



AMERICAN ACADEMY OF FORENSIC SCIENCES

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FEPAC Form 5.2

Forensic Science Education Programs Accreditation Commission (FEPAC)

Self-Study Report

1. Name of the Institution: Penn State University

2. Mailing address: 107 Whitmore Lab
The Pennsylvania State University
University Park, PA 16802

3. Name of Forensic Science Program: The Forensic Science Program

4. Department, Division, and/or School in which the Forensic Science Program is located: Eberly College of Science

5. Name and title of Forensic Science Program Director:
Dr. Robert Shaler, Director and Professor of Biochemistry & Molecular Biology

6. Contact information for the Forensic Science Program Director:

Telephone: 814-863-6758
Fax: 814-863-8372
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7. Program information:

Number of Faculty	Current Academic Year	Previous Academic Year
Full-time	4	3
Part-time	1	1

Number of Students	Current Academic Year	Previous Academic Year
Full-time	300	220
Part-time	0	0

SECTION 1 – GENERAL STANDARDS

3.0 STANDARDS FOR ALL PROGRAMS

All undergraduate and graduate programs seeking FEPAC accreditation must meet basic requirements of eligibility.

3.1 Initial Requirements

1. **The institution offering the program is accredited by an institutional accrediting agency that is recognized by the U.S. Department of Education.**
2. **The degree awarded upon successful completion of the program is at least a bachelor's degree in either forensic science or a natural science with a concentration in forensic science.**
3. **The program seeking initial accreditation with FEPAC shall have graduated at least two classes before applying for accreditation.**

Program Response:

Description

The Forensic Science program at Penn State University is housed under the Eberly College of Science, along with other departments such as Chemistry, Physics and Biochemistry & Molecular Biology. The University and Forensic Science program meet all basic eligibility requirements for the initial accreditation assessment, as defined by FEPAC. The University was first accredited by the Middle State Commission on Higher Education in 1921, and was most recently reaffirmed on June 22, 2005. The Forensic Science program was established January 10, 2005, and the first courses were taught in the Spring semester, 2006. The degree that students receive upon successful completion of the Forensic Science program is a Bachelor of Science in Forensic Science; the first class graduated from the Forensic Science program in May, 2007 (one student), with the second class graduating in May, 2008 (thirteen students).

Penn State University is a top ranking school, with an outstanding reputation in the sciences. The University is ranked 48th out of the top 125 schools in the nation by US News & World Report, and has received a number of other awards as a leading school in higher education (<http://www.psu.edu/ur/rankings/>). As a result, the resources available to the Forensic Science program at Penn State are outstanding, and allow us to provide our graduates with an exceptional learning experience.

On-Site Evaluation Team Comments for Standard 3.1:

Standard 3.2 Planning and Evaluation

The program shall have an explicit process for evaluating and monitoring its overall efforts to fulfill its mission, goals, and objectives; for assessing its effectiveness in serving its various constituencies; for modifying the curriculum as necessary, based on the results of its evaluation activities; and for planning to achieve its mission in the future. Toward this end, the program shall conduct at regular intervals an analytical self-evaluation that responds to the FEPAC standards and includes a summary statement both of the program's strengths and weaknesses with regard to each standard and of the program's performance with respect to student achievement. The program evaluation system shall consist, at a minimum, of the following elements:

- 1. An analysis of the results of students' performance in a capstone experience; e.g., an evaluation of forensic science standardized test results, publications and/or reports,**
- 2. Exit questionnaire and interview of graduates,**
- 3. Job placement statistics, and**
- 4. Employer satisfaction surveys.**

Program Response:

Description

The Forensic Science program at Penn State University has a core mission statement, program goals, and a set of learning objectives (see section 4.1). In addition, the program's mission is consistent with the University's mission. In an effort to fulfill the mission, goals and objectives of the program, we have developed an evaluation system that will measure our effectiveness in serving our constituencies, guide the modification of the curriculum, and help to identify future activities that will assist us in achieving our mission, goals and objectives. Our system includes the analysis of individual courses and faculty through Student Rating of Teaching Effectiveness (SRTE) surveys; the analysis of student performance through a capstone experience in their Senior year; exit questionnaires of graduates; job placement tracking and statistics; and assessment of employer satisfaction surveys.

At the conclusion of each semester, students have the opportunity to give us their feedback in the form of SRTE surveys. These surveys are anonymous, and allow the students to comment on the effectiveness of each course and instructor. This information is provided to each faculty member as well as the Deans of the Eberly College of Science, so it can be used to improve particular courses or methods of teaching. The program is currently instituting an expanded assessment process to evaluate the effectiveness of each course, and how each course meets the mission, goals and learning objectives of the program. Each faculty member identifies assignments and

activities which can be used to measure their courses' effectiveness in addressing specific program learning objectives. An internal assessment committee (made up of faculty and staff) then collectively evaluates the program's effectiveness in preparing the students to be successful in their post-graduation pursuits. Modifications are made at the recommendation of the committee.

The students are evaluated on their knowledge and skills through a capstone experience (FRNSC 401). The students are evaluated by all faculty members on their competence in areas of crime scene processing and laboratory analysis, including: finding and interpreting evidence; critical thinking and their ability to distinguish between probative and non-probative evidence; making sound laboratory decisions, such as prioritization; performing analytical tests and interpreting results properly; writing reports; and testifying. The reports generated by students in the capstone course represent the current means of evaluation. However, future elements of this course will include preparation for the FSAT (Forensic Science Aptitude Test) and assessment of the results.

Information on the students' overall experiences throughout the duration of the program is collected by electronically distributing exit questionnaires to all graduating seniors. The anonymous results are compiled and distributed to program faculty and staff. These results are incorporated into program planning sessions, where the effectiveness of the courses and instruction are examined and, if necessary, used to make changes within the curriculum.

For example, the capstone course (FRNSC 401) was originally designed as an independent study experience, where teams of students were assigned a crime scene and had to make decisions on how and when to process the scene, collect the evidence, and run the laboratory tests. Upon evaluation of feedback from the students, it became apparent that the students required more structure and guidance than was originally provided, and that the amount of evidence presented to them was overwhelming. As a result, we changed the course offered in the Spring semester (2008) by providing a scene that was more defined and structured, but still demanded independent thought and scheduling by the students. While some of the students embraced the experience, there were still many students that expressed concern regarding course structure and scheduling. During our annual program assessment meeting this past May, we identified additional modifications to this class to ensure the most effective measure of the students' abilities and maintaining a level of student independence while providing them with more structure.

Job placement information is collected and stored in a Laboratory Information Management System (LIMS), which is maintained and updated by a staff assistant. Up-to-date contact information and the future plans for each graduate are collected prior to graduation, and regular attempts are made to contact alumni through a variety of means, including email correspondence. Concurrent with recent graduates starting their new careers or advanced education, job placement statistics are collected and stored in the LIMS.

As more of our students graduate and enter the workforce, we will be able to more accurately assign trends and make comparisons. In future years, job placement and employer satisfaction

data can be used to compare graduates from the Forensic Science program at Penn State to those employees who have graduated from similar programs.

The Forensic Science program, as currently structured, serves our constituencies very well. These include first and foremost, our students, but also the Eberly College of Science, Penn State University, and the State College Community. While we have described a number of ways in which we serve our students, our faculty and students are also involved in various outreach and community service activities. For example, many of our students are actively involved in the largest student-run philanthropic event in the country, Dance Marathon, which raised more than \$6.6 million in 2008 for cancer research (<http://www.thon.org/whatisthon/index.php>). (See section 4.7 for more examples of community outreach efforts.)

Analysis

The SRTE process, conducted at the end of each semester, provides valuable information about the quality of the courses we provide and the level of instruction the students are receiving. The program faculty and staff meet annually to evaluate the curriculum and make changes as necessary in accordance with the assessment data collected in the SRTEs and other sources of feedback. Exit surveys completed by graduating seniors provide more program-specific information geared towards improving how we teach and interact with our students. The student exit questionnaires have been distributed just one time, to the graduating class of 2008, therefore data is limited at this time.

Job placement statistics and employer satisfaction data are limited, as our first graduate is currently in medical school, and the most recent graduates have just begun their post-graduate careers. It is expected that we will have collected sufficient data to make a more thorough evaluation of this year's graduates by the fall semester, and in time for the FEPAC auditors to review the data.

Our newly developed assessment efforts are still in the early stages of implementation, but it is readily apparent that the additional evaluation measures will be an effective tool for how our courses and program will positively affect student performance and post-graduate success in their careers. Different methods for collecting data, and from a variety of sources, will provide a broader range of information that will be useful in our efforts to further strengthen the program. Of significant importance, a summary statement which outlines how well the program conforms to each of the FEPAC standards will be incorporated into our future evaluation processes.

Plan

The SRTE surveys can be affected by student grading and emotional factors. Therefore, an expanded assessment process has recently been implemented that will allow our program to enhance the effectiveness of our evaluation process; addressing the level at which each course is meeting program-related learning objectives. The results of this process will provide information at a higher level, allowing faculty to fine tune how each course and the entire

program are preparing students in each specific area, with the goal of providing our graduates with the tools necessary to be successful in their future endeavors.

Additional modifications to the capstone course (FRNSC 401) are planned for the upcoming semester (Fall 2008) emphasizing critical thinking at all levels of scene and laboratory processing while eliminating ineffective elements of the course. Each step in the case process will be evaluated separately, so the students get continuous feedback and suggestions from the faculty on their performance. For example, a scene will be presented to the students, which they will evaluate, make recommendations on how it should be processed, and what evidence should be collected. An oral exam will assess their abilities to justify their decisions, and their expectations regarding the consequences of those decisions. Faculty will evaluate the students on this first phase of the course before they move on to the next step of processing and prioritizing the evidence. The students will decide what evidence will be tested, which tests should be performed, and through mock exercises, how to interpret and report the findings. Formal reports will continue to be used to assess performance, and regular reading assignments will build on their foundational knowledge. Mock exercises will be used for illustration and assessment purposes to facilitate the critical thinking process. This should allow the faculty to assess the students' overall thought processes involved in crime scene investigation and laboratory analysis in a more constructive and focused manner. In addition to a final exam, students will be questioned by each faculty member in a mock testimony atmosphere where they will be required to defend their decisions and conclusions throughout the case. An expansion of the evaluation process will include adding the FSAT to the capstone experience in the Spring 2009 semester. Students will be given guidance on how to prepare for the test. The test results will be evaluated with the students prior to graduation. As a result, graduating students will be able to share their test scores with prospective employers.

Planning for how we envision the program in the future has involved input from faculty and administrators at every level, and has taken into account the mission of the University and its goal of being student-centered. As the program continues to grow, so do our needs for additional physical space (see section 3.3). This need is addressed in strategic planning documents that will assist us in fulfilling our mission and improving our program's contributions to the forensic science community.

On-Site Evaluation Team Comments for Standard 3.2:

Standard 3.3 Institutional Support

The program shall receive adequate support from the institution. Financial resources available to the program shall be sufficient to allow the program to achieve its mission, goals, and objectives. The resources should be comparable to those of other natural science programs at the institution.

Classrooms, laboratories, and other program facilities, including equipment and supplies,

shall be adequate for the size and scope of the program. Instructional and support services for the program shall also be adequate.

Program Response:

Description

The overall budget for Forensic Science program at Penn State University currently exceeds \$1,100,000 on an annual basis. Comparisons to other majors within the College of Science is difficult because many other similar programs are housed within departments with large numbers of faculty who are responsible for teaching general education courses in addition to maintaining substantial research laboratories. The Forensic Science program's main focus is on providing an education for our majoring undergraduate students. On average, the budget of the Forensic Science program, in dollars per undergraduate student, is comparable to other departments.

Classrooms are available across campus, and are assigned on a semester basis in support of course offerings. In addition, two of the dedicated laboratory facilities in the Forensic Science program have classrooms.

FRNSC 201, Principles of Crime Scene Investigation, is conducted in 2 separate Victorian houses, Spruce and Pine Cottages, which were assigned exclusively to the Forensic Science program by the University and renovated for use as "crime scene" houses. Mock crime scenes, which focus on different skill sets associated with current lecture topics, are constructed in the house, and processed by students working in teams. Spruce cottage is equipped with a state of the art audio/visual system with cameras and microphones in teaching areas of the house, with monitors and headsets in the basement so the instructor can observe and interact with several teams at once. This equipment allows faculty to record class activities, practical exams, and mock crime scenarios which can be shown to the students at the conclusion of each scene. The basements of Spruce and Pine cottages contains working laboratories in which the students can perform various tests, such as superglue fuming and fingerprint processing and other chemistries related to scene investigation. Pine cottage has been furnished with carpeted floors and brightly colored walls, to make locating and collecting evidence more challenging. The basement of Pine is equipped with a functioning laboratory in which students can perform crime scene-related research projects.

The trace evidence-related Criminalistics course (FRNSC 301) is taught in a state-of-the-art Criminalistics laboratory, which includes an audio/visual system for displaying PowerPoint lectures and videos, and a demonstration station; a total of 46 microscopes of varying types for different types of analyses (2 bullet comparison scopes, 2 fiber/hair comparison scopes, 21 stereo microscopes and 22 polarizing microscopes), and a refractometer that allows students to perform trace evidence analysis. Here, students learn how to perform forensic analyses on a variety of evidential types: glass, pattern analysis, gunshot residue, etc.

The laboratory facilities for the forensic biology classes (FRNSC 302 and 421W) are currently housed in the Thomas building. The biology laboratories consist of a main general laboratory,

an LCN (Low Copy Number) laboratory and a post-PCR laboratory. The main laboratory is where screening and processing of biological evidence occurs, and is where the FRNSC 302 and 421W laboratories are conducted. There are 8 compound microscopes and 3 stereo microscopes available, as well as a Qiagen EZ1 workstation for nucleic acid extraction, an alternate light source and Dazor lighted magnifying lens for the visualization of biological evidence. Each laboratory has dedicated pipettors and small equipment (centrifuges, heat blocks, vortexers, etc.) to reduce the risk of cross-contamination. In FRNSC 302, students are exposed to all of the most common human and non-human types of biological evidence. They learn to recognize human hair and compare it with animal hair, and to identify and confirm the presence of various forensically important human biological fluids including blood, semen and saliva.

A computer laboratory is available for use as a classroom to conduct discussion sessions, perform DNA analyses and generate reports.

An LCN laboratory is available for use by students in an advanced Forensic Molecular Biology course (FRNSC 821), where they learn how to process evidence containing small quantities of DNA; this course is also offered to advanced undergraduates. Access to this room is restricted to only those students and faculty who are performing LCN type analyses. Dead space hoods provide a location to perform evidence sampling to reduce the risk of contamination. A refrigerator is provided that is dedicated to samples and reagents used for LCN tests.

The post-PCR laboratory houses the PCR and DNA analysis equipment, and is where students in 421W complete their laboratory analysis. We currently have two AB 9700 thermal cyclers, an AB 7500 Real-Time PCR analyzer used for quantifying DNA samples, and an AB 3130xl genetic analyzer (a 16-capillary electrophoresis instrument for STR and mitochondrial DNA typing analyses). The post-PCR laboratory also has traditional electrophoresis equipment (horizontal gel boxes) for mitochondrial DNA tests.

Forensic Chemistry courses (FRNSC 227 & 427W) use facilities that are shared with the Chemistry department. This facility is directly adjacent to the criminalists laboratory so that forensic science students taking FRNSC 301 or 401 can use the instrumentation without having to walk more than a few steps. The Physical and Analytical Chemistry laboratory houses 2 FTIRs and a micro-FTIR, 5 gas chromatographs, 3 HPLC systems, 5 UV/VIS spectrophotometers, a GC/MS, laser photolysis system and Raman spectrometer for instrumental analysis. A research grade UV/VIS spectrophotometer and fluorometer are also available for performing research.

Penn State University Libraries rank among the top ten research libraries in North America. The system boasts over 5 million volumes and 68,000 journals and serials divided into 14 different subject libraries. The Paterno Life Sciences Library collections include over 300,000 volumes, 1,300 print journal subscriptions and access to over 10,000 online journals. In addition to the vast collections available at the University Park library, Interlibrary loan services provide electronic access to collections from other libraries.

The University Learning Centers provide academic support for students in multiple areas such as

technology and writing, and tutoring services in a wide range of courses, including math, physics, language and writing. Computer labs located across campus gives students convenient access to computing and printing services. The Career Services center provides students with guidance in a wide range issues, including career planning and how to select the right major, how to write a resume, tips for a successful job interview and assistance with applying for graduate schools, from researching programs online to filling out the applications. All of the services available on the campus of Penn State University provide a welcoming atmosphere for incoming students and help them to be successful academically and give them the skills and confidence they need to be successful in their future endeavors.

Analysis

While making comparisons across majors is difficult, it is evident that the financial resources made available to the Forensic Science program at Penn State University are adequate to achieve our mission, goals and objectives, and are comparable to other natural science majors within the department.

Classrooms, equipment, supplies, laboratory facilities and support services are all adequate for the current size of the undergraduate program. While the office and instructional laboratory space currently available to the Forensic Science program is substantial, much of the space is separated in different locations and provides little room for research activities.

Plan

Regarding the location and size of office and laboratory space, a strategic planning document was submitted to the Deans of the Eberly College of Science in May of 2008. While the current space is certainly adequate to support our instructional needs, we hope that future initiatives will be approved that will allow us to enhance program-related communication, expand research activities, and thus, to serve our students and faculty at the highest level.

On-Site Evaluation Team Comments for Standard 3.3:

Standard 3.4 Student Support Services

The program shall provide adequate student support services, including mentoring, academic advising, and career and placement services. The program shall also provide an environment and culture that is congruent with professional standards and behaviors.

Program Response:

Description

The Forensic Science program at Penn State University has a number of support services available for its students. Students matriculating into the University as freshmen identify an option within the intended Forensic Science major (either Biology or Chemistry) and are immediately assigned an academic and career development advisor. These advisors are subject matter experts, and faculty members within the program. For consistency and continuity purposes, the assigned advisor stays with the student throughout their undergraduate career. Advisors typically meet with each advisee at least once per semester, providing assistance with course scheduling, discussion of any updates regarding career goals, and ensuring that the students are on the “right track.” Through this active and progressive approach, students are typically better organized and have a clearer understanding of what they can do with their education.

Degree records are reviewed annually to determine whether each student is progressing positively towards the fulfillment of programs goals and objectives, and completion of the program curriculum. Advising forms have been developed to ensure that students are provided with the guidance they need to graduate in a timely manner, and with all of the requirements completed. Upon entering the Senior year, a complete audit of a student’s record is conducted, and any deficiencies identified during this process are relayed to the student.

Mentoring is not only provided by the advisors, but also by all members of the Forensic Science faculty; during courses taught by the faculty and upon request for those students seeking additional guidance. As graduation approaches, students are advised on how to identify job placement locations and services or degree programs of higher learning, and are provided with the support needed to apply for such positions.

Finally, students are provided with administrative support services through the Forensic Science program office. Two administrative support personnel and a Program Coordinator are available to assist students with administrative and general scheduling needs. As a result, it is a rare event for the program office to be closed at any point during a normal working day. This gives the students the greatest level of support from, and access to program office staff. Annual gatherings are organized by the administrative staff, including a September event to welcome in the newly matriculating students, introduce them to upper class students and provide them with tours of the Forensic Science facilities. In addition, a student-run Forensic Science Club allows students at all levels to interact and organize events; for example, a seminar series is being organized by the club members that will be held in Spring 2009.

Beyond the support services offered by the program office, students have a number of tutoring, advising and career development services available to them across the Penn State campus. Tutoring in Mathematics and Chemistry are two of the most readily used services, which assist students in completing challenging courses such as Calculus and Organic Chemistry.

Given that the majority of faculty in the Forensic Science program have at least 15 years of experience working in the forensics field, an environment and culture is naturally fostered within the program that provides students with a “real-world” understanding of their potential future profession. Professional standards of behavior and practice are taught at all levels, starting with

the Freshman Seminar course they take in their first semester, and following through to the capstone course the students take as they prepare for graduation.

Analysis

In addition to the resources provided by the program, the University's student support services, including tutoring, career placement and advising, are available to students in the Forensic Science program. These services allow the students to seek assistance in matters outside the forensic science curriculum from a wide range of experts that are present on the University's campus. Being a part of such a vast and diverse academic community is one of the strengths of our program.

Advising resources are critical to the success of a student. The University and program provide extensive opportunities for the students to request and receive help in all areas of their academic experience. While the Forensic Science program provides an assigned academic advisor to each student with extensive knowledge and experience, the individuals that provide this service are also actively engaged members of the faculty, therefore the time available for each student can be limited.

Plan

Advising demands have been addressed by hiring a new Program Assistant within the past 4 months who will support the general advising needs of students intending to major in Forensic Science; for example, scheduling and identifying student resources. This will allow the faculty advisors to focus more on career development and mentoring. The Program Assistant will also be available to support active majors as well. By keeping the advising activities within the program office, the students receive the most accurate and timely support.

On-Site Evaluation Team Comments for Standard 3.4:

Standard 3.5 Recruiting and Admissions Practices, Academic Calendars, Catalogs, Publications, Grading and Advertising

The program shall have policies and procedures for student recruitment and admissions that locate and select qualified individuals who have the educational prerequisites and the interest and motivation to pursue careers in forensic science. These policies and procedures shall identify the scientific background necessary and clearly define the expectations for admission to, continuation in, and completion of the program. In addition, the student shall be advised of the typical suitability requirements particular to employment in the field (see Section I of the TWGED report).

All statements made about the program in any promotional advertising, catalogs, or other institutional publications shall be accurate.

The program shall ensure that all students receive timely and accurate information about the academic calendar, required coursework and degree requirements, grading policies and satisfactory academic progress, and other relevant academic policies.

All application, admission, and degree-granting requirements and regulations shall be applied equitably to individual applicants and students regardless of age, sex, race, disability, religion, or national origin.

Program Response:

Description

Many of the students that arrive at Penn State contact the Eberly College of Science Outreach Office. College sponsored events provide a venue for students interested in matriculating at Penn State an opportunity to explore the various majors and programs available within the College of Science and meet with program faculty and staff.

Students interested in pursuing a degree in science can attend Spend a Summer Day or the Open House, which include an orientation to Penn State, campus tours, an information fair and a discussion panel with current students. Forensic Science faculty and staff give a presentation outlining the program to interested students and allow them to tour the facilities and ask questions about the major. Students may also make individual appointments with the program coordinator to discuss the program, and tour the laboratories and crime scene cottages.

The University's policy on equitable opportunity states: "The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity or veteran status. Discrimination or harassment against faculty, staff or students will not be tolerated at The Pennsylvania State University."

The Forensic Science program complies with the University's Nondiscrimination policy, provided in its entirety in the Supporting Documentation section.

Analysis

The reputations of Penn State University, the Eberly College of Science and the Forensic Science faculty attract students to our program. University admission requirements ensure that only the most qualified students are accepted into the University. Orientation events and regular meetings with an academic advisor provide students with information about expectations and continuous feedback on their performance in required courses. Periodic reviews ensure that students are

progressing appropriately, and advisors alert the students if any deficiencies are identified. While not all students who have a desire to pursue a career in forensic science will be successful, those with a determination to succeed and an aptitude for science will succeed with the personal attention and assistance they require to graduate with a degree in forensic science. The forensic science program conforms to the University's policy on nondiscrimination towards students, faculty and staff.

Plan

The forensic science program is in compliance with the FEPAC requirements for this standard. However, more aggressive recruiting by the program and college recruitment personnel would increase the scholastic aptitude and diversity of the students pursuing acceptance into the program, thereby enhancing the overall quality of the program.

On-Site Evaluation Team Comments for Standard 3.5:

Standard 3.6 Record of Student Complaints

The program shall have a procedure for handling student complaints. At a minimum, this procedure shall include informing students of their right to file a complaint with the institution and providing students with the institution's procedures for filing such a complaint.

The program shall maintain a record of all complaints it receives, as well as the resolution of those complaints. The program shall make this record available to members of the on-site evaluation team during the on-site visit.

Program Response:

Description

The University's policy on student complaints is included in the University Undergraduate Advising Handbook (<http://www.psu.edu/dus/handbook/>), and guidelines are provided in the Faculty Senate Policy website (<http://www.psu.edu/ufs/policies/>). The procedure for lodging a complaint may vary depending on the nature of the offense. In general, students are encouraged to resolve disputes concerning grading discrepancies or classroom behavior directly with the faculty member. Complaints that are unresolved will eventually be referred to the Dean's office. More serious complaints, i.e. concerning sexual harassment or discrimination; are handled through the Office of Human Resources (OHR). Formal complaints are recorded and maintained by HR staff assistants. Due to issues of privacy, details about the number and nature of complaints against the program cannot be released by HR personnel. However, if FEPAC auditors require information regarding complaints against the Forensic Science program, they are encouraged to contact the Office of Human Resources directly. (<http://www.science.psu.edu/hr2/HumanResourcesFolder/index.htm>)

Students who have a complaint directly relating to the educational services provided by the Forensic Science program are encouraged to express their concerns at any time to any member of the faculty and staff. Included with the SRTE surveys that students complete each semester are program-specific comment areas where students are asked their opinions on the education they've received and the quality of the faculty and courses. These comments are anonymous, and are distributed to each individual faculty member. The results of these surveys are maintained, and commonly occurring issues are addressed during annual program meetings. Other than SRTE results, no formal procedure exists to record complaints against the program.

Analysis

The University policies on disputes concerning grades and classroom behavior provide access to the Assistant Deans of the Eberly College of Science, however no formal procedure exists to track complaints at the program level. More egregious complaints are handled and recorded by OHR, however due to University policies on student privacy and confidentiality, access to these records is restricted.

Plan

Program assistants are currently working on an Undergraduate Student Handbook for Forensic Science majors. Included in this handbook will be explicit procedures for lodging a complaint, whether against a faculty or staff member, a fellow student or a program policy, and will include a procedure for tracking complaints and their resolutions. An official form will be provided on the program's website. A record of all complaints will be stored in the LIMS, in accordance with the limitations outlined in the University guidelines, and maintained for a period of at least 5 years.

On-Site Evaluation Team Comments for Standard 3.6:

Standard 3.7 Distance Learning and Other Alternative Delivery Mechanisms

FEPAC considers distance learning to be one of several acceptable forms of instructional methodology. Therefore, FEPAC does not maintain separate standards for distance learning or other alternative delivery mechanisms and expects all programs to meet the same standards for accreditation, regardless of the instructional methodology used.

FEPAC acknowledges that laboratory-based instruction is integral to any science-based discipline such as forensic science. Therefore, any program that offers at least some instruction via distance learning shall demonstrate that it includes an appropriate laboratory experience for all students.

Program Response:

The Forensic Science program at Penn State does not currently use distance learning coursework to satisfy its prescribed curriculum. However, the Deans of the Eberly College of Science have contracted a consultant to work with Dr. Shaler to develop two courses that will be available through Penn State University's World Campus. FRNSC 101 will be offered to non-majors as a general education credit, and FRNSC 201, Principles of Crime Scene Investigation, will be offered as an online course, available to students attending other campuses in the Pennsylvania State University system as well as high school students who want to obtain early college credits. This course is currently not planned as a substitute for majors course taught at University Park.

An intranet system (ANGEL) provides students with course resources (course syllabi, copies of PowerPoint lecture notes, journal articles, etc), and a way for students and instructors to communicate.

The FEPAC standards currently applied to the standard curriculum will also apply to any courses provided online. As we develop this addition to our program, we will include these courses in our assessment process to ensure that these students are provided with the same high-quality education as those enrolled in the traditional classroom based courses.

On-Site Evaluation Team Comments for Standard 3.7:

SECTION 2 – STANDARDS FOR UNDERGRADUATE PROGRAM

NOTE: This section is to be filled out **only** if the program seeking accreditation leads to the **baccalaureate degree**.

4.0 UNDERGRADUATE PROGRAM STANDARDS

An undergraduate forensic science program shall provide a basic foundation in the scientific and laboratory problem-solving skills necessary for success in a modern forensic laboratory. Such a program shall combine rigorous scientific and laboratory training with exposure to the breadth of forensic science disciplines, including forensic science practice, law enforcement, and ethics.

Standard 4.1 Mission, Goals and Objectives

The undergraduate forensic science program shall have a clearly formulated mission with well-defined supporting goals and educational objectives. The mission shall be appropriate to the institution and consistent with the goals and objectives of the forensic science community to produce a technically skilled and educated workforce. The goals and objectives shall be clearly specified, consistent with the mission, and appropriate in light of the degree(s) awarded.

The undergraduate forensic science degree should not necessarily be viewed as a terminal

degree but instead can provide preparation for a variety of graduate and professional degrees including clinical and analytical chemistry, medicine, law, and biomedical research and advanced degrees in forensic science.

Program Response:

Description

Mission Statement: The mission of the Forensic Science Program is to provide students with an intensive holistic criminalistics experience within a rich educational environment through a combination of the didactic, vocational, and practical approach to forensic science education that will enable students to reach the highest levels of intellectual achievement and personal growth.

Program Goals: The Forensic Science program will provide students with a strong foundation in criminalistics philosophy through intensive scientific and laboratory problem-solving skills that are necessary for their success in forensic laboratory careers or graduate-level academic settings.

Learning Objectives:

1. Students will develop an understanding of the scientific principles of crime scene investigation and reconstruction, including evidence collection and preservation.
2. Students will receive intensive hands-on training in forensic laboratory methodologies with respect to the analysis of evidence.
3. Students will develop written communication skills for presentation of their findings in accordance with established professional guidelines.
4. Students will develop oral communication skills for discussing the scientific method in a laboratory setting and effectively testifying in a court of law.
5. Students will develop an understanding of the importance of the interaction between law enforcement, scientists and the legal profession.
6. Students will develop an understanding of the importance of professionalism and ethical behavior in the forensic science community.

The forensic science program is continuously striving to produce the most qualified and well-trained forensic scientists to enhance the quality of the forensic science community and make contributions of their own to the field of forensic science in academic, practical and basic science realms. Our annual program assessment meeting considers all aspects of our educational process and evaluates where improvements are needed, or in what ways changes in the demands of the professional community may effect changes in our educational objectives. As we gather data regarding the successes of our graduates and the impact they have on the community as a whole, we will identify weaknesses and make the necessary changes to our mission, goals or objectives. These changes will then be reflected throughout the curriculum through course requirements or topics included or excluded from course content.

Analysis

The program goals and objectives are in accordance with those identified by the university. The University strives to enrich the lives of the people of the Commonwealth through high-quality teaching, research and service. All of the goals of the Forensic Science program center around producing the most qualified graduates who impact the community as a whole, and enriching the local and global professional communities by providing opportunities for continuing education and professional development. The mission, goals and objectives of the Forensic Science program contribute to the University's efforts to fulfill its mission.

Plan

Any weaknesses identified in the program goals and objectives during assessment reviews are assessed annually by program faculty and staff. Any subsequent amendment of the goals and/or objectives will be geared towards more effectively addressing our overall mission.

On-Site Evaluation Team Comments for Standard 4.1:

Standard 4.2 Undergraduate Admission Requirements

At a minimum, a high school diploma or GED shall be required for admission into a forensic science undergraduate program. Additionally, a program shall be in place to assist and advise entering students to ensure that they have the requisite background in science and mathematics for success in the degree.

Program Response:

Description

Admission to a Penn State University baccalaureate program requires, at minimum, a high school diploma or GED and the following credits:

- Four units in English, including one in composition and one in literature
- Five units in any combination of foreign language, social studies, arts, and humanities
- Three units of science (preparation in Physics and Chemistry is required for admission into the College of Science)
- Three units of mathematics (four are recommended), from any combination of algebra, geometry and trigonometry (at least one-half unit from trigonometry or higher is required for admission into the College of Science)

Admission to the University Park campus of Penn State University, and a major within the Eberly College of Science, is dependent upon the following additional requirements:

- High School GPA of 3.57 or higher
- Combined SAT score of 1180-1350
- Composite ACT score of 26-30

Acceptance into the Forensic Science major requires the successful completion of Calculus I & II, General Chemistry I & II, and Chemistry Laboratory I.

The University's First-Year Testing, Counseling and Advising Program (FTCAP) provides a student with an initial evaluation of their academic proficiencies, and provides a system of advising and counseling services that help orient the students to college life and the expectations of the university. All entering freshman are required to take the FTCAP test prior to arriving on campus. This exam is used to evaluate a student's level of academic preparedness in the areas of math, English and chemistry, and is used by advisors to place the students in the correct freshman level classes. Students who express an interest in majoring in Forensic Science meet with the program's undergraduate advisor, who assists them with registration and answers any questions they may have about their schedule or the requirements for the major.

Analysis

Penn State University is a nationally ranked university and acceptance into the Eberly College of Science is very competitive. The Department of Undergraduate Studies and the Advising Centers for the College of Science are dedicated to recruiting the most qualified high school seniors and providing them with the assistance they need to identify their interests and aptitudes and register for the correct courses. FTCAP provides a first level screening that helps eliminate academic problems late during their first semester. Academic advisors perform regular audits to ensure that students are progressing satisfactorily, and have not encountered any major problems. Academic difficulties can be remedied by scheduling tutors through the learning centers, or meeting with individual faculty members for assistance with specific topics. These evaluation measures ensure that the program is recruiting and retaining qualified students. The retention rate for the graduating class of 2008 was 93%. This was based on the students that had enrolled in and successfully completed FRNSC 201, 301 and 302. (The initial graduating class was 1 student, therefore the rate of completion was 100% for that class.)

Plan

The Forensic Science program meets the FEPAC requirements for this standard. Retention and failure data will continue to be collected and used to regularly assess our admissions requirements. Currently, no plan is needed.

On-Site Evaluation Team Comments for Standard 4.2:

Standard 4.3.1 General Curriculum Requirements

The undergraduate program in forensic science shall offer a coherent curriculum that reflects the mission and goals of the program and provides the student with the appropriate skills requisite for the bachelor's degree.

The curriculum shall, at a minimum, ensure that each student:

- 1. Obtains a thorough grounding in the natural sciences,**
- 2. Builds upon this background by taking a series of more advanced science classes, and,**
- 3. Develops, through course work and laboratory-based instruction, an appreciation of issues specific to forensic science,**

The program shall have clear procedures for assessing and documenting each student's progress toward fulfillment of these objectives.

Program Response:

Description

The first two years for a student hoping to obtain a Bachelor's degree in Forensic Science at Penn State University are focused on fulfilling many of the general education requirements of the University, and ensuring that the student receives a solid foundation in science and math. These two years are similar for both chemistry and biology option students. Typically, beginning in the Fall semester of their Junior or the second semester of their Sophomore year, students who have been accepted into the major begin taking the forensic science specific classes, as well as more advanced courses in biology or chemistry. In addition to the criminalistics courses required by the program, students have the opportunity to take electives corresponding to their interests in forensic specialty areas, or in the arts and humanities. A student's Senior year is typically focused on upper-level forensic biology or forensic chemistry courses that include rigorous laboratory instruction and hands-on, practical application and the capstone course, FRNSC 401. Also in the Senior year, students take a journal club, which familiarizes them with how to read and critique peer-reviewed journal articles and present the information in a formalized setting, and a course focusing on expert testimony.

Analysis

The curriculum within the Forensic Science program provides rigorous scientific training which builds upon a solid foundation in the natural sciences that the students receive in their first two years. The program has been developed in such a way that all students, both chemistry and biology track, receive a well-rounded and diversified education that will allow them to pursue a career in a crime laboratory, law enforcement or other position within the legal community, or to continue their education in a graduate level or professional degree program, including medical, dental or law school. The forensic science specific courses give the students not only the knowledge they need, but also the confidence in their abilities as forensic scientists that only hands-on experience can provide. The introductory level courses prepare students, intellectually and practically, for the challenges and demands of the upper level forensic science courses. Students' academic experience is rounded out with courses which focus on the nuances of the forensic science profession, such as the capstone course, journal clubs, testimony and ethics.

Degree records are reviewed annually to determine whether each student is progressing positively towards the fulfillment of programs goals and objectives, and completion of the program curriculum. Advising forms have been developed to ensure that students are provided with the guidance they need to graduate in a timely manner, and will all of the requirements completed. Upon entering the Senior year, a complete audit of a student's records is conducted, and any deficiencies identified during this process are relayed to the student.

The rigor and thoroughness of the Forensic Science curriculum is one of the many strengths of our program. Given the young nature of the program, it is difficult to identify additional weaknesses to the program that have not already been discussed in previous sections of this document.

Plan

The program annually reviews and improves the forensic science courses, and provides feedback on those courses taught by other programs and colleges across the campus. Inadequacies in the preparation of students entering the major are addressed through amendments to the prerequisites outlined by the program as well as improvements to the teaching techniques and/or content of our courses.

On-Site Evaluation Team Comments for Standard 4.3.1:

Standard 4.3.2 Specific Curriculum Requirements

The specific curricular requirements that follow are based on the fact that most forensic scientists work in areas such as drug analysis, trace analysis, firearms and toolmarks, and forensic biology. Students seeking to work in alternative areas of forensic science such as computer analysis or crime scene reconstruction will require other curricula or further training.

Because certain forensic science disciplines require more rigorous coursework than the minimum described below, particularly more biology and chemistry, the program shall ensure that its curriculum is adequate to prepare students for specialization in subdisciplines of forensic science such as forensic biology, forensic chemistry, toxicology, or pattern evidence examination. Table 1: Example Curricula for Forensic Science Undergraduate degrees in the TWGED report provides sample curricula.

The curriculum shall include the following minimum components:

4.3.2.1. Natural Science Core Courses

Biology: at least one course, which includes an associated laboratory, in biology for science majors (4 semester hours).

Physics: at least two courses, each of which includes an associated laboratory, in physics for science majors (8 semester hours). Note: Calculus-based physics is preferred but not required.

Chemistry: at least four courses, each of which includes an associated laboratory. Two of the courses shall be in general chemistry for science majors (8 semester hours), and two shall be in organic chemistry for science majors (8 semester hours).

Mathematics: at least one course in differential and integral calculus (3 semester hours) and at least one course in statistics (3 semester hours).

Program Response:

Description

Forensic Science, Biology Track (36 credits)-

Biology (5 credits): MICRO 201, Introductory Microbiology, 3 credits; MICRO 202, Introductory Microbiology Laboratory, 2 credits

Physics (8 credits): PHYS 211, General Physics: Mechanics (calculus based), 4 credits, and PHYS 212 General Physics: Electricity and Magnetism (calculus based), 4 credits; or PHYS 250/251, Introductory Physics I & II, (non calculus based), 4 credits each (8 total credits)

Chemistry (16 credits): CHEM 110, Chemical Principles I, 3 credits; CHEM 111, Experimental Chemistry I, 1 credit; CHEM 112, Chemical Principles II, 3 credits; CHEM 113, Experimental Chemistry II, 1 credit; CHEM 210, Organic Chemistry I, 3 credits; CHEM 212 Organic Chemistry II, 3 credits; CHEM 213, Laboratory in Organic Chemistry, 2 credits

Mathematics (7 credits): MATH 140, Calculus with Analytic Geometry I, 4 credits; STAT 250, Introduction to Biostatistics, 3 credits

Forensic Science, Chemistry Track (35 credits)-

Biology (4 credits): BIOL 110, Biology: Basic Concepts and Biodiversity (includes a lab)

Physics (8 credits): PHYS 211, General Physics: Mechanics (calculus based), 4 credits, and PHYS 212 General Physics: Electricity and Magnetism (calculus based), 4 credits; or PHYS 250/251, Introductory Physics I & II, (non calculus based), 4 credits each (8 total credits)

Chemistry (16 credits): CHEM 110, Chemical Principles I, 3 credits; CHEM 111, Experimental Chemistry I, 1 credit; CHEM 112, Chemical Principles II, 3 credits; CHEM 113, Experimental Chemistry II, 1 credit; CHEM 210, Organic Chemistry I, 3

credits; CHEM 212 Organic Chemistry II, 3 credits; CHEM 213, Laboratory in Organic Chemistry, 2 credits

Mathematics (7 credits): MATH 140, Calculus with Analytic Geometry I, 4 credits; STAT 250, Introduction to Biostatistics, 3 credits

Analysis

The Forensic Science program meets, or exceeds, all the FEPAC requirements for this standard in the number of credit hours required and the course content.

Plan

No plan needed.

On-Site Evaluation Team Comments for Standard 4.3.2.1:

4.3.2.2. Specialized Science Courses

A minimum of 12 additional semester hours in more advanced coursework in chemistry or biology. Note: These classes shall be consistent with the degree program and shall meet the needs of students specializing in subdisciplines of forensic science. At least two of the classes shall include laboratory training. A suggested list of classes that satisfy this requirement may be found in the TWGED report.

Program Response:

Description

Forensic Science, Biology Track- (16 credits)

Genetics: BIOL 222, Genetics, 3 credits

Molecular & Cell Biology: BMB 251, Molecular and Cell Biology I, 3 credits

Biochemistry: BMB 342, Laboratory in Proteins, Nucleic Acids and Molecular Cloning, 3 credits (includes lab)

Calculus II: MATH 141, Calculus with Analytic Geometry II, 4 credits

Forensic Biology: FRNSC 302, Criminalistics IB, 3 credits (includes lab)

Forensic Science, Chemistry Track- (15 credits)

Cell Biology: BIOL 230W, Biology: Molecules and Cells, 4 credits (includes lab)

Analytical Chemistry: CHEM 227, Analytical Chemistry, 4 credits (includes lab)

Calculus II: MATH 141, Calculus with Analytic Geometry II, 4 credits

Instrumental Analysis: CHEM 423, Chemical Spectroscopy, 3 credits (includes lab);
or CHEM 425, Chromatography and Electrochemistry, 3 credits (includes lab)

Analysis

The Forensic Science program meets, or exceeds, all the FEPAC requirements for this standard in the number of credit hours required and the course content.

Plan

No plan needed.

On-Site Evaluation Team Comments for Standard 4.3.2.2:

4.3.2.3. Forensic Science Courses

A minimum of 15 semester hours in forensic science coursework that covers the following topics: courtroom testimony; introduction to law; quality assurance; ethics, professional practice, background; evidence identification, collection, processing; and a survey of forensic science.

Of these 15 hours, 9 semester hours shall involve classes in forensic chemistry, forensic biology, physical methods, or microscopy that contain a laboratory component. Internships or independent study/research courses may be used to fulfill up to 6 hours of this laboratory requirement.

Program Response:

Description

Forensic Science, Biology Track- (23 credits)

FRNSC 201W, Principles of Crime Scene Investigation, 4 credits (includes lab)

FRNSC 301, Criminalistics IA, 3 credits (includes lab)

FRNSC 400, Courtroom Proceedings and Testimony, 1 credit

FRNSC 401W, Criminalistics III, Advanced Analysis and Crime Scene Investigation,

4 credits (includes lab)

FRNSC 421W, Forensic Molecular Biology, 3 credits (includes lab)

FRNSC 475, Forensic Science Seminar, 1 credit

CRIM 100, Introduction to Criminal Justice, 3 credits or CRIM 113, Introduction to Law, 3 credits

CRIM 312, Introduction to Forensic Science in the Criminal Justice System, 3 credits

Forensic Science, Chemistry Track- (26 credits)

FRNSC 201W, Principles of Crime Scene Investigation, 4 credits (includes lab)

FRNSC 301, Criminalistics IA, 3 credits (includes lab)

FRNSC 302, Criminalistics IB, 3 credits (includes lab)

FRNSC 400, Courtroom Proceedings and Testimony, 1 credit

FRNSC 401W, Criminalistics III, Advanced Analysis and Crime Scene Investigation, 4 credits (includes lab)

FRNSC 427W, Forensic Chemistry, 4 credits (includes lab)

FRNSC 475, Forensic Science Seminar, 1 credit

CRIM 100, Introduction to Criminal Justice, 3 credits OR CRIM 113, Introduction to Law, 3 credits

CRIM 312, Introduction to Forensic Science in the Criminal Justice System, 3 credits

Analysis

The Forensic Science Program meets or exceeds the FEPAC requirements for this standard in the number of credit hours required and course content.

Plan

No plan needed.

On-Site Evaluation Team Comments for Standard 4.3.2.3:

4.3.2.4. Additional Courses

A minimum of 19 additional semester hours in courses that provide greater depth in the student's area of specialization. Table 1: Example Curricula for Forensic Science Undergraduate degrees in the NIJ Report (June 2004) provides sample courses.

Program Response:

Description

Forensic Science, Biology Track- (21 credits)

BMB 400, Molecular Biology of the Gene, 3 credits

BMB 401, General Biochemistry, 3 credits

15 credits from the following available courses:

- BMB 402, General Biochemistry II, 3 credits
- BMB 428, Physical Chemistry with Biological Applications, 3 credits
- BMB 433, Molecular and Cellular Toxicology, 3 credits
- BIOL 405, Molecular Evolution, 3 credits
- BIOL 422W, Advanced Genetics, 3 credits
- BIOL 460, Human Genetics, 3 credits
- ANTH 411, Skeletal Forensic Anthropology, 3 credits
- ANTH 413, Molecular Forensic Anthropology, 3 credits
- BB H 440, Principles of Epidemiology, 3 credits
- BIOL 428, Population Genetics, 3 credits
- BIOL 472, Mammalian Physiology, 3 credits
- ENT 313, Introduction to Entomology, 3 credits
- FRNSC 427W, Forensic Chemistry, 4 credits
- FRNSC 496, Independent Research, 3-4 credits (No syllabus)
- MICRB 410, Principles of Immunology, 3 credits
- CHEM 227, Analytical Chemistry, 4 credits
- CRIM 100, Introduction to Criminal Justice, 3 credits
- CRIM 113, Introduction to Law, 3 credits
- CRIM 421, Violent Crime, 3 credits
- CRIM 423, Sexual and Domestic Violence, 3 credits
- CRIM 425, Organized Crime, 3 credits

Forensic Science, Chemistry Track- (24 credits)

CHEM 450, Physical Chemistry-Thermodynamics, 3 credits

21 credits from the following available courses:

- CHEM 402, Chemistry in the Environment, 3 credits

- CHEM 410, Inorganic Chemistry, 3 credits
- CHEM 412, Transition Metal Chemistry, 3 credits
- CHEM 430, Structural Analysis of Organic Compounds, 3 credits
- CHEM 431W, Organic and Inorganic Preparations, 3 credits
- CHEM 450, Physical Chemistry I, 3 credits
- CHEM 452, Physical Chemistry II, 3 credits
- CHEM 457, Experimental Physical Chemistry, 3 credits
- ANTH 411, Skeletal Forensic Anthropology, 3 credits
- ANTH 413, Molecular Forensic Anthropology, 3 credits
- CRIM 100, Introduction to Criminal Justice, 3 credits
- CRIM 113, Introduction to Law
- CRIM 421, Violent Crime, 3 credits
- BMB 342, Protein and Nucleic Acids Laboratory, 3 credits
- BMB 428, Physical Chemistry with Biological Applications, 3 credits
- BMB 400, Molecular Biology of the Gene, 3 credits
- BMB 401, General Biochemistry I, 2 credits
- BB H 440, Principles of Epidemiology, 3 credits
- ENT 313/315, Introduction to Entomology, 3 credits
- FRNSC 421W, Forensic Molecular Biology, 3 credits
- FRNSC 496, Independent Research, 1-3 credits (No syllabus)

Analysis

The Forensic Science Program meets or exceeds the FEPAC requirements for this standard in the number of credit hours required and course content.

Plan

No plan needed.

On-Site Evaluation Team Comments for Standard 4.3.2.4:

Standard 4.4 Program Director

The program director shall be full-time and appropriately qualified to provide leadership in forensic science education, research, and scholarly activities so that students are adequately prepared for forensic science practice.

Program Response:

Description

Dr. Robert C. Shaler is the Director of the Forensic Science program. Dr. Shaler received his

Bachelor of Arts degree in Chemistry from Franklin and Marshall College and his Master's and Doctorate degrees in Biochemistry from Penn State University. Dr. Shaler did postdoctoral work at the University of Pittsburgh School of Medicine with Dr. Kivie Moldave. After several years of teaching and performing forensic science related research, Dr. Shaler accepted the position of Director of Forensic Science for Aerospace Corporation in 1977. Since that time, Dr. Shaler has served as the Director for numerous programs and departments, including Director of Serology and Director of Forensic Biology for the Office of Chief Medical Examiner in New York and Director of Forensic Science for Lifecodes Corporation. In addition to his experience in managing Forensic Science departments, he has served as instructor, professor and adjunct professor for numerous universities and colleges across the eastern region of the United States. He is currently a member of the National Academies' National Research Council committee on "Identifying the Needs of the Forensic Community."

Dr. Shaler has his own consulting firm, where he uses his expertise to assist crime labs, law enforcement agencies and law firms in evaluating crime scene evidence, assisting with quality control issues or establishing procedures for the use of DNA in crime scene analysis and the identification of human remains. In addition to his vast professional experience, Dr. Shaler has an impressive list of scholarly honors and activities, including serving on the editorial boards of American Journal of Forensic Pathology and Medicine, New England Journal of Medicine, Journal of Forensic Sciences and Forensic Science Review, being elected or appointed to numerous professional committees and academies and being invited to speak to professional symposia or conferences attended by respected practitioners in the field of forensic science.

Dr. Shaler's sole appointment at Penn State University is as Director of the Forensic Science Program and Professor of Biochemistry and Molecular Biology, and he devotes 100% of his professional time to official program activities and forensic teaching responsibilities.

Analysis

The Forensic Science Program meets or exceeds the FEPAC requirements for this standard.

Plan

No plan needed.

On-Site Evaluation Team Comments for Standard 4.4:

Standard 4.5 Faculty

The faculty shall be able to fully support the program's mission, goals and objectives. Specifically, faculty members and other instructional personnel shall be appropriately qualified, by education and experience, and adequate in number to implement the instructional program. In addition, the number of faculty members shall be sufficient to ensure the offering, on a regular basis, of the full range of courses needed for the degree

program.

At least 75 percent of the full-time science faculty teaching in the undergraduate forensic science program shall have an appropriate doctoral degree; faculty members with working experience in a forensic science laboratory are preferred.

The scientific and educational capabilities of the faculty should be distributed over the major areas of the program.

Full-time faculty members shall oversee all coursework and ensure its applicability to the program's mission, goals, and objectives.

The program shall have well-defined policies and procedures to recruit, appoint, and promote qualified faculty, to evaluate the competence and performance of faculty, and to support the professional development and advancement of faculty.

Program Response:

Description

The Forensic Science program started in the Fall semester of 2005 with 2 full-time faculty members, Dr. Robert Shaler and Dr. Mitchell Holland, and 1 half-time faculty, Dr. Dan Sykes. These three founding faculty members are responsible for the development of the program and recruiting additional faculty. In addition to the development of the overall undergraduate degree program, each faculty member developed their own courses that they would teach in the upcoming Spring and Fall semesters. Dr. Shaler developed the introductory-level Crime Scene Investigation course (FRNSC 201W), Dr. Holland developed FRNSC 421W, Forensic Molecular Biology, and Dr. Sykes developed FRNSC 427W, Forensic Chemistry, all taught for the first time in the Spring of 2006. In addition, the faculty team-taught the first year seminar course (PSU 016) for the first time in the Spring of 2006.

Dr. Holland received his Bachelor of Science in Chemistry from Hobart College and his Ph.D. in Biochemistry from the University of Maryland. He went on to do a post-doctoral fellowship at Johns Hopkins University Hospital in human genetics. He is a nationally renowned forensic DNA scientist, and has gained his extensive experience serving as Scientific Laboratory Director for the Armed Forces DNA Identification Laboratory and as Senior VP of Operations and Laboratory Director of the Bode Laboratory Group. Dr. Holland's prior teaching experience includes serving as an adjunct assistant professor for University of Maryland and Associate Professorial Lecturer in Forensic Sciences for George Washington University. In addition to the Forensic Molecular Biology courses (FRNSC 421W and 821), Dr. Holland teaches BMB 400, Molecular Biology of the Gene, a prerequisite for Forensic Molecular Biology; FRNSC 400, Courtroom Proceedings and Testimony; and assists teaching the FRNSC 401 capstone course, PSU 016 and FRNSC 475 (undergraduate journal club). Dr. Holland also serves as the advisor for Forensic Biology Option students.

Dr. Dan Sykes received his Bachelor of Science degree in Geochemistry from University of Oregon and his Ph.D. in Geochemistry from University of Alberta. He joined the Chemistry Department at Penn State in 2001 and serves as the Director of the Analytical/Physical Instructional Laboratories. Dr. Sykes joined the Forensic Science program at its inception in 2005 as a half-time faculty member. He is currently the instructor for the Forensic Chemistry courses (FRNSC 227 and 427) and the advisor for the Forensic Science Chemistry Option students. Dr. Sykes also assists with the FRNSC 401 capstone course. Dr. Sykes, the program's only part-time faculty member, shares his time with the Chemistry Department. Dr. Sykes has played a role in the initial development of the program, and has provided guidance in the areas of University and College policies, student advising and assessment.

In the summer of 2006, Ralph Ristenbatt was recruited to develop and teach FRNSC 301, Criminalistics IA, first taught in the Fall of 2006. This course focuses primarily on microscopy techniques and microscopic and chemical analysis of trace evidence, and includes evidence identification and processing, note taking and maintaining chain of custody. Mr. Ristenbatt obtained his Bachelor of Science degree in Biochemistry from Lebanon Valley College and his Masters of Science in Forensic Science from John Jay College of Criminal Justice/CUNY. He worked as a criminalist for more than 16 years for the Office of Chief Medical Examiner in New York City. His expertise ranges from crime/incident reconstruction, expert testimony, evidence collection, bloodstain pattern analysis, and forensic photography. He also has prior experience with serological and DNA testing. Mr. Ristenbatt's prior teaching experience includes an adjunct lecturer position at the John Jay College of Criminal Justice. In addition to FRNSC 301, Mr. Ristenbatt has taught FRNSC 475, the undergraduate journal club, PSU 016, the freshman seminar course, and assists with the FRNSC 401 capstone course. He will be teaching PSU 016 again this coming semester.

In the summer of 2007, Dr. Reena Roy joined the program to develop and teach FRNSC 302, Criminalistics IB, Forensic Biology, first taught in the Fall of 2007. This course focuses on the collection, processing and analysis of biological evidence. Dr. Roy obtained her Masters of Science degree in Zoology and Physiology and her Ph.D. in Life Sciences from the University of Nebraska. Dr. Roy began her career as the Forensic Biologist, Criminalist and Supervisor for the biology section of the Nebraska State Patrol, where she worked for 15 years. During this time, she enhanced her level of expertise serving as a Research Scientist in the Molecular Biology, Research and Development Department at Li-Cor company in Nebraska. Prior to coming to Penn State she was the DNA Technical Leader for the St. Louis County Crime Laboratory for 8 years, where she implemented the DNA analysis program. Dr. Roy's previous teaching experience includes teaching forensic biology to Master's students as an Adjunct Professor at Nebraska Wesleyan University and serving as an adjunct faculty member for Southeast Community College in Lincoln, Nebraska. In addition to teaching FRNSC 302, Dr. Roy assists with the FRNSC 401 capstone course, and will be teaching PSU 016 this semester.

Annual SRTE surveys and graduate exit questionnaires are used to collect data from students on the effectiveness of the faculty in teaching students the critical skills necessary to be successful forensic scientists. The results from these surveys are anonymous, and are distributed to faculty so that each can evaluate the effectiveness of their own courses and teaching methods. Program

assessment measures are also used to determine how effective each course and instructor are at fulfilling each of the learning goals and objectives outlined by the program.

The recruitment, appointment, and promotion of qualified faculty are conducted in accordance with University policy (see the supporting documentation). Once in place, the competence and performance of faculty are evaluated on a per semester and annual basis. The professional development and advancement of faculty is fully supported by the Eberly College of Science, and is formally documented at the end of each session; Fall, Spring and Summer.

Analysis

The faculty members within the Forensic Science program at Penn State University are the greatest strength of the program. They are able to fully support the program's mission, goals and objectives, are appropriately qualified, and are adequate in number to ensure the offering of all undergraduate courses needed for the degree program on a regular basis.

The extensive, previous experience of the faculty allows them to teach both the science and the practical application of the science from a knowledgeable perspective. More than 85% of our faculty has had at least 10-15 years of experience in the fields of crime scene investigation, criminalistics, forensic biology, forensic DNA, and/or forensic chemistry, and has presented forensic findings in courts of law in many thousands of cases. This level of experience provides the students with an environment that will benefit them enormously as they prepare to enter the field of forensics.

The current program supports both biology and chemistry option students. Of the 4.5 core faculty, two are focused on biology, one-half is focused on chemistry, one is focused on non-biological criminalistics, and one is focused on crime scene investigation. Based on the backgrounds of our faculty, it is clear that we are very strong in biology, and would benefit from expansion of the faculty in support of the chemistry option students.

Plan

A chemistry faculty position has been approved in the budget for the 2009/2010 academic year. As a result, a faculty recruitment search will be initiated in the Fall semester of 2008, in an effort to fill this position and address the emerging needs of the program.

On-Site Evaluation Team Comments for Standard 4.5:

Standard 4.6 Success with respect to student achievement

The program shall demonstrate that its graduates have a basic foundation in the scientific and laboratory problem solving skills necessary for success in a modern crime laboratory. The program may do this through the use of a formal, objective tool (such as the ABC-

Affiliate pre-certification process) or another appropriate pre-graduation assessment.

The program shall also document its record of student performance, as measured by degree completion rates, job placement rates, and any additional outcome measures the program may use to assess student progress and achievement. These records shall be maintained for at least five years after student graduation.

Program Response:

Description

The Forensic Science program at Penn State University produces graduates that have a strong foundation in the scientific and laboratory problem solving skills necessary for success in a modern crime laboratory. The curriculum includes courses that provide a solid foundation in math and the sciences, forensic science courses that are comprehensive, aggressive and hands-on, and a capstone experience that is designed to strengthen accumulated knowledge, expand problem solving skills, and assess competence prior to graduation. In the near future, the FSAT will be used as an additional measure of forensic science knowledge and abilities through a standardized testing format. This will allow for internal student comparisons, and for comparison of Penn State student performance to students from other forensic science programs.

The post-graduate performance of our students will be documented in a variety of ways; e.g., acceptance to academic institutions of higher learning, job placement rates, job performance (as measured through employer surveys), and long-term placement in forensic science laboratories and fields of study. Given that our approach is to produce scientists first, and forensic scientists second, we expect that a relatively large percentage of our students will attend institutions of higher learning; e.g., medical and dentals schools, and graduate schools. To date, fourteen students have graduated from the program. Of those fourteen, 4 have accepted positions performing laboratory analysis or research (28.6%) and 6 have entered post-baccalaureate degree programs (42.9%). The remaining 4 are awaiting offers from law enforcement agencies.

Analysis

The limited history of the program does not allow us to graphically illustrate trends at this time. However, based on the success of our graduates in securing jobs and being accepted to institutions of higher learning, the initial data are very positive. Job placement and employer satisfaction data will continue to be collected, and used as a measure of program effectiveness. A list of the graduates and their current jobs or academic institutions is provided.

Plan

We have the mechanisms and support in place to track the activity of our graduates, allowing us to evaluate the success of our program in producing scientists and forensic scientists. All future evaluation processes will include assessment of FEPAC requirements.

On-Site Evaluation Team Comments for Standard 4.6:

Standard 4.7 Professional Involvement

The program shall provide service to the forensic science profession and to the community through some combination of communication, collaboration, consultation, technical assistance, continuing education programs, and any other means it may have for sharing the program's professional knowledge and competence. The purpose of this involvement is to provide opportunities for faculty and students to contribute to the advancement of the field of forensic science, and to maintain program currency and credibility with practitioners and forensic science laboratory administrators.

To enhance the preparation of students for employment in forensic science laboratories, the program shall have a formal interaction with at least one operational forensic science laboratory.

Program Response:

Description

Since the inaugural semester of the Forensic Science program, the following workshops and training opportunities have been provided to area professionals:

- Facial Reconstruction, taught by Gloria Nusse, Summer 2007 & 2008
- Significance of Bloodstain Pattern Evidence, taught to the Philadelphia Crime Scene unit by Dr. Shaler and Ralph Ristenbatt, Penn State University, Abington, Jan. 10-11, 2007
- Bloodstain Workshop, taught to prosecuting attorneys by Dr. Shaler and Ralph Ristenbatt, Penn State University, University Park, May 25, 2006
- Pennsylvania Deputy Sheriff's Academy- 3 classes/year, taught by Randy Hoffman, Police Service Officer/Specialist, University Police. This course uses the forensic science program's crime scene investigation houses - Spruce and Pine cottages - for the crime scene component.

Additional courses and training opportunities are planned for next summer. Topics include:

- Documentation, Collection, and Examination of Fabric Impressions
- The Identification of Synthetic Fibers in the Forensic Lab
- Basic Geometric Optics for Firearms and Tool Mark Examiners
- Facial reconstruction course

The program has an ongoing collaboration with the Division of Forensic Sciences, New Jersey State Crime Lab (Fran Gdowski, Director of Forensic Sciences). Dr. Sykes provides consulting services for the theory, operation, troubleshooting, maintenance and method development and validation for the LC-MS instruments.

Dr. Holland has a formal relationship with Mitotyping Technologies, (Dr. Terry Melton, President) State College, PA: access to teaching resources, active case scenarios and consulting activities.

In addition, faculty members provide continuing education to working professionals at their places of employment. For example, one of our faculty members recently gave a talk on forensic mtDNA techniques to two dozen judges, lawyers and staffers at the 1st Judicial District Courthouse in Philadelphia, PA. Another of our faculty will be a panel member at the 9th Judicial District conference in July, 2008. Collaborative research efforts are ongoing with operational forensic science laboratories (e.g., DNA Securities, Inc. in North Carolina); an MOU agreement is being developed to conduct research with the United States Army Criminal Investigation Laboratory; an MOU is in negotiations between Penn State University and the International Association of Identification (IAI) to allow Penn State forensic students to take the IAI crime scene certification examination; and a cooperative research program is being developed with faculty from the forensic science program and the College of Engineering. Program faculty are also actively searching for research funding through proposals that have been submitted to the National Institute of Justice and the National Science Foundation, and proposals are being prepared for the Department of Homeland Security and the Department Of Defense. As the program continues to mature, we will expand the scope and extent of the research being conducted. In addition to research activities, many of our faculty members perform routine consulting services for the forensics community; Drs. Shaler and Holland have their own consulting firms. All of the full-time faculty, including Dr. Roy and Mr. Ristenbatt, have testified in courts of law during this current calendar year.

Lastly, Penn State University is committed to reaching out to the community through a formal Outreach effort within the Eberly College of Science. The Forensic Science program has been an active participant in some of the College's activities, but has recently submitted a grant proposal to the NSF to develop high school teacher's workshops that will assist them in teaching forensic science classes. The goals of this project are to strengthen the high school curricula, and to increase the number of students entering STEM (Science, Technology, Engineering and Mathematics) careers, including forensic science.

Analysis

Given the relatively short history of our program, we have been highly active in providing collaborative services to the forensic science, law enforcement and legal communities. As we move forward, our level of involvement will increase and mature. As with any organization, and given the limited size of our faculty and staff, the extent to which we can expand these activities will depend on available resources. Thus, we will need to be focused and restrictive when selecting our activities and collaborators so as not to overextend our faculty and staff.

Plan

A strategic plan will be developed in the near future to address how the Forensic Science

program will move forward and provide collaborative services to the forensic science, law enforcement and legal communities.

On-Site Evaluation Team Comments for Standard 4.7: