

# Biology Graduate Student Handbook



GUIDELINES FOR THE MASTERS PROGRAM IN BIOLOGY  
**THESIS OPTION**

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GUIDELINES FOR THE MASTERS PROGRAM IN BIOLOGY  
NON-THESIS OPTION

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# PROFESSIONAL GROWTH OPTION

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# THESIS TRACK

## INTRODUCTION

This compilation of procedures and advice is intended to provide both graduate students and faculty in Biology with guidelines for completion of the Masters Degree. The document was prepared, and will be periodically updated, by the Graduate Committee. In all instances, University policy will supersede policy in this handbook.

## OBJECTIVES OF THE PROGRAM

The MS program in Biology at West Chester University is intended to a) provide exposure to a broad range of concepts and techniques in modern biology at the graduate level, b) develop skills in a particular interest area, and c) provide an opportunity for experimental design and analysis related to research. The program is intended both for students seeking positions requiring Masters-level education and for students intending to enter doctoral programs. An important feature of the program in meeting objectives b and c above is the requirement of a thesis. Core course requirements are intended in part to provide additional exposure to other disciplines outside the thesis area (objective a).

Full-time students in the program normally take 3 courses per semester and finish the degree in approximately 2 years. Part-time students may take a maximum of 6 years to complete the degree, but must be able to perform the necessary research required by the thesis. Most graduate courses are offered at night to accommodate non-traditional or part-time students enrolled in the degree program, as well as to provide courses for non-degree students interested in professional growth.

## GENERAL AND COURSE REQUIREMENTS

Prerequisites for admission and course requirements are determined by the Graduate Catalog in effect at the time of admission to the Biology Program. Three core courses are required for all students taking the thesis option. These are as follows: Thesis Research I (BIO608), Thesis Research II (BIO609), and Thesis (BIO610). The total credit allocated to these three courses is 9 credits. In addition, the student must take an additional 21 elective credits. At least 6 credits come from Group I courses, and 6 credits come from Group II courses. For a complete listing of

courses in each of these groups refer to the Appendix. It is the student's responsibility to make certain that all appropriate course work needed for the degree is taken.

Full time thesis students should take Thesis Research I (BIO 608) in their second semester of study and complete it by the end of that semester. The Thesis Proposal may include the following: a thorough literature review in the area of the Thesis, and any preliminary experimental data the student has acquired for the Thesis. Successful completion of BIO 608 requires the approval of the Thesis Proposal by the student's Thesis Committee. The student then receives a grade for the course from the Thesis Advisor and the completed "Approval of the Thesis Proposal" form must be submitted by the Thesis Advisor to the Graduate Coordinator.

Full time thesis students should take Thesis Research II (BIO 609) in their third semester of study and complete it by the end of that semester. Once all of the experiments have been completed the student, in consultation with the thesis advisor, must setup a meeting of the student's Thesis Committee where the results of the experiments are discussed and reviewed. If all members of the Thesis Committee accept the results, then they must complete the form "Completion of Thesis Research (BIO 609)," submit it to the Graduate Coordinator, and then the advisor should give the student a letter grade for the course.

The Thesis (BIO 610) should be taken in the final semester the student is enrolled (usually the fourth semester) and it is expected that the student defend his/her thesis orally at the conclusion of that semester. In order to maintain full-time status BIO 610 can be taken together with one other course, Directed Research II (BIO 593). The courses, Thesis Proposal (BIO 608), Thesis Research (BIO 609) and Thesis (BIO 610) must be taken under the direct supervision of the Thesis Advisor with input from the student's Thesis Committee. Grading for the Thesis is again the responsibility of the Thesis Advisor. The Thesis Advisor is also responsible for completing electronic and hard copy assessments of the following: 1) first and final thesis drafts, 2) oral communication skills demonstrated during thesis defense, and 3) information literacy.

Of the 30 credits required for the degree, a minimum of 24 must be in Biology. Six credits may be taken in an allied discipline with the approval of the student's Thesis Committee.

Undergraduate prerequisites to the program, or to any of the graduate courses selected, cannot be applied to the degree. Because many elective courses are only offered during alternate years, it is important that the student develop an overall plan for taking preferred courses when they are

available. The student should discuss the course schedule at the first meeting with his/her Thesis Committee. A proposed schedule of biology course offerings is provided in the Appendix.

## REQUIRED FORMS

All required forms required for progression through and completion of the program are located on-line at the Department of Biology website (<http://bio.wcupa.edu/biology/index.php/forms-a-documents.html>) and the Graduate Studies website ([http://www.wcupa.edu/\\_admissions/sch\\_dgr/forms.asp](http://www.wcupa.edu/_admissions/sch_dgr/forms.asp)), respectively.

## COMPLETION OF PREREQUISITES TO FULL MATRICULATION

At the time of acceptance into the program, any deficiencies not completed prior to admission (2 semesters of General Chemistry, 2 semesters of Organic Chemistry, 1 semester of Calculus, 1 semester of Physics) are noted on the application by the Graduate Coordinator. The Thesis Committee reviews these deficiencies at its first meeting with the student (usually held during the first semester of study), and includes any remaining deficiencies in the plan of study timetable. All deficiencies should be completed by the student in a timely manner, usually by the end of their first year. It is the student's responsibility to make certain that all deficiencies are rectified by the given deadlines.

## APPLICATION FOR DEGREE CANDIDACY

Students should typically apply for Admission to Degree Candidacy during the second semester of their first year as a graduate student, once they have completed 12 to 15 credits of course work. This is done by completing the form "Application for Admission to Candidacy for the Degree". A copy containing all signatures will then be maintained in the student's departmental file.

The following are preconditions for Admission to Candidacy for the Thesis Option:

1. Removal of all deficiencies specified by the Thesis Committee at its first meeting.
2. Completion of 12 - 15 semester hours at the Graduate level in Biology, with an overall average of at least 3.0.
3. Selection of a Thesis Advisor and Thesis Committee.

4. Satisfactory (passing) performance at a meeting of the Thesis Committee to evaluate the Thesis Proposal.

#### ROLE OF THE GRADUATE COORDINATOR

All questions concerning degree requirements should be directed to the Graduate Coordinator. Students seeking advice in the initial selection of courses, or requiring general guidance early in their graduate careers, should also consult with the Graduate Coordinator. The Graduate Coordinator is also responsible for keeping track of all student records, and all paperwork related to Admission to the Degree Program, Admission to Candidacy, and Completion of the Masters Degree as described further below.

#### ROLE OF THE THESIS ADVISOR

Once admitted to the program, the student needs to select a thesis advisor before the end of his/her second semester. To select an advisor the student must make contact with a Biology faculty member and that faculty member must agree to act as his/her advisor. The Biology faculty member must inform the Graduate Coordinator via email and the Graduate Coordinator will then officially assign the student as an advisee of the selected Biology faculty member.

The principal responsibilities of the Thesis Advisor include:

1. guidance in the selection of course work
2. providing laboratory space and equipment necessary for conducting the thesis research.
3. advice in the choice of thesis topic, and of the research itself.
4. serving as Chair of the Thesis Committee.

#### THE THESIS COMMITTEE

The Thesis Committee should be chosen in consultation with the Thesis Advisor. Members of the Committee should be selected primarily for their interest in the student's area of research, and for their ability to provide advice or other assistance. See the Department of Biology web page for faculty research interests and publications (<http://bio.wcupa.edu/biology/index.php/faculty-directory.html>). The committee shall meet formally at least four times. The first meeting must occur during the first semester of study or before the completion of 9 credits of graduate study, and

is intended to map out recommended course work, to specify any deficiencies which must be made up by the student (reviewing deficiencies noted by the Graduate Coordinator at the time of admission into the Program) and to obtain a preliminary sense of the student's thesis interests. A “Thesis Committee Composition and Recommendations form” is filled out at that meeting and a copy is filed with the Graduate Coordinator. The student meets with the committee a second time to discuss what he/she will do for the Thesis Proposal. A third meeting will be set up to evaluate the student's Thesis Proposal, and a fourth to participate in the Thesis Defense. In addition, all committee members are expected to attend the Thesis Seminar, normally presented by the student during the final semester of graduate work.

At other times it is the student's responsibility to keep all members of the Thesis Committee informed of progress on the thesis research. So doing can save considerable difficulty and discomfort at the Thesis Defense, and is a courtesy to people who have a genuine interest in the work underway.

The Thesis Committee must consist of at least 3 members of the Faculty in Biology, including the Thesis Advisor who serves as chair of the Committee. An additional committee member is sometimes chosen from outside the department, particularly if a portion of the research is done off campus. Committee members outside the department may also serve as co-chairs, if the other co-chair is a member of the Biology faculty.

The Graduate Coordinator is an ex officio member of all Thesis Committees. It is the responsibility of the Graduate Coordinator to keep records of the Thesis Committee Composition and Recommendations form, the Approval of the Thesis Proposal and the Thesis Defense. The Graduate Coordinator may also serve as a regular, advising and voting member of the Thesis Committee when his/her area of expertise is needed.

## PREPARATION OF THE THESIS PROPOSAL

The thesis topic should be selected in consultation with the Thesis Advisor, and should generally be a subject of mutual interest. Additional considerations in the choice of a topic are the following:

1. The research should be completed within a 1 - 2 year time frame. A clear description of the questions to be asked can save considerable frustration later with a topic, which, once begun, is too open-ended to be addressed in a Masters Thesis.
2. The thesis must be accomplished with equipment and facilities available in the Biology department, or accessible through other departments or institutions.
3. The convenience and expense of the thesis project should be considered. For example, specialized equipment required, study sites, organisms of interest, and obtainment of data should be chosen with concern given to the efficiency of project completion.

It is therefore very important that the Thesis Proposal be prepared with considerable input from the Thesis Advisor and carefully scrutinized by the Thesis Committee. The proposal should contain the following:

### **Introduction**

The Introduction is designed to orient the reader to the general subject, with citations of literature to be used in analyzing the research and to precisely describe the specific problem (hypotheses and questions) to be investigated by the student.

### **Pilot Study**

A brief summary of preliminary data should be presented, if available.

### **Methods**

Proposed methods should be described as a series of experiments, with inclusion of a) equipment to be used and b) a time schedule for completion of the work.

### **Analysis**

The Analysis section should explain rather precisely how the experiments performed will be used to evaluate the Questions and Hypotheses.

## Literature Cited

All references cited in the Thesis Proposal should be included.

## APPROVAL OF THE PROPOSAL

Copies of the thesis proposal are first submitted to each member of the Thesis Committee, and a meeting of the committee to evaluate the proposal is then scheduled by the student. At that meeting the student will be expected to demonstrate both an understanding of the subject area addressed by the proposal, and the feasibility of the intended research.

At the end of the meeting the committee will:

- 1) approve the proposal as written,
- 2) approve the proposal with minor modifications to be made under the guidance of the Thesis Advisor,
- 3) require major modifications, to be evaluated at a second meeting of the Committee.

When the Proposal has been approved, all members of the Thesis Committee will sign a form indicating “Approval of the Thesis Proposal” to be attached to the proposal and kept in the student's file by the Graduate Coordinator.

## NON-TRADITIONAL OPTIONS FOR GRADUATE WORK

Full-time graduate students are usually expected to take 3 courses each semester, and to complete their degrees in a 2-year time interval. Students whose schedules do not permit full-time study may nonetheless enter the program and take course work as their time permits. Because of the intensive nature of the thesis research, the student will usually be urged to consider full-time work toward the degree once Admission to Candidacy has been achieved. Students must complete all requirements for the Masters Degree within 6 calendar years of entry into the Graduate Program.

Students employed by nearby companies or other institutions, which provide facilities for research may elect to do all, or a portion of their thesis research off campus. Students who do this should receive a written assurance that the research will not be considered to be proprietary, and

that it may be published and presented in an open forum. The student should take particular care to describe in detail how the research will be accomplished in the Methods section of the Thesis Proposal. Periodic progress reports should be provided to the Thesis Committee. Inclusion of an appropriate company/institution representative on the Thesis Committee is advisable.

#### DEMONSTRATION OF SATISFACTORY PROGRESS TOWARD THE DEGREE

Full-time students, during their first two semesters, are expected to complete 4 prerequisites for candidacy: 1) 12 - 15 hours of course work, 2) accumulation of at least a 3.0 GPA in Biology, 3) selection of a Thesis Advisor and Thesis Committee, and 4) defense of a Thesis Proposal to the Thesis Committee (BIO 608). In cases where these criteria are not met by the end of the first year, the student may be asked to meet with the Graduate Committee and Thesis Advisor. At that meeting, the student's progress toward the MS degree will be reviewed, and specific, written recommendations may be made by the Graduate Committee for course work or research during the coming (third) semester. The letter would first be sent to the Graduate Dean for signature approval, then sent to the student. If, after the third semester, the student has still not fulfilled the prerequisites for candidacy, the Graduate Committee may decide to terminate the student from the degree program. This would involve a second letter, also sent via the Office of Graduate Studies for prior signature. Such a termination procedure is intended only for extreme cases, in which the student fails totally in working with any potentially suitable Thesis Advisor within the Department, or clearly shows inability to design or conduct independent research. Termination from the program on the above grounds could occur no earlier than the end of the third semester, but at any time thereafter. Ethical misconduct with regard to the acquisition or presentation of data can likewise constitute grounds for dismissal from the program.

If at any time the student's grade point average falls below 3.0, the Graduate Office will place the student on probation, as described in the Graduate Catalog. The GPA must be raised to 3.0 within the next semester of graduate work taken or the student will be dropped from the program. A student may also be dropped from the program by the Graduate Office without probation if the GPA falls below 2.0, or if the student receives an "F".

Part-time (non-traditional) students, because of the broad range of their outside commitments, may require several years to accomplish the criteria leading to candidacy. Such progress is quite acceptable, but it is the student's responsibility to ensure that she/he completes all requirements for the MS degree within the six-year period specified by the Graduate School. The Biology Department Graduate Committee will sometimes support a student originated request to extend the six year deadline for completion of the program, but will do so only in cases where the student has shown substantial progress toward completion of the thesis.

#### CHANGES OF RESEARCH TOPIC

Graduate students frequently encounter unanticipated difficulties with their intended topic of research. If such difficulties require minor alterations of experimental design or research schedule, it is sufficient to simply inform the committee of the changes. However, if the changes are substantial, the Thesis Advisor may call for a new proposal. The new proposal must again be evaluated by the Thesis Committee, and, once approved, should replace the previous proposal in the files of the Graduate Coordinator.

#### SWITCHING FROM THE THESIS TO NON-THESIS OPTION

Changing from the thesis to the Non-thesis option is possible but discouraged. If a change is requested it must be done during the BIO 608 project. A statement outlining reasons for the change must be submitted in writing to the Biology Graduate Committee. The decision whether or not to grant the change will be at the sole discretion of the Graduate Committee, and the decision of the committee shall be final.

A student who has switched programs must also reconstitute his/her Non-Thesis Evaluation Committee. The new committee must meet to plan remaining coursework, and must fill out a "Non-Thesis Committee Composition and Recommendations Form." If a substantial change in the student's intent or focus is the reason for the change in curriculum, some graduate courses taken under the thesis program may not be considered as credit toward the Non-thesis option.

## CHANGES IN THE THESIS COMMITTEE

Occasionally, faculty retirement, sabbatical leaves and similar unanticipated events necessitate the dropping or replacement of a committee member. A member may also ask to be replaced in some instances for a variety of personal or academic reasons. Such replacements can be made at any time, but should be made with the full knowledge of the Thesis Advisor. Written notification of the change should then be made by the Thesis Advisor to the Graduate Coordinator.

Occasionally the Thesis Advisor may feel, for any number of reasons, that he or she can no longer serve as the Thesis Advisor for the student. In such cases, the Thesis Advisor should inform the Graduate Coordinator in writing. That letter should include the information that the Thesis Committee has been dissolved. It is then the student's responsibility to find a new Thesis Advisor and form a new Thesis Committee, usually with the help of the Graduate Coordinator. The new committee should be formally reconstituted at a meeting with all members present. At that meeting a new "Thesis Committee Composition and Recommendations" form should be completed, and the committee should reevaluate the Thesis Proposal if appropriate.

## EVENTS OF THE FINAL SEMESTER

It is the student's responsibility to inform the Graduate Office of an intent to graduate. Deadline dates for this generally fall within the first month of the semester in which the student plans to complete the Masters Degree. The student should consult the Graduate Catalog for the specific dates. The Graduate Coordinator and all Thesis Committee members should also be given an approximate timetable for completion of the thesis at the beginning of the final semester.

## THE THESIS SEMINAR

A research seminar of approximately 50 minutes duration is required of all Masters students nearing completion of their thesis. The seminar should summarize major findings of the research, and is open to the public. The date, time and room in which the seminar will be presented must be advertised to the Biology faculty and any other interested persons at least one week in advance of the event. The seminar often helps to update the Thesis Committee upon work in progress, and should therefore be scheduled at a time when all committee members can be in attendance.

Normally the Thesis Seminar directly precedes the Thesis Defense and is scheduled during the semester of intended graduation.

## THE WRITTEN THESIS

The thesis must follow the WCU Thesis Guidelines for formatting (available on-line at the Graduate Studies website [http://www.wcupa.edu/\\_admissions/sch\\_dgr/documents/thesisguide.pdf](http://www.wcupa.edu/_admissions/sch_dgr/documents/thesisguide.pdf)). Citation style should follow any peer-reviewed journal in the student's discipline or the guidelines of the American Psychological Association. The first draft(s) of the thesis should be evaluated by the Thesis Advisor, and improved to the point where it may be submitted to other members of the Thesis Committee in preparation for the Thesis Defense (below). Once the thesis has been successfully defended to the satisfaction of the Thesis Committee, the student must submit a copy of the thesis to the Graduate Dean for final approval. The thesis is not formally approved until it has been approved by the Graduate Dean. (WCU Thesis Guidelines are

## THE THESIS DEFENSE

At the conclusion of the thesis research, each student must pass an oral Thesis Defense. The defense is usually moderated by the Thesis Advisor, and provides an opportunity for all members of the Thesis Committee to examine the student on the research itself, or on general knowledge areas of biology supportive of the thesis topic. The student is responsible for notifying all Committee members of the time and location of the Defense. A copy of the thesis, already reviewed by the Thesis Advisor, should be given to each Committee member at least one week in advance of the Defense. Committee members are then expected to bring written comments on the manuscript to the Defense, and may use the manuscript as a basis for oral questions related to the research.

At the conclusion of the Thesis Defense, the student will be asked to leave the room briefly while members of the Thesis Committee discuss their views of both the written thesis and oral examination. As with Approval of the Thesis Proposal, the Committee will decide upon one of three courses of action:

1. If only minor changes are suggested for improvement of the thesis, the Committee may decide to leave the responsibility for addressing these changes with the Thesis Advisor. When satisfied, the Thesis Advisor will sign the thesis, which is then taken to other members of the Committee for signatures.

2. If major changes are requested by one or more Committee Members, those changes must be addressed in consultation with both the Thesis Advisor and Committee members involved. Signatures are then secured as before.

3. If the majority of the Committee feels that either the thesis is inadequate or that the student showed a consistent lack of understanding of questions asked in the Oral Examination, specific recommendations for further research, course work or reading will be made by the Committee. Once these recommendations have been met, the student must schedule a second thesis defense. Failure of two such defenses normally results in the student being dropped from the Graduate Program. In order for the thesis to be approved, all members of the thesis committee must agree that the thesis is acceptable.

Infrequently, substantial disagreement within the Thesis Committee may lead to the refusal of one or more Committee members to sign the thesis. In such cases, the Thesis Advisor must request formal review of the Thesis Defense by the Graduate Committee, which will then arbitrate all points of disagreement. Such instances are rare, and can be avoided if the student keeps all Committee members adequately informed of progress with the research.

Once the thesis has been accepted, the student or thesis advisor should obtain signatures of all Thesis Committee members on as many copies of the Signature Page as are intended for binding. One final copy of the thesis, together with all Signature Pages, is then given to the Graduate Coordinator who submits it to the Graduate Office to obtain the signature of the Dean of Graduate Studies. Once approved by the Graduate Office, the student photocopies the thesis and all copies are delivered to the library for binding (at the student's expense; turnaround time about 1 - 2 months). Four copies of the Thesis must be made for the University. Two copies will reside in the library, one with the Graduate Office and one copy with the Department of Biology.

## RESEARCH FUNDING

Funding for both research and conference travel is available (but not guaranteed) from West Chester University. Funds for research are available from the Graduate Dean's Research Fund. Applications may be obtained from the Office of Graduate Studies. In addition, funding for travel to conferences is also available from the Graduate Student Association (GSA). Contact GSA for details.

Additional funding for Graduate Student research theses are available from the Department of Biology Graduate Student Research Award by filling out a standard form available from the Department office. The student must attach a proposal to this form and an itemized budget with justification for the items in the budget. The thesis advisor must also include a letter of support for the student. There is no application deadline for these awards hence applications will be reviewed by a faculty committee on a case-by-case basis.

## COMPUTER ASSESSMENT

All students must complete an on-line assessment of their experiences in the Biology graduate program. The assessment can be found at the department's website under the link titled Web Interviewer (<http://bio.wcupa.edu/biology/index.php/web-interviewer.html>). Contact the Graduate Coordinator for the password.

## EXEMPTION TO POLICY

At any time during the graduate process a student may request an exemption to any of the policies discussed above. The student must fill out the form "Petition for Exemption to Graduate Policy/Regulations" form. This form must be signed by the Biology Graduate Coordinator, the Departmental Chairperson and the Graduate Dean. Final decision will be that of the Graduate Dean.

## GRIEVANCES

Grievances must always be handled at the lowest possible level. The student should first discuss the grievance with their thesis advisor, then if necessary with the Thesis Graduate Committee. If the grievance has not been resolved the student should see the Biology Graduate Coordinator and Department Chairperson. At this time if the grievance is unable to be resolved the grievance will be heard by the Graduate Dean. The decision of the Graduate Dean shall be accepted as final by the student.

## CONTINUING REGISTRATION

Any student who decides not to take courses in any semester, but who still wishes to maintain active status with the University must apply for continuing registration (GSR 799). The student must do this for each semester that he/she wishes to maintain in active status.

# NON-THESIS OPTION

## INTRODUCTION

A Non-thesis option is offered to students interested in the MS program in Biology. A complete list of required and elective courses is shown in the Appendix. The procedures and advice, which follow, are intended to provide both graduate students and faculty in Biology with guidelines for completion of the Masters Degree under the nonthesis option.

## OBJECTIVES OF THE PROGRAM

The Non-thesis option is intended primarily for part-time students in the MS program who cannot devote the time to, or would not benefit from, completion of a thesis. In lieu of the thesis, students take additional coursework (a total of 36 credits) and complete a research project of smaller scale (BIO 591). Students may take a maximum of 6 years to complete the degree. Most graduate courses are offered at night to accommodate non-traditional or part-time students enrolled in degree program, as well as to provide courses for Non-degree students interested in professional growth.

## GENERAL AND COURSE REQUIREMENTS

Prerequisites for admission and course requirements are determined by the Graduate Catalog in effect at the time of admission to the Biology Program. Seven core courses are required for all students. Experimental Design and Analysis (BIO 511) provides an introduction to the design and analysis of biological research. Research Techniques in the Biological Sciences I, II and III (BIO 513, 514 and 515, respectively) provide incoming students with experiences in a variety of fundamental technical skills and expose them to a range of departmental resources within the Department of Biology. In addition, three Course Topics I, II and III, (BIO 535, 536 and 537, respectively), which represent three fundamental concentration areas of Biology (Ecology, Evolution and Organismal Biology; Physiology, Development and Cell Biology; Molecular Genetics, Immunology and Microbiology), are required.

A Guided Study project is also completed by each Non-thesis student by taking BIO 591 as an Independent Study under the direction of one of the Biology faculty (usually the Academic Advisor) as described below.

Additional courses are selected with input from the Academic Advisor and Non-thesis Committee (below). Of the 36 credits required for the degree, all must be at the graduate level and at least 27 must be in Biology (including BIO 511, 513, 514, 535, 536, 537 and 591). Undergraduate prerequisites to the program, or to any of the graduate courses selected, cannot be applied to the degree. Likewise, BIO 593, 609 and 610 are reserved for students in the Thesis Option, and may not be counted toward the degree. It is important that the student meet early on in the program with his/her Non-thesis Committee to develop an overall plan for taking preferred courses when they are available. This is normally done at the first meeting between the student and the Non-thesis Committee, during the first semester. The schedule for the required biology courses is appended.

## REQUIRED FORMS

All required forms required for progression through and completion of the program are located on-line at the Department of Biology website (<http://bio.wcupa.edu/biology/index.php/forms-a-documents.html>) and the Graduate Studies website ([http://www.wcupa.edu/\\_admissions/sch\\_dgr/forms.asp](http://www.wcupa.edu/_admissions/sch_dgr/forms.asp)), respectively.

## THE GUIDED STUDY PROJECT

A research project, of approximately 1 semester duration, must be performed by all students taking the Non-thesis option. Credit for the project is given as BIO 591 (3 credits), which must be added to the Master Schedule as an Independent Study under the direction of one of the Biology faculty. This administrative procedure is done by computer by the Biology department secretary upon approval from the Graduate Coordinator. Usually the Academic Advisor directs the project, but in some cases the student may wish to take advantage of a research opportunity available under another faculty member. In such

instances, the project director must be a member of the Non-thesis Committee, and can be added to the Committee if necessary.

The intent of the Guided Study Project is to provide exposure to individually conducted research, in an area of particular interest to the student. At the same time, the scope of the project is much less than for thesis students. Guided Study Projects usually contribute to research-in-progress by the faculty, but should be sufficiently discrete that the student's own accomplishments are clearly discernible.

As part of the requirements for BIO 591, the student must write a formal research paper and deliver a seminar to interested members of the Biology Department. These are evaluated by the faculty member directing the research, who then assigns a grade for the course. As concepts in the Guided Study Project are also reviewed by the Non-thesis Committee during the final seminar, the student should have completed the project before the seminar is scheduled.

#### COMPLETION OF PREREQUISITES TO FULL MATRICULATION

At the time of acceptance into the program, any deficiencies not completed prior to admission (2 semesters of General Chemistry, 2 semesters of Organic Chemistry, 1 semester of Calculus, 1 semester of Physics) are noted on the application by the Graduate Coordinator. The Non-thesis Committee reviews these deficiencies at its first meeting with the student, and may modify them at that time, providing justification and a recommended timetable for completing all such prerequisites to the program.

#### ROLE OF THE GRADUATE COORDINATOR

All questions concerning degree requirements should be directed to the Graduate Coordinator. Students seeking advice in the initial selection of courses, or requiring general guidance early in their graduate careers, should also consult with the Graduate Coordinator. The Graduate Coordinator is also responsible for keeping track of all student records, and all paperwork related to Admission to the Degree Program, Admission to Candidacy, and Completion of the Masters Degree as described further below.

## ROLE OF THE ACADEMIC ADVISOR

An Academic Advisor is assigned to each student at the time of entry into the program. The principal responsibilities of the Academic Advisor include:

1. guidance in the selection of coursework to be taken, and scheduling of the first meeting of the committee.
2. providing laboratory space, equipment and advice as necessary for conducting the Guided Study project.
3. serving as Chair of the student's Non-thesis Committee.

## ROLE OF THE NON-THESIS COMMITTEE

The Non-thesis Committee should be chosen in consultation with the Academic Advisor and must consist of the Advisor and two other members of the Biology Faculty. Each member of the committee must come from a different concentration (area) of Biology. The three concentrations are: Ecology, Evolution and Organismal Biology; Physiology, Development and Cell Biology; Molecular Genetics, Immunology and Microbiology. (The current list of faculty in each concentration is appended.) One of the Nonthesis Committee members, usually the Academic Advisor, also directs the Guided Study Project. A meeting of the Non-thesis Committee should be convened early enough to map out recommended coursework to be taken in subsequent semesters. Normally the Non-thesis Committee will meet again formally as a group only at the end of the student's program, to attend the Guided Study Project Seminar and to participate in the Oral Defense. The Academic Advisor, in contrast, is responsible for continued guidance of coursework, etc. throughout the student's program.

The Graduate Coordinator is an ex officio member of all Non-thesis Committees. It is his/her responsibility to attend the final seminar in a non-voting capacity, and to record the results of the examination. The Graduate Coordinator may also serve as a regular, advising and voting member of the Non-thesis Committee in instances where his/her area of expertise is needed.

## DEGREE CANDIDACY

Fully matriculated students should apply for Degree Candidacy once 12 to 15 credits of course work has been taken. Normally, degree candidacy is suggested before initiating the Guided Study Project, and is required of student's scheduling for the Comprehensive Oral Examination.

The following are preconditions for Admission to Candidacy for the Non-thesis option:

1. Removal of all deficiencies specified by the Non-thesis Committee at its first meeting.
2. Completion of 12 - 15 semester hours at the Graduate level in Biology, with an overall average of at least 3.0.
3. Selection of a Non-thesis Advisor and Non-thesis Committee.

## THE DIRECTED RESEARCH SEMINAR

All students electing the Non-thesis option must perform satisfactorily at an open seminar of the results of their independent study research (BIO 591), with all members of their Evaluation Committee in attendance. Normally this occurs during the final semester of the program, and is scheduled after at least 30 credits of coursework, including BIO 511, 513, 514, 535, 536 and 537, have been taken. The Guided Study Project (BIO 591) must be completed by the time the seminar is presented. The Graduate Coordinator also attends the seminar in an ex officio capacity. If the Graduate Coordinator cannot attend the seminar, he/she must appoint another member of the Graduate Committee to act on their behalf.

Grading for the Guided Study Project (BIO 591) is again the responsibility of the Nonthesis Advisor. In addition, the Non-thesis Advisor is responsible for completing electronic and hard copy assessments of the following: 1) first and final guided study project drafts, 2) oral communication skills demonstrated during directed research seminar, and 3) information literacy.

Following the seminar, the student will be asked to complete a take home written exam. Details of the exam are described in the following section.

## THE COMPREHENSIVE WRITTEN EXAMINATION

The written examination will begin once all other requirements of graduation (i.e., all course work and the independent seminar) are completed. The examination will consist of three essay questions, one written by each of the three faculty members on the student's Non-thesis Committee. The exam is designed as a "take home" exercise, and the student is free to use resources at their disposal to answer each question. The three questions will cover each of the three concentration areas of Biology: Ecology, Evolution and Organismal Biology; Physiology, Development and Cell Biology; Molecular Genetics, Immunology and Microbiology. Prior to the questions being given to the student, the Non-thesis Committee will meet and discuss each of the questions. The student will receive the questions from the Academic Advisor. The day of question receipt by the student is considered to be Day 1. From this time the student has 30 calendar days to complete all three questions. All questions must be handed in person to the Academic Advisor. The faculty members that wrote the questions will grade their particular question. Before the student is informed of their grade the Non-thesis Committee will meet to discuss the outcome. The student will then be given the outcome by the Academic Advisor. The members of the Non-thesis Committee must complete the form "Outcome of Comprehensive Written Examination" and hand it to the Biology Graduate Coordinator before the student can graduate.

Possible grades for the examination are "pass", "no pass" or "fail". A "Pass" designation implies that no further comprehensive evaluation is necessary. If the student receives a grade of "no pass" further testing (as determined by the Non-thesis Committee) will be required to ensure adequate knowledge has been attained for granting of the degree. A grade of "fail" is reserved for rare instances where the quality of the answer is so low that it effectively removes the student from the graduate program with no provision for further testing.

## SWITCHING FROM THE NON-THESIS TO THESIS OPTION

Changing from the Non-thesis to the thesis option is possible. Reasons for the change must be submitted in writing to the Biology Graduate Committee. The decision whether or not to grant the

change will be at the sole discretion of the Graduate Committee, and the decision of the committee decision shall be final.

A student who has switched programs must also reconstitute his/her Thesis Committee. The new committee must meet to plan remaining coursework, and must fill out a “Thesis Committee Composition and Recommendations Form.” If a substantial change in the student's intent or focus is the reason for the change in curriculum, some graduate courses taken under the Non-thesis program (e.g. BIO 591) will have to be taken again for credit so as to be able to count toward the thesis option.

#### DEMONSTRATION OF SATISFACTORY PROGRESS TOWARD THE DEGREE

If at any time the student's grade point average falls below 3.0, the Graduate Office will place the student on probation, as described in the Graduate Catalog. The GPA must be raised to acceptable levels within the next nine credits of graduate work taken (usually the next semester) or the student will be dropped from the program. A student may also be dropped from the program by the Graduate Office without probation if the GPA falls below 2.0, or if the student receives an “F”.

Part-time students, despite the often broad range of their outside commitments, must nonetheless ensure that they can complete the MS program within the University mandated six year limit. The Biology Department Graduate Committee will sometimes support a student originated request to extend the six year deadline for completion of the program, but will do so only in cases where the student has shown substantial progress toward completion of the degree.

#### CHANGES IN THE NON-THESIS COMMITTEE

Occasionally, faculty retirement, sabbatical leaves and similar unanticipated events necessitate the dropping or replacement of a committee member. A member may also ask to be replaced in some instances for a variety of personal or academic reasons. Such replacements can be made at any time, but should be made with the full knowledge of the Academic Advisor. Written notification of the change should then be made by the Academic Advisor to the Graduate Coordinator.

## EVENTS OF THE FINAL SEMESTER

It is the student's responsibility to inform the Graduate Office of an intent to graduate. Deadline dates for this generally fall within the first month of the semester in which the student plans to complete the Masters Degree. The Graduate Coordinator should also be given an approximate timetable for completion of the degree at the beginning of the final semester.

## CONTINUING REGISTRATION

Any student who decides not to take courses in any semester, but who still wishes to maintain active status with the University must apply for continuing registration (GSR 799). The student must do this for each semester that he/she wishes to maintain in active status.

# PROFESSIONAL GROWTH OPTION

## INTRODUCTION

Unlike the thesis and Non-thesis options of graduate study this option does not lead to the attainment of a Graduate Degree. However, in order to be admitted into the program, a student must meet the same academic criteria as that of a student enrolling into a program to attain a Graduate Degree, as laid out in the Graduate Catalog.

## OBJECTIVES OF THE PROGRAM

This program is intended primarily for part-time, non-traditional students who wish to take courses with the sole purpose of personal enrichment, but who do not wish to obtain an MS degree. Students choosing this option are free to take as many (or few) courses as they wish in Biology. Unlike the other options there is no time limit on completing the program.

## ROLE OF THE GRADUATE COORDINATOR

All questions concerning the Professional Growth option should be directed to the Graduate Coordinator. Students seeking advice in the initial selection of courses, or requiring general guidance early in this option, should also consult with the Graduate Coordinator. The Graduate Coordinator is also responsible for keeping track of all student records, and all paperwork related to the student.

## ADMISSION PROCEDURE

Admission into the Professional Growth category is obtained by completing the on-line form "Application for Graduate Study: Professional Growth". Official transcripts (except in the case of West Chester University graduates) are required.

# APPENDIX

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# PROGRAM REQUIREMENTS

## THESIS TRACK

| <b>Required Courses (9 credits)</b> | <b>Credits</b> |
|-------------------------------------|----------------|
| BIO 608 Directed Research I         | 3              |
| BIO 609 Thesis Research *           | 3              |
| BIO 610 Thesis **                   | 3              |

### **Research Methods Core (6 credits)**

Select two of the following:

|  |   |
|--|---|
| BIO 511 Experimental Design and Analysis | 3 |
| BIO 513 Research Techniques I            | 3 |
| BIO 514 Research Techniques II           | 3 |
| BIO 515 Research Techniques III          | 3 |

### **Concentration Courses (6 credits)**

Select two of the following:

|   |   |
|---|---|
| BIO 535 Course Topics I (Ecology, Evolution, Organismal)          | 3 |
| BIO 536 Course Topics II (Micro., Immunology, Molecular Genetics) | 3 |
| BIO 537 Course Topics III (Cell Biology, Physiology, Development) | 3 |
| BIO 590 Directed Studies in Biology                               | 3 |

### **Elective Credits (9 credits)**

For this group, students may select from any 400 or 500 level course in the department, except for BIO 469 (Human Physiology). If a course is numbered at both the 400 and 500 level, the students must take the 500 level course.

No more than 6 credits of 400 level courses may be counted towards the MS.

Up to 6 semester hours of graduate course work from another department or university, but only with prior departmental approval.

BIO 535, 536, and 537 may be repeated for credit, provided the topic is different.

|                      |           |
|----------------------|-----------|
| <b>Total Credits</b> | <b>30</b> |
|----------------------|-----------|

\* A letter grade must be obtained for BIO 608 before the student can enroll in BIO 609.

\*\* A letter grade must be obtained for BIO 609 before the student can enroll in BIO 610.

## NON-THESIS TRACK

| <b>Required Courses (24 credits)</b>                                 | <b>Credits</b> |
|--|----------------|
| BIO 511 Experimental Design and Analysis                             | 3              |
| BIO 591 Directed Research I  | 3              |
| BIO 513 Research Techniques I (Microtechnique & Electron Microscopy) | 3              |
| BIO 514 Research Techniques II (Molecular Biology)                   | 3              |
| BIO 515 Computer Applications in Biological Research                 | 3              |
| BIO 535 Course Topics I (Ecology, Evolution, Organismal)             | 3              |
| BIO 536 Course Topics II (Micro., Immunology, Molecular Genetics)    | 3              |
| BIO 537 Course Topics III (Cell Biology, Physiology, Development)    | 3              |

### **Elective Credits (12 credits)**

For this group, students may select from any 400 or 500 level course in the department, except for BIO 469 (Human Physiology). If a course is numbered at both the 400 and 500 level, the students must take the 500 level course.

No more than 6 credits of 400 level courses may be counted towards the MS.

Up to 6 semester hours of graduate course work from another department or university, but only with prior departmental approval.

BIO 535, 536, and 537 may be repeated for credit, provided the topic is different.

|                      |           |
|----------------------|-----------|
| <b>Total Credits</b> | <b>36</b> |
|----------------------|-----------|

## GRADUATE CORE COURSE ROTATION

| COURSE TITLE & NO.       | SEMESTER  | OFFERED |
|--------------------------|---|---------|
|                          | FALL  | SPRING  |
| Exp. Design & Anal. 511  |   | XX      |
| Res. Techn. I 513        | XX  |         |
| Res. Tech. II 514        |   | XX      |
| Computer Apps. Biol. 515 | XX  |         |
| Course Topics I 535      | Offered every 3 <sup>rd</sup> semester in regular rotations |         |
| Course Topics II 536     | Offered every 3 <sup>rd</sup> semester in regular rotations |         |
| Course Topics III 537    | Offered every 3 <sup>rd</sup> semester in regular rotations |         |