A. Ph.D. in Entomology

B. Vision and Mission Statement: The Oklahoma State University Department of Entomology and Plant Pathology will work to maintain and strengthen its national recognition as a highly reputable department, respected for its productive, high quality programs in fundamental and mission-oriented research, extension and instruction.

The mission of the Department of Entomology and Plant Pathology is to discover, develop, disseminate and preserve knowledge needed to enhance the productivity, profitability and sustainability of agriculture; conserve and improve natural resources and the physical environment; improve the health and well-being of all segments of society; and to instill in its students the intellectual curiosity, discernment, knowledge, and skills needed for their individual development and contribution to society.

To this end, the department proposes to offer a nationally recognized program in entomology and plant pathology that graduates qualified professionals for positions in industry, education and further professional matriculation. Students will be educated in integrated pest management, classification, ecological methods, molecular biology and current practices that prepare them to analyze and solve problems related to integrated management of insect and/or plant disease problems. Through this process they will become proficient in diagnoses associated with plant and/or animal systems.

Primary Student Learning Outcomes:

1. Graduates will be able to communicate effectively through writing, speaking and graphics.

2. Graduates will be able to critically analyze insect and disease related problems and propose relevant solutions.

3. Graduates will understand integrated pest management and diagnostic techniques, to decipher pest related problems and suggest viable solutions.

4. Graduates will have knowledge of diagnostic materials, their use and care and be capable of using these tools to identify pest related problems and propose viable solutions.

Goals and Objectives:

1. Critical thinking/research. Graduates will demonstrate the ability to think critically and apply the scientific method and knowledge of entomology and related disciplines in conducting research and solving environmental needs and concerns related to arthropods (demonstrated problem-solving skills). This includes the possession of field, laboratory and computer skills for conducting research and the ability to plan, execute, and interpret experiments. Included are abilities in experimental design, analysis of data, and critical evaluation.

2. Knowledge of selected disciplines. Graduates will have acquired fundamental knowledge in the selected field and understanding of the principles underlying the field. Also, the possession of substantial understanding of the biological sciences, statistics and ecological principles. Included are assimilation of information, its integration with other knowledge, and its intelligent use.
3. **Effectiveness in communicating scientific findings and issues.** Graduates will demonstrate ability to evaluate and communicate scientific data to others in writing and in oral and visual presentations.

4. **Preparation for careers in entomology, plant pathology and/or related industries.** Students will be prepared for varied careers associated with entomology or related industries including further training (graduate or professional school, or postdoctoral positions) and a commitment to a lifetime of continual learning.
<table>
<thead>
<tr>
<th>C. Primary expected student learning outcomes</th>
<th>D. Methods that will be used to assess each outcome method</th>
<th>E. Timeline for use (i.e., annually)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Graduates will demonstrate their ability to think critically and apply the scientific method and knowledge of entomology and related disciplines in conducting research.</td>
<td>1a. Dissertation evaluation (see appendix III (items B, C, D, E, H, I, J, K, L, M, N, O))</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>1b. Preliminary examination evaluation (see appendix II) *</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>1c. Exit Survey (see appendix IV (item B))</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>1d. Alumni Survey, Items 5, 7, 8</td>
<td>Alternate Years</td>
</tr>
<tr>
<td>2. Graduates will demonstrate knowledge of core curriculum in entomology: (i.e. – Systematics, Physiology, Ecology, Biochemistry, Molecular Biology).</td>
<td>2a. Dissertation evaluation (see appendix III (items A, P &amp; F)).</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>2b. Oral presentation evaluation (see appendix I (Item G).)</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>2c. Written preliminary question examination (see appendix II)*</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>2d. Exit survey (see appendix IV(items C and D)).</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>2e. Alumni Survey (appendix V (item 5))</td>
<td>Alternate Years</td>
</tr>
<tr>
<td>3. Graduates will demonstrate ability to evaluate and communicate scientific data to others in writing and in oral and visual presentations.</td>
<td>3a. Dissertation evaluation (see appendix III (items H, I, J, K, L &amp; O)).</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>3b. Oral (seminar) presentation evaluation (see appendix I (items A, B, C, D, E, F &amp; H)).</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>3c. Exit survey (see appendix IV(item A)</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>3d. Alumni survey (appendix V (item 6))</td>
<td>Alternate Years</td>
</tr>
<tr>
<td>4. Graduates will be prepared for varied careers associated with entomology and/or related industries including further training (graduate or professional school, or postdoctoral positions) and a commitment to a lifetime of continual learning.</td>
<td>4a. Exit Survey and Subsequent exit interview (appendix IV (items A-D))</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>4b. Alumni survey (appendix V (items 1-12))</td>
<td>Alternate Years</td>
</tr>
</tbody>
</table>

Information will be collected and compiled by the Assessment Coordinator. Data for each degree will be summarized and reported independently within the complete report. Copies of assessment reports are given to all faculty and to the Department Head. Data from the exit interviews (Appendix IV) will be summarized in the annual assessment report and reviewed by faculty/curriculum committee. Reports will be discussed with the Department Head and the Curriculum and Graduate Student Selection Committees. These individuals/committees will discuss the outcome competencies that the Department’s graduate programs expect from our graduates. When ideas for improvement are identified, they will be brought to the full faculty. The departmental faculty will discuss and improve the curriculum and other key elements of the graduate program.
I. Appendix – Evaluation of Graduate Student Oral Presentations Ph.D. - Entomology
Evaluation of graduate student seminars, other presentations, and/or oral presentation of thesis/dissertation results will be conducted by the General Seminar Committee, members of the Assessment Committee, the Student’s Graduate Committee, and/or other faculty as appropriate. Evaluation and reporting will occur yearly. Only one presentation per student will be included in assessment.

1. Introductory Seminar, MS thesis/report, or Ph.D dissertation presentation - During their second semester, all graduate students will be expected to present an introductory seminar to include information about themselves and their proposed research program. Due to their level of appreciation for their new program, evaluation of this seminar will be quite lineate using the following rubric. The following questions will be answered on a five point scale (1 = Strongly disagree to 5 = Strongly agree). Before their final defense (MS thesis/report or Ph.D dissertation report), all graduate students are expected to present the results of their research to the general faculty. The same evaluation form will be used for assessment of these opportunities.

**Oral Presentation Assessment Instrument (please check one box only)**

☐ Introductory Seminar  ☐ M.S. Thesis Seminar  ☐ Ph.D. Dissertation Seminar

**Note to Evaluators**: These evaluations will be conducted for educational assessment purposes only. Records of responses will be kept anonymous with respect to the student and do not in any way become part of the student’s record or grade. Thus, please do not write the student’s name or other such identifying information on the form. The responses will not be shared with the student. This same form will be used for all public oral presentations by the student.

Evaluator’s name: ____________________________

Semester and year of presentation: ____________

Please read each of the statements below and respond by adding a number indicating your level of agreement/disagreement with the statement, according to the following scale:

1. strongly disagree  2. disagree  3. neutral  4. agree  5. strongly agree

A. _____ Presentation was well organized.
B. _____ The delivery of the presentation was superb.
C. _____ Illustrations were excellent (easily visible, got the point across, sparing of words).
D. _____ I understood what the main points of the presentation were.
E. _____ The speaker fielded questions satisfactorily.
F. _____ The presentation generated questions and/or discussion from the audience.
G. _____ Speaker was knowledgeable about the subject and the literature.
H. _____ The presentation was appropriate for the target audience.
I. _____ Overall, this was an excellent seminar.

Optional Comments: (Use back of form or additional sheets if needed. Of special interest is item G.)
II. Appendix – Evaluation of Preliminary Examination for Ph.D. Students - Entomology

This assessment will occur on each student taking written preliminary examinations. To utilize this process to assess learning, the student’s graduate committee will complete the following assessment instrument and return them to the assessment coordinator.

**Preliminary Examination Assessment Instrument (please check one box only)**

☐ Written Examination  ☐ Oral Examination

**Note to Evaluator.** This rubric is for outcomes assessment only. It is not intended as part of your evaluation of the student’s qualifications. It will not become part of the student’s record. Records of your responses will be kept anonymous with respect to the student. Thus, please do not write the student’s name or other such identifying information on the form. Please return the completed form to the Assessment Coordinator.

Evaluator’s name: ________________________ Month/Year of examination: __________
Month/Year student entered the program: __________

Please read each of the statements below and respond by adding a number indicating your level of agreement/disagreement with the statement, according to the following scale:

1. Strongly disagree  2. disagree  3. neutral  4. agree  5. strongly agree

1. _____ Student has excellent background knowledge in the field of his/her research project.
2. _____ Student has excellent background knowledge in the specific areas of entomology and/or plant pathology of his/her training.
3. _____ Student interprets data well.
4. _____ Student is able to construct hypotheses well.
5. _____ Student is familiar with most analytical instruments and methods used in his/her area, including the principles on which they are based.
6. _____ Student can design properly controlled experiments.

7. For the following disciplines, please indicate your perceptions of the student’s knowledge.

Enter “0” or leave blank if you cannot judge these areas based on this examination.

<table>
<thead>
<tr>
<th>Systematics and/or classification</th>
<th>Biotechnology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Pest Management</td>
<td>Biological control</td>
</tr>
<tr>
<td>Ecological principles and methods</td>
<td>Morphology</td>
</tr>
<tr>
<td>Physiology (Arthropod or Plant)</td>
<td>Diagnostics</td>
</tr>
<tr>
<td>Statistics</td>
<td>Professionalism</td>
</tr>
<tr>
<td>Molecular biology</td>
<td>Teamsmanship</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>Collegiality</td>
</tr>
<tr>
<td>Toxicology</td>
<td></td>
</tr>
<tr>
<td>Host plant resistance</td>
<td></td>
</tr>
</tbody>
</table>

Optional Comments: Use the back of form or additional sheets if needed.

Each advanced degree candidate must undergo a final oral examination given by the student’s graduate advisory committee. The dissertation/thesis serves as the central element for this examination, but other questions concerning the student’s overall graduate program are frequently included. Each thesis/dissertation and its defense will be evaluated the student’s graduate advisory committee using the following rubric.

**PhD Dissertation Assessment Instrument**

**Note to Respondent:** This assessment instrument is for outcomes assessment only. This evaluation is not intended for evaluation of the student’s qualifications for the degree and will not become part of the student’s record. Records for your responses will be kept anonymous with respect to the student. Thus, please do not write the student’s name or other such identifying information on the form. Please return the completed form to the Departmental Assessment Coordinator.

Evaluator’s name: ___________________________________________
Month and year of defense: ____________
Month and year student entered the program: ____________

Please respond to each of the statements below by indicating your level of agreement/disagreement with the statement, according to the following scale (some questions have comments indicating how your rating may be interpreted.

1. Strongly disagree  2. disagree  3. neutral  4. agree  5. Strongly agree

A. _____ Candidate was broadly aware of the literature both directly relevant to the work done and from related fields. (5= aware of literature both directly relevant to the work done and from related fields; 4=aware of all directly relevant literature; 3=aware of a good range of literature; 2=only aware of key papers; 1=totally unaware).

B. _____ Thesis/dissertation tested hypotheses generated by the candidate from an analysis of previous work, both published and unpublished. (5=candidate generated the hypothesis and mastered the analysis that led to it; 4=candidate did not generate hypothesis but has mastered the analysis that led to it; 3=knows the hypothesis; 2=doesn’t know the hypothesis; 1=no hypothesis.)

C. _____ Experiments reported were designed well to test hypotheses.

D. _____ Experiments included all necessary positive and negative controls.

E. _____ Results of experiments were interpreted appropriately.

F. _____ Results were placed in proper context of other work.

G. _____ Work contributes to the advancement of the field.

H. _____ Thoughts were logically organized.

I. _____ Thoughts were expressed clearly, using appropriate words, correct grammar, etc.

J. _____ Good use was made of tables and figures.

K. _____ Tables and figures were easily comprehensible.

L. _____ Appropriate credit given to ideas, quotations and illustrations taken from other sources.

M. _____ Work reported used appropriate laboratory methods.

N. _____ Work reflects candidate’s competency in use of computational tools.

O. _____ Candidate readily understood questions asked of him/her in the defense.

P. _____ Candidate answered defense questions thoroughly and, to the best of my knowledge, correctly.

Other comments:
IV. Appendix – Evaluation of all undergraduate and graduate programs using initial exit survey and subsequent exit interview information from students.

1. Exit interview survey – Prior to an official exit interview, all graduates will be asked if their OSU education prepared them for their careers using the following questions, to be answered on a five point scale (1 = strongly disagree to 5 = strongly agree or not applicable).

   A. My OSU education prepared me to communicate ideas verbally and graphically.
   
   B. My OSU education taught me to analyze arthropod and/or plant disease related problems and propose relevant solutions.
   
   C. My OSU education provided me an understanding of integrated pest management and ecological methods associated with arthropods and/or plant pathogens.
   
   D. My OSU education provided me an understanding of basic diagnostic techniques for identifying arthropod and/or plant disease related problems.

   **Timeline:** At the end of each academic year surveys will be tabulated and an assessment summary report provided.

2. Exit Interviews – All graduates will be asked to meet with the Department Head immediately prior to the time of graduation. These meetings will be informal, but notes from the meetings will be preserved. The exit interviews will include any discussion the graduate wishes to include but will always include questions concerning the curriculum, quality of instruction and advising, extracurricular activities and information pertaining to job placement. Results of these exit interviews (frequently heard concerns, new issues of interest, degree of satisfaction with the program, suggested changes) will be summarized and reported in the annual assessment report.
V. Appendix – Alumni Satisfaction Surveys for Entomology Ph.D. Degree Program

OSU Student Alumni Survey – Program-specific Questions for Entomology

In which program did you participate in while in our department?

1. What did you see as the primary strength of the Entomology program in which you participated?
2. What did you see as the primary weakness of the Entomology program in which you participated?
3. What should the department of Entomology and Plant Pathology do to improve its graduate programs (based on the one with which you were involved)?
4. Did you publish the research from your OSU dissertation?
5. I expanded my knowledge and skills in my field of study.
   1= not at all
   2= very little
   3= moderately
   4= above expectations
   5= a great deal
   Don’t know
   Refused

6. I improved my professional writing skills.
   1= not at all
   2= very little
   3= moderately
   4= above expectations
   5= a great deal
   Don’t know
   Refused

7. I improved my computer use/application skills.
   1= not at all
   2= very little
   3= moderately
   4= above expectations
   5= a great deal
   Don’t know
   Refused

8. I increased my ability to critically examine my own ideas and the ideas of others.
   1= not at all
   2= very little
   3= moderately
   4= above expectations
   5= a great deal
   Don’t know
9. My performance in my current position has been enhanced because of the education I received during my OSU Entomology and Plant Pathology program.
   1= not at all
   2= very little
   3= moderately
   4= above expectations
   5= a great deal
   Don’t know
   Refused

10. Entomology and Plant Pathology faculty members were interested in the welfare and professional development of students. Would you…….
    Strongly disagree
    Disagree
    Neutral
    Agree
    Strongly agree
    Don’t know
    Refused

11. The quality of academic advising in the Entomology and Plant Pathology program was excellent. Would you ……..
    Strongly disagree
    Disagree
    Neutral
    Agree
    Strongly agree
    Don’t know
    Refused

12. I have continued to grow and learn in my professional and personal life. I consider myself a life long learner. Would you…….
    Strongly disagree
    Disagree
    Neutral
    Agree
    Strongly agree
    Don’t know
    Refused