Status: PENDING

PROGRAM REQUEST
Master of Science in Plant Pathology

Last Updated: Myers,Dena Elizabeth
01/19/2011

Fiscal Unit/Academic Org	Plant Pathology - D1178
Administering College/Academic Group	Food, Agric & Environ Science
Co-adminstering College/Academic Group	
Semester Conversion Designation	Re-envisioned with significant changes to program goals and/or curricular requirements (e.g., degree/major name changes, changes in program goals, changes in core requirements, structural changes to tracks/options/courses)
Current Program/Plan Name	Plant Pathology
Proposed Program/Plan Name	Master of Science in Plant Pathology
Program/Plan Code Abbreviation	PLNTPTH-MS
Current Degree Title	Master of Science

Credit Hour Explanation

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program		45	30.0	30	0.0
Required credit hours offered by the unit	Minimum	20	13.3	18	4.7
	Maximum	45	30.0	30	0.0
Required credit hours offered outside of the unit	Minimum	0	0.0	0	0.0
	Maximum	25	16.7	12	4.7
Required prerequisite credit hours not included above	Minimum	0	0.0	0	0.0
	Maximum	0	0.0	0	0.0

Explain any change in credit hours if the difference is more than 4 semester credit hours between the values listed in columns B and C for any row in the above table

The required courses in the semester are necessary to provide the comprehensive curriculum in our discipline that is the foundation for our learning objectives. We feel requiring the additional pathogen classes will give the student a more well-rounded education. There was additional classes added to the required list of courses for the Masters degree. This was in part because a course that was not taught in quarters will now be taught in semesters (PLNTPTH 5030: Nematology).

Program Learning Goals

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

Program Learning Goals

- (See attached file for specially formatted learning outcomes.)
- Understand the importance of the history, principles, and practices of plant pathology.
- Understand social and global issues pertinent to plant pathology, including economic, political, scientific and ethical perspectives that pertain to international development and commerce.
- Know the basic core foundation in biology (including general plant anatomy and physiology), chemistry, mathematics, and statistics.
- Understand the fundamental biology of the major pathogen groups and plant-associated microbes that affect plant health, including fungi, oomycetes, bacteria, viruses, and nematodes.
- Understand how plant diseases develop temporally and spatially in plant populations using simple mathematical models.
- Understand the basic ecology of plant-associated microbes including means of transmission, dissemination, and survival.
- Know the molecular basis for the disease development and suppression as it relates to pathogenesis, host resistance, and biological control.
- Know and characterize major mechanisms of plant disease resistance and host-pathogen interactions at the cellular and molecular levels.
- Know the principles of plant disease management and how to deploy integrated plant health management strategies.
- Know the basic tenets and applications of genetic and genomic-based studies as they realte to plant pathology.
- Be able to diagnose plant diseases (and use Koch's Postulates) and explain pathogen-induced changes on plant anatomy and physiology.
- Be able to isolate and identify plant-associated microbes that affect plant health and know classical, biochemical and molecular characterization methods.
- Be able to generate and test hypotheses on a central research question using the scientific method.
- Be able to conduct experiments using good laboratory/field practices and standard operating procedures.
- Be able to communicate with diverse audiences in both written and oral forms and describe, interpret, and present a disease related topic.
- Demonstrate professional behavior that is consistent with the highest ethical and moral standards.

Assessment

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

Is this a degree program (undergraduate, graduate, or professional) or major proposal? Yes

Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? No

A full assessment plan has been submitting using the survey form

Program Specializations/Sub-Plans

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

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Pre-Major

Does this Program have a Pre-Major? No

Attachments

- PLNTPTH Masters Learning Outcomes 9-29-10.docx: PLNTPTHMastersLearningOutcomes9-29-10

  (Other Supporting Documentation. Owner: Ellis,Sarah Dee)

- PLNTPTH Masters Assessment Plan 9-29-10.pdf: PLNTPTHMastersAssessmentPlan/CurricularMap9-29-10

  (Curricular Map(s). Owner: Ellis,Sarah Dee)

- PLNTPTH Masters Program Proposal 11-19-10.pdf: PLNTPTHMastersProgramProposal11-19-10

  (Program Proposal. Owner: Ellis,Sarah Dee)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Ellis,Sarah Dee	10/01/2010 10:45 AM	Submitted for Approval
Approved	Graham,Terrence Lee	10/01/2010 11:42 AM	Unit Approval
Revision Requested	Stokoe,Laurie Anne	10/18/2010 10:51 AM	College Approval
Submitted	Ellis,Sarah Dee	10/28/2010 01:28 PM	Submitted for Approval
Approved	Mitchell,Thomas Kenneth	10/28/2010 01:55 PM	Unit Approval
Revision Requested	Stokoe,Laurie Anne	11/05/2010 03:56 PM	College Approval
Submitted	Ellis,Sarah Dee	11/10/2010 03:53 PM	Submitted for Approval
Approved	Mitchell,Thomas Kenneth	11/10/2010 05:22 PM	Unit Approval
Revision Requested	Stokoe,Laurie Anne	11/16/2010 07:42 AM	College Approval
Submitted	Ellis,Sarah Dee	11/22/2010 02:40 PM	Submitted for Approval
Approved	Mitchell,Thomas Kenneth	11/22/2010 02:54 PM	Unit Approval
Revision Requested	Stokoe,Laurie Anne	11/29/2010 03:22 PM	College Approval
Submitted	Ellis,Sarah Dee	12/08/2010 03:32 PM	Submitted for Approval
Approved	Mitchell,Thomas Kenneth	12/08/2010 05:18 PM	Unit Approval
Approved	Stokoe,Laurie Anne	01/14/2011 04:08 PM	College Approval
Approved	Myers,Dena Elizabeth	01/19/2011 10:19 AM	GradSchool Approval
Pending Approval	Soave,Melissa A	01/19/2011 10:19 AM	CAA Approval

THE OHIO STATE UNIVERSITY

Department of Plant Pathology

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September 15, 2010

Office of Academic Affairs
203 Bricker Hall
190 North Oval Mall
Columbus, OH 43210

Dear Office of Academic Affairs,

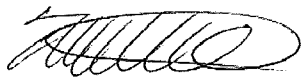
Currently the Department of Plant Pathology consists of 4 programs: Minor in Plant Pathology, Major in Plant Health Management, Master of Science in Plant Pathology, and Doctorate of Plant Pathology. All programs will remain in the semester system with modifications to each and the addition of a new major (Major in Plant Pathology) and tagged masters (Master in Plant Health Management).

The following document is the proposed Master of Science in Plant Pathology (within the College of Food, Agricultural and Environmental Science) to begin Summer of 2012. Currently the Master of Science degree in our department is Plant Pathology and is typically a two-year program. When we convert to semesters the name of the degree will remain the same and have both a thesis (Plan A) and non-thesis (Plan B) option. The major will consist of 30 credit hours or course work, not including research hours. The core curriculum consists of pathogen specific courses (mycology, virology, bacteriology, and nematology), a plant disease management course, a disease diagnosis May/summer course and an advanced statistics course. Students will begin their coursework with the advanced plant pathology course (PLNT PTH 6001- equivalent to PLNT PTH 401 in the quarter system).

As part of the development of this program proposal, we sought the assistance of our existing graduate students. Specifically, a graduate student representative is a member of the Department of Plant Pathology Academic Affairs Committee. As part of her duties, she brought the proposal and new curriculum to the graduate students for review and comment. The students did a thorough job of reviewing the plan and made excellent suggestions for improvement. We believe their input was vital to the quality of this proposal.

The faculty in the Department of Plant Pathology faculty, staff, and students met on March 6, 2010 in a retreat specifically designed to discuss the transition to semesters. At the retreat, the undergraduate program's curricula were determined. The faculty since has reviewed the curricula, learning outcomes, rationale, assessment plan, transition policy, semester course list, and curriculum maps. A vote was conducted by the faculty on Thursday, June 17, 2010. The vote for the proposal was unanimously affirmative (13/13). Subsequently, we forwarded the proposal to the College of Food, Agricultural, and Environmental Science for review.

Sincerely,



Thomas Mitchell
Academic Affairs Committee Chair
Department of Plant Pathology
Assistant Professor
Ohio State University
Columbus, OH

Master of Science in Plant Pathology

Rationale for proposed program change and description of how the changes will benefit students and enhance program quality.

The Master of Science in Plant Pathology program was re-designed following consideration of the learning objectives. The most substantive changes were to the courses themselves rather than the requirements of the degree. Students will still be required to take the core curriculum of the pathogen groups with the addition of Nematology (5030), which was added following the recent hiring of a new faculty in that area. In the quarter system, the major pathogen groups each compose a full quarter course. In the semester system, three of the 4 groups will become half semester courses. Currently, new students to the degree have to take PLNTPTH401 – General Plant Pathology, however they do not receive graduate credit. This course has been changed to the 600-level (6001 in semesters) with added content and rigor. PLNTPTH602 Molecular Plant Microbe Interactions, is currently required, but will be changed in the semester system and developed into an 800-level (8400 in semesters) capstone course. Students have the opportunity to select from a list to fulfill 9 credit hours of electives. The driving factor in re-designing this degree was to provide a solid comprehensive Plant Pathology curriculum to prepare students to matriculate into positions in industry, government, or academia (teaching).

Plant Pathology
Semester Course
List

Quarter Course Number	Semester Course Number	Course Title in Semester	Instructor(s)	Quarter Credit Hours	Semester Credit Hours	Number of Weeks	Semester Offered
	2000 - GEC	Molds, Mushrooms and Man	Tom Mitchell		3	14 weeks	Spring
201D	2001	Sick Plants and a Hungry World	Sarah Ellis	3	2	14 weeks	Autumn, Spring
401	3001	General Plant Pathology Lecture	Sarah Ellis	5	2	14 weeks	Autumn
	3002	General Plant Pathology Lab	Sarah Ellis		2	14 weeks	Autumn
395	3195	Plant Health Science Forum	Monica Lewandowski	1	1	14 weeks	May
597	3597	Societal Issues: Pesticides, Alternatives, and the Environment	Monica Lewandowski	5	3	14 weeks	Autumn, Spring
489	4191	Internship Experiences in Plant Health Management	Monica Lewandowski	1-5	1-6	14 weeks	Autumn, Spring, Summer
	4683	Research with Distinction	Faculty		1-6	14 weeks	Autumn, Spring, Summer
H683	4683 (H)	Research with Distinction	Faculty	1-10	1-6	14 weeks	Autumn, Spring, Summer
455	4550	Bioterrorism: An Overview	Michael Boehm	5	2	7 weeks	Spring
	4998	Undergraduate Research	Faculty		1-6	14 weeks	Autumn, Spring, Summer
600.01	5010	Phytobacteriology	Brian McSpadden-Gardener	3	2	7 weeks	Spring
600.02	5020	Introductory Plant Virology	Feng Qu	3	2	7 weeks	Spring
636	5030	Plant Nematology	Chris Taylor	3	2	7 weeks	Spring

660	5040	Science of Fungi: Mycology Lecture	Tom Mitchell	5	3	14 weeks	Autumn
	5041	Science of Fungi:Mycology Lab	Tom Mitchell		1	14 weeks	Autumn
610	5110	Ecology and Management of Pathogens and Insects Affecting Trees in Forest and Urban Environments	Enrico Bonello/Dan Herms	4	3	14 weeks	Spring
501	5120	Diseases of Ornamentals	Dennis Lewandowski	5	2	7 weeks	Spring
612/613	5130	Turf Diseases and Integrated Turf Health Management	Joe Rimelspach	3-4	3	14 weeks	Autumn
614	5140	Diseases of Field Crops	Anne Dorrance and Pierce Paul	3	2	14 weeks	Spring
615	5150	Fruit and Vegetable Diseases	Michael Ellis and Sally Miller	3	2	7 weeks	Spring
603	5603	Plant Disease Management	Michael Ellis and Larry Madden	5	3	14 weeks	Autumn
	5604	Capstone Course: Problem-Based Studies in Plant Health	Faculty from Plant Path and Entomology		2	14 weeks	Spring
685	5685	Plant Disease Diagnosis	Sally Miller	3	2	3 weeks May/Summer	Summer, May
401	6001	Advanced Plant Pathology	Sarah Ellis		3	14 weeks	Autumn
693	6193	Individual Studies	Faculty	1-5	1-6	14 weeks	Autumn, Spring, Summer
702	7002	Plant Disease Epidemiology	Larry Madden	4	3	14 weeks	Spring
703	7003	Agricultural Genomics: Principles and Applications	Guo-Liang Wang and Eric Stockinger	3	3	14 weeks	Spring
830	8300	Current Topics in Plant Pathology	Bonello, Mitchell, McSpadden-Gardener, Wang	1-2	1-2	14 weeks	Autumn, Spring, Summer
602/841/842/843	8400	Molecular Bases of Plant Host-Microbe Interactions	Graham/ Bonello/ McSpadden-Gardener/Redinbaugh/ Taylor/ Mitchell/Wang	1-3	3	14 weeks	Spring

995	8899	Plant Pathology Seminar	Various Instructors	1	1	14 weeks	Autumn, Spring
901	8901	Mentored Teaching in Plant Pathology	Various Instructors	1-5	1-3	14 weeks	Autumn, Spring, Summer
902	8902	Mentored Extension/Outreach Teaching in Plant Pathology	Michael Ellis	1-3	1	14 weeks	Autumn, Spring, Summer
999	8999	Plant Pathology Research	Various Instructors	1-100	1-100	14 weeks	Autumn, Spring, Summer

*No longer offering: 294, 300, 602, 604, 613, 655, 694, 704, 832, 838, 839, 841, 842, 843. Either doing away with or incorporating course into other semester courses.

Master of Science in Plant Pathology

Semester Curriculum Advising Sheet

Requirements and Curriculum

Master of Science in Plant Pathology students are required to complete a minimum of 30 credit hours of graduate work with a minimum cumulative GPA of 3.0. At least 25 credit hours must be earned at OSU.

- **30 credit hour minimum**

Course and Credit Hour Requirements

- ***Core Curriculum*** **21 credits**

All students seeking a Master of Science in Plant Pathology will take the following courses:

PLNTPTH 6001: Advanced Plant Pathology	3 credits
PLNTPTH 5010: Phytobacteriology	2 credits
PLNTPTH 5020: Virology	2 credits
PLNTPTH 5030: Nematology	2 credits
PLNTPTH 5040 & 5041: Science of Fungi: Mycology Lecture and Lab	4 credits
PLNTPTH 5603: Plant Disease Management	3 credits
PLNTPTH 5685: Plant Disease Diagnosis	2 credits
Advanced Statistics Course (agreed upon by SAC)	3 credits

- ***Electives*** **9 credits**

Electives will consist of courses chosen by the SAC to support the student's individual area of research. It will also consist of PLNTPTH 8899 Seminar credits and PLNTPTH 8999 Research credits.

Master's Thesis Degree Plan

As specified by the SAC, a typical Master's thesis degree plan may include 30 credit hours of courses, not counting seminar (PLNTPTH 8899). The thesis will count for additional credit hours and will be registered for under PLNTPTH 8999, Research. After meeting with the student to determine the student's proficiency and needs for coursework, and during the development of Form I, Graduate Program Requirements, the SAC may reach the decision to recommend substitutions in courses listed above with other courses that are appropriate for the student's graduate program. Such changes should be listed and each individually justified on Form I and a copy sent to the Graduate Studies Chair for signature and approval. Often changes in coursework are also necessary later in a student's program of study. Justification for these substitutions should be listed as an amendment to Form I, again subject to approval by the Graduate Studies Chair. The Master's degree final oral examination in defense of the thesis will be given by the SAC.

The examination can be comprehensive in nature and need not be confined to the thesis topic. The student is considered to have passed the Master's Examination successfully only when the decision of the Examination Committee is ***unanimously*** affirmative. Form II, Results of the Master's Examination and Recommendation to Continue to the Ph.D. Degree, will be used to report the results of the examination and provide a recommendation regarding continuation to the Ph.D. degree. A student may pass the Master's degree examination but may not be recommended for continuation to the Ph.D. degree. Form II will be placed in the student's permanent file.

If the final oral examination for the Master's degree is judged unsatisfactory, the rules pertaining to a second examination as listed in the Graduate School Handbook will be followed.

Master's Non-Thesis Degree Plan

The Master's non-thesis degree plan is available in Plant Pathology. The requirements and restrictions for this degree are as follows:

a) The University requirements include: no thesis, completion of minimum of 30 credit hours of graduate course work with a cumulative GPA 3.0, and satisfactory performance on a departmental comprehensive written exam of at least 4 hours duration.

b) The department additionally requires special projects in two of three areas: teaching, extension or research. The nature of each project will be determined by the SAC and will be completed by formal written reports approved by the SAC. To meet these requirements, the student will schedule PLNTPTH 8901 - Mentored Teaching in Plant Pathology (3 credit hours), PLNTPTH 8902 - Mentored Extension/Outreach Teaching in Plant Pathology (1 credit hours) or PLNTPTH 6193 - Independent Study (3 credit hours) depending on the project subject area of teaching, extension or research, respectively. These hours will count toward the 30 credit hours required by the University. At their discretion, the SAC may require an oral examination in addition to the 4 hour written examination.

c) No PLNTPTH 8999, Research, or PLNTPTH 8899, Seminar, credit will be included in the 30 credit hours required.

Master of Science in Plant Pathology

4-Year Plan

A typical semester course map for a Master of Science student (to be modified by SAC):

Year 1: Autumn Semester
PLNTPTH 6001: Advanced Plant Pathology (3)
Advanced Statistics (X)
PLNTPTH 8899: Seminar (1)

Year 1: Spring Semester
PLNTPTH 5010: Phytobacteriology (2)
PLNTPTH 5020: Virology (2)
PLNTPTH 5030: Nematology (2)
PLNTPTH 8899: Seminar (1)

Year 1: May-Term
PLNTPTH 5685: Plant Disease Diagnosis (2)-------or--------PLNTPTH 5685: Plant Disease Diagnosis (2)
PLNTPTH 8999: Research (X)

Year 1: Summer Semester
PLNTPTH 8999: Research (X)

Year 2: Autumn Semester
PLNTPTH 5603: Plant Disease Management (3)
PLNTPTH 5040/5041: Science of Fungi: Mycology (4)
PLNTPTH 8899: Seminar (1)
PLNTPTH 8901 or 8902: Mentored Teaching (1-3)

Year 2: Spring Semester
Electives (X)
PLNTPTH 8899: Seminar (1)
PLNTPTH 8999: Research (X)

Year 2: May-Term
PLNTPTH 8999: Research (X)

Year 2: Summer Semester
PLNTPTH 8999: Research (X)

Plant Pathology
Quarters Advising Sheet

Master's Degree Requirements

Students pursuing a Master's degree who anticipate going on to the Ph.D. degree should select the Master's thesis degree plan. However, a Master's non-thesis degree plan is available.

Course and Credit Hour Requirements

All students will take PLNTPTH 401 - General Plant Pathology if they have not had a comparable introductory course in Plant Pathology.
Master's degree students are required to complete a minimum of 45 credit hours of graduate work with a minimum cumulative GPA of 3.0. At least 37 credit hours must be earned at OSU. All Plant Pathology Master's degree students are required to take:

Plant Pathology 600.01 Phytobacteriology 3 credits
Plant Pathology 600.02 Plant Virology 3 credits
Plant Pathology 602 Plant-Microbe Interactions 4 credits
Plant Pathology 603 Plant Disease Management 5 credits
Plant Pathology 660 Mycology 5 credits

Master's Thesis Degree Plan

As specified by the SAC, a typical Master's thesis degree plan may include 30 to 35 credit hours of courses, not counting seminar (PLNTPTH 995). The thesis will count at least an additional 10 to 15 credit hours and will be registered for under PLNTPTH 999, Research. After meeting with the student to determine the student's proficiency and needs for coursework, and during the development of Form I, Graduate Program Requirements, the SAC may reach the decision to recommend substitutions in courses listed above with other courses that are appropriate for the student's graduate program. Such changes should be listed and each individually justified on Form I and a copy sent to the Graduate Studies Chair for signature and approval. Often changes in coursework are also necessary later in a student's program of study. Justification for these substitutions should be listed as an amendment to Form I, again subject to approval by signature by the Graduate Studies Chair.

The Master's degree final oral examination in defense of the thesis will be given by the SAC.

The examination can be comprehensive in nature and need not be confined to the thesis topic. The student is considered to have passed the Master's Examination successfully only when the decision of the Examination Committee is ***unanimously*** affirmative. Form II, Results of the Master's Examination and Recommendation to Continue to the Ph.D. Degree, will be used to report the results of the examination and provide a recommendation regarding continuation to the Ph.D. degree. A student may pass the Master's degree examination but may not be recommended for continuation to the Ph.D. degree. Form II will be placed in the student's permanent file.

Form II (Word) is available on the department intranet: plantpath.osu.edu/intranet/grad-studentforms/)

If the final oral examination for the Master's degree is judged unsatisfactory, the rules pertaining to a second examination as listed in the Graduate School Handbook must be followed.

Master's Non-Thesis Degree Plan

The Master's non-thesis degree plan is available in Plant Pathology. The requirements and restrictions for this degree are as follows:

a) The University requirements include: no thesis, completion of minimum of 45 credit hours of graduate course work with a cumulative GPA 3.0, and satisfactory performance on a departmental comprehensive written exam of at least 4 hours duration.
b) The department additionally requires special projects in two of three areas: teaching, extension or research. The nature of each project will be determined by the SAC and will be completed by formal written reports approved by the SAC. To meet these requirements, the student will schedule PLNTPTH 901 - Mentored Teaching in Plant Pathology (3 to 5 credit hours), PLNTPTH 902 - Mentored Extension/Outreach Teaching in Plant Pathology (3 credit hours) or PLNTPTH 693 - Independent Study (3 to 5 credit hours) depending on the project subject area of teaching, extension or research, respectively. These hours will count toward the 45 credit hours required by the University. At their discretion, the SAC may require an oral examination in addition to the 4 hour written examination.

Descriptions of PLNTPTH 901 and 902 are in Appendix I and II at the end of this handbook.
c) No PLNTPTH 999, Research, credit will be included in the 45 credit hours required.
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Master's Degree Based on Candidacy Examination

Upon the recommendation of the adviser and SAC, a student in the Ph.D. program may earn a Master's degree on the basis of satisfactorily completing the doctoral Candidacy Examination, if he/she does not already hold an equivalent Master's degree in Plant Pathology. The student must apply for this degree immediately following completion of the Candidacy Examination as outlined in the Graduate School Handbook (Section VI: Master's Degree Programs, General Information, Earning Master's Degree On the Basis of Candidacy Examination).

Master of Science in Plant Pathology

Transition Policy

A student entering the Plant Pathology M.S. program in **Academic Year 2011-2012** (SU, AU, WI, SP) will spend up to one year in the current quarter system and subsequent terms in the new semester system. A suggested course plan is below. A student entering the Master of Science in Plant Pathology program in Autumn 2010 will be able to finish coursework prior to the transition.

Plant Pathology course requirements for the graduate program will change in the semester system. On the quarter system, students are required to take Plant-Microbe Interactions (PLNTPTH 602). This is not a required course in the semester system. However, on the semester system, students will be required to take Plant Disease Diagnosis (PLNTPTH 5685) and Nematology (PLNTPTH 5030); two courses not required in the quarter system. As stated in the Plant Pathology Graduate Program Handbook, the student's advisory committee may allow substitutions of courses with others that are more appropriate for the student's individual graduate program.

Course Map for Students Entering Academic Year 2011-2012

Year	Quarter/Semester	Required Courses	Possible Elective Courses
1	Autumn 2011	General Plant Path 401(5Q)	Turf Path 613(4Q), Forest Path 610(4Q), Stats 655(3Q); a statistics course
1	Winter 2012	Mycology 660(5Q)	Fruit and Veg Path 615(3Q), Epidemiology 702(4Q)
1	Spring 2012	Plant Disease Mgt. 603(3Q)	Field Crop Path 614(3Q), Plant Microbe Interactions 602(3Q), Ag Genomics 703(3Q)
	Semester System Begins		
2	May/Summer 2012	Plant Dis. Diagnosis 685(5685 – 2S)	
2	Autumn 2012		Turf Path 612/613(5130 – 3S), Forest Path 610(5110 – 3S),
2	Spring 2013	Phytobacteriology (5010 – 2S), Virology (5020 – 2S), Nematology (5030 – 2S)	Field Crop Path 614 (5140 – 3S)

Master of Science in Plant Pathology
Assessment Plan

Learning Outcome-Course Matrix
(Note: international students from countries where English is not the first language may be required to take English writing courses.)
(SAC = Student Advisory Committee)
(* indicates required course for Plant Pathology M.S. Program)

	Program Learning Outcomes/Goals	Course that achieves this goal at a beginning level	Course that achieves this goal at an intermediate level	Course that achieves this goal at an advanced level	OTHER means of assessment
FOUNDATIONAL KNOWLEDGE	***Global Perspectives***				
	LO#1: Understand the importance of the history, principles, and practices of plant pathology;	6193 (Individual Stud.)	*5010 (Phytobacteriology), *5030 (Nematology), *7002 (Epidemiology), 8400 (Plant-Host Interaction)	*5040 (Mycology Lecture), 5140 (Dis. of Field Crops), *6001 (Adv. Plant Path)	Final MS oral examination; advanced level. Annual student evaluation by faculty advisor; advanced level. MS thesis; advanced level
	LO#2:Understand social and global issues pertinent to plant pathology, including economic, political, scientific and ethical perspectives that pertain to international development and commerce;	*5010 (Bacteriology), 5110 (Forest Health Protect.), 5120 (Dis. of Ornamentals)	*5030 (Nematology), *8899 (Seminar)	*5040 (Mycology Lecture), 5140 (Dis. of Field Crops), *6001 (Adv. Plant Path)	MS thesis; advanced level
	Core Science and Mathematics				
	LO#3: Know the basic core foundation in biology (including general-plant anatomy and physiology), chemistry, mathematics, and statistics;		*5010 (Bacteriology), 5110 (Forest Health Protect.), 5130 (Turf Dis.), *8899 (Seminar), 8400 (Plant-Host Interaction)	5140 (Dis. of Field Crops), *6001 (Adv. Plant Path), *7002 (Epidemiology)	MS: faculty advisor and SAC review of students previous coursework and knowledge of field; recommendations are made for additional coursework. MS: Annual student evaluation by faculty advisor; advanced level. MS: Final oral examination; intermed to advanced level. MS thesis; advanced level

	Program Learning Outcomes/Goals	Course that achieves this goal at a beginning level	Course that achieves this goal at an intermediate level	Course that achieves this goal at an advanced level	OTHER means of assessment
	Plant Pathology				
	LO#4: Understand the fundamental biology of the major pathogen groups and plant-associated microbes that affect plant health, including fungi, oomycetes, bacteria, viruses, and nematodes;		*5020 (Virology), *5030 (Nematology), 5110 (Forest Health Protect.), 5130 (Turf Dis.), 5150 (Fruit and Veg Dis.), *5603 (Dis. Mgt.), 5604 (Capstone),*5685 (Dis. Diagnosis), *8899 (Seminar), *8300 (Current Topics), 8400 (Plant-Host Interaction)	*5010 (Bacteriology), *5040 (Mycology Lecture), *5041 (Mycology Lab), 5140 (Dis. of Field Crops), *6001 (Adv. Plant Path)	MS: faculty advisor and SAC review of students previous coursework and knowledge of field; recommendations are made for additional coursework. MS: Annual student evaluation by faculty advisor; intermed-advanced level. MS: Final oral examination. Beginning to advanced levels. MS thesis; advanced level.
	LO#5: Understand how plant diseases develop temporally and spatially in plant populations using simple mathematical models;	*5030 (Nematology), 5110 (Forest Prob.)	*5603 (Dis. Mgt.), *8899 (Seminar)	*7002 (Epidemiology)	Depending on discipline of the student: MS: Final oral examination. Beginning to advanced levels MS thesis; advanced level
	LO#6: Understand the basic ecology of plant-associated microbes including means of transmission, dissemination and survival;	5120 (Dis. of Ornamentals), *8899 (Seminar)	*5030 (Nematology), 5130 (Turf Dis.), 5150 (Fruit and Veg Dis.), *5603 (Dis. Mgt.)	*5010 (Bacteriology), *5040 (Mycology Lecture), *5041 (Mycology Lab), 5110 (Forest Health Protect.), 5140 (Dis. of Field Crops), *6001 (Adv. Plant Path), *7002 (Epidemiology), *8300 (Current Topics), 8400 (Plant-Host Interaction)	Depending on discipline of the student: MS and PhD: Final oral examination. Beginning to advanced levels. MS thesis; advanced level

	Program Learning Outcomes/Goals	Course that achieves this goal at a beginning level	Course that achieves this goal at an intermediate level	Course that achieves this goal at an advanced level	OTHER means of assessment
	LO#7: Know the molecular basis for disease development and suppression as it relates to pathogenesis, host resistance, and biological control;	*8899 (Seminar)	*5010 (Bacteriology), *5020 (Virology), *5030 (Nematology), *5040 (Mycology Lecture)	8400 (Plant-Host Interaction), 8999 (Seminar)	Depending on discipline of the student: MS: Final oral examination. Beginning to advanced levels. MS thesis; advanced level
	LO#8: Know and characterize major mechanisms of plant disease resistance and host-pathogen interactions at the cellular and molecular levels;	*5603 (Dis. Mgt.), 8899 (Seminar)	*5010 (Bacteriology), *5030 (Nematology), *7003 (Ag. Genomics)	8400 (Plant-Host Interaction), 8999 (Research)	Depending on discipline of the student: MS: Final oral examination. Beginning to advanced levels. MS thesis; advanced level
	LO#9: Know the principles of plant disease management and how to deploy integrated plant health management strategies;	8400 (Plant-Host Interaction)	*5030 (Nematology), 5120 (Dis. of Ornamentals), 8902 (Extension)	5110 (Forest Health Protect.), 5130 (Turf Dis.), 5140 (Dis. of Field Crops), 5150 (Fruit and Veg Dis.), *5603 (Dis. Mgt), 5604 (Capstone),*6001 (Adv. Plant Path), *7002 (Epidemiology), *8300 (Current Topics)	Depending on discipline of the student: MS: Final oral examination. Beginning to advanced levels. MS thesis; advanced level
	LO#10: Know the basic tenets and applications of genetic and genomic-based studies as they relate to plant pathology;	*5020 (Virology), *6001 (Adv. Plant Path), 8899 (Seminar)	*5010 (Bacteriology), *5030 (Nematology), *5040 (Mycology Lecture), *7003 (Ag. Genomics)	8400 (Plant-Host Interactions), 8999 (Research)	Depending on discipline of the student: MS: Final oral examination. Beginning to advanced levels. MS thesis; advanced level

	Program Learning Outcomes/Goals	Course that achieves this goal at a beginning level	Course that achieves this goal at an intermediate level	Course that achieves this goal at an advanced level	OTHER means of assessment
SKILLS	***Plant Pathology***				
	LO#11: Be able to diagnose plant diseases (and use Koch's Postulates) and explain pathogen-induced changes on plant anatomy and physiology;	*5020 (Virology), 5110 (Forest Health Protect.), 5120 (Dis. of Ornamentals), *6001 (Adv. Plant Path)	*5010 (Bacteriology), *5030 (Nematology), 5130 (Turf Dis.), 5150 (Fruit and Veg Dis.), *5603 (Dis. Mgt.), 8899 (Seminar)	5140 (Dis. Of Field Crops), *5685 (Dis. Diagnosis), 8999 (Research)	Depending on discipline of the student: MS: Final oral examination. Beginning to advanced levels. MS thesis; advanced level
	LO#12: Be able to isolate and identify plant-associated microbes that affect plant health and know classical, biochemical and molecular characterization methods;	*5020 (Virology), 5120 (Dis. of Ornamentals), *5603 (Dis. Mgt.)	*5030 (Nematology), 8899 (Seminar)	*5010 (Bacteriology), *5041 (Mycology Lab), *5685 (Dis. Diagnosis), 8999 (Research)	Depending on discipline of the student: MS: Final oral examination. Beginning to advanced levels. MS thesis; advanced level
	Research				
	LO#13: Be able to generate and test hypotheses on a central research question using the scientific method;	*5020 (Virology), *5040 (Mycology Lecture)	*5010 (Bacteriology), 5140 (Dis. of Field Crops), *7002 (Epidemiology), 8899 (Seminar)	*8300 (Current Topics), 8400 (Plant-Host Interaction), 8999 (Research)	MS : Written research proposal and defense (administered by advisor and SAC); advanced level. MS: Annual student evaluation by faculty advisor; advanced level. MS: Public seminar and final seminar requirements; intermediate-advanced level. MS: Publications; advanced level. MS: Final oral examination; advanced level. MS thesis: advanced level

	Program Learning Outcomes/Goals	Course that achieves this goal at a beginning level	Course that achieves this goal at an intermediate level	Course that achieves this goal at an advanced level	OTHER means of assessment
	LO#14: Be able to conduct experiments using good laboratory/field practices and standard operating procedures;	*5020 (Virology), *5041 (Mycology Lab), *6001 (Adv. Plant Path)	*5010 (Bacteriology), 5140 (Dis. Of Field Crops), *7002 (Epidemiology), 8400 (Plant-Host Interaction), 8899 (Seminar)	8999 (Research)	MS: Annual student evaluation by faculty advisor; advanced level. MS thesis; advanced level
	Communication				
	LO#15: Be able to communicate with diverse audiences in both written and oral forms and describe, interpret and present a disease related topic; and	*5020 (Virology), *5040 (Mycology Lecture), 5110 (Forest Health.), 6193 (Individual Stud.)	*5010 (Bacteriology), 5120 (Dis. Of Ornamentals), 5130 (Turf Dis.), *5603 (Dis. Mgt.), 5604 (Capstone), *5685 (Dis. Diagnosis), *6001 (Adv. Plant Path), *7002 (Epidemiology), 8400 (Plant-Host Interaction)	5140 (Dis. Of Field Crops), *8300 (Current Topics), 8899 (Seminar)	MS: Written research proposal (administered by advisor and SAC); Oral presentation of research proposal. Beginning-intermediate level. MS: Annual student evaluation by faculty advisor; advanced level. MS: Public seminar and final seminar requirements; intermediate-advanced level. MS: Publications; advanced level. MS: Participation in professional meetings; intermediate-advanced. MS: Final oral examination; advanced level. MS: dissertation; advanced level.
PROFESSIONALISM	LO#16: Demonstrate professional behavior that is consistent with the highest ethical and moral standards.	*5020 (Virology)	*5010 (Bacteriology), *5030 (Nematology), 5110 (Forest Health Protect.), 5120 (Dis. of Ornamentals), *5685 (Dis. Diagnosis)	5140 (Dis. Of Field Crops), 5604 (Capstone), *8300 (Current Topics), 8899 (Seminar), 8999 (Research)	MS: Final oral defense; advanced level. MS: dissertation; advanced level. MS: Publications; advanced level. MS: Annual student evaluation by faculty advisor; advanced level.

I. MEANS TO EVALUATE ACHIEVEMENT OF PROGRAM GOALS

A. Evaluation of the students

1. Classroom-based assessments - Learning Outcomes

LO #1-16 will be assessed through classroom examinations, quizzes, laboratory reports, written and oral assignments. The required plant pathology (PP) core of classes encompasses all LOs. Classroom examinations, quizzes, laboratory reports, written and oral assignments will also be used as assessments in elective classes.

Grade point average is monitored quarterly by the Graduate School and the Plant Pathology Graduate Program. To be in good standing in the Graduate School, a student must maintain a graduate cumulative point-hour ratio (CPHR) of 3.0 or better in all graduate credit courses and must maintain reasonable progress toward Graduate School or graduate program requirements.

2. Evaluation of LO #13 and 15 is also assessed by preparation of a research proposal.

Plant Pathology Students pursuing the MS degree must prepare a written proposal to be used as the basis for the MS thesis within the first year of their program. The SAC members review and approve the proposal.

All first-year students present their research proposals to the department in an oral seminar of 20 minutes in length and answer questions pertaining to the proposed work or base knowledge of the field.

All first-year students must present their research proposal to their SAC and defend the proposal in an oral exam administered by the committee (1-2 hours). This oral defense is intended to be a means by which the committee can determine the student's proficiency and further needs for development in coursework or research.

3 Evaluation of LO #13 and 15 is assessed in part by a seminar requirement.

Graduate students are required to present one seminar per year at a public venue. This includes the minimum of one presentation for the M.S. degree in PLNTPTH 8899. Participation in regional or national professional meetings, including oral or poster presentation of research is encouraged and expected of graduate students.

4 LO #13, 15 and 16 is assessed in part by written publications.

Graduate students are expected to work with their major advisors to prepare manuscripts for publication in professional journals. Students are strongly encouraged to have at least one manuscript accepted prior to graduation.

5. Evaluation of LO #1, 2, 3, 4, 13, 14, 15, and 15 is assessed in part by the written M.S. thesis requirement.

M.S. thesis must be approved by faculty advisor and SAC members.

6. Evaluation of LO #1, 3, 4, 13, 14, 15 and 16 are assessed in part by the final oral examination in defense of the thesis as administered by the Student Advisory Committee. Depending on the student's discipline, the student may also be evaluated for LO# 5, 6, 7, 8, 9, and 10 to varying levels.

7. Evaluation of LO# 1, 3, 4, 13, 14 and 15 is documented yearly by the faculty advisor in an annual student evaluation process.

The faculty advisor completes a "Graduate Student Evaluation, Goal Setting and Progress Report" that includes assessment and performance of the student in the following categories: Knowledge of Field; Productivity; Communication, Technical Skills, Intellectual Skills and Professionalism. The evaluation is discussed with the student and the student has the opportunity to provide feedback in writing.

B. Evaluation of the courses

1. Student feedback

Student feedback will be collected through the Student Evaluation of Instruction and narrative evaluations administered towards the end of each term in each course. Narrative evaluations, which are anonymous, ask for student feedback on the course content, delivery method and the effectiveness of the instructor. Student feedback is also sought informally through discussions with students.

2. Instructor feedback

Department chair meets with faculty and instructors to discuss course outcomes, teaching methods and related issues. For faculty, this is part of the annual program review process.

3. Staggered course reviews

On a staggered rolling schedule, each course will be evaluated by the Department of Plant Pathology Academic Affairs Committee with regard to content, quality of instruction, and course structure. Each course will receive a review once every 4 years. The committee will consider student written reviews, faculty self assessment of course, and student interviews. Specific attention will be given to how each course accomplishes the learning objectives they are prescribed (see table above). Courses that do not cover the expected learning objectives will be asked to alter the curriculum to do so, or work with the committee to ensure that the objective is covered in another required course.

C. Evaluation of the program and curriculum

1. Several types of data are collected and monitored annually and reported to CFAES and other institutions. These data are used to guide program changes.

Total Graduate Enrollment, Diversity in ethnicity and gender, Time to Degree, Percent Completion, Credit Hours Generated, Career Placement, Graduate School Quality Parameters of GRE (Quantitative, verbal, and analytical writing), Undergraduate GPA (low GPA waivers for students with undergraduate GPA < 3.0 or equivalent), Master's degree GPA (if applicable), Publications - Peer-reviewed journal articles (number of student authors), Presentations at professional meetings, and Honors and recognition at local and national levels

2. Alumni Review

Following successful completion of their degree, each student spends time with the Department Chair to discuss the program as a whole, individual courses, and the quality of education. These discussions are key points of assessment that are used to guide future

development of the program. Following the exit interview, the Department Chair will either make incremental changes or charge the Academic Affairs Committee to research issues and develop an ongoing plan for program enhancement.

Within four years of graduation, the graduate coordinator will send alumni a questionnaire. The questionnaire will assess how the graduate feels the program enabled them to obtain a position in the field, prepared them for their careers, and changes that should be made. Results of the questionnaire will be shared with the Department Chair and the Academic Affairs Committee to identify key strengths and challenges to address.

II. USES OF THE ASSESSMENT DATA

A. Students

Instructors assess student performance on the classroom assignments, provide feedback and make suggestions for improvement. Additional assistance and resources are also made available to students as appropriate. Graduate students regularly meet with their advisor, the Graduate Studies Chair and the Department Chair. The Department Chair or the faculty advisor conducts an exit interview with Ph.D. graduates to gather feedback on the program. Graduate students have a formal opportunity to document concerns or issues during the Annual Graduate Student Evaluation.

Following Graduate School guidelines, a student with fewer than 15 earned hours of graduate credit whose Cumulative Point Hour Ratio (CPHR) is below 3.0 will receive a "poor performance" letter from the Graduate School. A student whose graduate CPHR falls below 3.0 after 15 graduate credit hours have been attempted is placed on probation by the Dean of the Graduate School. In both cases, consultations are scheduled between the student, faculty advisor, and in some cases, the Graduate Studies Chair.

B. Courses

1. Student feedback

   Each instructor uses the student evaluations/narrative comments to self assess course content and delivery methods, and to guide changes. Areas of strength and weakness are identified and adjustments are made accordingly. The department chair monitors evaluations and course enrollment trends and engages faculty in discussion about the course.

2. Instructor feedback

   All faculty and instructors in the department are evaluated. For each P&T eligible faculty member, the department assigns a Teaching Evaluation (TE) Committee, composed of two faculty members of senior rank. Professors do not have a TE Committee but the department continually evaluates graduate student advising and Extension-Outreach teaching through informal discussions with graduate students.

   A formal evaluation process for lecturers is being developed. In recent years, lecturers have been utilized more regularly to teach general education courses in the department. In 2009, the department chair began to implement a more formal evaluation of instructors, which include one-on-one meetings with each instructor. Feedback from faculty and the instructors was sought and will be incorporated into the evaluation process.

3. Evaluation of course enrollment

Department Chair and the Departmental Academic Affairs Committee make 4-year rolling assessments based on changes and trends in course enrollment. Instructors will evaluate their courses annually. Changes can include discontinuing courses with low enrollment, adding course sections to accommodate growing enrollment, or adding courses based on student interest and need to cover learning outcomes.

C. Program/Curriculum

1. Institutional Assessments (Department, CFAES, and University)

The Plant Pathology Graduate Studies Committee works with the Department Chair and the faculty to assess the graduate program, including overall student performance, enrollment, time to degree, program quality and other aspects. The Graduate Studies Committee provides updates and summaries at quarterly department meetings.

The Doctoral Program Assessment and Plan (April 2008) administered by the Graduate School classified the university's graduate programs into one of six groups: High Quality, Strong, Good, New and/or Developing, Reassess and/or Restructure, and Divestment or Elimination. The Plant Pathology Graduate program was classified as *Good*: Doctoral programs that are doing reasonably well and appear to have viable plans for moving ahead.

Based on feedback from the Graduate School and CFAES, the Department of Plant Pathology submitted a Plan for Enhancing Doctoral Program Quality to CFAES. The plan was devised by the Graduate Studies Committee with extensive input from faculty, academic staff and graduate student representatives. Areas needing improvement are low GRE scores (particularly low verbal scores) and the number of low GPA petitions to the Graduate School for doctoral students. Progress in these areas is reported annually to CFAES as part of the Annual Program Review (Academic Programs).

Diversity in gender, ethnicity and sexual orientation is documented in the department's annual Diversity Report to CFAES. The plan, which addresses diversity in graduate and undergraduate student enrollment, faculty and staff, includes demographics, actions and future plans pertaining to recruitment and retention, target goals, and identification of strengths, barriers and opportunities.

2. External Reviews

NSF/NIH Survey of Graduate Students and Post-doctorates in Science and Engineering
This is an annual survey of academic institutions in the United States. Ohio State and the Department of Plant Pathology provide data on the number and characteristics of graduate students, postdoctoral appointees, and doctorate-holding non-faculty researchers. NSF uses the results of this survey to assess shifts in graduate enrollment and postdoctoral (postdoc) appointments and trends in financial support, MS/PhD enrollment; gender; domestic/international; underrepresented minorities; funding of graduate students, funding source by category. These data are similar to the metrics that are monitored by our program in Part A and assessed and evaluated on an annual basis.

Assessment of Research Doctoral Programs (National Research Council)
Data collected in (2006/2007). Final report is yet to be released but anticipated to be this year.
The assessment will offer data about program characteristics that will be of interest to policymakers, researchers, university administrators, and faculty, as well as students

considering doctoral study. The assessment analyzes and combines these data to create ranges of rankings that allow the comparison of different doctoral programs within a field (A Guide to the Methodology of the National Research Council Assessment of Doctorate Programs, 2009, www.nap.edu/catalog/12676.html) (Coordinated by Institutional Research and Planning, Ohio State)

National Study of Instructional Costs and Productivity (University of Delaware)
Data on 2009 FY budgets and AU 2008 course enrollments/credit hours submitted; final report not yet released.
Study to provide benchmark comparisons of teaching workloads, instructional costs and productivity. (Coordinated by Institutional Research and Planning)

Master of Science in Plant Pathology

Learning Outcomes

AREAS	Upon successful completion of the Plant Pathology Master's Program, students should:
Foundational Knowledge	***Global Perspectives***
	1. Understand the importance of the history, principles, and practices of plant pathology;
	2. Understand social and global issues pertinent to plant pathology, including economic, political, scientific and ethical perspectives that pertain to international development and commerce;
	Core Science and Mathematics
	3. Know the basic core foundation in biology (including general plant anatomy and physiology), chemistry, mathematics, and statistics;
	Plant Pathology
	4. Understand the fundamental biology of the major pathogen groups and plant-associated microbes that affect plant health, including fungi, oomycetes, bacteria, viruses, and nematodes;
	5. Understand how plant diseases develop temporally and spatially in plant populations using simple mathematical models;
	6. Understand the basic ecology of plant-associated microbes including means of transmission, dissemination and survival;
	7. Know the molecular basis for disease development and suppression as it relates to pathogenesis, host resistance, and biological control;
	8. Know and characterize major mechanisms of plant disease resistance and host-pathogen interactions at the cellular and molecular levels;
	9. Know the principles of plant disease management and how to deploy integrated plant health management strategies;
	10. Know the basic tenets and applications of genetic and genomic-based studies as they relate to plant pathology;
Skills	***Plant Pathology***

	11. Be able to diagnose plant diseases (and use Koch's Postulates) and explain pathogen-induced changes on plant anatomy and physiology;
	12. Be able to isolate and identify plant-associated microbes that affect plant health and know classical, biochemical and molecular characterization methods;
	Research
	13. Be able to generate and test hypotheses on a central research question using the scientific method;
	14. Be able to conduct experiments using good laboratory/field practices and standard operating procedures;
	Communication
	15. Be able to communicate with diverse audiences in both written and oral forms and describe, interpret and present a disease related topic;
Professionalism	16. Demonstrate professional behavior that is consistent with the highest ethical and moral standards.

Master of Science in Plant Pathology

Learning Outcomes

AREAS	Upon successful completion of the Plant Pathology Master's Program, students should:
Foundational Knowledge	***Global Perspectives***
	1. Understand the importance of the history, principles, and practices of plant pathology;
	2. Understand social and global issues pertinent to plant pathology, including economic, political, scientific and ethical perspectives that pertain to international development and commerce;
	Core Science and Mathematics
	3. Know the basic core foundation in biology (including general plant anatomy and physiology), chemistry, mathematics, and statistics;
	Plant Pathology
	4. Understand the fundamental biology of the major pathogen groups and plant-associated microbes that affect plant health, including fungi, oomycetes, bacteria, viruses, and nematodes;
	5. Understand how plant diseases develop temporally and spatially in plant populations using simple mathematical models;
	6. Understand the basic ecology of plant-associated microbes including means of transmission, dissemination and survival;
	7. Know the molecular basis for disease development and suppression as it relates to pathogenesis, host resistance, and biological control;
	8. Know and characterize major mechanisms of plant disease resistance and host-pathogen interactions at the cellular and molecular levels;
	9. Know the principles of plant disease management and how to deploy integrated plant health management strategies;
	10. Know the basic tenets and applications of genetic and genomic-based studies as they relate to plant pathology;
Skills	***Plant Pathology***

	11. Be able to diagnose plant diseases (and use Koch's Postulates) and explain pathogen-induced changes on plant anatomy and physiology;
	12. Be able to isolate and identify plant-associated microbes that affect plant health and know classical, biochemical and molecular characterization methods;
	Research
	13. Be able to generate and test hypotheses on a central research question using the scientific method;
	14. Be able to conduct experiments using good laboratory/field practices and standard operating procedures;
	Communication
	15. Be able to communicate with diverse audiences in both written and oral forms and describe, interpret and present a disease related topic;
Professionalism	16. Demonstrate professional behavior that is consistent with the highest ethical and moral standards.