

2020

Graduate Student Handbook



Biological & Ecological Engineering

Oregon State University

116 Gilmore Hall, Corvallis, OR 97331

T 541-737-2041 | F 541-737-2082 | <http://bee.oregonstate.edu/>

GRADUATE STUDENT HANDBOOK

Revised: September 2020



Oregon State
University

BIOLOGICAL & ECOLOGICAL ENGINEERING

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1. PURPOSE OF THIS DOCUMENT

"Education is not filling of a pail but lighting a fire" -John Dwayne

"Sometimes Oregonians need to carry pails full of water to the fires. BEE grads know the time and place for both." - John Selker, Sept 2020

This handbook provides an overview of departmental policies in graduate education. It provides graduate students and advisers information on departmental policies regarding course requirements, general regulations, and conflict resolution. This document details requirements specific to the Biological & Ecological Engineering Department.

2. MISSION OF THE DEPARTMENT

Our mission is to achieve national and international recognition for integrated research and education in the programs broadly defined as Biological Engineering & Ecological Engineering. Our constituencies will include environmental and ecological consulting firms, ecotechnology providers, entrepreneurial enterprises building new 21st-century biology- and ecology-based industries, public resource management agencies, and stakeholders in the state with interests in the focus areas outlined below. We accomplish our research and educational mission through a combination of undergraduate and graduate education, scholarly research, extension education, and public outreach.

Biological & Ecological Engineering (BEE) offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees. The BEE graduate program serves at the interface of engineering and life sciences. It is the application of problem-solving techniques derived from **engineering** and life science principles to optimize the use and sustainability of complex earth systems. The curriculum is engineering-based with strong emphases in the life sciences and earth processes. Courses focus on biological systems modeling, bioprocess engineering, bioenergy and bioproducts, bioremediation, regional hydrologic analysis, groundwater systems, irrigation, and water resource optimization.

Department email address: info-bee@engr.orst.edu

Website: <http://bee.oregonstate.edu>

3. RESEARCH FOCUS

The department concentrates its research efforts on three major thrust areas: biological engineering, ecological engineering, and water resource engineering.

The BEE department plays a major role in this graduate program, which is adjacent to the BEE graduate degree program. Our Ecological Engineering program examines topics such as alternative landscape futures modeling, watershed management, dynamics of coupled human/natural systems, landscape restoration engineering, and ecohydrology. Beyond processes found purely in nature, BEE researchers in training, from undergraduate to post-doctoral, examine the use of bio-based processes and technologies for biofuels and high-value bioproduct development. Specific research topics in biological engineering include biohydrogen production, bacterial biofilm development, bioconversion processes, biomolecular



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separations, microscale fermentations, biofuels, downstream processing of biological products, and modeling of biological systems.

Water resource engineering activities, which at the graduate level are administered by the Water Resources Graduate Program ([WRGP](#)) address questions related to: optimum water and energy use; agricultural water management; water allocation and storage; global climate change; modeling large-scale hydrologic systems; soil-water-atmosphere-plant system relationships; erosion control and soil drainage.

4. ADMISSION REQUIREMENTS

4.1. General Requirements for All Applicants

Most, but certainly not all, prospective graduate students have an undergraduate or graduate degree of recognized standing in a field related to biological and/or ecological engineering. Many students join the department with undergraduate degrees in biology, natural resources, geology, etc. and are highly successful. A student's committee may require the student to take appropriate undergraduate courses to make up deficiencies in the undergraduate program, particularly those without engineering undergraduate degrees. A list of required 'Undergraduate Fundamentals' is part of the Checklist for Biological & Ecological Engineering Programs of Study and is included in this handbook. Credit received in undergraduate courses taken to overcome deficiencies may not be used as credit towards meeting the requirements for a graduate degree.

Applications must include a copy of the graduate school application, copies of transcripts, personal statement of objectives, and three letters of reference. PhD applicants should also provide a list of publications and research experiences. To help evaluate student potential, prospective graduate students may submit GRE scores and/or writing samples as part of their application. U.S. Citizens and Permanent Residents

A four-year baccalaureate degree from an accredited college or university for MS applicants.

Master's degree with thesis (i.e. a non-terminal master's degree) from an accredited college or university for PhD Applicants.

A combined GPA of 3.0 on the last 90 credit hours of graded undergraduate work plus all work completed thereafter.

4.2. International Applicants

Equivalent of an American baccalaureate degree with a 3.0 average GPA for MS applicants.

Equivalent of an American master's degree with a 3.0 average GPA for PhD applicants.

English language proficiency (TOEFL minimum score of 80 with a minimum score of 18 on each section. Applicants awarded a GTA must have a minimum of 22 on the Speaking section). TOEFL scores must be no more than two years old at the time of registration. TOEFL is not required if you completed a baccalaureate or master's degree from an accredited school in the United States.

Sufficient financial resources to obtain required visas.



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Always reference the Graduate School's International Student requirements webpage for possible changes to Federal requirements: <https://gradschool.oregonstate.edu/admissions/international>

5. APPOINTMENT GUIDELINES

5.1. Provisional Admission

The first requirement to gain admission is that a member of the faculty agrees to serve as the applicant's major professor. **For PhD candidates**, the admission must be approved by the Chair of the Graduate Committee or the Department Head.

5.2. Conditional Admission

Students with a degree from a non-accredited institution or students who do not meet the minimum GPA requirement may be considered for conditional admission. To stay enrolled these students must satisfactorily complete specified requirements in order to demonstrate their ability to carry out graduate-level work. Note that more information regarding these rules may be found in the Graduate Catalog.

Students admitted to the university on a conditional basis are not eligible for an assistantship until they have accomplished regular admission status. Students on an assistantship are still responsible for paying all student fees each term.

Conditional admission of international students presenting TOEFL scores of at least 500 may be granted. This would require On-campus English language instruction prior to enrollment.

Compliance with the subsequently specified plan for English and academic course work during each quarter until that student qualifies for regular admission status by achieving a TOEFL score of 550.

6. FINANCIAL SUPPORT

6.1. Graduate Research Assistantships

Graduate research assistants may be appointed on an academic-year (9 month) basis or a full-year (12 month) basis. Appointment must be 0.30 to 0.49 FTE ('full-time equivalence'). All graduate research assistants are required to provide service to OSU to justify their stipends. Graduate assistants on a 0.49 FTE appointment are expected to provide an average of 20 hours of service per week. This service may be in addition to the time required to complete their thesis research. Graduate research assistants at other FTE levels would provide proportional levels of service.

To maintain financial support, you must be registered for a minimum of 12 graduate level credits each term. Thesis credits can be used to satisfy enrollment requirements for these students. A minimum of twelve credit hours per term and maintaining a GPA of 3.0 or better is required for continued financial support.

6.2. Graduate Teaching Assistantships

The department offers a few graduate teaching assistantships per year that are organized by the Department Chair in consultation with the professors teaching each year. These can be very important sources of funding for recruiting new graduate students or assisting who have run out of other resources. The graduate



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student's advisor should bring any such needs to the attention of the chair, so students are advised not to ask the chair for these opportunities directly.

6.3. Scholarships and Awards

The department recognizes excellence in various student activities through a number of scholarships. These scholarships are in addition to [university wide scholarships](#). A list of current departmental scholarships can be found at on [BEE Scholarships](#).

7. POLICIES AND REQUIREMENTS

The information in the following pages is taken, in part, from the Oregon State University Graduate Catalog. Additional information can be obtained by requesting a copy of the current Graduate Catalog from the Office of Admissions or the Graduate School.

Graduate students in the Department of Biological & Ecological Engineering are responsible for complying with the rules of the University, the Graduate School and the Department. In instances where the requirements of the Department are more stringent than those of the Graduate School, the departmental requirements specified will apply.

8. ROLE AND DUTIES OF MAJOR PROFESSOR AND STUDENT

Having an open and honest relationship between the major professor and the student is central to the success of a graduate experience. The student should feel free to discuss successes and problems, mistakes, or disappointments. Throughout research and coursework, there are bound to be instances where things go wrong and this is to be expected. The sooner a problem is discussed the sooner it can be resolved.

8.1. Duties of the major professor

- To guide the student in choosing a graduate program committee.
- To guide the student in developing a program of study.
- To ensure that thesis committee meets regularly and functions effectively.
- To supervise the student's research work, thesis, thesis research publication, and professional development.
- To provide basic computing resources for the student with access to printing and web access.
- To advise student in thesis preparation to meet university and departmental guidelines.
- To review and approve student's thesis before presenting it to other members of graduate committee.
- After completion of all requirements, approve student's application for graduation.

8.2. Duties of the Student

- It is the responsibility of the student to see that all deadlines and requirements are met.
- Select members for graduate program committee in consultation with major professor.
- Create a checklist for graduation requirements and deadlines (Please refer to Appendix A and B).
- Fulfill graduate program committee/advisor requirements. Fulfill Departmental requirements (see Appendix A).



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- Fulfill University Graduate level requirements.

9. ACADEMIC REQUIREMENTS

A summary of academic requirements is given on the Checklist for BEE Programs of Study and is included in Appendix A. The MS and PhD academic requirements described below are general requirements. Any exceptions must be approved by the BEE Graduate Committee and Department head. Students are advised to bring any potential exceptions to the notice of major professor and BEE Graduate Committee at the earliest. If you need to take a leave of absence, you must file the form to the Graduate School at least 15 working days prior to the first day of the term involved. Unless on an approved leave of absence, all graduate students in degree and certificate programs must register continuously for a minimum of 3 graduate credits, excluding summer session, until their degree or certificate is granted or until their status as a credential-seeking graduate student is terminated. If a student is granted a leave of absence during a term, they must also withdraw from the term. The graduate student is expected to form their committee within the first two terms of attending OSU. All Doctoral students and Master's students who are writing a thesis (as well as all Master of Arts in Interdisciplinary Studies (MAIS) students) are required to include a Graduate Council Representative on their committee. The Graduate Council Representative (GCR) serves in the role of impartial committee member who advocates for the student and ensures that all rules governing committee procedures are followed. They must be present at your final defense of your thesis. You must select a GCR from the list generated by the online GCR list generation tool maintained by the graduate school.

9.1. MS Degree Specific Requirements

Master's degree programs require a minimum of 45 graduate credit hours including thesis (6 to 12 credits), or a project-in-lieu-of-thesis (3 to 6 credits). Exceptions to this capstone requirement are specified under the degree descriptions that follow these universal master's degree requirements.

All graduate student programs of study submitted to the Graduate School must consist of at least, 50% graduate stand-alone courses. The remaining credits may be the 500 component of 400/500 "slash courses." General regulations for all master's programs can be found at <https://catalog.oregonstate.edu/regulations/>

The residence requirement for the Master's degree is 30 credit hours on the OSU campus after admission as a graduate student. These 30 credits must appear on the Master's degree program of study.

All work toward a MS degree, including transferred credits, course work, thesis (if required), and all examinations, **must be completed within five years**. Credit hours used in one Master's program may not be used in an additional Master's program but can be used in follow-on PhD programs.

The final oral examination will be conducted by an examining committee, which will consist of at least four graduate faculty members: two in the major field, one in the minor field (or a professor from outside the major, if you have no minor), and (except for the non-thesis option) a Graduate Council Representative (GCR).

Departmental requirements for the M. S. degree include the following course areas:

- Nine (9) credits of graduate level pure or applied biological sciences selected from the College of Agricultural Sciences and/or Science. The student’s committee may allow some of these credits to be in natural resource sciences other than biology and would then prepare a letter to the Graduate Committee describing the rationale for that particular program.
- Nine (9) credits of graduate level engineering courses (in addition to BEE 529) which include significant components of engineering science and/or design, selected from the College of Engineering.
- Modeling Skills: BEE 529 (Biosystems Modeling Techniques).
- Departmental Seminars: Each student must take two department seminars (BEE 507: Graduate Student Orientation, Journal Club, Graduate Research and Publication, and Oral Presentation Skills) that are intended to develop their understanding of the profession and to develop presentation skills. Additional requirements may be set by the student’s major or minor professor, by the department, or by the student’s advisory committee as needed to strengthen his or her background.
- Formulating a program of study in consultation with major professor and graduate program committee before the end of the second term of study.
- Perform research with integrity and due diligence.
- Collect appropriate data, perform data analysis and write a complete thesis with all necessary sections such as literature review, methods, results, discussion, conclusion, future work and engineering relevance.
- It is strongly recommended that full-time graduate students, who are not Graduate Research Assistants, register for 16 credits per term, including thesis research.
- Student must arrange regular meetings (at least monthly) with major professor and graduate program committee (twice a year is recommended).

9.2. Non-Thesis Option

The non-thesis option or project-in-lieu-of-thesis, is intended for those students seeking a ‘terminal’ degree (student does not plan to continue towards a more advanced degree). Selection of this option requires the approval of the student’s major professor. The total credit requirements are the same, but a project, which must include a minimum of 6 project credits (BEE 506), are taken in lieu of a research thesis. At completion of the degree, a written project report is submitted to the advisor and the department. Additionally, a public presentation of the project must take place before graduation.

9.3. PhD Degree Specific Requirements

The equivalent of at least three years of full-time graduate work beyond the bachelor’s degree is required. University guidelines suggest a minimum of 108 graduate credits, including 30-45 credits of PhD thesis (MS thesis credits cannot be included). There is no rigid total credit requirement except for the university guidelines.

The student’s doctoral study program is formulated and approved subject to departmental policies at a formal meeting of his or her doctoral committee. The committee consists of a minimum of five members of the graduate faculty, including two from the major department and a representative of the Graduate Council.

A minimum of one full-time academic year (at least 36 credits) should be devoted to preparation of the thesis. Gaining the ability to critically evaluate societal impacts and ethical issues associated with research



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in biological and/or ecological resource engineering is an important component of the PhD program. Toward this end, PhD candidates are required to include in their dissertations a comprehensive treatment of the potential societal impact of their research. This treatment would constitute an independent section (chapter) of the dissertation.

Departmental requirements for the PhD degree include the following course areas:

- Twelve (12) credits of graduate level pure or applied biological sciences selected from the College of Agricultural Sciences and/or Science. The student's committee may allow some of these credits to be in natural resource sciences other than biology and would then prepare a letter to the Graduate Committee describing the rationale for that particular program.
- Twelve (12) credits of graduate level engineering courses (in addition to BEE 529) which include significant components of engineering science and/or design, selected from the College of Engineering.
- Modeling Skills: BEE 529 (Biosystems Modeling Techniques).
- Departmental Seminars: Each student must take two department seminars (BEE 507: Graduate Student Orientation, Graduate Research and Publication, and Oral Presentation Skills) that are intended to develop their understanding of the profession and to develop presentation skills. Additional requirements may be set by the student's major or minor professor, by the department, or by the student's advisory committee as needed to strengthen his or her background.
- One (1) credit of additional seminar that focuses on professional topic areas and/or presentation skills (in addition to the 2 credits of BEE Departmental seminars).

9.4. Graduate Minor

A graduate minor is an academic area that complements the major to address research objectives or long-term educational goals. Minors are not required in graduate programs at OSU or in BEE. On a MS or PhD program, a minor may be:

- An academic area available only as a minor the same major with a different area of concentration
- an approved major at another institution in the Oregon University System
- an integrated minor

Note: An integrated minor consists of a series of cognate courses from two or more areas. These courses must be outside the major area of concentration, with most of the courses being outside the major department. The graduate faculty member representing the integrated minor must be from outside the major department. Graduate minors are listed on the student's transcript.

If a minor is declared, approximately two-thirds of the work must be in the major field and one-third in the minor field. The student's advisory committee must include a member from the minor department and be approved on the student's program of study.

9.5. Dual Major

For the MS or PhD degree, a student may pursue two graduate major areas instead of the traditional single major. Only one degree is awarded, and the student must satisfy all degree requirements for majors in both areas.

10. THESIS/DISSERTATION

10.1. Research

Each graduate student's research project is the centerpiece of their graduate educational experience. At least 15 hours per week should be spent on the research project from the first day a student enters the graduate program, whether on an assistantship or not, regardless of course load. The research project must be composed of original work that addresses an area of contemporary concern to science or engineering. As such, the results should be obtained using conceptually sound methods, and with sufficient precision to be suitable for publication in the peer reviewed journals.

MS students should have completed a research proposal by the end of their second term at OSU and PhD students should complete research proposals by the end of their first year in the program. "The development of a research proposal is intended to help the student focus on developing a problem statement and hypotheses, and to focus on concrete details of the proposed methodology. The latter is important to accomplish prior to fieldwork and the process of writing can help identify potential methodological problems at an early stage. Proposal writing can also help identify writing problems – too often, these are left unaddressed until the thesis. Lastly, the proposal document helps the committee understand the scope of work and provides a structure on which they can comment and provide guidance. The format of the proposal is intended to be flexible and under the direction of the student's major advisor."

Graduate students must file a study program with the Graduate School before completing 18 hours of graduate credit. This is the responsibility of the student. A student who does not file a program within the specified deadline will not be allowed to register for the next term. A study program is developed under the guidance of the major and minor professors and is signed by the Department Head before filing in the Graduate School.

Changes in the program may be made by submitting a Petition for Change Form.

10.2. Preparation

Every thesis must be written in grammatically correct English and should be thoroughly checked for errors in math or transcription of data. Although this is fundamentally the responsibility of the student, the major professor will support this effort.

Detailed guidelines for preparation of the thesis are presented in <https://gradschool.oregonstate.edu/current/thesis-guide>. Students should check with the Graduate School before the final thesis draft is prepared to ensure that the format meets current standards.

OSU policy states that all matters related to thesis preparation and costs are the responsibility of the student. Services required, such as clerical help, duplication, etc., must be arranged for outside the Department. In some instances, the thesis research relates to a sponsored project; so the thesis may form a necessary part of the required project reports. In those cases, and with approval of the major professor, the cost of preparation of the thesis can be supported in part by the research grant.

OSU requires that final copies of each thesis be submitted to the university and to the department. When the final library copies of the thesis are submitted to the Graduate School, students are required to follow the guidelines listed at <https://gradschool.oregonstate.edu/graduate-student-success>.

Examinations

10.3. *PhD Preliminary Oral Exams*

The purpose of the preliminary exam is to ensure the student’s readiness to advance to candidacy. They must demonstrate knowledge of major and minor fields, and the ability to plan and conduct PhD level research. It is a university requirement that students must be enrolled for a minimum of 3 credits in any term in which they undertake written or oral preliminary exams.

- 1) Program of Study Approval: The first step is to have the program of study approved by the student’s program committee. As part of that process, the members of the committee review and sign the student’s Program Check List.

Written preliminary exams (called ‘written comprehensive examination’ in the OSU catalog) and oral preliminary exams are given after coursework is largely completed and early enough in the research program that the committee is able to influence its direction.

- 2) Written Comprehensive Exam: This is required by the Department. The exact format for each student will be a decision of that student’s program committee. Some example options would include:
 - Development of one research proposal.
 - Response to a series of questions prepared by the program committee (3-7 days is provided to the student to develop the response).
 - A proposal describing the student’s thesis research.

The written exam is reviewed by the student’s entire committee which will then confer and decide if the student has performed adequately to move on to the oral preliminary exam. The student then schedules the oral exam with the committee and the Graduate School at least one week prior to the exam date.

- 3) Oral Preliminary Exam: This is required by the University and must be scheduled with the Graduate School at least one week in advance of the date. The student should schedule the oral exam to allow a duration of 3 hours; the ‘target’ as stated in the OSU catalog is to be ‘at least 2 hours.’ At least one week prior to the exam, the student distributes to the committee an outline describing his/her proposed research. Typically, the student is expected to deliver a short (15-20 minute) presentation of proposed research. Questions at the oral exam can cover coursework, the proposed area of research and/or the written exam results. No more than half the exam period should be devoted to specific aspects of the research proposal. More general questions can cover any societal impact of research or background coursework described on the student’s Program Checklist.
 - a. Pass: Upon approval of the graduate committee with the possibility of up to one dissenting vote, student is declared as having passed and can progress into the next step of the program towards completion of dissertation research.
 - b. Fail with an opportunity to retake exam only once: Should the student fail the first oral exam, a second exam may be given, but no sooner than one month after the original exam.
 - c. Fail without an opportunity to retake exam: The student will be terminated from the graduate program.

- d. Adjourn for a period not less than 1 term: During this period, student must address areas of significant concern and complete the specific tasks that graduate committee suggests.

10.4. MS and PhD Final Oral Exam

Final oral exams may be taken only after all other requirements for the degree have been satisfied. Final oral exams must be scheduled at least one week prior to thesis/dissertation deposit deadline. These exams will be a minimum of two hours in duration, the first part of which is devoted to presentation (open to public) and discussion of the thesis/dissertation (closed door). These exams will be advertised to the department and full campus at least one week prior to the scheduled date. Students and faculty of the department and university are invited and encouraged to attend the first portion of any MS or PhD final oral exam; thus, an effort should be made to schedule the exam on the hour, to minimize conflicts with classes.

Complete thesis/dissertation draft must be submitted to the committee at least a week before the final oral exam for MS, and two weeks for PhD Thesis option master's and doctoral students will be required to submit only the pretext pages of their thesis to the Graduate School for editing, instead of the entire thesis draft. For a listing of pretext pages, see the online Thesis Guide at

<http://gradschool.oregonstate.edu/success/thesis-guide>. There are four possible outcomes of the final oral exam:

- 1) Pass: Upon approval of the graduate committee with the possibility of up to one dissenting vote, student is declared pass and will be recommended for degree, subject to final approval from major professor and Department.
- 2) Fail with an opportunity to retake exam only once: Should the student fail the first oral exam, a second exam may be given, but no sooner than one month after the original exam.
- 3) Fail without an opportunity to retake exam: The student will be terminated from the graduate program.
- 4) Adjourn for a period not less than 1 term: During this period, student must address areas of significant concern and complete the specific tasks that graduate committee suggests.

11. COURSE LOADS, GRADES AND TIME LIMITS

Any student who receives less than a 3.0 GPA for two consecutive terms, or who cannot maintain a 3.0 GPA after three terms, will be notified that he/she is no longer considered a candidate for a graduate degree in the Biological & Ecological Engineering Department.

Unsatisfactory performance of duties, failing an oral exam, academic dishonesty or other violations of the Student Conduct Regulations may all serve as grounds for dismissal from the Department and/or Graduate School.

Students admitted to MS programs must complete all requirements of the program within seven years, or nine years for PhD students.

12. SATISFACTORY STUDENT PROGRESS CRITERIA

Continuous satisfactory performance in academics and research is essential for success in graduate school. Biological & Ecological Engineering Department continuously strives towards excellence in academics and research. As a part of that effort, graduate students in Biological & Ecological Engineering Department will be continually assessed in two major areas.

12.1. Academic criteria

Students must enroll for a minimum of 12 credits although department strongly recommends enrollment in 16 credits. Students must maintain a minimum 3.0 GPA in all quarters. Students must meet minimum enrollment requirements to be eligible for financial aid/assistantship. Any student who receives less than a 3.0 GPA for two consecutive terms, or who cannot maintain a 3.0 GPA after three terms, will be notified that he/she is no longer considered a candidate for a graduate degree in the Biological & Ecological Engineering.

Student, in consultation with their major professor and thesis committee should prepare a graduate program of study before completing 18 credits.

12.2. Research criteria

Each graduate student's research project is the centerpiece of his or her graduate educational experience. At least 15 hours per week should be spent on the research project from the first day a student enters the graduate program, whether on an assistantship or not, regardless of course load. The research project must be composed of original work that addresses an area of contemporary concern to science or engineering. As such, the results should be obtained using conceptually sound methods, and with sufficient precision to be suitable for publication in peer reviewed journals.

Development of a research proposal is intended to help the student focus on developing a problem statement and hypotheses, and to focus on concrete details of the proposed methodology. All MS students should complete a research proposal by the end of their second term. All PhD students must complete a research proposal by end of their first year. The format for the research proposal will be decided by the student's major advisor and committee. All proposals must include a timetable for thesis research. A copy of the proposal signed by the graduate committee will be kept with student's major professor.

12.3. Monitoring student progress

At the beginning of every quarter, all graduate students in the Department must submit a 1-2 page summary and research objectives for that quarter to the student's major professor. Major Professor is expected to assess research progress. Continued poor performance may serve as grounds for termination of assistantship/dismissal from the graduate program at the Department and/or Graduate school. Guidelines for the graduate student progress are listed in Appendix B.

13. PROFESSIONAL RESPONSIBILITIES AND ACADEMIC CONDUCT

Graduate students enrolled at OSU are expected to conform to basic regulations and policies developed to govern the behavior of students as members of the University community. Violations of honesty are unacceptable in course work, lab notes, and oral or written reports. Any work that is not that of the student must be fully referenced as to its origins. Any writing that is directly quoted must be indicated with quotation marks. Assignments that are carried out with other students should be noted as such. Values written in lab books and reports must be factual, having been taken directly from an instrument, or a summary of instrument readings. Any data that is omitted must be documented as such, i.e., partial data sets must be identified.

13.1. Publication of Research

Scientific research is at the heart of the graduate education. Evaluation of research by peer review process, publishing in peer reviewed journals and dissemination of research findings through publications, proceedings is central to scientific research. Such published research enhances the standing of the graduate students, faculty, department and university. Therefore, all graduate students, especially those on assistantships are expected to seek to publish their research findings in peer-reviewed journals. Graduate students are expected to complete publication-ready drafts of papers before they leave the university. Some BEE advisors place requirements of a certain number of accepted and submitted publications on their PhD students. We encourage students to speak directly to their advisors about such rules and expectations.

13.2. Significant Teaching Experience

In today's competitive world, communication skills are very important for student success in academia, industry, government agencies and NGO's. Significant teaching experience, especially for PhD students, is expected by academic employers. PhD students are expected to obtain sufficient training in communication skills. While departmental seminars will provide a basic framework to develop communication skills, students are advised to talk to their major professors about opportunities such as presenting lectures, conducting lab sessions, and other avenues to demonstrate significant teaching experience.

14. CONFLICT RESOLUTION

We sincerely strive to ensure a conflict free work environment. We expect everyone from the University community to observe high standards of professional conduct. We recognize that sometimes some problems may arise. Department strongly encourages that any grievances be informally addressed by having an open, honest discussion with the faculty or staff with whom the problem has arisen. Additionally, the major professor or Department Head may try to resolve the issue and arrive at a mutually acceptable solution. If the grievance is not addressed informally, a formal process under university guidelines may be initiated by the Department Head. Use of the University [Ombuds](#) is worth considering if you have a conflict that has not otherwise been resolved. Further resources for conflict resolution can be found at <https://studentaffairs.oregonstate.edu/tags/conflict-resolution>.

15. GENERAL REGULATIONS CONCERNING FACILITIES

15.1. ID Cards, Keys and Office Space

All Oregon State University students are eligible to receive an I.D. card that allows access to various campus services and activities. Detailed information about these cards and how to acquire one can be found in the Schedule of Classes.

Keys to access labs will be based on individual needs. The Department office will provide necessary forms after obtaining approval from the major professor. Keys can be obtained from the key shop located on campus. Access to secure labs will require a Criminal History Check, paid for by your advisor, before a key can be issued.

Keys are the property of OSU and are the student's responsibility. Keys must not be shared/replicated under any circumstances. Please report any lost keys immediately. Office space will be provided for graduate students enrolled in the department. Space for graduate students who are advised by our faculty but enrolled in other departments is not guaranteed due to lack of sufficient space and is available only on an application basis. No space may be occupied without permission of the Department.

15.2. Computing Support

The goal of computing support within the Biological & Ecological Engineering Department is to provide robust access to computing resources within the department and across campus. Computing resources are provided at three levels:

- 1) Within the department
- 2) At the College of Engineering
- 3) Through OSU computing support.

Students should visit the [BEE Department home page](http://bee.oregonstate.edu) at <http://bee.oregonstate.edu> for updated policies regarding computer access.

All BEE students are given a computer account that is centrally administrated. One element is an unlimited "[Box](#)" account for cloud-based file storage for materials, which are part of your educational efforts.

Students are also given an ENGR account, which is accessible from any computer on campus, as long as you login to the ENGINEERING domain. Any computer that is connected to the departmental network is required to conform to certain standards. These standards reflect needs for security, access, and **ANY COMPUTER THAT DOES NOT CONFORM TO THESE STANDARDS WILL BE DISCONNECTED FROM THE NETWORK.**

- You must have the BEE Network Administrator set up your machine.
- You must have an 'admin' account on your machine. The Network Administrator can set this up.
- You must have Symantec or any other Department approved antivirus running and configured correctly. The Network Administrator can set this up.
- BEE student laptop printer setup - printer access for BEE students with laptops.
- Departmental stationary, envelopes and postage are not allowed to be used



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15.3. *Printing, Copying, and Other Services*

Departmental staff may not be asked by graduate students for assistance in matters that are of a personal nature. This includes course work, forms, copying, thesis preparation and personal correspondence.

Long-distance telephone calls within the United States are unlimited and free, but you must have an authorization code from your advisor to call numbers off campus. Long distance calls outside of the United States also require the authorization code, and calls must be approved by your advisor ahead of time. Use non-telephonic communication means whenever possible. Personal long-distance telephone calls are not to be made when using OSU authorization codes. Use of these authorization codes to make personal telephone calls will result in a letter of reprimand or termination from the program and the individual will be expected to pay for any charges associated with the calls.

The copy machine in the main office is available with approval. Faculty members have been assigned access codes and any copying done on those codes will be charged to the faculty member account. This access code can be made available to students for project-related copying on a fee basis but only with the approval of the major professor. Personal copying is to be done on a personal access code (available from the office staff) and is five cents per page for single-sided copies. This must be paid in cash. Personal copying is not allowed when using a faculty member access code. If you need help determining whether a copy job is personal or otherwise, check with the office personnel. The number of copies made on each code is recorded by the copier and reviewed monthly.

OSU security personnel are responsible for closing and locking outside doors to Gilmore Hall and the Annex around 6:00 p.m. Once security personnel secure the building, doors should remain closed and locked in order to protect the security of the building and its contents. Propping doors open after hours allows easy access to individuals not authorized to be in the building and should not be done. It is important to close windows and lock doors in graduate student offices when leaving. Windows and doors in faculty offices and the main office are the responsibility of faculty and staff.

Because labs are used by many people, the last person to leave a lab should close windows and lock doors. The security of personal possessions, computers and valuable research equipment depends on our willingness to assume responsibility for seeing that windows and doors are left closed and locked. All graduate students advised by department faculty are issued an After-Hours Permit. This permit will indicate to security personnel that a student is authorized to be in the building after regular working hours.

Students are authorized to drive motor vehicles on university business with advisor approval. The Motor Pool is the first choice for all driving. To use OSU vehicles the student must read and sign the proper authorization forms, available on the OSU Motor pool website. If alternative sources of vehicles are required (rentals out of town, trips when Motor Pool cannot be used) students must receive authorization from their advisor and the front office. , Reimbursement requests for mileage with personal vehicles only can be submitted via a travel reimbursement request to the front office.

Alcoholic beverages and weapons of any kind are FORBIDDEN on campus property.



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16. GRADUATE FACULTY

These are the faculty who have been granted the right to advise graduate students in the BEE program.

16.1. Department Faculty

John P. Bolte

Professor and Head

(541) 737-6303

boltej@engr.orst.edu

PhD, Auburn University

Watershed modeling, decision support, geographic information systems

Frank W. R. Chaplen

Associate Professor

(541) 737-1015

chaplef@engr.orst.edu

PhD, University of Wisconsin-Madison

Biocatalyst characterization, bioprocess improvement through rational biocatalyst modification, cellular engineering, metabolic pathway engineering

Stephen P. Good

Assistant Professor

(541) 737-2118

Stephen.Good@oregonstate.edu

PhD, Princeton University

Ecohydrology, environmental remote sensing

Chad W. Higgins

Associate Professor

(541) 737-2286

Chad.Higgins@oregonstate.edu

PhD, The Johns Hopkins University

Environmental fluid mechanics, land atmosphere interactions

Gerrad D. Jones

Assistant Professor

(541) 737-4534

Gerrad.Jones@oregonstate.edu

PhD, University of Nevada, Reno

Environmental chemistry, water quality, biogeochemical cycling, statistical and machine learning modeling



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Hong Liu

Professor

(541) 737-6309

Hong.Liu@oregonstate.edu

PhD, University of Hong Kong

Microbial fuel cells, Biological engineering

Ganti S. Murthy

Adjunct Professor

Ganti.Murthy@oregonstate.edu

PhD, University of Illinois, Urbana-Champaign

Renewal bioresources, bioethanol, algae biofuels, process modeling, sustainability analysis and biological engineering

John S. Selker

Professor

(541) 737-6304

John.Selker@oregonstate.edu

PhD, Cornell University

Groundwater quality, hydrology and modeling

Desiree Tullos

Professor

(541) 737-2038

Desiree.Tullos@oregonstate.edu

PhD, North Carolina State University

Ecohydraulics, river morphology and restoration

16.2. External Faculty

In addition to the campus-based faculty in the Department, the following Adjunct and Courtesy Faculty are Graduate Faculty of the Department of Biological & Ecological Engineering and have been approved for some or all of the following department-related duties:

- Act as a co-major advisor of MS and/or PhD students
- Direct non-thesis option students
- Teach graduate courses in the department
- Serve on thesis committees



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Dominique M. Bachelet

Associate Professor

(541) 757-0687 ext. 8

bachelet@fsl.orst.edu

PhD, Colorado State University

Ecosystems Modeling, Global Climate Change

Michael J. Gamroth

Professor Animal Sciences Department/OSU

Master of Agriculture, Oregon State University

Livestock facilities planning, animal waste planning, non-point source pollution control, milking parlor design

Gordon E. Grant

Professor Geosciences Department/OSU PhD

Johns Hopkins University

Fluvial geomorphology; effects of dams and dam removal on channels; sediment and woody debris transport; cumulative effects of human activities on watersheds; effects of altered flow regimes

Jonathan D. Istok

Professor

Civil, Construction and Environmental Engineering/OSU PhD, Oregon State University

Soil and water engineering, aquifer testing, numerical modeling of groundwater flow, bioremediation

Stephen Lancaster

Associate Professor Geosciences Department/OSU

PhD, Massachusetts Institute of Technology

Geomorphology, hydrology, mass-movement processes, sediment dynamics, river meandering, geomorphic evolution and analysis, numerical modeling

Danny Marks

Research Scientist Northwest Watershed Research/ Boise, ID

PhD, University of California

Global climate change, large-scale spatial modeling, regional and watershed hydrology, snow and alpine hydrology, remote sensing, digital terrain analysis, geobase information systems

Michael T. Morrissey

Professor Food Science and Technology/OSU

PhD, Oregon State University

Seafood processing, quality standards in seafood, biochemical/microbial changes in seafood

Michael H. Penner

Associate Professor Food Science and Technology/OSU

PhD, California, Davis

Lignocellulose biomass utilization, cellulolytic enzyme systems, analytical methods with lignocellulosics



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17. OTHER RESOURCES

In addition to the information contained in this Graduate handbook, other resources that will be useful are:

- How to write a paper Mike Ashby (an excellent article that provides valuable insight into how scientific peer reviewed publications are written): <http://www-mech.eng.cam.ac.uk/mmd/ashby-paper-V6.pdf>
- Importance of stupidity in scientific research Martin A. Schwartz. (on why its ok to dream that crazy dream sometimes): <http://jcs.biologists.org/cgi/content/full/121/11/1771>

18. ACKNOWLEDGEMENT

This graduate handbook was prepared and revised by referring to Oregon State University guidelines. Graduate handbooks from other universities and many other online sources were also consulted to incorporate best policies into our graduate program at Biological & Ecological Engineering Department.

19. APPENDIXES

19.1. Appendix A: Checklist for Biological & Ecological Programs of Study

This form is to be signed by all BEE representatives of student's committee and submitted with the student's program of study. Students must have completed these credits/courses by the time they finish their degree in BEE.



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Student's Name:

Degree (circle one): MS // PhD

Course requirements:

Undergraduate Fundamentals	
One year, Calculus Equivalent : MTH 251,252, (306 or 254)	
Applied Differential Equations Equivalent: MTH 256	
One year, University-level Physics Equivalent: PH 211,212,213	
One year, Chemistry for engineering majors Equivalent: CH 201, 202, 205, 211, 212	
Graduate Requirements	
Biosystems Modeling Techniques (BEE 529)	
Additional Graduate Engineering Credits (MS: 9 Credits; PhD: 12 Credits)	
Graduate Student Orientation (BEE 507)	
Graduate Research and Publication (BEE 507)	
Graduate Student Orientation (BEE 507)	
Oral Presentation Skills (BEE 507) (PhD students take 1 additional credit)	
Biological (or alternative) Science Courses) Credits (MS: 9 Credits; PhD: 12 Credits)	
Thesis/Project Credits MS Research Thesis (6 to 12)	
MS Project (3 to 6)	
PhD Research Thesis (36 or more)	
<u>Major Advisor Signature</u>	<u>Date</u>
<u>Student Signature</u>	<u>Date</u>

19.2. *Appendix B: Criteria and timelines for satisfactory student progress*

TABLE 1: SCHEDULE FOR MS STUDENTS (THESIS OPTION).

Activity	Timeline
Identify major professor (You are advised to contact potential advisors prior to application/ during application process)	After application and Prior to acceptance.
One/two-page summary of research objectives.	Beginning of every quarter.
Identify course work and identify research area.	End of first term.
Identify potential committee members in consultation with major professor.	End of second term.
Complete research proposal and circulate among thesis committee.	End of second term.
File graduate program.	Before completion of 18 credits
Complete courses in graduate program.	Recommended by end of fifth term.
Complete thesis draft and submit to major professor.	Six weeks before oral examination.
Schedule final defense with graduate school and submit pretext pages of thesis.	One week prior to Oral examination. Only after approval of major professor.
Complete thesis draft and submit to committee. Oral Examination	One week before oral examination. End of sixth term or later. Only after approval of major professor
Submit one bound copy of thesis to major professor, department and graduate school.	After final approval by major professor.
<i>Students in MS program must complete all requirements of the program within five years of admission</i>	

TABLE 2: SCHEDULE FOR MS STUDENTS (NON-THESIS OPTION).

Activity	Timeline
Identify major professor (You are advised to contact potential advisors prior to application/ during application process).	After application and Prior to acceptance.
Identify course work and identify research area.	End of first term.
Identify potential committee members in consultation with major professor.	End of second term.
File graduate program.	Before completion of 18 credits.
Complete courses in graduate program.	Recommended by end of fifth term.
Complete report draft and submit to Major professor.	Four weeks before oral examination.
Schedule final oral presentation with graduate school and submit pretext pages of thesis.	One week prior to Oral examination. Only After approval of major professor.
Complete report draft and submit to committee.	One week before oral examination.
Oral Examination End of sixth term or later.	Only after approval of major professor.
Submit one bound copy of report to major professor & department.	After final approval by major professor.
<i>Students in MS program must complete all requirements of the program within five years of admission</i>	

Table 3: Schedule for PhD students.

Activity	Timeline
Identify major professor (You are advised to Contact potential advisors prior to application/ during application process).	After application and Prior to acceptance.
One/two page summary of research objectives.	Beginning of every quarter.
Identify course work and identify research area.	End of second term.
Identify potential committee members in Consultation with major professor.	End of fourth term.
Complete research proposal and circulate among Thesis committee.	End of fourth term.
File graduate program.	Before completion of 18 credits.
Program of study approval by thesis committee.	Recommended by end of seventh term.
Complete courses in graduate program	Recommended by end of eighth term.
Written comprehensive exam.	Recommended by end of ninth term.
Schedule oral comprehensive exam.	One week prior to Oral examination. Only After approval of major professor.
Oral comprehensive exam.	Recommended by end of tenth term.
<i>Further progress in program determined by the outcome of written and oral comprehensive exams.</i>	
Research and dissertation preparation.	A minimum of one full-time academic year (At least 36 credits) should be devoted to preparation of the thesis.
Complete dissertation draft and submit to major Professor.	Six weeks before oral examination.
Schedule final defense with graduate school and Submit pretext pages of thesis.	One week prior to Oral examination. Only After approval of major professor.
Complete dissertation draft and submit to Committee.	One week before oral examination.
Oral Examination End of sixth term or later.	Only after approval of major professor.
Submit one bound copy of dissertation to major Professor, department and graduate school.	After final approval by major professor.
<i>Students in PhD program must complete all requirements of the program within seven Years of admission. Students with MS degrees from other institutions must complete the requirements in six years.</i>	



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19.3. Appendix C: Defense Preparation Checklist

The purpose of this document is to provide an overview of the steps needed to prepare for your defense. You are receiving this form because we have received an approved Program of Study from the Graduate School for you. This list applies to both BEE & WRGP students preparing to defend their thesis, dissertation or final project. If you have any questions about these steps or have any suggestions to improve this form, please contact Catherine Mullins (mullcath@oregonstate.edu).

RESOURCES

Title	Link
Graduate School Forms	http://gradschool.oregonstate.edu/forms
Graduate School Guide to Success	http://gradschool.oregonstate.edu/success
Exam Scheduling Form	https://gradschool.oregonstate.edu/forms#event
Required Materials	http://gradschool.oregonstate.edu/progress/required-examinations
Diploma Application	http://oregonstate.edu/dept/grad_school/forms.php#diploma
Graduate Council Rep List	http://oregonstate.edu/dept/grad_school/StuGetGCR.php
Commencement Deadlines	https://gradschool.oregonstate.edu/current/commencement
Room Scheduler	http://goo.gl/d5jF2x
Zoom	https://is.oregonstate.edu/zoom
Electronic Submission Approval Form	https://gradschool.oregonstate.edu/sites/gradschool.oregonstate.edu/files/revised_etd_approval_form_2.pdf

Checklist

- Verify your **Program of Study** is on file with the Graduate School.
- At least** two weeks prior to defense date, file the **Exam Scheduling form** with the Graduate School
 - The **Diploma Application** is usually completed by the Graduate School thesis coordinator when the form is turned in.
 - Diplomas are issued four times a year, at the end of each term.

- The Exam Scheduling Form may require additional changes to the Program of Study form
- Putting the room on your Exam Scheduling form for the Graduate School DOES NOT reserve the room, it only tells your GCR where to show up. See more about scheduling below.
- **Review thesis/dissertation/project copies for committee**
 - Preliminary review copies of your thesis are due to your committee TWO WEEKS before your defense session—please see your advisor for specifics on content and timeline for this particular item!
- **Student Status**
 - You must be registered for at least 3 credits the term you defend.
 - If you are defending in summer term, you should be registered for the summer session that coincides with your defense date.
 - GRA, GTA & Fellowship recipients typically need to be registered for 12 credits during the school year (full time status); or 9 credits in the summer. Refer to your award letter to verify.
- **Defense Scheduling**
 - Set a day and time with your committee
 - You must reserve the defense room and/or electronic venue accessible to all committee members:
 - BURT 193 can be reserved in a notebook in the CEOAS Admin lobby
 - WILK 203 can be reserved through Melinda Jensen.
 - Regular classrooms can be reserved through the Schedule Desk (541-737-2181) or using the [scheduling system](#). Good seminar style rooms include LINC 314 and KEC 1001; Strand Ag, Furman and the Beth Ray Center also have nice spaces. Ask Catherine for the ‘special event CRN’ if you are going to request a regular classroom space.
 - If you can’t find an open room, please contact Catherine Mullins for assistance
- **Webinar**
 - Remote participation: The Graduate School no longer requires a form.
 - Students have used Zoom, Skype and Adobe Connect with success on their own laptops.
 - Technology for remote participation in your defense is your responsibility. There is no assumed IT support from either Student Services or RCS.
- **Announcements.** We must publicly announce your defense TWO WEEKS prior to the defense. This is a program requirement. Send the following information to Catherine Mullins, to announce in the OSU Calendar, WRGP & BEE Facebook pages, WRGP & BEE Mailing lists, and OSU Today:
 - Full Legal Name
 - Degree Program
 - Advisors
 - Thesis Title
 - Date
 - Time
 - Location
 - Photo of yourself or research (optional)
- **Graduate Committee Representative**
 - Send Catherine a list of all committee members. If someone needs to be BEE or WRGP Graduate Faculty, we need to submit paperwork well ahead of time.

- **Timing**
 - Be aware that you can defend up to the last day before the start of the [next] term and that still counts as the current term but be careful as this shortens up the time you have to get your final revisions in to the grad school. Extensions are sometimes granted.
- **MS to PhD students:**
 - Contact Student Development Office or the Graduate School for more information BEFORE your defense as you need to do a concurrent degree form so that your degree completion and continuation can be seamless.
- **The Day of the Defense:**
 - Snacks are often provided by the student defending. Coffee, tea, and snacks like cookies or fruit are common items. Catherine has a coffee carafe she can loan out on a limited basis.
 - Webinar and/or video: student responsibility to arrange. Catherine has a video camera and tripod that can be loaned out as needed.
- **Post defense:**
 - Revisions are due in 6 weeks or the first day of the next term, whichever comes first!
 - [ETD Submission Approval form](#) is submitted to the Graduate School along with a copy of the title page once the final thesis/dissertation is approved and uploaded to ScholarsArchive.
 - Do you intend to 'walk' at graduation? Verify [commencement deadlines](#)
 - You will want to clear at your desk and return in your keys once your revisions are final. If you have a departmental computer or laptop, or any other departmental equipment, these will need to be returned.
 - Breathe deeply! When you make it this far, then congratulations are in order!