Oklahoma City Community College

Program Review Self Study Year 2011

Division: Science and Mathematics

Program Name Pre-Engineering 032

Prepared by: Gregory D. Holland

1. Program Curriculum

Program Name: Pre-Engineering 032

Options: None

I. Program Requirements — Minimum Required Hours: 62

Major Courses		
Prefix & Number	Course Title	Credit Hours
ENGR 2002	Professional Development	2
ENGR 2133 -- OR --	Rigid Body Mechanics	
ENGR 2243	Statics	3
	Faculty advisor approved major electives selected from:	6
	ENGR 1213; ENGR 2103; ENGR 2143; ENGR 2313;	
	ENGR 2333; ENGR 2343; ENGR 2523; ENGR 2613	
	Total	11

General Education Courses		
Prefix & Number	Course Title	Credit Hours
ENGL 1113	English Composition I	3
ENGL 1213	English Composition II	3
HIST 1483 -- OR --	U.S. History to the Civil War	
HIST 1493	U.S. History Since the Civil War	3
POLSC 1113	American Federal Government	3
CHEM 1115	General Chemistry I	3
PHYS 2014	Engineering Physics I	5
PHYS 2114	Engineering Physics II	4
MATH 2014	Calculus and Analytic Geometry I	4
MATH 2214	Calculus and Analytic Geometry II	4
	Humanities Electives	6
	Social Science Elective	3
	Total	42

Support Courses		
Prefix & Number	Course Title	Credit Hours
MATH 2314	Calculus and Analytic Geometry III	4
	Faculty advisor approved support electives chosen from:	4-6
	ENGR 1213; ENGR 2103; ENGR 2143; ENGR 2313;	
	ENGR 2333; ENGR 2343; ENGR 2523; ENGR 2613;	
	CHEM 1215; CHEM 2115; CHEM 2125; CS 2163; CS 2363;	
	MATH 2013; MATH 2413; PHYS 2223; CAT 1214	
	Total	8-10

Life Skills Courses		
Prefix & Number	Course Title	Credit Hours
SCL 1001	Success in College and Life	1
	Total	1

2. General description of review process and participants assisting with and conducting the review.

a. Program faculty assess annually student learning and program outcomes for their program. Every five years these assessments are evaluated globally. A program review document contains general college information from Advising, Recruitment and Admission and Institutional Effectiveness and program specific assessments of strengths and weakness of the reviewed program and program plans for the future.

b. A list of the student learning outcomes

Students will be able to solve appropriate problems at the sophomore level in basic engineering sciences.

c. A list of program outcomes for the program

Students who take engineering classes at OCCC will be successful in their subsequent engineering classes at transfer institutions.

d. Well defined the criteria for measurement and how the criteria were used in the program.

<u>Student Learning Outcomes:</u> At the end of each semester, students were given non-credit assessment instrument in one or more of the following program courses - ENGR 2133, ENGR 2143, ENGR 2333, ENGR 2343, ENGR 2623, and ENGR 2613. These assessment instruments were composed of questions from previous Fundamentals of Engineering (FE) exams that corresponded to material covered in a given course. The actual FE exam covers a broad range of topics, including: chemistry, calculus, physics, ethics, economics, statics, dynamics, material science, strengths of materials, thermodynamics, fluid mechanics, and electrical science. Students were allowed 3 minutes per problem on the sample exam. The practice exams were composed of multiple-choice questions with four possible answers to choose from. The students were allowed to use their textbooks as references. A scaled score of 70 is required to pass the actual FE exam, but minimum passing raw scores range from 50-60% each year, depending on the difficulty of a particular exam. Since students taking the FE vary in their selected engineering discipline, not all students will perform at the same level on all sections. Therefore, it is deemed reasonable that 70% of students passing the course in question should score 50% or higher on their assessment exam in a given course. <u>Program Outcomes:</u> The graduation rate at 4-year transfer institutions for students who complete the program at OCCC will be compared to the graduation rate for students who began

their degree at the transfer institution. The graduation rate at 4-year transfer institutions for students who complete the program at OCCC should be greater than or equal to the graduation rate for students who began their degree at the transfer institution.

e. The evaluation, results and recommendations based on the criteria used.

Student Learning Outcomes:

A total of 24 students were assessed in ENGR 2333 - "Thermodynamics" during the fall of 2009 and spring of 2010. Eight multiple-choice questions related to topics covered in the course were selected as the sample exam. The average score was 39%, with the highest score being 87.5%. Nine of the twenty-four students (37.5%) scored 50% or higher, which is half of the stated goal. While there was a general deficiency across the range of topics, two areas of particular difficulty appear to be: (1) recognition that the quality of a 2-phase liquid-vapor mixture depends on the mass of the vapor phase rather than volume, and (2) proper use of the carnot efficiency. These topics should be continually reinforced during the semester.

A total of 10 students were assessed in ENGR 2613 - "Electrical Science" in the summer of 2010. Twelve multiple-choice questions related to topics covered in the course were selected as the sample exam. The average score was 61%, with the highest score being 75%. Eight of the ten students (80%) scored 50% or higher, which exceeds the stated goal. Three areas of particular difficulty appear to be: (1) The forced response of an RC circuit, (2) the relationship between the time-domain expression of a circuit variable and the frequency-domain, or phasor, representation of that variable, and (3) the definition of "resonant frequency". All three topics should be continually reinforced during the semester.

The assessment instrument used here (multiple-choice) does not provide as much useful information as exams typically administered in class (problem-solving). There is typically more than one place where a mistake may be made on a given problem and the simple "right or wrong" outcome from a multiple-choice exam does not assist in determining the specific nature of the student's error. Future assessment instruments should include essay problem-solving questions where students are required to show their work. This will better illustrate any underlying deficiencies.

In the future, additional student learning outcomes will include assessment of oral, written, and graphical communication skills.

Program Outcomes:

Only the University of Oklahoma has provided GPAs of transfer students. Unfortunately, these numbers are not broken down by transferring institution for the current year and do not accurately reflect the performance of students graduating from OCCC compared to any other cohort. This method of assessment

did not provide useful results. Alternative methods of assessment should be investigated.

Approximately 1/3 of students transferring into OU engineering programs come from OCCC This is by far the largest number from any single institution. Our relationship with OU is very strong.

The Engineering Program at OCCC has recently initiated an effort to track and mail surveys to graduates regarding GPA information, graduation rates, and their level of satisfaction with their education at OCCC. This will also allow monitoring of the number of students who attend or graduate from OCCC and then complete a BS at their transfer institution.

3. **Research and evaluation must be conducted on a continuing, systematic basis as an integral part of the program. All aspects of the program must be evaluated and the results used to improve services to students. There must be evidence that the program is reaching its stated student learning outcomes/program outcomes. The review should address each of the following areas. The program:**

    a. is central to the institution's mission:

MISSION STATEMENT: OCCC provides the people of Oklahoma and our community with broad access to certificates of mastery, associate degrees, community education, and cultural programs of exceptional quality, empowering our students to achieve their educational goals and our community to thrive in an increasing global society.

The low number of AS degree recipients from FY 2006-2009 is most likely due to the dramatic changes in the engineering curriculum at OU that began in FY2006. The recent increase in the number of AS recipients (FY2010) is an indicator that the Pre-Engineering program has made significant adjustments to the Pre-Engineering curriculum that allows students to both complete the AS degree and work toward their eventual degree requirements simultaneously.

Number of students receiving associate degrees in Pre-Engineering:
FY2006 = 14
FY2007 = 23
FY2008 = 20
FY2009 = 14
FY2010 = 32

Percentage of students who met their educational goals at OCCC, according to the graduation survey:
FY2006 = 88.9% of 14 respondents
FY2007 = 100% of 23 respondents
FY2008 = 87.5% of 20 respondents

FY2009 = 85.7% of 12 respondents
TOTAL = 92% of 69 respondents

b. meets stakeholder expectations:

OCCC programs provide our community with broad equitable access to a college education. OCCC students are prepared to succeed in college and are able to achieve their individual educational aspirations. OCCC graduates succeed at four-year institutions and/or in their careers. OCCC has a rich history of enriching our community both economically and socially through our educational and cultural programs.

c. produces graduates and former students who are successful on transferring:

The most recent report with detailed transfer information concerns the 2006 transfer cohort at the University of Oklahoma. That report indicates that there were 110 OCCC students (who transferred in as juniors or seniors) in various programs at OU. Their average GPA at OU was 2.71. This compares favorably to the GPA of junior and senior UCO transfers to OU (22 students, 2.74 GPA) and to all other Oklahoma four year institution transfer students (65 students, 2.85 GPA). OU "native student" GPA was not reported. It should be noted that over 18% of transfer students at OU report OCCC as the "last institution attended"

This data includes all OCCC engineering students who transferred to OU after their sophomore year, but not for all OCCC engineering students transferring to OU. Many of our students transfer to OU after their freshman year. In the aggregate approximately 1/3 of the total transfer students to OU report OCCC as their last school attended.

The Engineering Program at OCCC has recently initiated an effort to track and survey graduates for the purpose of acquiring this information. This will also allow monitoring of the number of students who attend or graduate from OCCC and then complete a BS at their transfer institution.

Discussions with OU staff in the Williams Student Services Center (for engineering students) frequently reveal a very high opinion of OCCC graduates, and confirmation that "they do very well" at OU.

d. contains instruction relevant to the curricular requirements at transfer institutions and in line with student interests and abilities

Programs of Study

OCCC offers two types of associate degree programs: transfer and technical/occupational. In addition, a number of certificates of mastery are offered in technical and occupational fields of study.

University Parallel/Transfer Programs

OCCC offers a broad range of transfer programs for students planning to continue on at a four-year college or university. Students may enroll in freshman and sophomore courses which lead to a baccalaureate degree in practically any field of study. Upon completion of specified degree requirements, the student is awarded an Associate in Arts or Associate in Science. These degrees require the completion of a minimum of 60 semester credit hours. Of the 60 semester credit hours, a minimum of 37 must satisfy the general education core requirements (see Degree Requirements). The remaining approved courses will be related to the student's major or courses which directly support that major.

Requirements and Articulation assures that the general education core (37 credit hours) of the Associate in Arts or Associate in Science degree at OCCC will apply directly toward the lower division general education requirements at any state university in Oklahoma.

Policy Statement on Undergraduate Degree Requirements and Articulation

In accordance with the Oklahoma State Regents for Higher Education Policy Statement on Undergraduate Degree Requirements and Articulation, a student who completes an Associate in Arts or an Associate in Science degree at OCCC “may transfer into a Bachelor of Arts or a Bachelor of Science degree program at any senior institution of the State System and be assured of completing his or her program in sequential fashion.”The Policy Statement on Undergraduate Degree

In addition, students are advised to secure the official catalog of the university to which they plan to transfer. Each university's official catalog provides pertinent information about admission policies and academic programs. That information is essential to the student's successful transfer to that university. Students should also consult a faculty advisor in their major at OCCC. With approval, the associate degree program may be modified to meet a student's needs depending on the intended transfer college or university.

Students are encouraged to visit the “Transfer Center” on the Oklahoma State Regents for Higher Education web site at http://www.okhighered.org/studentcenter/transfer-stdnts. This site will assist a student in determining which course or courses will transfer to another Oklahoma college or university.

Transfer guides showing course-by-course articulation between OCCC and a number of state universities are available in Office of Academic Advising. By using the appropriate transfer guide, the student can be assured that courses in the student's major will transfer directly toward the bachelor's degree.

OCCC has established specific curriculum patterns for transfer programs leading to the Associate in Arts (A.A.) or Associate in Science (A.S.) degrees. The curriculum patterns listed below are presented in the next section of the Catalog.

e. Have systems to evaluate courses and faculty by students, administrators, and departmental personnel

Faculty Performance Review and Evaluation

Faculty will be evaluated on the basis of the established standards of performance and objectives established in the person's contract and any subsequent memorandums of agreement established for the position/person. Faculty are defined as employees who primarily perform teaching and instruction-related duties and who are employed on the basis of a written contract setting forth the duties to be performed and the compensation to be paid. The performance appraisal for each faculty member will be conducted by the Division Dean or Director as appropriate. In preparation for the review, the employee will provide relevant information to the Division Dean or Director as appropriate at least two working days prior to the evaluation conference. The results of the subsequent performance appraisal conference will be documented on a rating sheet signed by both the employee and the Division Dean and/or Director as appropriate.

Course and Faculty Evaluation

The Student Input on Instruction form is a means of gathering student perceptions of instruction at the college. The results are intended for use by you and your dean in identifying ways to improve instruction. A copy of the form is in the appendix of this document. The forms and supportive instructions will be distributed for you to administer during the 8th, 9th, or 10th week of 16-week courses or the 5th or 6th week of eight-week courses. Prior to administering the instrument, you should:

1. Plan class time to help ensure that time is available for completing the forms.

2. Where desirable, prepare up to three (3) questions, which are unique to the course or section for inclusion as the optional questions on the form. You should have multiple copies of these questions printed for use by the students.

3. Select a student to be responsible for administering and returning the forms and brief him or her about the process. It is best to keep the forms and instructions in your possession until the day you plan to administer them. Your cooperation in helping to ensure that the Student Input on Instruction forms are completed in a timely manner will go a long way to provide useful student input concerning your instructional methods.

f. Is staffed, administered, and supplied to provide for the development of competent students in all areas including citizenship and social conscience

Service-Learning

Incorporating service-learning as a part of a course's curriculum is easy to do and can enhance students' ability to understand and apply course material. Service-learning can generally be used as a part of any course's learning objectives and tailored to desired learning outcomes. The Student Life Service-Learning Center partners with over 100 community agencies, so there is something for every course and interest area. Office of Student Life coordinates student involvement in service learning.

g. Has current, appropriate, useful, and sufficiently comprehensive instructional media and materials.

Library collection evaluation - Pre -Engineering
Fall 2010

The Pre -Engineering program currently has 1 full -time and 1 - 2 part -time faculty, with a significant number of students planning to pursue mechanical engineering. No major curriculum changes are planned.

Students' Library assignments include watching videos, using reference books and giving presentations based on articles from professional journals available through the online databases. All teachers put materials on Reserve for student use.

The following areas support the Pre -Engineering program:

T 351 - 385	Engineering graphics
TA 1 - 2040	Engineering (general), esp. mechanics of engineering, applied mechanics, materials of engineering & construction, strength of materials, testing & properties of materials.
TC 1 - 1665	Hydraulic engineering, fluid flow, mechanics
TD 172 - 196	Environmental pollution
878 - 894	Special types of pollution
TK 1 - 9971	Electrical engineering, esp. distribution of electric power, electric power circuit.

Materials supporting the Pre -Engineering program get substantial use. The circulating collection needs some updating. Faculty recommended adding books on nanotechnology, history of engineering, robotics, thermodynamics, and updating the AutoCAD books. Minor weeding was done during the review.

The reference collection has been greatly enhanced since the 2005 program review with the addition of new handbooks and updating edition of others.

The AV collection needs some improvement. Faculty will recommend titles to order on history of engineering and nanotechnology.

The Library subscribes to the following technical general periodicals which support the Pre -Engineering program:

Civil Engineering
ENR
Issues in Science & Technology
Science News

Chemical & Engineering News and *Environmental Science & Technology* subscriptions were cancelled in 2010 due to execessive subscription costs.

These periodicals support the curriculum well. The most amazing change in support for the Engineering program has occurred in the area of access to periodical articles. With the Library's article databases, students can find articles in well over 200 mechanical engineering journals --to focus on just one area.

From the Library's home page, students can use the catalog of books and videos, search a variety on online article databases, link to recommended web sites, and make online requests. During 2005 - 2010 the Library web pages were extensively redesigned, adding more resources and information. With these databases and the Internet, students have wonderful access to current information.

Since the previous program review, the Library has employed an Electronic Services / Reference Librarian to help strengthen student awareness of and skill in using Library online databases and other resources. Several online video tutorials have been created in addition to the online Research Paper Help module. These can be found from the Library front page or directly from the Library YouTube channel.

Students who have access to computers off-campus can easily do online research not possible a few years ago. The Library provides user authentication so that any member of the OKC College Community can use all of the Library's online resources, even from a computer off -campus. The Library has created simple, new resources (widgets) for faculty to insert into their ANGEL course materials, making it convenient for students to research the article databases, Library catalog or other resources - without exiting the course software.

With some updating and purchases to fill out a few areas, the engineering part of the collection will continue to support the curriculum effectively.

h. Provides adequate resources and adequate and appropriate faculty whose qualifications (including educational background, related experience, and service contributions related to the program) support the objectives and curriculum of the program.

ENGINEERING RESOURCES:

Engineering Center

The OCCC Engineering Center is a new 6000 ft^2 facility that includes: 5 offices for faculty and staff, 2 laboratories, 1 computer classroom, a commons area for students, and a 1300 ft^2 outdoor work area.

Equipment

The OCCC Engineering Center provides the following equipment for use by faculty and students: Stick, TIG, and MIG welders. Metal lathe, mill, and drill-press. Tensile strength, hardness testers, and concrete compression machines. High-temperature furnace. Drying oven. Bench-scale steam power plant (Rankine Cycler). Metallurgical microscope. Atomic force microscope. Scanning tunneling microscope. Soldering equipment. Hand-held power tools for metal, plastic, and wood. Labview data acquisition system.

ENGINEERING STAFF:

Engineering Outreach Assistant

The OCCC Engineering Program employs 1 part-time employee dedicated to assisting with outreach efforts to area high-schools and managing transfer issues with 4-year engineering programs in the area.

Engineering Lab Assistants

The OCCC Engineering Program employs 2 part-time laboratory assistants to help faculty manage laboratory activities and provide assistant to engineering students. The OCCC Engineering Program also employs 3 part-time tutors to assist engineering students with coursework.

ENGINEERING FACULTY:

Gregory D. Holland, Ph.D.
Professor of Engineering

Primary Departmental Responsibilities

Program Director - Engineering
ENGR 2002 - Professional Development (Course Coordinator)
ENGR 2003 - Engineering Practice I (Course Coordinator)
ENGR 2333 - Thermodynamics (Course Coordinator)
ENGR 2343 - Fluid Mechanics (Course Coordinator)
ENGR 2613 - Electrical Science (Course Coordinator)
Advisor - Engineering Transfer Students

College Responsibilities

Physics Hiring Committee
Engineering Club Sponsor

Educational Background

2002 - Ph.D., Chemical Engineering, Oklahoma State University, Stillwater.
1994 - B.S., Chemical Engineering, Oklahoma State University, Stillwater.

Professional Experience

2005 - Present Professor of Engineering, Oklahoma City Community College
2003 - 2004 Post-Doctoral Research Assistant, Oklahoma State University

Professional Organizations

2010 - Present American Society for Engineering Education

Advisory Boards

2009 - Present Northeast Academy for Engineering, Oklahoma City, OK
2009 - Present Moore-Norman Technology Center: Pre-Engineering Program, Norman, OK

Gary W. Houlette, P.E.
Professor of Physical Science
Primary Departmental Responsibilities

ENGR 2133 - Rigid Body Mechanics (Course Coordinator)
ENGR 2143 - Strength of Materials (Course Coordinator)
ENGR 2523 - Dynamics (Course Coordinator)
Advisor - Engineering Transfer Students

College Responsibilities

GEOL 1064 - Earth Science (Course Coordinator)
GEOL 1114 - General Geology (Course Coordinator)
PHYS 2014 - Engineering Physics I
PHYS 2114 - Engineering Physics II
Physics Hiring Committee
Engineering Club Sponsor

Educational Background

1982 - M Eng, Civil Engineering, Oklahoma State University, Stillwater, OK.
1977 - A.S., Science, Oklahoma City Community College, Oklahoma City, OK.

Professional Experience

1986 - Present Professor of Physical Science, Oklahoma City Community College
1982 - 1986 Engineering Consultant

Activities and Honors

· Registered Professional Engineer in the State of Oklahoma (P.E.)
· OCCC Faculty Employee of the Year, 2006-2007

· Distinguished Service Award, Wanette Lions Club, 2003
· Board Member- Wanette Public School System, 1999 - 2006
· Board Member, South Pott. Co. Senior Citizens Center, 1997 - 2000
· Club Sponsor of the Year, Oklahoma City Community College, 1998 - 99
· Presenter, Education Commission of the States, July 1997, Providence, Rhode Island. “Integrating Technology into the Fabric of Postsecondary Education”
· Presenter, Fall 1996 and Fall 1997 League of Innovation preconference workshop “Designing Multimedia for your Students”.
· Named to “Who's Who Among America's Teachers”.
· Selected as a Primary Resource Person in “Resource to Earth Science Information in Oklahoma”, a publication by the Oklahoma Geological Survey, 1996.
· Project Director for state-wide high-school competition in the field of Meteorology. The MAPS project was funded by the National Science Foundation in 1991 and 1993. Author of materials required for MAPS project.
· Academic Advisor for National Telecourse in geology. EARTH REVEALED was funded in part through CPB and the Annenberg Foundation. Author of supplemental laboratory materials required for this telecourse.
· Chair of Physics, Chemistry and Engineering Department 1991-1994, 1996-1997
· Engineering Program Director , 2004-05
· President/Vice President /Secretary, American Society of Civil Engineers, OKC Branch, 1988-1990

4. Evidence should be presented that shows a systematic review of the curriculum is conducted regularly. This review should indicate how the general education competencies are being met:

General Education Assessment Plan

Objective:

To assess and recommend actions for the general education component of Oklahoma City Community College's curriculum.

Strategy:

The General Education Committee will create six interdisciplinary teams with embers from multiple divisions. Each team will consist of five members with two members specifically teaching in one of the General Education Core Areas. Also, at least one team member will be a representative of the General Education Committee.

Twice a year these teams will evaluate one hundred artifacts from students having attained at least 36 hours of General Education Courses from OCCC. During each Spring Semester, the reports from each team will be shared at the meeting of the whole General Education Committee and dispersed to faculty within each division. Specifically, during the Fall Semester, each team in charge of a specific Student Learning Outcome area will make curriculum recommendations to the General Education Committee. Reports, recommendations, and actions created from the General Education Assessment Process will be stored on the General Education Committee Website. Faculty members on each team will be compensated each semester.

Method:

Developed rubrics will provide common criteria for assessing “artifacts” gathered from various courses. Artifacts may include but are not limited to recorded performances, PowerPoint Presentations, essays, lab reports, research projects, service-learning projects, or any assignment preexisting in a faculty's course. However, the artifacts should adhere to the specific objectives of the Student Learning Outcomes established by the General Education component of OCCC's curriculum.

Nevertheless, the underlying principle of this method is (1) to reduce the intrusive nature of assessment within faculty courses, (2) to create a real environment of student performances within a classroom setting instead of a contrived environment of a forced examination (i.e. CAAP exams not counting for a classroom grade), and (3) to collect

Data Collection:

The Office of Institutional Effectiveness will identify each semester students completing at least 36 credit hours in General Education Courses. From this list, they will identify a random sampling of students enrolled in courses, which faculty have included “artifacts” relating to the Student Learning Outcomes measured each semester.

For example, if an outcome in Math is measured, then the following courses beyond a Math Prefix could also be used: Introduction to Logic, Business Statistics, Behavioral Statistics, Chemistry, Physics, Accounting, Physical Science, or other General Education Courses involving Math and including the objectives for the Math Student Learning Outcome. Likewise, data collection could be attained from an outcome in Writing from any course involving writing, including a scientific lab report, as long as it adheres to the objectives of the Writing Student Learning Outcome for the General Education curriculum.

The premise behind this kind of data collection (1) allows for an interdisciplinary approach to the General Education curriculum; (2) creates a shared vision of faculty collaboration beyond the microcosm of specific divisions; (3) allows for a more accurate depiction of student learning as they progress from one General Education Course to the next; and (4) creates a shared approach to improve student learning and success by reiterating General Education Skills from multiple courses.

The General Education Core

General Education at Oklahoma City Community College is an integral component of each student's experience. Every student receiving an Associate Degree (AAS, AA, or AS) must complete at least one course from each of the following areas, indicating a general understanding of that area.

I. **Human Heritage, Culture, Values, and Beliefs**

Students will demonstrate an understanding of the ideas, values, and beliefs that have shaped global communities. Specifically, students should be able to

Demonstrate understanding of basic world geography; Demonstrate familiarity with major cultural issues of selected global communities; Demonstrate knowledge of significant historical events and figures of selected global communities; and Demonstrate an understanding of ethical concerns of selected global communities.

II. Communication and Symbols

A. Students will demonstrate effective writing and public speaking skills.

For writing, students should be able to

Generate a clear, specific, and arguable thesis or dominant idea; Formulate evidence and examples to support the topic idea; Construct a logical pattern of paragraph development; and Demonstrate consistent use of correct and appropriate spelling, grammar, and word choice.

For public speaking skills, students should be able to

Demonstrate the effective use of an introduction, body, and conclusion of a formal speech; Demonstrate an audience-centered purpose that adapts to the audience, occasion, and time limit of the speech; Deliver the speech with effective eye contact relative to the use of presentational aids (when applicable) and the audience; Vary the tone of voice appropriate to the content of the speech and context of the audience; and Demonstrate appropriate attire, gestures, good posture, and meaningful body movement.

III. Social, Political, and Economic Institutions

Students will demonstrate an understanding of the function of major social institutions. Specifically, students should be able to

Analyze how political systems impact society; Analyze how economic systems impact society; Analyze how religion serves to shape the norms of a society; Analyze how education interacts with cultural values and norms; and Analyze how shifts in social institutions impact the family.

IV. Relationships in Nature and Science

Students will demonstrate critical thinking by using scientific methodology. Specifically, students should be able to

Analyze a set of data or qualitative observations using previously learned tools; Draw reasoned conclusions based on the results of the analysis; and Support conclusions logically and communicate them effectively.

Program Response to General Education Assessment Data

General Education requirements represent just over sixty percent of each Associate of Science or Associate of Arts degree, making the careful assessment of these broad competencies OCCC considers essential for all graduates very important. Provide Evidence that shows a systematic review of the curriculum is conducted regularly. This review should indicate how the general education competencies are being met.

The Engineering Program does not offer any General Education courses as part of its major's curriculum, however as stated above over 60% of the curriculum consists of general education courses. The program recognizes and supports the goals of a general liberal arts education through the use of papers, presentations and mathematically based projects and assignments that encourage critical thinking and the clear expression of ideas. The program also supports general education assessment through its close cooperation with the physics and mathematics programs. Students in engineering classes are participants in the program assessment studies done by physics and mathematics. While these assessments are done from the point of view of programs, approximately half of the majors courses in these programs (physics and mathematics) are also listed as general education courses. Curricular changes that impact these programmatic courses also impact general education at the College.

5. Provide a summary of how concerns and recommendations identified in the last program review were addressed.

Changes to the various engineering degree plans at the University of Oklahoma reduced the number of hours for engineering courses offered at OCCC that were needed at the transfer institution.

OCCC Engineering faculty and staff have worked to provide students with clear guidelines for choosing the proper engineering courses. These guidelines are posted online. Changes have also been made in the A.S. Pre-Engineering degree to allow for a broad range of engineering, math, and science courses to apply toward the degree requirements, according the the specific discipline requirements at OU.

Additionally, many engineering courses at OU that were taken by students in all disciplines were broken into discipline-specific versions of the original course. As a result, the OCCC Engineering Program has worked with OU to insure that the courses offered at OCCC will transfer for as many different versions as possible.

The Engineering Program did not have a dedicated area for students to gather and work together on projects or coursework.

The OCCC Engineering Program is now located in a new 6,000 ft^2 facility that includes: 5 offices for faculty and staff, 2 laboratories, 1 computer classroom, a commons area for students, and a 1,300 ft^2 outdoor work area. Students can now

gather in the commons area where they can work on projects and coursework together and have direct access to engineering and physics faculty.

The Engineering Program did not have tutors to help students when faculty were not available.
The OCCC Engineering Program employs 2 part-time laboratory assistants to help faculty manage laboratory activities and provide assistant to engineering students. The OCCC Engineering Program also employs 3 part-time tutors to assist engineering students with coursework.

6. Describe the strengths of the program identified through this review.

- Dedicated space where engineering students can gather and work together.
- Improved access to engineering and physics faculty.
- Facilities that enable hands-on projects and skills.
- Improved transfer to 4-year engineering programs in the area.
- Improved visibility of the OCCC Engineering Program to area highschools.
- Small class sizes.
- Flexible scheduling of courses, including evenings and summers.
- An active engineering student organization that brings speakers from engineering field to campus and provides numerous fieldtrip opportunities to engineering companies.
- A full offering of core engineering sciences.

7. Describe the concerns regarding the program that have been identified through this review.

Increased enrollment
The number of students enrolled in the Engineering Program has increased approximately 20% during the last year. Continued growth in the program may require additional course sections, which may in turn require more faculty. Additionally, there are times of the day throughout the week when the commons area is completely full of students and they are forced to work together in empty classrooms and laboratory space.

Dual-enrollment of students at OCCC and OU
Changes to the engineering curriculum at OU have resulted in discipline-specific courses being pushed down into the sophomore year. Many students planning to transfer to OU are now forced to attend both institutions for one or two semesters if they wish to maintain full-time enrollment and not delay graduation by a year or more.

8. Develop a list of recommendations for action that addresses each of the identified concerns and identify planned actions to implement recommendations.

Increased enrollment

Enrollment in program-critical course (e.g. Calculus, Physics, and the Engineering Sciences) should be monitored each semester to determine if additional sections of these courses are warranted. Since current faculty are already teaching more than the minimum required load, additional faculty (full-time or adjunct) may be needed. Total program enrollment should be monitored each year to assess the need for increased space. Administrators should be made aware of that the use of existing space is already approaching capacity at certain times.

Dual-enrollment of students at OCCC and OU

New courses may need to be created at OCCC so that dual-enrollment at both OCCC and OU isn't required during a student's sophomore year. Faculty at OU should be approached concerning the possibility of employment as adjunct professors at OCCC to provide a more diversified selection of courses for students planning to transfer to OU.

This situation also creates difficulties for students requesting financial aid and is noted in "Institutional Recommendations" below.

II. Institutional Requirements

1. Provide factual and accurate documentation which demonstrates acceptable standards of ethics in recruiting and advertising activities.

All materials provided to students are thoroughly reviewed by appropriate personnel to ensure they are factual and accurate. In addition, appropriate personnel review all recruiting and advertising activities to ensure they meet acceptable standards of ethics. Prospective students may access information about the college and its programs through the Office of Recruitment and Admissions.

Services provided by this office include campus tours, community and high school outreach, information sessions, scholarship programs and corporate recruiting. College information is provided to students through traditional means such as class schedules, catalogs, student handbooks, Recruiters Manual, and new student orientation as well as through the College website.

2. Provide recruitment and admission policies and practices reflecting that the program is available to qualified applicants and that qualified applicants will be admitted regardless of sex, race, ethnic background, religious preference, disability or any disadvantage.

Recruitment practices and activities are planned and reviewed by appropriate personnel to ensure the institution's vision, mission, and ENDS are met. Every effort is made to ensure that all qualified prospective students are contacted and provided with opportunities to be informed about College programs, services and courses and are provided with the opportunity to apply for admission to the College.

Students entering Oklahoma City Community College as a Regular Degree Seeking Student will meet the following admissions requirements:

- graduated from high school or earned a GED;
- completed the ACT, SAT or a similar acceptable battery of tests; and
- completed all high school curricular requirements.

Students who do not meet the above criteria may be admitted under one of seven Special Admission Categories outlined in the Catalog. All students who meet the above requirements or who fall into one of the special admissions categories are admitted without regard to sex, race, ethnic background, disability or disadvantage.

3. **Provide documentation that an organized, coordinated program of guidance and counseling exists. The program should foster maximum development of individual potential by providing institution-wide assistance in the choices, decisions, and adjustments that individuals must make to move through a program.**

   Faculty from each program work very closely with the Student Development Center staff. Each student is encouraged to have a counselor from Student Development as well as a faculty advisor.

   Degree sheets are available in the Student Development Center as well as in faculty advisors' offices. Students may also access degree requirements and complete an up-to-date degree audit online. Faculty advisors work closely with Student Development Counselors to minimize the number of hours unable to be counted when a student transfers to a four-year institution.

   The general philosophy and objectives of the Student Development Center include informational, relational and conceptual processing of educational planning and student goal achievement, including degree completion, articulation or personal development and apply to all students.

   The functions of Student Development are stated in the College's Policies and Procedures Manuals and in the Catalog for the benefit of all students, faculty, and staff. Student Development objectives are also outlined in the above mentioned documents.

   Counselors follow guidelines listed below in working with students. After admission to the College, a student is evaluated for placement. After the evaluation is complete, the student meets with a counselor to determine enrollment. Course selections are based on test scores, anticipated program and required courses, workload, possible transfer and past academic history. If the student expresses indecision over goals, especially for career or program choice, they explore them with a counselor in Student Development.

   When a student indicates a desire to pursue a specific program, they are referred to the appropriate faculty advisor or program director. An individual strategy is built for each student, designating courses to be enrolled in for each semester.

Counselors in the office of Student Development are available to discuss career objectives and degree programs with each student. The staff of Student Development assists all students with educational planning, career decisions, and occupational choices. Further assistance is available in conjunction with the Discover Program and the other resources of the Career Counselor.

Academic Advisement (faculty handbook)

In the course of interacting with students, it is the responsibility of faculty members to serve as academic advisors. In addition, faculty give advice on a broad range of topics and issues. The kinds of advice offered by faculty can be categorized in the following way.*

* It is important to underscore that this listing is intended to be suggestive rather than exhaustive or prescriptive.

Program Requirements

It is important for students to meet with an advisement professional to establish a Student Academic Plan (SAP). Returning students who are familiar with their degree requirements and those not seeking a degree or certificate may self advise.

Students are also encouraged to work concurrently with their faculty advisor in the academic discipline of their degree choice. A faculty advisor can help ensure that major specific educational objectives are met in an efficient, orderly fashion. If you have questions on course selection, entry-level skills required or general academic information contact Office of Academic Advising. With respect to program requirements, faculty advisement may address such things as degree planning (timing and sequencing of courses), identifying the appropriate catalog (degree plan to follow), selecting support electives, and meeting special requirements for a program or student (e.g., clinical performance, immunization, CPR).

Transfer Concerns

Relative to transfer concerns, faculty advisement may include such things as providing information on programs at area transfer institutions, information on out of state/state institutions, and transfer procedures to those institutions. It may also include evaluation of course content of major courses being transferred in for a particular major.

Career Information

Providing career information may include information about employment opportunities with various levels of education and responding to questions regarding how to select a path to follow within the field.

Referral

Referral may be done when faculty advice is sought on such matters as financial aid, transportation problems, problems with transcripts, formal degree checks, personal problems requiring counseling, graduation procedures, or any issue that the faculty member determines can be best served by others.

4. **Provide documentation that reflects accurate and complete cumulative records of educational accomplishment including**:

   a. **The number of majors (head count and FTE) in the instructional program during each of the last three years and projections for the next two years.**

Head-count (HC), credit hours (CrHrs), and full-time equivalent (FTE) by fiscal year are presented, along with projections based on linear growth projections.

Fall 2007: HC=373 CrHrs=3,607 FTE=300

Fall 2008: HC=394 CrHrs=3,780 FTE=315

Fall 2009: HC=459 CrHrs=4,603 FTE=383

Fall 2010: HC=495 CrHrs=4,993 FTE=416 (linear projection)

Fall 2011: HC=538 CrHrs=5,491 FTE=457 (linear projection)

   b. **the size of specialized (program major) classes, if any, identified as integral elements in the program during the last three years.**

A survey of 95 students enrolled in courses with the ENGR prefix (FA10) provided the following breakdown of majors:

7 - Aerospace Engineering
2 - Architectural Engineering
6 - Biomedical Engineering
1 - Chemical Engineering
4 - Civil Engineering
3 - Computer Engineering
1 - Computer Science
15 - Electrical Engineering
3 - Engineering Physics - Physics

2 - Engineering Physics - Electrical Systems
3 - Engineering Physics - Mechanical Systems
0 - Environmental Engineering
0 - Environmental Science
2 - Industrial Engineering
24 - Mechanical Engineering
18 - Petroleum Engineering
4 - Other

95 - Total

Based on these results, three majors account for 60% of the enrollment and should be primary factors in determining course offerings: Mechanical (25%), Petroleum (19%), and Electrical (16%).

c. Instructional cost, including efficiencies and improved learner outcomes achieved through the use of any technology.

Oklahoma City Community College offers online courses (computer based/ Internet) which allow students the freedom from attending regularly scheduled course meeting times while still earning college credit. Online courses are similar to traditional, on campus courses in that they have a regular class schedule, assignment due dates, and the expectation of student interaction. OCCC has committed resources for the creation of specialized resources for online students with the goal of increasing student success. These resources include a customized section of the OCCC website to assist them as they progress in their academic studies via distance and an orientation to the College's Learning Management System. We are also in the early stages of implementing virtual tutoring in the Math and Communication labs to further customize and personalize online students' education. The cost of these initiatives and efforts totals $17, 000.00. OCCC has also dedicated a specialized team of student technology support to provide assistance to students seven days a week as they work within the learning management team which costs the College $120,034.00.

As of August, 2010, all classrooms on campus requested to be multimedia classrooms will be appropriately equipped with computers and projectors for instructors to incorporate into their courses. The cost incurred with this multi-year effort is $1.22 Million. Instructors are beginning to utilize classroom response systems, slates, and SMARTBoards as part of their efforts to continue to increase student engagement with course content. The classroom technologies are part of a new effort on campus so the cost thus far has only been $15,000.00. The Center for Learning and Teaching offers multiple learning opportunities for faculty related to strategies for incorporating technology into instruction effectively as well as the use of the College's LMS, ANGEL. Faculty members are also provided multiple opportunities to increase their learning through participation in webinars on identified topics relevant to faculty's professional development goals and objectives. Data will be collected in the upcoming months on the impact of these efforts to assist with the assessment of the expenditure of funds and direct further efforts.

d. The number of FTE faculty in specialized (program major) courses within the curriculum

For FY 2008 there were 1.7 FTE faculty in the Engineering Program. In FY 2009 and FY 2010 there were 1.8 FTE Faculty in the Engineering Program.

e. Projected job market for graduates in occupational programs during the next two years.

According to the United States Department of Labor, overall engineering employment is expected to grow by 11 percent over the 2008-2018 decade, but notes that job outlook varies by specialty. Most of the employment growth is expected in R&D and consulting services. In addition to job growth, many openings will be created by the need to replace current engineers who retire.

Boeing recently announced that it will be moving 500 engineering jobs to the Oklahoma City area in 2011.

More specific job projections by engineering specialty can be found on the Bureau of Labor Statistics website. (http://www.bls.gov/oco/ocos027.htm)

f. The success of transfer students based on GPA comparisons.

OU has provided GPA comparisons for all OCCC majors transferring to OU, and for all engineering students transferring to OU from other institutions, but not for all OCCC engineering students transferring to OU.

Engineering Program faculty at OCCC have recently initiated an effort to track and survey graduates for the purpose of acquiring this information.

5. Provide documentation that a process exists to insure that cumulative records of educational accomplishment are securely and permanently maintained for every student, and transcripts are issued upon student request.

The Registrar's Office establishes an official record for each student admitted to the college. Cumulative academic records are maintained and archived in compliance with all federal and state requirements and in accordance with American Association of Collegiate Registrars and Admissions Officers (AACRAO) recommendations.

The College complies with the Federal Rights to Privacy Act of 1974, as amended, regarding record integrity, security, access, and the release of Directory Information. Transcripts are issued directly to the student upon request and at no charge.

6. **Provide evidence that a formalized and effective process to address student complaints is in place and available to students.**

   The Student Handbook describes the student grievance procedure. The Student Handbook is published annually so that changes can be made to stay current with all state and federal policies and rules.

   Also students may at any time submit questions or complaints in boxes located across campus. The Office of the Vice President for Enrollment and Student Services collects the input from these boxes and addresses the student's question or complaint. The results are given to the student, reviewed by The Leadership Council, published on a public bulletin board in the Main Building of campus, and published in the Student Services Annual Report.

7. **Provide institutional recommendations as the result of the program review and planned actions to implement recommendations.**

The Engineering Program at OCCC is in excellent health. The addition of the Engineering Lab has given students the opportunity for hand-on work rarely available for students in their first two years; and a dedicated study/work area where they (students) have access to tutoring in engineering. Faculty and staff are in regular contact with transfer institutions and work hard to ensure the transferability and relevance of course work. The majors concerns of the program are of the sort that come from success.

If enrollment continues to increase at its current rate staffing increases and additional space will be necessary. These needs will remain a high priority in SM planning in the coming years.

Our relationship with the University of Oklahoma, while robust, is complex. A majority of engineering majors will be forced to enroll at both OCCC and OU for at least one semester. Faculty and staff at both institutions have been involved in discussions aimed at solving this problem for students so that transfer is seamless. Of particular concern is how "co-enrollment" affects financial aid. Administrators and staff in Engineering and Financial Aid will follow-up on previous discussions with OU to provide financial-aid at the full-time level to those students whose total enrollment meets that requirement, even if they are enrolled only part-time at each institution.