

EASTERN OKLAHOMA STATE COLLEGE

ASSOCIATE OF SCIENCE Physical Science Program Review (036) 2023

**PREPARED FOR OKLAHOMA STATE REGENTS FOR HIGHER LEARNING
500 EDUCATION BUILDING
STATE CAPITOL COMPLEX
OKLAHOMA CITY, OKLAHOMA 73105**

Program Review Report 3.7 Academic Program Review

A thorough internal or external program review addressing all criteria in policy should be possible within a comprehensive report of ten or fewer pages. This template is provided to assist institutions in compiling the program review information, which is to be presented to the institutional governing board prior to submission to the State Regents.

Institution Name: Eastern Oklahoma State College

Program Name and State Regents Code: Physical Science, 036

List Program Options: N/A
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List Embedded Certificates included in this review: N/A
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Previous Review

Date (Year) of Last Review 2018

1. Summarize key findings from previous internal and/or external reviews of this program.

The last major review of this program in 2018 indicated that more state-of-the-art equipment, including computer hardware and software and computer-interfaced experiments would improve the program. Limited budgets previous to the last five-year review had resulted in less progress towards upgrading to modern labs than desired. This continues to be a concern, because of the shift toward computer-based measurement in all scientific arenas. At this time, the gap between the laboratory environment and current state-of-the-art equipment has been decreased, but it is not closed. We realized that it was not possible to purchase some available equipment because the cost is prohibitive, even for the limited number of experiments which can be performed in the available laboratory time in the courses offered.

2. What developments and actions have taken place since the last review?

A concerted effort to maintain progress toward fully integrated computer-based laboratories has been undertaken over the last five-year period. High-tech multimedia usage, computer simulation software, and increased usage of computers for laboratory analysis are similarly affected by limited budget, although some progress is being made in these areas as well.

A. The Chemistry I and Chemistry II laboratories on the third floor of Sullivan Hall have been renovated. A new epoxy lamination has been applied to the lab tables, and new plumbing has been installed.

B. The Chemistry II lab has acquired new computers and advanced computer-interfaced lab experiments using Vernier equipment.

C. The Physical Science Laboratory on the first floor of Sullivan Hall has obtained 13 new computers (and associated peripherals) and is in the process of upgrading the experiments with electronic sensors from Vernier.

Current Review

Date (Year) of Current Review 2023

Review Criteria (*Institutions should address each criterion of OSRHE policy 3.7.5 as directed below*).

A. Vitality of the Program:

A.1. Program Objectives and Goals:

Students successfully completing the physical science degree plan will be prepared to enter a four-year program at the junior level and will be able to do successful work at their transfer institution. Students will be expected to acquire a working knowledge of many of the applicable physical laws and develop the analytical skills required of students in the various professional programs.

Specific objectives include:

- introduction to the “language of science”, and development of communication skills, including the reporting of experimental results
- development of an understanding of the “scientific method”
- development of critical thinking skills including analysis and synthesis
- development of skills in utilizing auxiliary resources
- development of an appreciation for the use of the scientific theories and modeling methods, including the original development, testing, modification, and use in explaining observed phenomena
- development of a sense of the impact of science on society within its cultural and historical perspectives
- development of laboratory skills, including experimental design, laboratory safety, data acquisition, data analysis, evaluating the significance of, and the proper reporting of, results
- development of collateral mathematical skills, at the calculus level or beyond
- development of the personal skills for success, such as self-motivation, discipline, time management, use of resources, and personal communications
- promotion of science as a cooperative, accumulative process
- utilization of the computer to aid in data acquisition, analysis, and report preparation, and as a tool in researching data banks
- providing a solid foundation for advanced courses at the upper division.

Collateral outcomes which are desired, but for which direct methods of assessment of outcomes are not available include:

- ❖ preparing pre-professional students for the physical sciences portion of the admission examinations required of applicants to the respective professional schools

- ❖ introduction to the underlying unity and complementary of the physical universe through the study of several separate, but related, topics
- ❖ introduction to many of the various mathematical models of the physical universe, and the use of mathematical models and problem solving in real life situations and in the laboratory
- ❖ providing direct laboratory experience in measurement and experimentation relating to the subject matter discussed in lecture sessions
- ❖ providing a sense of the history of the development of science, especially the physical science.

The graduate of the physical science degree program will have achieved most of the program objectives listed above. Specifically, he or she will be able to enter upper division courses in the major field of study without any deficiencies in the prerequisite courses.

A.2. Quality Indicators (including Higher Learning Commission criteria and requirements):

The procedures for evaluating the progress of the program are continual monitoring of laboratory and classroom equipment, monitoring professional development of the instructional staff, monitoring the utilization of computer technology in classroom and laboratories, periodic examination of the progress of students in the various courses, weekly review of the homework and laboratory work assignments of the students, personal interviews with students near the completion of their program and periodic reviews of course content, delivery methods, and effectiveness. The curriculum content is continually reviewed by the instructors. This evaluation includes comparison of course content and textbooks with other instructors in the state at various professional meetings and by reviewing the newer texts available in the course. The program content is reviewed by evaluating what is expected of the student at the various transfer institutions. Additionally, an informal discussion with past students is used to gauge the effectiveness of the individual course in preparing the students for what she or he encounters at the transfer institution.

A.3. Minimum Productivity Indicators:

Time Frame (e.g.: 5-year span)	Enrollment	Graduates
2018 Fall	20	3
2019 Fall	19	1
2020 Fall	15	1
2021 Fall	11	1
2022 Fall	8	0

A.4. Other Quantitative Measures:

- a.4.a.** Number and enrollment of courses taught exclusively for the major for each of the last five years:

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<u>Course</u>	<u>Total enrollment</u>
Chemistry 1315 (General Chemistry I)	491
Chemistry 1415 (General Chemistry II)	149
Chemistry 2105 (Organic Chemistry I)	14
Chemistry 2205 (Organic Chemistry II)	10
Physics 1114 (General Physics I)	48
Physics 1214 (General Physics II)	19
Physics 2014 (Engineering Physics I)	15
Physics 2114 (Engineering Physics II)	14

a.4.b. Student credit hours by course level (i.e., 1000, 2000) generated in all major courses in the degree program for five years:

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<u>Course</u>	<u>Credit-hours</u>
Chemistry 1315 (General Chemistry I)	2455
Chemistry 1415 (General Chemistry II)	745
Chemistry 2105 (Organic Chemistry I)	70
Chemistry 2205 (Organic Chemistry II)	50
Physical Science 1124 (Astronomy)	896
Physical Science 1214 (Earth Science)	1100
Physics 1114 (General Physics I)	192
Physics 1214 (General Physics II)	76
Physics 2014 (Engineering Physics I)	60
Physics 2114 (Engineering Physics II)	56

a.4.c. Direct instructional costs for the program during the review period:

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<u>School Year</u>	<u>Chemistry</u>	<u>Physical Science</u>	<u>Program Budget</u>
2018-2019	\$6202	\$6897	\$13099
2019-2020	\$7236	\$6880	\$14116
2020-2021	\$6600	\$5897	\$12497
2021-2022	\$8250	\$7150	\$15400
2022-2023	\$9250	\$7850	\$17100

The average yearly budget for the Physical Science Program is \$14442.

a.4.d. The number of credits and credit hours generated in the program that support the general education component and other degree programs including certificates:

<u>Course</u>	<u>Total enrollment</u>	<u>Credit-hours</u>
Chemistry 1315	491	1,964
Physical Science 1114	415	1,660
Physical Science 1124	224	896
Physical Science 1214	275	1,100

- a.4.e.** If available, information about employment or advanced studies of graduates of the program over the past five years:

Not available

- a.4.f.** If available, information about the success of students from this program who transferred to other institutions:

Generally, the success of transfer students is determined by the motivation of the student. While there are only seven (7) graduates of the program during the previous five years, there has been no information received from transfer institutions to allow direct follow-up studies of student performance. Informal reporting from individuals or from family members of this program's graduates indicates generally that students' progress normally toward their objective or have obtained baccalaureate degrees.

Recommendation(s)

A. Recommendation for the Program (3.7.7.A.4):

- Maintain the program at the current level.
- Continue the program with modifications as noted below and detailed in the comment section below.
 - Expand the program
 - Reduce program in size or scope
 - Merge or consolidate program
 - Reorganize program/curricular modifications*
- Suspend program to allow an opportunity to consider recommendations detailed in the section below*
- Delete program*

**Requires a Request for Degree Program Modification and governing board approval.*

B. Specific comments regarding recommendations:

(Provide detailed recommendations for the program as a result of this thorough review and how these recommendations will be implemented, as well as the timeline for key elements. Recommendations to suspend or modify the program should include measurable goals and a timeline for monitoring the program in one-, two-, three-, or four-year increments)

Recommendations	Implementation Plan	Target Date
Increase usage of high-tech multi-media in the classroom and in laboratories.	Funds need to be provided in order to outfit all chemistry labs on the Wilburton campus and the Physical Science lab on the McAlester campus with new, state-of-the-art smartboards.	5/1/2024
It is recommended that additional funds, \$50,000 - \$60,000, be allocated for use by the Physical Science Department to continue the improvements in hardware and software suitable for use in the Physical Science laboratory settings.	Purchase lab computers, Vernier interfaces, sensors, and experimental apparatus for all Chemistry labs, Physical Science labs on the Wilburton campus, and especially for the branch campuses in McAlester and Idabel.	5/1/2026
In the chemistry laboratory, spectrophotometers, centrifuges, some precision balances, and pH meters need to be replaced to keep pace with area high schools.	Purchase said equipment with funds from Eastern's administration.	5/1/2028

Add additional rows as necessary

Department/Program Head Dr. M. Nelson

(Signature)

Date: 10/31/2023

Dean Dr. Andrea Green _____

(Signature)

Date: 10/31/2023

Chief
Academic
Officer _____ Date: [Click here to enter a date](#)
(Signature)

President _____ Date: [Click here to enter a date](#)
(Signature)