



Institute of Bioinformatics
UNIVERSITY OF GEORGIA

Graduate Student Handbook

Reviewed Summer 2021

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Useful Information

Contact Information:

April King Mosley – Graduate Program Administrator	iobgradadmin@uga.edu	706-542-7783
Jan Mrázek – Graduate Coordinator	mrazek@uga.edu	706-542-1065
Travis Glenn –IOB Director	travisg@uga.edu	706-583-0662
Sandra Getz – IOB Business Administrator	iobadmin@uga.edu	706-542-7784
Fax number		706-542-7782

IOB OFFICE ADDRESS: Institute of Bioinformatics
Davison Life Sciences Complex, Room B118B
120 Green Street
Athens, GA 30602-7229

Listserv Addresses

iobgrads@listserv.uga.edu (all graduate students receive and can post to this list including administrators of the graduate program and IOB director)

binfgrads@listserv.uga.edu (all graduate students only – this list is administered by the Bioinformatics Graduate Student Organization, BIGSA)

ioball@listserv.uga.edu (all IOB members including graduate students, postdocs, and faculty)

Useful websites:

IOB: <http://iob.uga.edu>

IOB events/seminars: https://calendar.uga.edu/group/institute_of_bioinformatics

UGA Graduate School: <http://grad.uga.edu/>

Integrated Life Sciences: <https://ils.uga.edu/>

Office of the Registrar: <https://reg.uga.edu/>

Enterprise Information Technology Services: <https://eits.uga.edu/>

Georgia Advanced Computing Resource Center: <https://gacrc.uga.edu/>

International Student Life: <https://isl.uga.edu/>

Doctor of Philosophy (Ph.D.) in Bioinformatics

ILS Curriculum Requirements:

Students who enter the Ph.D. program through the Integrated Life Sciences (ILS) program will take the ILS Core Curriculum for the first semester. Currently, this one-semester curriculum consists of lab rotations, a professional development class, a responsible conduct of research class, a scientific literature reading class, and a data management class (<http://ils.uga.edu/admissions/curriculum/>). Upon entering the Bioinformatics Ph.D. program, the student is required to follow the curriculum described below. For a suggested course schedule, see Appendix A.

IOB Ph.D. Curriculum Overview:

Prerequisites	Core (All Required)	Electives
Intro Molecular Genetics Intro Biochemistry Intro to Statistics and Probability Proficiency in a programming language Intro Calculus	BINF 8441 (3.0) Statistical Inference for Life Sciences BINF 8500 (3.0)* Bioinformatics Algorithms BINF 8600 (1.0) Intro Grant Writing	One elective from IOB approved list One elective chosen by advisory committee
Other Required Courses		
BINF 8001 (1.0) – Graduate Professional Development BINF 8060 [^] (1.0) – IOB Seminar BINF 8061 [†] (1.0) – IOB Student Scientific Communication Seminar BINF 8970 [^] (1.0-2.0) – Lab Meeting BINF 8900L (3.0) – Rotations (for non-ILS students) BINF 9000 (1.0-18.0) – Dissertation Research BINF 9300 (1.0-12.0) – Dissertation Writing GRSC 7770 (1.0-3.0) – required for Teaching Assistants only		

[^]Required every semester; [†] Required every semester in years 1-3 and once a year in years 4-5 but students are encouraged to audit the class (without an attendance requirement) during semesters when they are not required to take it; *Prerequisite course is BINF 8006 “Advanced Programming and Algorithms for Informatics” (may be waived for students who demonstrate sufficient proficiency in computer programming to complete BINF 8500)

Requirements for 8000 Level Courses

Graduate School rules require that Ph.D. students with a Master’s degree take at least 16.0 credit hours of 8000 level courses, while students without a Master’s degree must take 20.0 credit hours of 8000 level courses. Doctoral research (9000), independent study courses, directed study, and dissertation writing (9300) may not be counted in the 8000 level requirements.

Program Prerequisites

It is assumed that students entering the program have taken introductory courses in molecular genetics, biochemistry, calculus, and statistics & probability. Prior computer programming experience

is beneficial but not required. Students who lack in any of these areas must take appropriate courses in their first year in the program. These courses may not be counted towards degree requirements.

Registration Requirements

Students will register for 18.0 credits in all semesters they are enrolled, including Summer semesters. This is to accurately reflect the time and effort BINF students put into their research. Exceptions to this requirement are made on a case-by-case basis, and only in anticipation of the semester in which the requirement will not be met. Requests to enroll for less than the required amount should be submitted to the Graduate Program Administrator prior to registration for the effected semester. For specific questions, please contact the Graduate Program Administrator.

Core Courses

All students are required to take a core of three bioinformatics courses:

BINF 8441 (3.0): Statistical Inference for the Life Sciences. Introductory statistics for students in the life sciences, including probability, discrete and continuous random variables, distributions, expectations, maximum likelihood, Bayesian inference, hypothesis testing, and linear regression. These topics will be mixed with applications of the statistical concepts to biological data. Statistical inference and real data analysis are implemented in R.

BINF 8500 (3.0): Bioinformatics Algorithms. A hands-on course in which students will design and implement selected bioinformatics algorithms.

BINF 8600 (1.0): Grant Writing. The course introduces the principles of successful grant writing and manuscript preparation. Students are expected to develop and produce a grant proposal in the NIH or NSF format.

IOB Approved Electives

Students are required to take one elective course that focuses on applying bioinformatics analyses to real data. Examples include BINF 8211, GENE (BINF) 8940, FANR (BINF) 8140, BINF 8980, PBIO (BINF) 8350, EHSC 8460(L), and MIBO (BINF) 8270L. Requests to add other courses to this list may be made in writing to the Graduate Affairs Committee. Any such course must have a strong emphasis on applications to the analysis of experimental data.

BINF 8211 (3.0): Advanced Methods for Biological Data Analyses. Advanced strategies and methodologies for large-scale data analyses in support of genomics, transcriptomics, proteomics, and studies of biological pathways and networks. Offered Spring semester every year.

FANR (BINF) 8140 (3.0): Functional Genomics. Fundamentals and practical applications of functional genomics in biological research. Lecture- and paper-based discussion on topics including gene discovery, genome sequencing, transcript profiling by microarray and next-generation sequencing (RNA-Seq), regulation of gene expression, forward and reverse genetics, proteomics, metabolomics, correlation network analysis, and ecological genomics. Offered Spring semester every year.

GENE (BINF) 8940 (3.0): Applied Genome Analysis. Hands-on application of bioinformatics approaches used in whole genome analyses. Topics will include aspects of genome assembly, annotation, expression studies, ChIP-sequence, and comparative genomics. Emphasis is placed on mastery and critical evaluation of the approaches used for whole genome analyses rather than any particular software program or approach. Offered Fall and Spring semesters every year.

BINF 8950 (3.0): Systems Biology. Broad introduction to mathematical modeling for molecular processes in living systems. Offered Spring semester every year.

BINF 8980, 8980D (4.0): Case studies in Systems Biology. Shared research experience in systems biology. The research case study subject will vary each semester. Emphasis will be placed on state-of-the-art, transformative research. Offered Fall and Spring semester every year, as needed.

PBIO (BINF) 8350 (3.0), Molecular Phylogenetics and Evolution. The course includes hands-on training of phylogenetic and population genomic methods, discussions of the underlying assumptions of these methods, and an opportunity to frame and execute a term project relevant to each student's research interests ranging from the evolutionary ecology of trait evolution and diversification to the molecular evolution of gene families. With just 12-16 students in the course, lecture topics will be tailored to student interests. Offered Spring semester every year.

CHEM (BCMB) (BINF) 8330 (3.0), Macromolecular Simulations. Introduces techniques of molecular simulation relevant to biomolecular systems, and provides extensive hands-on experience with current modeling and simulational programs. Typical projects include protein homology modeling, 3-D structure refinement by molecular dynamics simulations, and the calculation of interaction energies. Offered Spring semester every year.

BCMB(BINF) 8125 (3.0), Cancer Bioinformatics. This course teaches a fundamentally novel framework of cancer biology. Throughout this course, students will learn how the initial and seemingly harmless stressors induced by chronic inflammation or ROS accumulation can lead to increasingly malignant development of neoplastic cancer tumors as a result of adaptation to the also evolving microenvironment. Offered Spring semester every year.

EHSC 8460 (L) (1.0-3.0): Environmental Genomics. Covers the background and use of new high throughput genomic tools for environmental studies. Content and credits will vary depending on subjects covered, which are modified to meet the needs of enrolled students.

ENGR 8260 (L) (3.0): Computer-Aided Drug Design and Engineering. The course will introduce many up-to-date bioinformatics tools, analyze the strengths and weaknesses of the algorithms, and their applications in different biological problems, especially virtual drug design. Topics include sequence alignment, genome comparison, protein structure comparison, structure prediction, model construction and simulation, virtual drug screening, and drug repurposing.

General Electives

Students are required to take one elective, as directed by their advisory committee. Any selection of elective that is approved by the Graduate Coordinator and the student's committee are acceptable. However, students will not be allowed to count program prerequisites as elective courses.

Additional Electives

Student advisory committees may specify additional requirements designed to extend the breadth or depth of the student's knowledge in the area of their specialization. These additional requirements may include both graduate and specialized undergraduate courses deemed appropriate by the student's advisory committee. It is expected that such additional requirements will be instituted mainly for students whose focus is more computational because these programs traditionally require more courses than biological disciplines.

Courses Required for Teaching Positions

For those students who have a teaching assistantship at any point in their program, it is required they take GRSC 7770. If the student speaks English as a second language, they must pass a language proficiency exam. The exam will be coordinated through the Graduate School. If the student is unable to pass the proficiency exam, they must register for LLED 7768 or LLED 7769.

GRSC 7770 (1.0-3.0): Graduate Seminar. Provides graduate teaching assistants with knowledge of pedagogical approaches and available support systems. Special sections are reserved for international students, with focus on use of language, pedagogy, and cultural aspects of teaching in this country. Offered every year.

LLED 7768 (3.0): International Graduate Internship I. Provides international graduate teaching assistants with knowledge of pedagogical approaches and available support systems. The course focuses on cultural aspects of teaching and English language for the classroom with particular attention to pronunciation, stress, and intonation patterns. Offered Fall and Spring semester every year.

LLED 7769 (3.0): International Graduate Internship II. Provides international graduate teaching assistants with knowledge of pedagogical approaches and available support systems. The course focuses on English language for the classroom and cultural aspects of teaching with emphasis on presentation skills and audience awareness. Offered Fall and Spring semester every year.

Other Required Courses

In addition to the courses above, all students are required to take the following:

- BINF 8001 (1.0): Graduate Professional Development. Taken Spring of the first year
- BINF 8060 (1.0): IOB Seminar. Taken every Fall and Spring semesters
- BINF 8061 (1.0): IOB Student Scientific Communication Seminar. Taken every Fall and Spring semester for the first three years, then at least once a year in years 4 and 5
- BINF 8900L (3.0): Lab rotation (for non-ILS students)*
- BINF 8970 (1.0-2.0): Current Topics in Research (Lab meetings). **Taken every semester**
- BINF 9000 (1.0-18.0): Doctoral research. Taken to fulfill credit load requirements after the completion of courses
- BINF 9300 (3.0-12.0): Doctoral dissertation. Minimum of 3.0 credits total

*Satisfied by GRSC 8000 for students entering through ILS Program. This requirement also does not apply to students who already selected a major professor at the time of admission.

BINF 8060 (1.0): Bioinformatics Seminar. Seminar dealing with various topics in current Bioinformatics. Offered Fall and Spring semester every year.

BINF 8061 (1.0): Institute of Bioinformatics Student Seminar. A special seminar class focused on student research presentations with an emphasis on presentation skills. While all students are required to attend in their first three years and once a semester in years 4 and 5, only students in their second year and beyond are required to present. Students are encouraged to audit the class even when attendance is not required since new students benefit from experience of more senior students. Offered Fall and Spring semester every year.

BINF 8900L (3.0): Bioinformatics Lab Rotation. Students will be exposed to research topics and techniques by participating in the research projects of Bioinformatics faculty members. Offered Fall

and Spring semester every year, as needed. Satisfied by GRSC 8000 for students entering through ILS Program and not required for students admitted directly into a specific lab.

BINF 8970 (1.0-2.0): Current Topics in Research. Subjects of current interest in Bioinformatics research. Current literature and modern analysis of research results. Course is designed to meet the specific research needs of the student. Offered at the request of faculty. This course is also used to cover student time and effort spent in research lab meetings within their chosen research laboratory. Students register for sections offered by their thesis advisor. Offered Fall, Spring, and Summer semester every year.

BINF 9000 (1.0-18.0): Doctoral Research. Research while enrolled for a doctoral degree under the direction of faculty members. Offered Fall, Spring and Summer semester every year.

BINF 9300 (1.0-12.0): Doctoral Dissertation. Dissertation writing under the direction of the major professor. Offered Fall, Spring and Summer semester every year.

NOTE: Bioinformatics students are to take 9000 and 9300 hours in BINF only. No other department courses in 9000 and 9300 will be allowed.

Lab Rotations

Students who enter through the ILS program will complete rotations in their first semester at UGA. ILS students register for GRSC 8000 (Lab Rotations) and will complete three 6-week rotations during the semester. By the end of the first semester, ILS students will join a lab. ILS students will begin taking the IOB Core curriculum upon joining the Bioinformatics program. Please be pro-active in contacting faculty about arranging rotations.

Students who enter the bioinformatics PhD program directly and are not committed to a major professor upon entering the program will rotate through labs in order to find a major professor. Students will spend one third of a semester in each of three different labs, participating in research work in that lab (BINF 8900L). Rotations will occur on a regular schedule. See the IOB faculty Webpage for a list of approved faculty and links to their sites (<http://iob.uga.edu/faculty/>).

Advisory Committee

Upon arrival at the University, students will meet with the Graduate Coordinator and/or the Graduate Program Administrator for guidance and mentoring.

Because this program is interdisciplinary, students will be advised to take prerequisite courses in areas where the student does not have the necessary background.

Students will select their major professor by the end of the Fall semester of their first year. The major professor must be a Full or Adjunct Faculty member of the Institute of Bioinformatics, and a member of the Graduate Faculty. **By the end of Spring semester of the first year, students must establish an advisory committee.** The student's major professor serves as the chair of the advisory committee and the student should work with the major professor to select other members of the committee. The advisory committee must consist of the major professor and at least three other UGA Graduate Faculty members. At least two members of the advisory committee, including the major professor, must be Full or Adjunct Faculty of the IOB. The advisory committee should be composed of representatives of both the biological and the quantitative sciences. At least one member of the advisory committee will represent the student's focused area of study e.g. computer science, plant biology, microbiology, etc.,

from outside the institute. This member of the committee will provide input from outside bioinformatics and ensure that the program of study is consistent with the practices of the most related outside discipline. In some instances, the student may benefit from expertise of an external member (not UGA faculty); an external member can be included in addition to four members who are UGA Graduate Faculty (including the major professor).

The advisory committee will meet with the students no less than once per academic year. The advisory committee will be responsible for mentoring the student's research and training, approving the student's program of study, administering the written and oral comprehensive examination, approving the subject for the dissertation, approving the completed dissertation, and approving the student's defense of their research. Students will take their comprehensive examination during their second year, supervised by the major professor, under the Graduate School guidelines.

Advisory Committee form is required, see:

<http://grad.uga.edu/index.php/current-students/forms/>

IOB Comprehensive Examination

Students are expected to complete their comprehensive exams by the spring semester of their second academic year. At least one committee meeting must have occurred prior to submission of the written portion of the comprehensive exam.

The comprehensive exam will be comprised of a written portion and an oral portion. The written portion will be submitted by the student to their advisory committee before the oral portion, and will consist of a written proposal of the student's dissertation research, based on NIH guidelines. It is expected that students are able to articulate the rationale for their proposed research and be able to explain and justify their research strategy. For more information about the proposal format, see Appendix B.

The student should coordinate with their advisory committee to establish a timeline for submission of the written portion of the exam and scheduling of the oral exam. This process will take about four weeks from submission of the written exam until the date of the oral exam. The student should begin by scheduling the oral exam date and time with their advisory committee and notifying the Graduate Program Administrator of the agreed upon time. At least four weeks before the oral exam date, the student should submit the written portion of the exam to the committee and the Graduate Program Administrator. Each committee member will then have two weeks to review and submit a grade of 'pass' or 'fail' via email to the student and the Graduate Program Administrator. To pass the written portion and go on to the oral portion, the student must receive no more than one failing grade. If a committee member does not provide a grade two weeks after submission of the written exam, the grade will be marked as a 'pass' for that committee member. The Graduate Program Administrator will compile grades and send results to student and the entire committee. If there are more than one failing grade on the written exam, the Graduate Program Administrator will alert the Graduate Coordinator and advisor as soon as possible, detailing the outcome of the exam. Once the student has passed the written portion of the exam, the Graduate Program Administrator will make the official announcement of the date, time, and place of the oral portion of the exam. The official announcement must be made at least two weeks before the oral exam, as required by the Graduate School.

Prior to the oral exam, the student will obtain the "Report of the Written and Oral Comprehensive Examination" form required by the Graduate School from the Graduate Program Administrator. These

forms must be taken to the oral exam by the student. The oral exam will last at least two hours, but not longer than three hours. The student will prepare a presentation of no more than 20 slides that are intended to serve as a framework of the discussion of the proposed research. The student's presentation should last for approximately 20-25 minutes without interruptions, followed by questions from the advisory committee and other faculty present. Questions during the exam will consist of both general and specific knowledge related to the student's proposed research as described in their presentation and written proposal. A member of the student's committee, other than the advisor, will serve as chair of the exam. The advisor is not allowed to answer questions for the student, and will not participate in the discussion unless granted permission by the exam chair.

At the conclusion of the oral exam, the committee will provide pass/fail grades on the oral component of the exam. UGA Graduate School requirements indicate that there may be only one failing grade on each part of the exam from the committee for the exam to be considered passing. The student's advisor may issue a failing grade and the student may still pass.

Students who fail their comprehensive exam, either written or oral portion, may make a second attempt at the exam. If the student fails on the second attempt, the matter will be forwarded to the Graduate Affairs Committee for review and recommendations. Possible outcomes include, but are not limited to, change of degree objective from Ph.D. to Master's level, or student exiting the program without degree. Recommendations from the Graduate Affairs Committee may be considered after reviewing the situation with the student, the student's advisor, and the student's advisory committee.

Final Program of Study Form is required PRIOR to Notice of Exam, see:

<http://grad.uga.edu/index.php/current-students/forms/>

Dissertation Planning

A written proposal, or prospectus, serves as the written component of the comprehensive exam. This proposal will detail the breadth and scope of research the student plans to undertake during their dissertation research. It is expected that the committee will provide input on this proposal to ensure that the proposal represents a viable dissertation project. However, it is expected that the proposal will be entirely the student's own work. It is important to note that the student is not required to have data prior to taking their comprehensive exams.

Admission to Candidacy

The student will submit an Application for Admission to Candidacy form along with the Report of the Written and Oral Comprehensive Examination form, indicating they have passed the comprehensive exam. The Graduate Program Administrator will assist the student in the preparation of the required forms. The Application for Admission to Candidacy for Doctoral Degrees form must be filed with the Graduate School at least one full semester before graduation. Once the student has been admitted to candidacy, they may register for Doctoral Dissertation (BINF 9300) credit hours.

The Graduate School prepares the Report of Written and Oral Comprehensive Examination form and sends it to the Graduate Program Administrator.

Application for Admission to Candidacy is required, see:

<http://grad.uga.edu/index.php/current-students/forms/>

Dissertation Approval and Defense

The student's dissertation must represent originality in research, independent thinking, scholarly ability, and technical mastery of a field of study in bioinformatics. The conclusions must be logical, the literary form acceptable, and the contribution to knowledge meriting publication. The dissertation must also demonstrate competent style and organization (see [Graduate School guidelines](#) for theses and dissertations). While working on the dissertation, the student must enroll for a minimum of 3.0 credit hours of BINF 9300 (Doctoral Dissertation). Students may not register for this course until they have been admitted to candidacy. Once the student's major professor approves the final version of the dissertation, it will be distributed to the other members of the advisory committee, and a dissertation defense scheduled no sooner than three weeks after the distribution. The Graduate School requires two weeks' notice of the defense exam; therefore, the student will contact the Graduate Program Administrator prior to scheduling the defense and provide the Notice of Exam form at least three weeks prior to the defense date. The defense will consist of a public presentation followed by a private defense during which only the student and advisory committee will be in attendance. The public presentation is open to anyone who wishes to attend. The student and committee chair must appear in person for both components of the defense, but other committee members can participate via teleconference or video conference, provided that the comments of all participants can clearly and consistently be heard. If the major professor is not able to attend the defense in person, they can designate a substitute chair who is a current member of the committee. The advisory committee must approve the student's dissertation and defense with no more than one dissenting vote and must certify their approval in writing. An abstention is not allowable for the final defense. The results of the defense of the dissertation must be reported to the Graduate School at least two weeks prior to graduation for the current semester.

Once the dissertation has been approved by the advisory committee and the final oral examination has been passed, the dissertation must be submitted to the Graduate School for final approval no later than two weeks prior to graduation of the following semester. Dissertations that are not submitted by this deadline must be defended again and approved by the advisory committee before they will be considered by the Graduate School for final approval.

Dissertation and Final Examination Approval form is required, see:

<http://grad.uga.edu/index.php/current-students/forms/>

Electronic Thesis and Dissertation (ETD) Submission Approval form is required, see:

<http://grad.uga.edu/index.php/current-students/forms/>

Master of Science (M.S.) in Bioinformatics

Because of its interdisciplinary nature, the bioinformatics M.S. degree program admits students from diverse backgrounds and leads to multiple career paths, depending upon the background and interests of the students. Thus, the curriculum is designed to provide flexible training of a diverse student body while maintaining the rigor of the program.

Master's students are required to take BINF 8060 (IOB seminar) every semester, however, if there is a schedule overlap with their other classes, they have to take it at least one semester during their program. Students with thesis option should take BINF 8061 (IOB Student Seminar) at least once. In addition, 6.0 credit hours of BINF 7000 (Master's research) and 3.0 credit hours of BINF 7300 (Master's thesis) are required for students with the thesis option. In the absence of a thesis, students will instead take 9.0 credit hours of 8000 level courses in an area of specialization to be approved by the student's advisor (the Graduate Coordinator or a faculty member designated by the Graduate Coordinator).

Registration Requirements

Students with the thesis option will register for 18.0 credits in all semesters they are enrolled, including Summer semesters. This is to accurately reflect the time and effort BINF students put into their research. Students without a thesis should register for courses in accordance with their approved plan of study. Exceptions to this requirement are made on a case-by-case basis, and only in anticipation of the semester in which the requirement will not be met. Requests to enroll for less than the required amount should be submitted to the Graduate Program Administrator prior to registration for the effected semester. For specific questions, please contact the Graduate Program Administrator.

Core Courses for M.S. Program

Every M.S. student needs to take the following four core courses and complete any prerequisites for these courses. Alternatively, students who complete curriculum requirements for the PhD degree, including BINF 8441, BINF 8500, BINF 8600, IOB-approved elective, and additional elective selected by the student's advisory committee, can use these courses to satisfy the core requirements for the MS degree.

BINF 8211 "Advanced Methods for Biological Data Analyses" (3.0 credits)
BINF 8940 "Applied Genome Analysis" (3.0)
BINF 8441 "Statistical Inference for the Life Sciences" (3.0)
BINF 8500 "Bioinformatics Algorithms" (3.0) or BINF 8006 "Advanced Programming and Algorithms for Informatics" (4.0)*

*BINF 8006 is a prerequisite for BINF 8500 unless the student can demonstrate that he/she already has programming skills approximately at the BINF 8006 level. MS students can satisfy this requirement by taking BINF 8006 but those with sufficient prior programming skills should take BINF 8500.

M.S. Advisory Committee

Upon arrival at the University, students will meet with the Graduate Coordinator and/or the Graduate Program Administrator for guidance and mentoring.

Because this program is interdisciplinary, students will be advised to take prerequisite courses in areas where the student does not have the necessary background.

By the end of their first year in the program, students with the thesis option will establish an advisory committee. The major professor must be a core IOB faculty member or an adjunct faculty member of the Institute of Bioinformatics, as well as a member of the Graduate Faculty. The advisory committee must consist of the major professor and at least two other Graduate Faculty members. At least two members of the advisory committee must be full or adjunct faculty of the IOB. The advisory committee will also be composed of representatives of both the biological and the quantitative sciences.

Advisory Committee form is required, see:

<https://grad.uga.edu/index.php/current-students/forms/>Students with the non-thesis option are not required to form an advisory committee; the graduate coordinator or a designated academic advisor will monitor their progress.

Final Program of Study form must be submitted by the second semester of residence. The Program of Study Form indicates how and when degree requirements will be met and must be formulated in consultation with the student's major professor (thesis option) or the academic advisor (non-thesis option).

Final Program of Study for MS Degree, see:

<https://grad.uga.edu/index.php/current-students/forms/#ms>

<https://grad.uga.edu/index.php/current-students/forms/>

Master's Thesis (only students with thesis option)

The thesis is a report of the student's investigations under the supervision of their major professor and requires the approval of the major professor and the advisory committee. The thesis must demonstrate competent style and organization, and communicate technical knowledge. The thesis often includes original research in bioinformatics. It must demonstrate mastery of a particular area of bioinformatics. The student's advisory committee assures that the quality of the thesis meets the standards of the IOB and the Graduate School. The candidate must register for BINF 7300 (Master's Thesis) for at least 3.0 credit hours while working on the thesis.

M.S. Thesis Defense (only students with thesis option)

After all course work has been completed and the thesis has been approved by the student's major professor, the thesis is submitted to the other members of the advisory committee at least two weeks before the thesis defense date. The thesis defense consists of a public presentation by the student followed by a final oral examination conducted by the student's advisory committee. The Graduate School requires two weeks' notice of the defense exam; therefore, the student will contact the Graduate Program Administrator prior to scheduling the defense. All members of the advisory committee must be present at the defense. The advisory committee members, including the major professor, must vote on whether the student passed the defense and record their votes. These results are recorded and submitted to the Graduate School on the Approval Form, provided by the Graduate Program Administrator prior to the scheduled defense. To pass the thesis defense, no more than one of the advisory committee members' votes can be fail.

Thesis Defense and Final Examination Approval form required, see:

<https://grad.uga.edu/index.php/current-students/forms/>

Electronic Thesis and Dissertation (ETD) Submission Approval form required, see:

<https://grad.uga.edu/index.php/current-students/forms/>**M.S. Graduation Requirements (all M.S. students)**

Before the end of the second semester in residence, a student must submit to the Graduate School, through the Graduate Program Administrator, the Master's **Program of Study form**. The Program of Study Form indicates how and when degree requirements will be met and must be formulated in consultation with the student's major professor. An **Application for Graduation form** must also be submitted directly to the Graduate School.

For forms, please see: <https://grad.uga.edu/index.php/current-students/forms/>

Graduate Certificate in Bioinformatics

Curriculum Requirements

Graduate students in any department at UGA can receive the Graduate Certificate in Bioinformatics by taking bioinformatics coursework. Students seeking a Certificate must be currently enrolled and in good standing in a graduate program at the University of Georgia, Athens.

The requirements for the certificate in Bioinformatics are:

1. BINF 8211: “Advanced Methods for Biological Data Analyses”
2. BINF 8441: “Statistical Inference for the Life Sciences”
3. BINF 8006: “Advanced Programming and Algorithms for Informatics”
or any 3- or 4- credit hour 7000- or 8000-level course offered by computer science (CSCI prefix)
4. At least one additional 3- or 4- credit graduate-level course with BINF prefix
5. At least one additional 3- or 4-credit graduate-level course in biology

How to Apply for a Certificate

Prior to completing the certificate coursework, contact the Graduate Program Administrator (jobgradadmin@uga.edu) with your interest in the Certificate Program. Include your name, student identification (810 or 811), your department, and degree program. Upon receipt of this information, the certificate program will be added to your registration profile in Athena. The Graduate Program Administrator will assist you with course scheduling to complete the certificate requirements.

Once you have completed coursework toward the certificate program and wish to apply for the certificate, send a letter to the Graduate Program Administrator of the Institute of Bioinformatics that includes the following: your name, your student identification number (beginning with 810 or 811), and the courses completed to fulfill the Certificate requirements. This request must be received one semester prior to the one you plan to graduate.

In addition, please include information on the courses you have taken for credit toward the certificate. For each course, include only the course prefix and number (e.g. BINF 8211) and the semester in which the course was completed. Include a copy of your transcript that shows the grades for the course used for completion of the Certificate. For courses recently completed whose grades are not included on your transcript, include a brief letter from the instructor stating that you have received a grade B or higher.

Please note: The Certificate is not a document mailed to you, but a notation added to your transcript, which would say “COMPLETION OF A CERTIFICATE IN BIOINFORMATICS.”

Graduate School Requirements

The Graduate School sets forth additional requirements concerning residence, time limits, programs of study, acceptance of transfer credits, admission to candidacy, minimum GPAs, dissertation, and examinations, etc. The students should refer to the Graduate School Bulletin for details:

<https://grad.uga.edu/index.php/current-students/policies-procedures/graduate-bulletin/graduate-bulletin-a-c/>

Probation and Dismissal Policy

The Institute of Bioinformatics reserves the right to place students on probation or dismiss them if they have not made sufficient academic progress or if they have willfully violated IOB or UGA policies. Indications that a student is not making sufficient progress include, but are not limited to: cumulative GPA below 3.0, unsatisfactory annual evaluation by the student's advisory committee, failure to hold the annual committee meeting and provide required documentation, or unsatisfactory grade from BINF 9000/7000 or BINF 9300/7300. The IOB Graduate Affairs Committee will review the student's situation and the Graduate Coordinator or another member of the IOB Graduate Affairs Committee will meet with the student and advisor as needed. If it is found that the student has failed to meet expectations, the student may be dismissed from the Bioinformatics graduate program.

For details on the Graduate School's Probation and Dismissal Policies, please visit their website.

Course Waiver Policy

A faculty advisor may request a student waiver for a course by making a request to the Graduate Affairs Committee. The request must come from the student's advisor and not from the student directly. The request and materials should be sent to the Graduate Coordinator, with the Graduate Program Administrator copied in the email. For the exception to be considered, the advisor must supply supporting evidence, such as: (1) syllabi of related courses prior to the one required; (2) relevant work experience; or (3) transcripts indicating satisfactory grades.

Once all materials are received, GAC will review and vote on whether the student has sufficient knowledge to waive the course requested.

Expectation of Graduate Students

The institute of Bioinformatics expect their graduate student to actively contribute to and participate in all aspects of the graduate program. This includes attending IOB seminars, IOB social events, retreats, graduate student and faculty recruitment events, and engaging in the intellectual life of the institute.

Graduate research is a full-time job. This work is the start of your career, so the more effort you put into it, the better start you will have. More important than the hours you spend working is your ability to communicate with your advisor and committee. It is expected that you will communicate your regular course schedule with your advisor so they know when to expect to see you in the lab. In addition, any changes to your schedule, be it expected absences, life events, etc., should be communicated to your advisor. We know that you have personal lives outside of graduate school, but you are expected to report to your advisor as you would to an employer.

Should you be in a situation where you are considering additional employment outside of your graduate assistantship, please discuss the details with your advisor and the Graduate Coordinator, so they are aware of the details and can work with you so you do not get behind in your research. Communication is key!

Each graduate student must meet with the Graduate Program Administrator once per year to check progress and compliance with IOB and Graduate School policies. The Graduate Program administrator will remove the Academic Advisement Hold in Athena to allow for registration after attending this meeting and fulfilling all other current requirements. All graduate students will be contacted annually to sign up for a meeting date and time.

Multiple Program Enrollment

Bioinformatics student who are interested in pursuing an additional degree while enrolled at UGA must speak with the Graduate Program Administrator and Graduate Coordinator before applying to or enrolling in an additional program. Students must receive written approval from their faculty advisor to enroll in courses toward a degree other than their Bioinformatics program. This allows for the paperwork to be processed correctly for both degrees. Such approvals are contingent upon progress toward their primary degree, grant funding sources, project compatibility, and lab work requirements.

Student Concerns and Grievances

IOB is committed to providing students with friendly, inclusive, and intellectually stimulating environment. We want to hear about students' concerns, grievances, and any issues that affect their ability to be successful in their work and study. We encourage students to discuss their concerns with their advisor, members of their advisory committee, Graduate Program Administrator, Graduate Coordinator, IOB Director, or any other IOB faculty who make them most comfortable to talk to. Students can also seek help outside IOB, including the Ombudsperson (<https://eoo.uga.edu/policies-resources/the-ombudspersons/meet-the-ombudspersons/>) and Student Care and Outreach (<https://sco.uga.edu/>). Students experiencing high levels of stress or depression should contact Student Care and Outreach or the UGA Health Center (<https://www.uhs.uga.edu/bewelluga/bewelluga>, <https://www.uhs.uga.edu/caps/>).

APPENDIX A:

Sample Curriculum:

First Year:

Fall: ILS students will complete the core course requirements set by the ILS program. For the most up-to-date listing of the ILS curriculum, please visit their website:

<http://ils.uga.edu/admissions/curriculum/>

Students admitted directly to the IOB Ph.D. program will consult the IOB Graduate Coordinator to plan their course schedule for their first fall semester in the program. If admitted during the spring semester, BINF 8900L will replace BINF 9000.

<p><u>Spring:</u></p> <ul style="list-style-type: none"> • BINF 8006 - Advanced Programming and Algorithms for Informatics (prereq for BINF 8500) • BINF 8001- Graduate Professional Development • BINF 8441 - Statistical Inference for the Life Sciences • BINF 8060 - IOB seminar • BINF 8061 - Student seminar • BINF 8970 - Lab Meeting • BINF 9000 - Research 	<p><u>Summer:</u></p> <ul style="list-style-type: none"> • BINF 9000 - Research
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Second Year:

<p><u>Fall:</u></p> <ul style="list-style-type: none"> • BINF 8500 - Bioinformatics Algorithms • BINF 8600 - Intro to Grant Writing • Elective • BINF 8060 - IOB seminar • BINF 8061 - Student seminar • BINF 8970 - Lab Meeting • BINF 9000 - Research 	<p><u>Spring:</u></p> <ul style="list-style-type: none"> • Elective • BINF 8060 - IOB seminar • BINF 8061 - Student seminar • BINF 8970 - Lab Meeting • BINF 9000 - Research <p><u>Complete Comprehensive Exam</u></p>	<p><u>Summer:</u></p> <ul style="list-style-type: none"> • BINF 9000 - Research
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Third and Fourth Year:

<u>Fall:</u> <ul style="list-style-type: none">• BINF 8060 - IOB seminar• BINF 8061 - Student seminar• BINF 8970 - Lab Meeting• BINF 9000 - Research Any electives as recommended by advisory committee	<u>Spring:</u> <ul style="list-style-type: none">• BINF 8060 - IOB seminar• BINF 8061 - Student seminar• BINF 8970 - Lab Meeting• BINF 9000 - Research Any electives as recommended by advisory committee	<u>Summer:</u> <ul style="list-style-type: none">• BINF 9000 - Research and/or• BINF 9300 - Dissertation
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Fifth Year (if applicable):

<u>Fall:</u> <ul style="list-style-type: none">• BINF 8060 - IOB seminar• BINF 8061 - Student seminar• BINF 8970 - Lab Meeting• BINF 9000 - Research and/or• BINF 9300 - Dissertation	<u>Spring:</u> <ul style="list-style-type: none">• BINF 8060 - IOB seminar• BINF 8970 - Lab Meeting• BINF 9000 - Research and/or• BINF 9300 - Dissertation
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APPENDIX B:

Research Proposal Guidelines

The written research proposal will take the form of the Research Plan section of an NIH grant proposal, which is prepared by the student as a possible dissertation research prospectus. The student should consult with their major professor regarding the exact format of the proposal but should follow NIH grant preparation instructions (e.g., the font size should be at least 11 pt., and the document should be single-spaced, with numbered pages, and one-inch margins). The following sections have to be included in the proposal: Specific Aims, Significance, Innovation, and Approach. In general, the proposal should include major hypotheses and specific aims for the project, an introduction reviewing the relevant literature and explaining the significance of the proposed research, explanation how the proposed research is novel, preliminary results (optional), and the proposed methods for achieving the specific aims. The latter section should outline specific procedures, and include potential outcomes, potential problems, and alternative approaches. For detailed guidance on the proposal preparation, see for example: <https://www.niaid.nih.gov/grants-contracts/write-research-plan> or

https://www.niaaa.nih.gov/sites/default/files/publications/Training/Training_Quick_Guide_for_Grant_Applications-rev-2010.pdf.

The proposal should be concisely written. The Specific Aims section must not exceed one page and the remaining sections combined (excluding references) must be the minimum of 10 pages but not more than 12 pages. A good proposal is expected to take advantage of the available space and therefore be close to the full 12 pages. Numbered tables and figures with legends should be embedded into the appropriate sections of the text and they count towards the page limit. The proposal must be presented in writing to the Advisory Committee at least four weeks before the oral preliminary exam. The proposal title page has to include the summary of the exam procedure for the members of the student's advisory committee provided in the "Written Exam Title Page Template" at <https://iob.uga.edu/graduate-program/forms/>.

The proposal does not have to be based on preliminary results already obtained by the student. The purpose of this proposal is to evaluate the student's ability to develop and present a coherent, logical, and well-thought-out research project in the area of their thesis research. As such, while the student may consult with their major professor regarding the written proposal prior to distributing it to their committee, the proposal should represent the student's independent work.

The research plan in the dissertation proposal is not meant to be a blueprint for completion of the degree – it is expected that changes in the actual progress of the project may occur over time, in consultation with the student's Advisory Committee and advisor.

APPENDIX C:

Ph.D. Student Checklist

Coursework:

Core, all required:

- BINF 8441 BINF 8500 BINF 8600

IOB Approved Elective: Pick one

- _____ Course

Committee Approved Elective: Pick one

- _____ Course

Other Required Courses

- BINF 8060, each semester BINF 8061, each semester in years 1-3, once a year in years 4-5
 BINF 8900L or GRSC 8000 BINF 8970, lab meeting BINF 9000 BINF 9300
 GRSC 7770 (teaching assistants only)

Dates:

Begin at UGA:

Enter IOB Program:

Date of Written Exam:

Date of Oral Exam:

Admission to Candidacy:

Date of Notice to Graduate:

Date of Defense:

Required Forms – Ph.D.:

First Year:

- Advisory Committee form, end of second semester (May)
- Preliminary Program of Study (May)

Second Year:

- Annual Student Evaluation
- Final Program of Study (at least two weeks prior to written exam)
- Notice of Exam-Written exam, to Graduate Program Administrator
- Notice of Exam-Oral exam, to Graduate Program Administrator (three weeks prior to oral exam)
- Report of the Written and Oral Comprehensive Examination form (upon completion of oral exam)
- Application for Admission to Candidacy (upon completion of oral exam)

Third Year:

- Annual Student Evaluation

Fourth Year:

- Annual Student Evaluation

Final Semester:

- Application for Graduation-directly to Graduate School (check due date on Graduate School website)
- Format Check-directly to Graduate School, deadline applies
- Notice of Exam-Dissertation Defense (three weeks prior to the oral defense)
- Dissertation and Final Examination Approval (upon passing of dissertation defense)
- Electronic Thesis and Dissertation (ETD) Submission Form (upon passing of dissertation defense)
- Graduation Ceremony Information-directly to Graduate School

To view forms: <http://grad.uga.edu/index.php/current-students/forms/>

Forms are prepared and submitted by the Graduate Program Administrator, unless otherwise stated.

M.S. Student Checklist

Coursework:

Core, all required:

- BINF 8211 BINF 8940 BINF 8441 BINF 8500 or BINF 8006

Other Required Courses

Thesis option:

- BINF 8060, BINF 8061
 BINF 8970, lab meeting (if applicable) BINF 7000 BINF 7300

Non-Thesis option:

At least three 8000-level courses (9 or more credits) to substitute for thesis:

- _____ Course _____ Course _____ Course

 BINF 8060

Dates:

Begin at UGA:

Enter IOB Program:

Date of Notice to Graduate:

Date of Defense (thesis option):

Required Forms – M.S.

First Year:

- Advisory Committee form, end of second semester (May)
 Final Program of Study, second semester of residence, but no later than the Friday of the second full week of classes of the semester in which the student intends to graduate.

Second Year:

- Annual Student Evaluation

Final Semester: (Thesis option)

- Application for Graduation-directly to Graduate School (check due date on Graduate School website)

- Format Check-directly to Graduate School, deadline applies
- Notice of Exam-Thesis Defense (three weeks prior to the oral defense)
- Thesis Defense and Final Examination Approval (upon passing of thesis defense)
- Electronic Thesis and Dissertation (ETD) Submission Form (upon passing of thesis defense)
- Graduation Ceremony Information-directly to Graduate School

To view forms: <http://grad.uga.edu/index.php/current-students/forms/>

Forms are prepared and submitted by the Graduate Program Administrator, unless otherwise stated.

Final Semester: (Non- thesis option)

- Application for Graduation-directly to Graduate School (check due date on Graduate School website)
- Graduation Ceremony Information-directly to Graduate School

To view forms: <http://grad.uga.edu/index.php/current-students/forms/>

Forms are prepared and submitted by the Graduate Program Administrator, unless otherwise stated.