**Prepared by:** Larry Owens

**What are the strengths of your area?:** The engineering program provides the classes necessary for a student to complete their lower division engineering course work. Some of the strengths of this program include:

1. High success rate in courses. ENGR courses which have pre-requisites (ENGR 2, 3 and 4) have success rates of 86% or higher. The two ENGR courses without pre-requisites (ENGR 1 and 110) still have good success rates (64% to 87%) but they are lower. The data is included in documents.

2. Students who complete ENGR 2 are very likely to successfully transfer in engineering. ENGR 2 is selected as a benchmark course because most, not all, engineering students take it and all the students in it are engineering majors. Also by the time a student takes ENGR 2 they have completed at least two calculus courses and the first physics course. This would signify the student is serious about engineering as a major. In fall 2011 and fall 2012 only 1 student each semester has not gone on to transfer. See the data in the documents section.

3. The engineering program enjoys a strong relationship with and support from MESA/SETA. The engineering faculty member has been the faculty adviser for SETA since the organization began in 2003. This faculty member also serves as the MESA faculty liaison.

4. The connections the engineering department has with various colleges and universities allows the transfer process to occur smoothly. The engineering faculty member is active at the state level, serving on the Faculty Discipline Review Group (FDRG) currently working on the Model Curriculum (MC) for engineering, as well as being an active member of the state-wide Engineering Liaison Committee. He is also currently working on the Joint Engineering Program (JEP), a US Department of Education funded project which is working to coordinate engineering offerings among the community colleges using distance learning technology.

5. The local connections the engineering department has with various organizations and employers has resulted in internships and short-term employment for engineering students. Among the local places that students have been placed are SERPA Packaging, USDA-Natural Resource Conservation Service and Voltage Multipliers. In the past some of these placements have resulted in permanent employment after the student completes their BS degree.

6. Students benefit from a faculty member with the dual strength of a PhD in engineering with research experience coupled with practical experience in the engineering field as a Registered Civil Engineer. This unusual combination of education and practical experience allows the department to support students who may want to go into graduate research work as well as students who want to complete a BS degree and begin working as an engineer.

**What improvements are needed?** Identify qualified engineering students from the large pool of declared engineering majors. Improve number of students completing the engineering program. Decrease faculty time spent on laboratory set-up, clean-up and related chores to allow faculty to spend more time with students.

**Describe any external opportunities or challenges:** Faculty involvement with Joint Engineering Program (JEP), Engineering Liaison Committee, and Summer Engineering Teaching Institute (SETI), develops relationships with other universities and community colleges that provide opportunities for students. For example JEP is working to develop distance education courses which may allow COS engineering students to enroll in lower division engineering courses that COS does not offer. JEP may also provide opportunities for engineering students at other community colleges to enroll in a COS engineering course, thus increasing class size. These discussions are just in the initial stages, but they present both opportunities and challenges for COS engineering department.

The Science Undergraduate Research Group Experience (SURGE) grant, of which the engineering faculty is the principal investigator, provides opportunities for engineering students to gain practical and research experiences.

Faculty involvement on the statewide Faculty Discipline Review Group (FDRG) provides the COS engineering department with direct input into the TMC/MC (Model Curriculum) process in order to shape and quickly respond to statewide issues.

**Overall Outcome Achievement:** As described in the approved cycle (attached in documents) the first program level outcome review will be completed by spring 2015 (as stated in approved cycle). As described in the cycle three engineering courses have had their course outcomes reviewed (ENGR 1, 2 and 4). Although these reviews were generally positive, the results of two course outcomes for ENGR1 showed a need for increased faculty time for student follow-up and review.

**Changes based on outcome** The need for increased time for faculty follow-up and support of students may be an issue based on preliminary course level outcomes. To determine if this is a
achievement: issue in other engineering courses the assessment of course level outcomes needs to be done more frequently during this initial cycle of assessments. In addition to reviewing ENGR 2, as required by the assessment cycle, course level assessments will also be done for ENGR 110.

Outcome cycle evaluation: The engineering program is meeting the assessment cycle requirements. However additional course outcome results would be helpful during this inaugural cycle of the Assessment cycle.

Action: Increase course level assessments
Assess ENGR 110 in addition to ENGR 2, this fall

    Start Date: 09/01/2014
    Completion Date: 01/15/2015
    Status: New Action

Identify related course/program outcomes: This allows the faculty to assess course/program outcomes in a more timely manner.

Person(s) Responsible (Name and Position):
Larry Owens

Rationale (With supporting data):
because this is the inaugural cycle for the Assessment cycle the faculty did not realize the helpfulness of having initial course assessment results available.

Priority: Medium
Safety Issue: No
External Mandate: No

Action: Increase the number of students completing engineering program
This action will be addressed with several approaches.
1. Investigate the success rates of courses within the engineering program and determine where along the pathway students may have difficulty.
2. Determine which students should actually be considered as engineering majors.
3. Review students support services (MESA/SETA, tutorial, counseling) to see assess the effectiveness for engineering majors.

    Start Date: 09/08/2014
    Completion Date: 06/15/2015
    Status: New Action

Identify related course/program outcomes: All three program outcomes state “Students will develop the ability to...” To adequately assess these outcomes, identifying which students are really in the engineering program is important. Once these students are clearly identified assessing problem areas in the program as well as effectiveness of support services can be done.

Person(s) Responsible (Name and Position):
Larry Owens

Rationale (With supporting data):
According to EIS, as of August 31, 2014, 138 students declared themselves engineering majors. However, as of August 31, 2014 only 9 student of the 26 students in ENGR 1 declared themselves engineering majors. Obviously there are problems with determining which students are actually engineering majors. Determining who is actually an engineering major would be helpful to develop a process to help all engineering majors. Determining this would also be helpful to follow and evaluate the success of engineering majors at COS.

Investigating the success rates of courses within the engineering program, assuming the student follows a typical course pattern, can help determine where students may have problems and need additional support or alternative opportunities. (A typical course pattern can be found in the documents section.)

A review of support services for engineering students will help determine what services are available as well as how effective those services are for the engineering students.

Priority: High
Safety Issue: No
External Mandate: No
**Action:** Increase faculty time for student support.

Hire a lab tech to handle set-up, clean-up and related duties of the engineering lab classes. If the faculty member is not responsible for these tasks, he will have more time to spend with students before, during and after laboratory courses.

**Implementation Timeline:** 2014 - 2015
- **Start Date:** 09/08/2014
- **Completion Date:** 06/15/2015
- **Status:** New Action

**Identify related Program Outcomes:**
- **Program Outcomes:** Students will develop the ability to identify, formulate and solve engineering problems (e.g. circuits, statics, materials, graphics). Students will develop the ability to design and conduct experiments, as well as to analyze and interpret data. Students will develop the ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

**Person(s) Responsible (Name and Position):** Larry Owens, engineering faculty, Jared Burch, Division chair, Robert Urtecho, Dean

**Rationale (With supporting data):** Engineering is a single-faculty department with 3 of the 5 engineering courses requiring significant laboratory experiences. In addition, this single faculty member is responsible for the physics laboratory equipment and repairs. Almost all other science and technology courses and programs on campus have a technician to assist with laboratory set-up, clean-up, equipment maintenance and similar duties. Equal support is necessary for the engineering and physics courses. This technician would also support the physics laboratories.

**Priority:** High

**Safety Issue:** No

**External Mandate:** No

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### Add Resource Request for Action

<table>
<thead>
<tr>
<th>Resource Description</th>
<th>Why is this resource required for this action?</th>
<th>Notes (optional)</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory tech for engineering and physics courses.</td>
<td>The engineering faculty member cannot increase the number of hours in each day. If this faculty member would like to increase the amount of time for student contact and support, then time spent in another way will need to decrease. A lab technician would decrease the amount of time the faculty member needs to spend on laboratory duties and this time could be spent improving student success.</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Resource Type:** Classified- New/Replacement