

# **Ph.D. in Microbiology and Cell Science Academic Assessment Plan 2012-2013**

College of Agricultural and Life Sciences  
Dr. Tony Romeo  
tromeo@ufl.edu

*Office of the Provost*

*University of  
Florida*

*Institutional  
Assessment*

*Continuous Quality  
Enhancement*

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# 2012-2013 Academic Assessment Plan for Ph.D. in Microbiology and Cell Science

College of Agricultural and Life Sciences

## A. Mission

The mission of the Department of Microbiology and Cell Science at the University of Florida is to generate new knowledge in microbial, molecular, cellular, and computational biology and extend our knowledge to undergraduate and graduate students as well as the general public. We always strive to conduct competitive and state-of-the-art science in many of today's important biological problems. We pride ourselves in the diversity of our faculty, student body, and curriculum. Our curricula at the graduate and undergraduate levels are intended to prepare our students for positions in academia, biomedical sciences, industry, and government. We foster and encourage collaborations with other units at UF as well as with other scientists at many institutions around the world.

The Microbiology and Cell Science graduate program supports the missions of the college and university to serve the nation's and state's critical needs by contributing to a well-qualified and broadly diverse citizenry, leadership and workforce through graduate education and to expand our understanding of the natural world, the intellect and the senses through graduate student research.

## B. Student Learning Outcomes and Assessment Measures

| SLO Type      | Student Learning Outcome                                                                                                    | Assessment Method                                                                                                                                                                                                                                                        | Degree Delivery |
|---------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Knowledge (1) | Describe orally and in writing, a thorough understanding of the molecular genetic, biochemical and cellular basis of life   | 1) Evaluation of the student's Program of Study by the Supervisory Committee using a faculty-developed rubric; 2) Evaluation during the written and oral qualifying examinations and dissertation defense by the Supervisory Committee using a faculty-developed rubric. | Campus          |
| Skills (2)    | Discuss orally and in writing, research methodologies for applying the scientific method to the generation of new knowledge | Evaluation during the qualifying examination, preparation of a research proposal, dissertation defense and preparation of a manuscript for publication in a peer-reviewed journal by the Supervisory Committee using a faculty-developed rubric.                         | Campus          |

|                           |                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                  |        |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Professional Behavior (3) | Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication. | 1) Consistent adherence during the degree program to the UF Honor Code; 2) Observation by faculty of professional behavior during class activities, seminars, journal colloquia, research work, thesis defense (or project report) and participation in professional societies. These observations will be shared with the Supervisory Committee and evaluated using a faculty-developed rubric. | Campus |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|

### C. Research

Ph.D. students are involved in research activities throughout their studies, starting with attendance of our annual departmental research retreat, where new students meet faculty and other graduate students, attend talks and poster presentations and receive instructions on submitting research proposals and related topics. Students conduct research rotations in three laboratories in their first semester to help them to select a laboratory for their research. They begin their dissertation research projects in the second semester. The Ph.D. student conducts original research under the guidance of the major professor and a supervisory committee consisting of a minimum of five members, including the major professor, selected by the student in consultation with the major professor. Members of the supervisory committee for the Ph.D. degree must have Graduate Faculty status. One member, the official "external" member, of the committee must be selected from a department other than the Microbiology and Cell Science department and is also not an affiliate faculty of the Department of Microbiology and Cell Science. Graduate students interact with their major professor frequently, essentially daily, to discuss their research. Graduate students are expected to meet with their supervisory committee on a regular basis, at least annually, to assess their progress. Starting in the second year, graduate students are expected to present their research at least annually at departmental seminars and retreats. Degree completion requires that at least one manuscript, based on the student's research, shall be accepted for publication in a refereed scientific journal.

The student must present a departmental seminar of the dissertation research to be immediately followed by a closed oral defense administered by the individual supervisory committee. The style and format of the dissertation must adhere strictly with the rules and abbreviations described in "Instruction for Authors" published in the Journal of Bacteriology or another approved journal. At the student's option, reference citations within the text may be in the form of (author and date) rather than the usual reference number format. This will greatly facilitate changes, which may be suggested by the student's committee. If there is any conflict, the format, typing and positioning requirements of the Graduate School Guide take precedence over the journal specifications. A copy of the dissertation is to be provided to the department.

## D. Assessment Timeline

Ph.D. in Microbiology and Cell Science

College of Agricultural and Life Sciences

| Assessment<br>SLOs           | Program of<br>Study Review | Qualifying Exam<br>& Dissertation<br>Defense | Annual<br>Evaluation |
|------------------------------|----------------------------|----------------------------------------------|----------------------|
| <b>Knowledge</b>             |                            |                                              |                      |
| #1                           | X                          | X                                            | X                    |
| <b>Skills</b>                |                            |                                              |                      |
| #2                           |                            | X                                            | X                    |
| <b>Professional Behavior</b> |                            |                                              |                      |
| #3                           |                            |                                              | X                    |

## E. Assessment Cycle

Assessment Cycle for:

Ph.D. in Microbiology and Cell Science

Analysis and Interpretation:

Program Modifications:

Dissemination:

College of Agricultural and Life Sciences

May-June annually

Completed by September 1 of each year

Completed by September 1 of each year

| SLOs                         | Year | 12-13 | 13-14 | 14-15 | 15-16 |
|------------------------------|------|-------|-------|-------|-------|
| <b>Content Knowledge</b>     |      |       |       |       |       |
| #1                           |      | X     | X     | X     | X     |
| <b>Skills</b>                |      |       |       |       |       |
| #2                           |      | X     | X     | X     | X     |
| <b>Professional Behavior</b> |      |       |       |       |       |
| #3                           |      | X     | X     | X     | X     |

## F. Measurement Tools

NOTE The individual rubrics used as measurement tools are shown in the Appendix.

SLOs are assessed on a continuing basis initially in the classroom and later in the research laboratory. Classroom assessment in various courses is reflected by the course grade. SLOs in the research laboratory are assessed by the student's major professor who is interacting with the student daily. In addition, achievement of SLOs is reflected in a seminar the student presents to the entire department on her/his research once a year. The student's performance in research and the ability to orally present and defend her/his research up to that point is evaluated by all the faculty members of the department during this time. The student also presents her/his research in a mini-symposium held just before the beginning of the Fall semester of each year and again the student's overall performance is evaluated by the faculty members of the department. These evaluations of the SLOs are used to track the progress of the student through the academic career both by the major professor and other faculty members of the department. The major professor addresses any concerns with the student and attempts to help the student overcome any limitation. The student's supervisory committee meets with the student at least once a year to further evaluate the student's progress in all three areas of SLOs. Before graduation, an exit seminar to the entire department and her/his defense of dissertation along with published manuscript(s) based on research or a yet to be published manuscript serves as the ultimate evaluation of the SLOs.

During the sixth semester of the student's residency in the program, the supervisory committee administers a comprehensive written examination. The student is expected to obtain a minimum of 75% in all sections of this examination. If the student does not obtain the minimum score in one or more sections of the examination, the student is required to obtain a combined average score of 75% in all sections before he/she is declared to have passed the written qualifying examination with the noted deficiency. The members of the supervisory committee address the deficiency during the oral part of the qualifying examination, which follows passage of the written exam. In addition, the student is required to provide the supervisory committee members with a written research proposal that may be related to her/his research topic of dissertation. The student is expected to defend this proposal during the oral part of the qualifying examination. A student who fails to pass the oral examination is allowed one opportunity to remediate. Upon passage of written and oral portions of the qualifying examination the student is admitted to candidacy for the Ph.D. degree.

The student's Program of Study is reviewed by the major professor and the supervisory committee to determine that all required coursework is included and to tailor the choice of elective courses to support the area of emphasis of the student's research project and career goals.

Evaluation of professional behavior is documented at the end of every semester in a written evaluation by the major professor and during the graduate committee meetings, which are held at least annually.

Evaluation of the student's knowledge of our field, research methodology and skills, and progress toward degree completion is formally assessed at least annually during committee meetings.

The dissertation defense provides the final opportunity for the supervisory committee to evaluate the student's understanding of molecular, genetic, biochemical and cellular bases of life and to document level of competence in research methodology and scientific written and oral communication.

## G. Assessment Oversight

| Name                             | Department Affiliation            | Email Address      | Phone Number |
|----------------------------------|-----------------------------------|--------------------|--------------|
| Tony Romeo, Graduate Coordinator | Microbiology & Cell Science (MCS) | tromeo@ufl.edu     | 352-392-2400 |
| Claudio Gonzalez                 | MCS                               | cfgonzalez@ufl.edu | 352-273-8088 |
| Nemat Keyhani                    | MCS                               | Keyhani@ufl.edu    | 352-392-2488 |
| Peter Kima                       | MCS                               | pkima@ufl.edu      | 352-392-0384 |
| Julie A. Maupin                  | MCS                               | jmaupin@ufl.edu    | 352-392-4095 |
| Wayne Nicholson                  | MCS                               | wln@ufl.edu        | 321-261-3773 |
| James F. Preston                 | MCS                               | jpreston@ufl.edu   | 352-392-5923 |
| Kelly Rice                       | MCS                               | kcrice@ufl.edu     | 352-392-1192 |
| K. T. Shanmugam                  | MCS                               | shan@ufl.edu       | 352-392-2490 |

## H. Appendix

### Rubric for Assessing the Program of Study in Microbiology and Cell Science (SLO 1)

To be used by the graduate student in conjunction with the major professor and degree committee.

Yes

No

All courses required for the student's program are included & credit hours meet graduation requirements.

Elective courses important for the student's research emphasis and long term career goals are included.

### **Rubric for Use in Semester Evaluation of MCS Graduate Student by Major Professor (SLO 1-3)**

|                                                                                                                   | Always | Usually | Infrequently | Never |
|-------------------------------------------------------------------------------------------------------------------|--------|---------|--------------|-------|
| Displayed diligence in the conduct of research, coursework, and/or teaching.                                      |        |         |              |       |
| Demonstrated ethical conduct and integrity in pursuit of research and other student activities.                   |        |         |              |       |
| Interacted respectfully and professionally with others in the laboratory, department, university and at meetings. |        |         |              |       |

### **Rubric for Use in MCS Graduate Student Committee Meetings (1, 2)**

|                                                                                                                                                                   | Satisfactory | Needs improvement | Unsatisfactory |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------|----------------|
| Understands and communicates the questions/hypotheses of the project how the project contributes to new cellular, molecular genetic and/or biochemical knowledge. |              |                   |                |
| Describes the approach and methodology, including the strengths & limitations thereof, in sufficient detail.                                                      |              |                   |                |
| Provides an organized update of results and progress made since the prior committee meeting.                                                                      |              |                   |                |
| Answers questions in an informed, thoughtful, and professional manner.                                                                                            |              |                   |                |
| Understands and communicates the short and long range goals of the project.                                                                                       |              |                   |                |

## Rubric for Use in Qualifying Examination for the Ph.D. in MCS (SLO 1, 2)

|                                                                                             | Satisfactory | Needs Improvement      | Unsatisfactory |
|---------------------------------------------------------------------------------------------|--------------|------------------------|----------------|
| <b>Written exam:</b>                                                                        |              |                        |                |
| Equal weighting of questions from committee members from topic areas identified by members. | (≥ 75%)      | (<75% on 1 or 2 parts) | (<75% overall) |

|                                                                                                                                                                     | Satisfactory | Needs improvement | Unsatisfactory |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------|----------------|
| <b>Defense of proposal (oral exam):</b>                                                                                                                             |              |                   |                |
| Proposal definition: Delineates the key questions and hypotheses of the project and their relationship to the knowledge base.                                       |              |                   |                |
| Literature of proposal: Demonstrates sound knowledge of the literature of the research area and the field.                                                          |              |                   |                |
| Project approach: Applies appropriate methodology /technology. Understands the basis & interpretations thereof.                                                     |              |                   |                |
| Context: Student communicates the broader implications of the research, basic and/or applied.                                                                       |              |                   |                |
| Defense of written proposal: Orally communicates concepts and details of the written proposal. Addresses questions and concerns with knowledge and professionalism. |              |                   |                |

Student's Name \_\_\_\_\_

Committee Chair \_\_\_\_\_ Signature \_\_\_\_\_

Committee Member \_\_\_\_\_ Signature \_\_\_\_\_

Committee Member \_\_\_\_\_ Signature \_\_\_\_\_

Committee Member \_\_\_\_\_ Signature \_\_\_\_\_

Committee Member \_\_\_\_\_ Signature \_\_\_\_\_

Committee Member \_\_\_\_\_ Signature \_\_\_\_\_

## Rubric for Ph.D. Dissertation Defense in Microbiology & Cell Science (SLO 1-2)

Satisfactory      Needs Improvement      Unsatisfactory

### Dissertation:

#### Abstract

Statement of purpose/question(s)

Hypothesis and design

Findings

Importance/Relevance

#### Literature Review

Comprehensive

Current

Contextualized

Analytic

Thematic

#### Concepts/Theory

Logical

Appropriate

Aligned with questions

Strengths/Limitations

#### Methods/Approach

Appropriate for questions

Sufficient evaluation & detail

Advantages/Disadvantages

#### Results/Analysis

Alignment with questions

Sophistication

Clarity of presentation

Interpretation and insights

Limitations

### **Summary / Conclusions**

Refers back to Introduction

Ties everything together

Presents broader perspective

Implications, applications

Future directions

### **Oral Defense of Dissertation:**

**Introduction:** Delineates the key questions and hypotheses of the project and their relationship to the knowledge base.

**Background information:** Demonstrates sound knowledge of the literature. Appropriately selective.

**Project approach:** Describes use of methodology /technology in sufficient detail. Understands and explains the basis & interpretations thereof.

**Findings:** Results presented in a logical order. Implications and limitations discussed.

**Summary:** Findings are summarized in a clear and organized fashion, integrated into model(s), as appropriate.

**Context:** Student communicates the value of the research to the broader field and where appropriate, applications.

**Response to questions:** Addresses questions in direct and professional manner. Demonstrates mastery of the project and foresight with respect to the research area.

