



## **FORENSIC SCIENCE (MS)**

### **Program Learning Assessment**

#### **2011-2013 Assessment Planning Cycle Key Findings and Proposed Actions**

**October 1, 2015**

## **Acknowledgments**

The implementation of the 2011 to 2013 assessment plan, leading to key findings and actions to enhancing the learning experience of Master of Science in Forensic Science students, was made possible by the active participation of talented faculty in the Department of Sciences. The contributions of the following faculty members are acknowledged.

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## Forensic Science (MS)

### Mission

#### *a. Department Mission Statement (Ratified Nov 24, 2009)*

This mission of the Department of Sciences is to provide all John Jay College students with a meaningful understanding of basic scientific principles, scientific methodologies, and to develop their quantitative and analytical reasoning skills. Furthermore, the Department seeks to:

- Present all forensic science students with a sound multidisciplinary foundation in science, to equip these students with the skills needed to pursue advanced educational opportunities, and to prepare them to become scientific professionals;
- Offer forensic science graduate students the opportunity to develop their scientific research skills and to provide them with in depth knowledge of current and cutting edge analytical techniques used by the forensic science community;
- Endow those students enrolled in the forensic science concentration of study of the Criminal Justice Doctoral program with the comprehensive theoretical background and analytical skills necessary to conduct independent research toward advancing the discipline of forensic science.

#### *b. Program Mission Statement*

The Master of Science in Forensic Science is designed to provide advanced educational opportunities for scientists, supervisors, administrators and other professionals currently employed in crime laboratories, medical examiners' offices and in such related areas as public safety, arson investigation and environmental protection. The program also prepares individuals who are interested in entering such careers. Drawing from the areas of chemistry, biology, physics and law, the program offers specializations in criminalistics, molecular biology and forensic toxicology and involves the mastery of advanced techniques for application both in the laboratory and presentation in the courts. The curriculum meets an urgent national need for broadly trained forensic scientists and research specialists.

### Assessment Philosophy

The primary mission of Master of Science in Forensic Sciences (MS FOS) is to facilitate student success. One way to measure student success is to conduct student learning assessment. The assessment of student learning outcomes is able to provide the fundamental data for promoting Program effectiveness and the improvement of programs and courses. Effective and valuable assessment is best attained when there is a clear definition of what the learning objectives / outcomes and the assessment cycle are. Going beyond assessment of simple acquisition of knowledge, MS FOS assesses students' mastery of subject matter and their ability to apply knowledge in the areas of Reasoning (critical thinking and creativity), Practical skills, and Communication.

MS FOS assessment is a faculty-led assessment to ensure a direct focus on learning. The assessment of student learning outcomes is ultimately the assessment of Program's capability to provide learning opportunities consistent with its mission. The data obtained from assessment is used exclusively to assess and improve teaching and learning, **not** for the evaluation of individual faculty members or students.

## Learning Goals

Building on the four learning goals approved by the Department of Science faculty, students in the MS FOS Program will develop a deep understanding of the physical laws that govern biology, chemistry and toxicology. The program focuses on teaching the fundamentals of science rather than on techniques that will change over time. In a profession that requires the mastering of constantly evolving techniques in the analysis of physical and biological evidence, this program gives them a unique professional advantage.

Students will:

### 1. Reasoning

Draw appropriate scientific conclusions from evidence and experimental data.

- Critically evaluate the biological, chemical and physical processes and recognize the significance of the scientific process in understanding medico-legal based problems
- Determine and compose appropriate conclusions based on scientific evidence

### 2. Knowledge

Acquire broad fundamental concepts, theories, and principles in physical and biological sciences.

- Develop good habits of scientific literacy search for the current scientific discoveries relevant to their study and research.
- Correctly apply information from popular media and primary scientific literature to support their perspectives and research findings.

### 3. Practical skills

Accrue hands-on laboratory and practical research skills, including emphasizing the role of quality assurance and objectivity in scientific data collection and how these relate to the system of professional ethics in science.

- Apply research protocols and advance experimental techniques for the analysis of biological, chemical and physical processes including using quality assurance/quality control systems.

- Design hypothesis-driven experiments and trouble-shoot or modify experimental protocols
- Use appropriate statistical analyses

#### 4. Communication

- Develop competence in oral and written forms of scientific communication including testimony in an adversarial legal system and thesis writing.
- Use sound scientific reporting techniques

### **Assessment Cycle Review**

The 2011-2013 program learning assessment includes six different surveys, targeting current students, alumni or employers, and one capstone evaluation. The Master in Forensic science program is small with no more than 50-60 students enrolled at any given year. This results in low numbers not only for the surveys, but also for the capstone project where 10 recent research theses were evaluated. The alumni survey had the biggest pool of potential participants and with 23 responses the highest number of answers. The low number of answers makes it more difficult to spot general trends. There is another technical issue affecting survey results that is easily demonstrated when looking at the student surveys. The 2013 college wide student satisfaction survey did not include the category “neutral” as one of the answer options. The earlier departmental surveys had this option and thus allowed the participants to not render an opinion. The forensic science student cohort in the college wide survey indicated much higher meet/exceed ratings than the 2011 survey, while the 2012 survey had more neutral answers than the 2011 survey and lower meet/exceed ratings. Starting in 2016, the surveys will be re-designed.

Regarding the learning goals, the Master in Forensic Science program is rated best for knowledge and practical skills. This is not only based on self-assessment in the surveys, but also demonstrated by the capstone thesis assessment. On the other hand several surveys including the employer survey point towards a lack of oral and written communication skills. A science curriculum may be intrinsically biased towards focusing on basic knowledge rather than communication, but in recent years the department has made a deliberate effort to add student presentations to several of the courses, and the thesis prospectus course now includes several segments on scientific writing and ends with a critique of each student’s thesis proposal. The learning goal of “reasoning” is probably the most important goal for a graduate program. Here the students’ self-assessment is better than what is demonstrated by the capstone evaluation where most of the work was only rated satisfactory rather than excellent. This learning goal will be monitored carefully in the future.

All of the surveys also addressed student satisfaction regard to science department faculty engagement, teaching resources, and John Jay college support services. Results were decidedly mixed. Science faculty members generally got good marks, but students were dissatisfied for example with career services, help with scholarship applications, and the laboratory facilities. The latter is something that has been addressed with the science department moving to brand new facility connected to the old John Jay building in the fall of 2012. Teaching and research now takes place in modern, state of the art laboratories and all more recent surveys have shown much better ratings. College wide resources for graduate students are also being addressed by the Dean of graduate studies.

Most of the proposed actions identified through the assessment activities have been implemented. The science department is committed to continuous assessment activities and curriculum improvement to make sure content stays current and learning goals are met.

## Forensic Science (MS)

Program Learning Assessment. Key findings and proposed actions  
(2011-2013)

### Program Learning Goals

1. Reasoning: Draw appropriate scientific conclusions from evidence and experimental data.
2. Knowledge: Acquire broad fundamental concepts, theories, and principles in physical and biological sciences.
3. Practical skills: Accrue hands-on laboratory and practical research skills.
4. Communication: Develop competence in oral and written forms of scientific communication.

### Outcomes Assessment

Program Learning Goal #	% Meet / Exceed <sup>1</sup>	Key Findings	Proposed Actions (Semester Implemented)	Was action effective? <sup>4</sup>		
				Follow-up assessment Sem. Year	% Meet / Exceed	
<b>2011</b>						
<b>Assessment Context<sup>2</sup> : Enrolled Students (n=21), Tool<sup>3</sup> : 2010 Student Satisfaction Survey</b>						
3	71	<p><u>Skill preparation</u> was generally satisfactory, although some students were neutral about quantitative skills (29%), writing (24%), public speaking (29%) and research skills (29%).</p> <p>Only 38% of students were advised to present at <u>professional conferences</u> and most (81%) did not get help applying for scholarships or positions upon completion. Students were mostly neutral or satisfied about <u>academic resources</u>, quality of instruction and availability of instructors, and satisfied / very satisfied with <u>content</u> (62%), prerequisites (67%), sequencing (52%), facilities (86%) and understanding the responsibilities and ethical practices (71%). More than 70% of students were satisfied with their <u>thesis experience</u>.</p>	<p>Improve college services supporting student success such as library and career center.</p> <p>Add more opportunities to practice written and oral communication.</p>	2012	47	↓
4 - Writ	57			2012	53	↓
4 - Oral	62			2012	40	↓

(1) Percent represents ratio of students who met or exceeded expectations. Where scores represent mean performance, the mean score and highest scale value are indicated (e.g., 3.3 out of 4). (2) Assessment context may relate to comprehensive program review, specific academic setting (e.g., course #, capstone, internship), class standing (e.g., seniors, transfers, alumni), post-graduation outcomes (e.g., placement, further education, employers ratings of employee skills), or indicators of learning progress. (3) Examples of tools include exams, portfolios, research projects, lab reports, papers, essays, surveys, licensure tests, performances, presentations. (4) Re-assessment of learning follows the implementation of actions to determine their effectiveness in improving learning outcomes.

**Outcomes Assessment**

Program Learning Goal #	% Meet / Exceed	Key Findings	Proposed Actions (Semester Implemented)	Was action effective? Follow-up assessment Sem. Year % Meet /
<b>2011 (cont.)</b>				
<b>Assessment Context : Alumni (n=23), Tool : Spring 2011 Alumni Survey</b>		<p><u>Employment</u>: Most alumni (67%) secured their first job within eighth months or continued pre-graduation employment (29%). The majority (72%) indicated their first job after graduation was related to forensic science, were employed full-time (95.5%), earned \$40,000 to \$50,000 at their first job (57%) and were employed in the same position as that secured after graduation (68%). Reasons for alumni not employed in the field include undesirable location (57%), lack of qualifications (43%), continuing education (29%), inadequate salary (14%), and decision to work in another field (29%). Most alumni indicated the program was very effective in developing <u>career skills</u>, such as communication, analysis, and research techniques, and those <u>continuing education</u> (27%) were mostly enrolled in a doctoral program (83%). Alumni were satisfied with the quality of <u>instruction</u> (95%), advisement (77%), facilities (67%) and preparation for employment (91%).</p>	<p>Reach out to alumni, especially graduates prior to 2008, in order to sample a representative group. Consider the development of an MS FOS Alumni Facebook site.</p> <p>New curriculum, active advisement and mentoring will assist students in selecting a course of study commensurate with their employment goals.</p> <p>Urge students to use the Graduate Career Advisor early in their careers to develop strategies for securing positions suitable in location and salary.</p>	
<b>Assessment Context : Alumni (n&gt;25), Tool : Employer Survey</b>		<p>John Jay graduate employees were rated "excellent" in conceptual knowledge, technical skills, and decision making skills, with "good" marks in critical thinking, comprehension skills, analytical reasoning, speaking, attention to quality, leadership and ability to work with others. By contrast, their ability to write reports was only rated "fair." On their professional demeanor, graduates were considered dependable and responsible, with positive attitude and good organizational and time management skills.</p>	<p>The employer survey should be re-designed to target multiple employers rather than multiple alumni working for a single agency (2014).</p>	

## Outcomes Assessment

Program Learning Goal #	% Meet / Exceed	Key Findings	Proposed Actions (Semester Implemented)	Was action effective? Follow-up assessment Sem. Year % Meet /
<b>2012</b>				
<b>Assessment Context : Capstone (n=10), Tool : Thesis</b>				
1	2.4 of 3	Overall performance was satisfactory. Students demonstrated excellence in Practical Skills and proficiency in Knowledge. Although the overall averages for Reasoning and Communication were satisfactory, the majority of students were not sophisticated in those areas, especially Reasoning.	Assessment will be implemented again with larger sample (2012). Laboratory experiments/exercises in FOS725, FOS732, FOS722 and FOS711 will add more components of reasoning on their reports (2012-14). Thesis prospectus courses (FOS795, FOS796 and FOS797) will focus on student thesis writing skills (2012-2014).	
2	2.5 of 3			
3	2.6 of 3			
4	2.5 of 3			
<b>Assessment Context : Enrolled Students (n=17), Tool : 2012 Student Satisfaction Survey</b>				
1	60	<u>Skill preparation</u> was generally satisfactory, although some students were neutral about quantitative skills (27%), writing (33%), public speaking (33%) and research skills (33%). Only 37% of students were advised to present at <u>professional conferences</u> and most (87%) did not get help applying for scholarships or positions upon completion. Students were mostly neutral about <u>academic resources</u> , neutral or satisfied about availability of instructors, and satisfied / very satisfied with <u>content</u> (60%), prerequisites (60%), sequencing (80%), quality of instruction (60%), and understanding ethical practices and responsibilities (53%). Students were dissatisfied / very dissatisfied with <u>lab facilities</u> (47%). Only 27% of students were satisfied with their <u>thesis experience</u> .	Revise the prospectus course series (FOS 795-797) (Fall 2014).  Create 1-2 more electives (2014-15).  Conduct workshops for scholarship / fellowship application (Fall 2014).  Revise the Student Satisfaction Survey (Spring 2014).	2013 85 ↑
3	47			2013 85 ↑
4 - Writ	53			2013 77 ↑
4 - Oral	40			
<b>2013</b>				
<b>Assessment Context : Enrolled Students (n=13), Tool : Evaluation of Graduate Program (Student Survey)</b>				
1	85	Graduates credit the program with challenging them to do their best work and improving their critical thinking and communication skills. Students agree that faculty members are interested in student success (85%), interact with students outside of class (85%), prepare their courses (92%), and are effective teachers (92%). Most students had a good to excellence experience and would enroll again. There were some concerns on career services, scheduling and feedback.	Work with career center on improving services for job/career and further graduate studies counseling.  Review scheduling options and online courses with curriculum committee.  Discuss performance feedback with MS FOS faculty.	
4 - Writ	85			
4 - Oral	77			