays in the degradation of materials. • ENGR161 SLO8 - Compare mechanical and electrical behaviors of metals, ceramics and semiconductors • ENGR161 SLO9 - Describe different techniques for forming and shaping metals and ceramics.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Apply fundamental concepts of mathematics (through calculus), science and engineering. • ENGR PSLO - Identify, formulate and solve basic engineering problems.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 5 - Quantitative Literacy • ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems. ILO 6 - Scientific Literacy • ILO 6 - Scientific Literacy: Use scientific knowledge and methodologies to assess potential solutions to real-life challenges.
Course: 8.	ENGR162 Materials Science Lab
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Architectural Drafting (A.S. & Certificate), Engineering (A.A.), Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT
CSLOs:	• ENGR162 SLO1 - Construct models of metallic bonds and calculate their geometric properties. • ENGR162 SLO2 - Prepare and perform tensile tests on metals and polymers. • ENGR162 SLO3 - Analyze tensile test stress-strain data. • ENGR162 SLO4 - Perform Rockwell hardness tests on metals. • ENGR162 SLO5 - Perform impact tests on metals and relate results to specimen temperature. • ENGR162 SLO6 - Interpret microstructure from microscopic images. • ENGR162 SLO7 - Gather and interpret temperature (cooling curve) data to generate phase diagrams for metal alloys. • ENGR162 SLO8 - Observe and describe a galvanic cell and the effect of corrosion on various metallic systems. • ENGR162 SLO9 - Measure electrical properties of semiconductors (optional). • ENGR162 SLO10 - Interface computers to test equipment. • ENGR162 SLO11 - Gather and analyze test data and images using computers.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Apply fundamental concepts of mathematics (through calculus), science and engineering. • ENGR PSLO - Conduct experiments and analyze and interpret data. • ENGR PSLO - Use techniques, skills and modern engineering tools necessary in engineering education and practice.

ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 4 - Information & Technology Literacy • ILO 4 - Information & Technology Literacy: Define what information is needed to solve a real-life issue then use appropriate technologies to locate, access, select and manage the information. ILO 6 - Scientific Literacy • ILO 6 - Scientific Literacy: Use scientific knowledge and methodologies to assess potential solutions to real-life challenges.
Course: 9.	ENGR170 Electric Circuit Analysis
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Engineering (A.A.), Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT
CSLOs:	• ENGR170 SLO1 - Analyze resistive circuits utilizing basic techniques of circuit analysis and network theorems. • ENGR170 SLO2 - Analyze op-amp circuits. • ENGR170 SLO3 - Determine natural and forced responses of first-order RL and RC circuits. • ENGR170 SLO4 - Determine natural and forced responses of second-order RLC circuits. • ENGR170 SLO5 - Analyze steady-state AC circuits, including power calculations, using complex notation and phasors.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Identify, formulate and solve basic engineering problems.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 5 - Quantitative Literacy • ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems.
Planned Asmts:(Term-specific)	• Fall 2014 Sec A Final Exam
Terms with Scores:(Term-specific)	• Fall 2014
Course: 10.	ENGR171 Electric Circuit Lab
Owner:	Engineering
Course Groups:	All Course Group - 100 Level Courses, Engineering (A.A.), Engineering Courses, MATHEMATICAL SCIENCES DEPTARTMENT
CSLOs:	• ENGR171 SLO1 - Analyze circuits using standard circuit analysis techniques. • ENGR171 SLO2 - Build circuits on breadboards with resistive, capacitive and inductive elements. • ENGR171 SLO3 - Generate electric signals using DC voltage sources and function generators. • ENGR171 SLO4 - Measure voltage, current, and resistance using various meters. • ENGR171 SLO5 - Measure voltage, frequency, and phase using an oscilloscope. • ENGR171 SLO6 - Record results and analyze and evaluate data. • ENGR171 SLO7 - Use computer tools to analyze/design and build a circuit system.
PSLOs:	Outcomes Group: Engineering Program Outcomes Engineering Program Outcomes • ENGR PSLO - Identify, formulate and solve basic engineering problems. • ENGR PSLO - Conduct experiments and analyze and interpret data. • ENGR PSLO - Use techniques, skills and modern engineering tools necessary in engineering education and practice.
ISLOs:	Outcomes Group: Institutional Learning Outcomes (ILOs) ILO 4 - Information & Technology Literacy • ILO 4 - Information & Technology Literacy: Define what information is needed to solve a real-life issue then use appropriate technologies to locate, access, select and manage the information. ILO 5 - Quantitative Literacy • ILO 5 - Quantitative Literacy: Use mathematical concepts and models to analyze and solve real life issues or problems. ILO 6 - Scientific Literacy • ILO 6 - Scientific Literacy: Use scientific knowledge and methodologies to assess potential solutions to real-life challenges.
Planned Asmts:(Term-specific)	• Fall 2014 Sec A Lab Practicum • Fall 2014 Sec B Lab Practicum
Terms with Scores:(Term-specific)	• Fall 2014
Course Analysis:(Term-specific)	**Fall 2014** • [What did the assessment data indicate about the strengths of your course?]Students learned to use the equipment at a sufficient level. It helped that a lab set-up was placed in the STEM Center - for the entire semester - so students could practice building circuits, applying voltages, and measuring voltages and current. Nobody went over the allotted time (as in the past), and many finished well within time. • [What did the assessment data indicate about the weaknesses of your course?]SLOs may be a bit broad compared to what the assessment is trying to measure. • [What changes have you made/do you plan to make based on the data? What resources would you need, if any, to make these changes?]Continue to leave a circuits lab set-up in the STEM Center so students can access outside of lab. Reevaluate SLOs.