Academic Handbook
Academic Year 2019-2020

Updated: May 2019
# STUDENT HANDBOOK
## COMPUTATIONAL SCIENCES PhD PROGRAM

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CSci PROGRAM CURRICULUM OUTLINE
CSci PROGRAM FORMS

Please note: The PhD Handbook is updated periodically. For the latest version, please visit the Computational Sciences PhD Program website at: www.csci.umb.edu.
Section I
Introduction

This handbook is designed to provide guidance to Ph.D. Students regarding policies and procedures specific to the Computational Sciences Program. It also offers information about resources available to students enrolled in the program.

This handbook is designed to supplement the University’s Graduate Handbook and Graduate Studies Catalog that contain material related to student rights, academic policies, registration, tuition, fees, financial aid, campus facilities, and course offerings. A full listing of University graduate requirements can be found on the Registrar’s website in the “Academic Policies” section. Students are responsible for being familiar with these requirements. Rules and procedures pertaining to the code of student conduct, confidentiality of academic records, resolution of problems, human subjects’ protection, faculty conduct, and student governance are not reproduced in this handbook.

Although the handbook is not a contract, every effort is made to ensure the accuracy of the information in this handbook, and the program reserves its right to make necessary changes.

Section II
About the Computational Sciences PhD Program

Structural Overview

The Computational Sciences (CSci) PhD Program is a college-wide initiative in the College of Science and Mathematics (CSM). The Program is administered by the CSM Dean's Office due to its interdisciplinary nature. This is different compared to traditional PhD programs that are administered by a particular Department. The CSci Program involves faculty from the Departments of Biology, Chemistry, Computer Science, Engineering, Mathematics and Physics. Students will obtain their degree in one of the three tracks: Data Analytics, Computational Physics, and Bioinformatics.

Figure 1. Structure of the CSM Dean’s Office PhD Programs
Program Goals

The Computational Sciences PhD Program at UMass Boston coordinates and promotes multidisciplinary exchange of ideas among researchers and graduate students. The program involves faculty and graduate students in various departments at the College of Sciences and Mathematics. Departments currently participating in the program include: Biology, Chemistry, Computer Science, Engineering, Physics and Mathematics.

The program emphasizes interdisciplinary research, crossing the boundaries between physical, computational, and mathematical sciences to address challenging problems in science and engineering. At its core, the program builds a strong foundation on the mathematical and the computational background that are fundamental to data-oriented interdisciplinary research and then branches out to more specialized concentrations. The core of the program revolves around scientific computing, numerical analysis and optimization, and probability and statistics. The program provides specialized tracks in Data Analytics, Computational Physics, and Bioinformatics. Graduates from the program are expected to be well positioned for securing jobs in academia or industries seeking specialized expertise in data analytics and algorithm development.

Program Governance

Policy-making authority for the CSci Program resides with the program committee, which consists of a core of faculty members from each of the participating departments who have been designated as members by the Graduate Program Director (GPD). The GPD is appointed by the CSM Dean. The GPD also reports to the Office of Graduate Studies on enrollment, recruiting, and other administrative matters, certifies and completes student dissertations, graduation applications, assigns research assistantships, and collaborates with Department Chairs to secure appropriate research and/or teaching assistantships relevant to students’ area of focus. The program is also obligated to uphold policies established by the Office of Graduate Studies, which sets general academic regulations from the University. Students should familiarize themselves with the policies described on the Graduate Studies web site.

http://catalog.umb.edu/content.php?catoid=14&navoid=1766

Section III
Curriculum

Degree Requirements

Students enroll in one of the three program tracks: Data Analytics, Computational Physics, or Bioinformatics. They will take a combination of core courses, courses specific to each track, as well as a common pool of elective courses.

Overall, students should successfully fulfill the following requirements in order to graduate:
1) Completion of 62 credits: 40 course credits, 2 program seminar, and 20 dissertation research credits.
2) Passing written qualifying examinations.
3) Passing an oral qualifying examination.
4) Presentation and defense of a dissertation proposal.
5) Dissertation defense of the original research work.

It is expected that all CSci PhD students will contribute to original research of interdisciplinary nature, as evidenced in either published or in publishable work in indexed, high-quality peer refereed journals or conferences.

**Curriculum Summary**

**Core Curriculum**
- Four Math courses (16 credits)
- Five track courses (15-18 credits)
  - Three from primary track
  - One from each of the other two tracks

**Elective Courses**
- Three courses from list of electives (9-12 credits)

**Dissertation Research**
- INTR-D 899 Dissertation Research (20 credits)

**Program Seminar**
- INTR-D 601 Program Seminar (1 credit)
- INTR-D 602 Scientific Communication (1 credit)

**Total credits: (40 course credits, 2 program seminar credit, and 20 research credits)**

**Interdisciplinary Nature of the Program**

The following elements of the CSci program are designed to emphasize its interdisciplinary and collaborative nature:
- As part of the Program Seminar (INTR-D 601), students will learn about the research conducted in different departments within the College of Science and Mathematics.
- Students are required to take at least one course in each of the other two tracks.
- Oral qualifying exams include at least one topic outside of student’s research concentration.
- Students have primary and secondary dissertation advisors from different disciplines.
- Student training will include rotations in research groups and laboratories other than that of their primary advisor’s.
Required Courses

All students are required to take a Program Seminar (INTR-D 601) that will include a theoretical component that introduces students to the nature of interdisciplinary research and discusses challenges and solutions to its practical implementation. Faculty from different CSM departments will present their research, and students will make presentations of original research articles with an interdisciplinary and/or collaborative focus. The second required introductory course is INTR-D 6xxx Course, Scientific Communication. This is a primary component of our communication training. The course covers the storage and retrieval of scientific information, the design of tables, figures, and other graphics, the writing of technical reports and papers, and the preparation of publications and scientific presentations. As a capstone experience, students develop a research proposal, typically based on their current research projects that can be submitted to external funding agencies. In addition to the four Math core courses, students are required to take 3 courses within their selected track plus one course from each of the other two track course sets.

Required Program Courses:

Math Core Courses:
• MATH 625: Numerical Analysis (4 credits)
• MATH 626: Numerical Linear Algebra (4 credits)
• MATH 647: Probability Models (4 credits)
• MATH 648: Computational Statistics (4 credits)

Data Analytics Track:
• CS 671: Machine Learning
• CS 624: Analysis of Algorithms
• CS 670: Artificial Intelligence
• CS 672: Neural Networks
• CS 738: Data Mining
• CS 724: Topics in Algorithm Theory and Design
• CS 752: Parallel Programming

Computational Physics Track:
• PHY 610: Topics in Medical Imaging
• PHY 611: Classical Mechanics
• PHY 614: Statistical Mechanics
• PHY 616: Mathematical Physics
• PHY 637: Introduction to Stochastic Processes
• PHY 638: Quantum Measurement and Control
• PHY 640: Scientific Computation and Visualization

Bioinformatics Track:
• BIOL 370: Molecular Biology
• MATH 604: Mathematical Biology
• CS 612: Algorithms in Bioinformatics
• CS 624: Analysis of Algorithms
• BIOL 625: Genomics and Biotechnology
• BIOL 664: Bioinformatics for Molecular Biologists
Elective Courses

In addition to the required introductory and core courses, CSci students are required to take three elective courses. Electives can accommodate a variety of student interests, such as:

- Pursuing a specific topic in depth, especially if it pertains to the students’ dissertation research;
- Exploring how literature in other disciplines and fields of study relates to research topic;
- Taking courses related to student’s major area of focus that are not addressed in required courses;
- Building additional skills in interdisciplinary research or in a specific research method.

The PhD student’s faculty advisor must approve the three courses that will fulfill the electives requirement. To obtain this approval, students must meet with their advisor prior to the start of the semester. The student must notify the GPD and Program Coordinator to update their file (Program of Study Form CSC02). This form will be used to ensure that degree requirements have been fulfilled prior to students applying for graduation.

Common Pool of Elective Courses:

- BIOL 626: Molecular Genetics of Bacteria
- BIOL 641: Quantitative Population Modeling
- BIOL 677: Advanced Eukaryotic Genetics
- BIOL 681: Network Biology
- BIOL 615: Immunology
- CHEM 601: Thermodynamics and kinetics
- CHEM 602: Quantum mechanics
- CS 680: Object-Oriented Design and Programming
- CS 681: Object-Oriented Software Development
- CS 682: Software Development Laboratory I
- CS 683: Software Development Laboratory II
- CS 630: Database Management Systems
- CS 636: Database Application Development
- MATH 620: Combinatorial Analysis
- MATH 640 Computational Algebraic Topology
- MATH 648: Statistical Learning
- MATH 673 Structure and Dynamics of Complex Networks I
- MATH 674 Structure and Dynamics of Complex Networks II
- MATH 677 Symbolic Computations
- MATH 680 Introduction to Computational Algebraic Geometry

Interdisciplinary Seminars

Students are encouraged to participate in the relevant departmental seminars throughout their studies. For the most up-to-date information, please check the [www.csci.umb.edu](http://www.csci.umb.edu) website.

The Biology Seminar [https://www.umb.edu/academics/csm/biology/seminar_series](https://www.umb.edu/academics/csm/biology/seminar_series)
The Chemistry Seminar  https://www.umb.edu/academics/csm/chemistry/events

The Computer Science Seminar  https://www.cs.umb.edu/news_and_events/colloquia

The Mathematics Seminar  http://www.math.umb.edu/research/seminar_semester_schedule.php

The Physics Seminar  https://www.umb.edu/academics/csm/engineering/upcoming_seminars

**Academic Advisory Committee**

Computational Sciences students have primary and secondary research advisors, usually from different disciplines. The student’s primary advisor is the main student mentor and is automatically the chair of the student’s Academic Advisory Committee and the Dissertation Committee (details below). Advisors assist students in planning research, electing courses and seeking funding opportunities to support their research and education. Adviser will provide guidance in career and professional development.

By the end of the students’ second semester in the Ph.D. Program, the student and the academic advisor choose an Academic Advisory Committee (AAC) and submit this proposed committee for approval (form CSC01) to the Graduate Program Director (GPD). The AAC consists of the primary research advisor, a secondary advisor and at least one additional faculty member. The AAC and the student meet on an annual basis to assess the student’s progress. The AAC is also responsible for administering the oral qualifying exams. Cases of misunderstanding or disagreements between the primary and secondary advisors will be reviewed and resolved by the student’s AAC, and if necessary, by the GPD. Changes to the AAC must be documented in a memo to the GPD and the change is to be recorded in the student’s file (updated from CSC01).

**List of Participating Faculty**

A list of CSM faculty members who are engaged in interdisciplinary research and have expressed interest in CSci Program, and therefore can serve as PhD advisors for CSci students, are listed at the end of this handbook by home department. For a list of participating faculty members check out the faculty tab on www.csci.umb.edu website.

**Progress Report**

CSci students and their research advisors provide a yearly progress report (due by May 15) to the GPD. The Program Coordinator will email all students during the Spring semester requesting this information.

**Teaching**

CSci students are encouraged to participate in the teaching program as teaching assistants (TA). The teaching responsibility is intended to enhance the experience and skills of CSci students. Students are also expected to partially support their studies through TA-ships.
Master’s degree

At this point, the program does not offer a Master of Science (MS) degree. Developing a proposal to add an MS degree option is currently under consideration.

Section IV
Research Requirements

Research Rotations

Applicants to the CSci Program will make an initial determination of the track they are interested in pursuing (Data Analytics, Computational Physics, or Bioinformatics) and will begin taking appropriate courses. Students entering the program have an option to participate in research rotations. These rotations are expected to offer students an opportunity to identify possible research projects to pursue in greater depth, as well as to identify faculty that could potentially become part of their AAC. Students are required to select a primary dissertation advisor by the end of their first year. After selection of the primary dissertation advisor, students will make a final choice of their program track.

Qualifying Exams and PhD Candidacy

A requirement for advancement to PhD candidacy is successful completion the Qualifying Examinations. Students are expected to take these examinations after completion of all of their coursework, typically after two years of study, and successfully complete them typically no later than the end of their third year. These examinations are intended to evaluate the breadth and the depth of students’ knowledge in their respective areas of specialization and to provide compelling evidence of potential to do research and produce original results.

The qualifying examination shall consist of two parts: a written component and an oral component. Qualifying examinations shall be offered twice per academic year, typically at the end of each semester. A student expecting to be considered for PhD Candidacy must notify the GPD one semester prior to the intended examination and pre-fill forms CSC03 and CSC04. The structure of the tests is as follows.

Written Component

Math examinations: two exams based on the required Math core curriculum of the program. The material to be tested in these exams shall be broad, spanning the topics the program’s Math core courses (MATH 625, MATH 626, MATH 647, MATH 648).

Track-specific examination: one exam based on the track-specific curriculum of the program. The choice of the exam shall be determined the student and her/his advisors. The material covered in the exam shall be selected from the list of track specific-courses.
Each written exam shall be composed by at least two faculty members. Students shall be given up to two opportunities to successfully complete all three exams in the written component. The examiners shall make a recommendation to the GPD (submit signed form CSC03).

**Oral Component**

After passing the written component, the student’s Academic Advisory Committee shall administer the oral component. The student’s AAC shall assign a research article directly related to student's area of research concentration and another article in a nearby research area. Students will be given approximately two weeks to study each paper and present a concise summary of the papers in form of a short (30-60 minutes) presentation. Students shall be tested on the content of the articles and are expected to demonstrate a thorough understanding of the materials they present. Upon completion of the oral exam, the AAC shall make a recommendation to the GPD (submit signed form CSC04).

Upon successful completion of the written and oral components, the student shall advance to PhD candidacy; the GPD shall notify the Office of Graduate Studies that the student has been admitted to candidacy (form OGS01).

**Dissertation Proposal**

Within one year after the date the student advanced to PhD candidacy, the student, in consultation with the student’s AAC, shall propose a Dissertation Committee (DC) in writing (form OGS02) to the Office of Graduate Studies for approval. Typically, the DC is an extension of the student’s AAC. The DC must include at least one external member (see form OGS02). Subsequently, the student shall submit a 2-5 pages Dissertation Proposal to the DC and schedule an oral presentation of the proposed dissertation research. The proposal shall be reviewed by the student’s DC and is due to the committee members two weeks before the scheduled oral presentation date.

The Dissertation Proposal typically includes:

1. An introduction section that provides a clear statement of the research problem with a justification and rationale for selecting that problem; as well as the research questions that will be examined in the dissertation.
2. A literature review section that analyzes and synthesizes the theoretical and empirical literature on the problem; and that delineates a theoretical or conceptual framework that the student will use to guide the dissertation research. Literature review can be included as part of the extended Introduction.
3. A methods section that includes the description of the technical details of the proposed research approaches.
4. A preliminary results section that describes the experiments and results obtained to date.
5. A future steps section that presents the design of the remaining experiments to be completed in the course of the dissertation research. The interdisciplinary nature of the research should be explicitly mentioned in this section.
6. A references section, citing all relevant sources.

Shortly after the Dissertation Proposal presentation, the student’s DC must make a decision to either Approve, Approve with Reservations, or Do not Approve (form OGS03) and submit their recommendation to the GPD.
The Dissertation

The dissertation is designed to demonstrate the capacity of students to carry out original interdisciplinary research. Chapters in the dissertation can follow the structure of the dissertation proposal (see above).

APA Style and References

The reference format used in the dissertation is the style specified in the Publication Manual of the American Psychological Association (also called the APA Publication Manual): American Psychological Association. (2009). APA Publication Manual, 6th ed. Washington, DC: APA. Follow the APA guidelines for citing and quoting sources, and for preparing the references section of the dissertation. The references section must provide a list of all works cited in the text, and only those works cited in the text. In preparing the list of references, you should begin on a new page with the word References typed in the top center of the page. You can find an excellent online tutorial for APA style requirements at the following website:

http://owl.english.purdue.edu/owl/

Section V
The Dissertation Process

Dissertation Credits

CSci students must enroll in at least 20 dissertation credits (INTR-D 899) while working on their dissertation thesis. Students may enroll in dissertation credits after the end of their second year of the program. After taking all of the required coursework, students register for a Program Fee until they successfully defend their dissertation.

Dissertation Funding

Several sources of funding are available to defray some of the expense of conducting dissertation research.

The University of Massachusetts Boston, through the Office of Graduate Studies, conducts a university-wide dissertation grant competition once in the fall semester and once in the spring semester. For more information, visit the website below.

http://www.umb.edu/research/info_for_students/graduate_research_opportunities_funds

The Graduate Student Assembly (GSA) at UMass Boston also sponsors doctoral dissertation awards. Furthermore, the GSA provides funds for graduate students to travel to research conferences. The GSA provides $250 in travel funds for students who attend conferences and $400 in travel funds for students who present at conferences. Students can receive this GSA travel award twice during their program of study. For more information about the GSA, visit the website: http://gsaubm.wordpress.com

Dissertation Defense

The first step in scheduling the dissertation defense is obtaining approval from the Dissertation
Committee (see below) for a defense to take place. All committee members must agree that the research is ready to be defended, and all members must agree on a day and time for the dissertation defense meeting.

The second step involves the student working with the Program Coordinator to identify a dissertation defense meeting location, and to publicize the dissertation defense to the UMass Boston community. Public notice of the dissertation defense must be provided to the Office of Graduate Studies no fewer than 30 days prior to the dissertation defense date (see below for procedures to do so).

The dissertation defense is an open meeting attended by the student/candidate, the Dissertation Committee, and other interested parties. At the end of the defense, the Dissertation Committee meets in a private session to assess the dissertation. The candidate can pass the dissertation defense examination only with the unanimous approval of all members of the dissertation committee.

The Office of Graduate Studies allows the student to order, at a discounted rate, bound copies of his or her dissertation. One of the bound copies is provided to the UMass Boston library collection. Another bound copy is housed in the CSci Program Office.

**Stages of the Program Progression and Dissertation Process**

The CSci Program tracks student’s progress through six stages. Five of them are identical to the Office of Graduate Studies (OGS) dissertation completion requirements. The CSci and OGS stages are described below and outlined in the following chart. Please use the CSci Forms in the Appendix to comply with the university and program requirements. A student’s progress through these stages is at the discretion of the dissertation committee chair (student’s primary advisor), and each chair may structure this process somewhat differently; yet, all students must progress through the following six stages.

**Stage 1. Selection of Academic Advisory Committee and CSci Program Requirements.** Newly enrolled students are assigned a Primary Advisor by the GPD. They need to update their Program of Study form, in consultation with their Primary Advisor, each semester. By the end of the second semester, students need to select an Academic Advisory Committee (AAC) which later becomes part of their Dissertation Committee.

**Stage 2. Results of Qualifying Exam.** When the Primary Advisor determines, in consultation with the AAC, that students are ready for the Qualifying Exam (QE), the student and the advisor notify the GPD and Program Coordinator of the proposed dates for the Written and Oral Exams. Before the exam, the Program Coordinator will generate the accompanying forms for your AAC members to sign. The student will need to turn in the signed forms to the Program Office after the exams.

**Stage 3. Notification of Candidacy, Dissertation Committee, and Proposal Acceptance.** After the student has successfully completed both written and oral portions of the Qualifying Exam (QE), the Program Office will generate the respective forms to notify the Office of Graduate Studies of the student’s candidacy for the degree.

Within one year after the date the student advanced to PhD candidacy, the student, in consultation with the student’s AAC, shall propose a Dissertation Committee (DC) in writing (form OGS02) to the Office of Graduate Studies for approval. Typically, the DC is an extension of the student’s AAC. The DC must include at least one external member (see form OGS02). Subsequently, the student shall submit a Dissertation Proposal to the DC and schedule an oral presentation of the proposed dissertation
research. The 2-5 pages proposal shall be reviewed by the student’s DC and is due to the committee members two weeks before the scheduled oral presentation date.

Shortly after the Dissertation Proposal presentation, the student’s DC must make a decision to either Approve, Approve with Reservations, or Do not Approve (form OGS03) and submit their recommendation to the GPD.

**Stage 4. Notification of Intent to Defend Dissertation.** After all Dissertation Committee members agree that the student is ready to schedule a dissertation defense and have agreed on a day and time for the defense, the student and the advisor (Dissertation Committee Chair) must notify the GPD and Program Coordinator of the proposed date. This notification must occur **no fewer than 30 days prior to the date of the proposed dissertation defense.**

The Program Coordinator will obtain signatures from the Program Director and from the student’s Dissertation Committee Chair, which are required for the respective form to notify the Office of Graduate Studies and the UMass Boston’s community of the defense date. S/he will also assist the student in scheduling a room for the meeting and in acquiring audio-visual equipment requested by the student for the dissertation defense presentation.

**Stage 5. Result of Dissertation Defense.** The Program Coordinator will prepare the respective OGS form for the student to bring to the dissertation defense meeting. If the dissertation committee approves the student’s dissertation, the committee members will sign the form, and the student will submit the signed form to the Program Office following the defense meeting. The Program Coordinator will submit the form to the Office of Graduate Studies on behalf of the student.

**Signature Page.** Students will typically need to make revisions and modifications to the dissertation following the dissertation defense presentation. The dissertation committee members will approve the content of the dissertation at some point following the defense presentation. When the dissertation committee has approved the content of the dissertation (in addition to approving the defense presentation), then the dissertation committee members will sign the signature page of the dissertation.

Students are responsible for obtaining the necessary signatures and for submitting the signature page – along with the committee-approved dissertation – to the Office of Graduate Studies. [Note: the signature page should follow the format guidelines provided by the Office of Graduate Studies. It is advised that students prepare and obtain signatures on multiple (3) copies of the signature page, in case a particular copy of that page becomes damaged in any way.] The signature page, with original signatures, must be submitted to the Office of Graduate Studies. Electronic signatures are not allowed.

**Stage 6. Review of Dissertation by Office of Graduate Studies.** After the dissertation committee has approved the content of the student’s dissertation (via their signatures on the signature page), the student will submit the committee-approved version of the dissertation to the Office of Graduate Studies for format review. The format-review submission occurs electronically. See the website below for more information regarding the submission of committee-approved dissertations to the Office of Graduate Studies.

[http://www.umb.edu/academics/graduate/info_for_graduate_students/graduating_from_umass_boston/theses_dissertations/](http://www.umb.edu/academics/graduate/info_for_graduate_students/graduating_from_umass_boston/theses_dissertations/)
# CSCI Student Checklist (Including OGS Dissertation Tracking Stages)

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<th>What it means</th>
<th>What is required</th>
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<td><strong>Stage One:</strong> Selection of Academic Advisory Committee and Updating Program Requirements</td>
<td>You have identified your Academic Advisory Committee (AAC) and met with your primary advisor to discuss course registration.</td>
<td>Student completes AAC Form <a href="#">CSC01</a> and Program of Study Form <a href="#">CSC02</a> and submits them to the Program Office.</td>
<td>Graduate program director (GPD) signs <a href="#">CSC01</a> form.</td>
</tr>
<tr>
<td><strong>Stage Two:</strong> Qualifying Exam Notification of Candidacy Dissertation Committee</td>
<td>You have finished your required courses and your Primary Advisor, in consultation with AAC, has recommended that you take the written and oral Qualifying Exams. You have successfully passed both written and oral portion of your Qualifying Exam. Your AAC has transitioned your AAC into your Dissertation Committee (DC), presented your Dissertation Proposal and your DC approved.</td>
<td>Advisor and Student notify the Program Office to schedule the exams and to generate required forms. Student submits results - signed <a href="#">CSC03</a>, <a href="#">CSC04</a>, and <a href="#">OGS3</a> forms to the Program Office. The Program Office submits the forms to the Office of Graduate Studies.</td>
<td>Graduate Program Director (GPD) signs <a href="#">CSC03</a>, <a href="#">CSC04</a>, <a href="#">OGS1</a>, and forms. AAC/DC members and GPD sign forms <a href="#">OGS2</a> and <a href="#">OGS3</a>. Dean of Graduate Studies must approve.</td>
</tr>
<tr>
<td><strong>Stage Three:</strong> Notification of Intent to Defend Dissertation</td>
<td>You have finalized the membership of your Dissertation Committee. Your AAC/DC agrees that you are ready to defend your dissertation and has selected a day and time for the dissertation defense.</td>
<td>Advisor and Student notify the Program Office to schedule the defense. Student provides an updated AAC Form and external members’ CV to the Program office. The Program office submits the <a href="#">OGS4</a> form to the Office of Graduate Studies.</td>
<td>Advisor/Dissertation committee Chair and GPD sign <a href="#">OGS4</a> form. Dean of Graduate Studies must approve.</td>
</tr>
<tr>
<td><strong>Stage Five:</strong> Approval of Dissertation Defense</td>
<td>Your AAC/Dissertation Committee provides approval for your dissertation defense presentation.</td>
<td>Student requests and brings <a href="#">OGS5</a> form to dissertation defense. After committee members sign the form, the student returns the form to the Program office. The Program office submits the form to the Office of Graduate Studies.</td>
<td>AAC/Dissertation Committee members and GPD sign form.</td>
</tr>
<tr>
<td>Signature page</td>
<td>Your AAC/Dissertation Committee approves the final version of your dissertation.</td>
<td>Student prepares signature page based on Office of Graduate Studies format guidelines. Student obtains necessary original signatures (3 copies) and submits signature page to Office of Graduate Studies.</td>
<td>Dissertation Committee members, GPD, and Department Chair sign the signature page. Original signatures required.</td>
</tr>
<tr>
<td><strong>Stage Six:</strong> Format Review.</td>
<td>Office of Graduate Studies approves format of the dissertation.</td>
<td>Student electronically submits committee-approved dissertation to the Office of Graduate Studies for format review.</td>
<td>Office of Graduate Studies approves format of the dissertation.</td>
</tr>
</tbody>
</table>
Section VI
Financial Support and Research Assistantships

Research, Teaching Assistantships, and Teaching Fellowships

Students in the CSci program are supported through Graduate Research Assistantships (RAs), Teaching Assistantships (TAs) provided by the Office of Graduate Studies, Teaching Fellowships (TF) provided by the College of Science and Mathematics and faculty grants. Additional university sources of support include Research Fellowships (currently Sanofi Genzyme and Oracle Fellowships), available to students who have advanced to candidacy, as well as various travel grants to support conference participation.

After being supported by the CSci Program as RAs during their first year, students will be supported by Research Assistantships (RAs) provided by their faculty advisors’ grants, and/or Teaching Assistantships (TAs) or Teaching Fellowships (TFs) provided by the home department of the faculty advisor. The first year of RA support will allow a student to focus on their course work and selection of the dissertation advisor and their primary topic of research. Additional sources of support are available to graduate students through the CSM and Office of the Provost. Every semester, students are required to sign contracts with the Office of Graduate studies for full-time commitment.

External Support

All CSci students are strongly encouraged to apply for extramural fellowship support. A partial list is included below.

National Science Foundation (NSF) Graduate Fellowships: First-year graduate students are urged to apply for these prestigious three-year fellowships. NSF Fellowship applications are due in November of each year. For applications and instructions go to: https://www.nsfgrfp.org

The DOE Computational Science Graduate Fellowship: https://www.krellinst.org/csgf/ is another funding opportunity offered by the Krell Institute and the U.S. Department of Energy. Applications are due January.

National Institutes of Health Ruth L. Kirschstein Predoctoral Individual National Research Service Award (F31): https://researchtraining.nih.gov/programs/fellowships/F31

Students can also look into grants at a federal level through the website Grants.gov by doing a search for student level or graduate-level grants. The Community of Science (COS) also offers grant opportunities at the federal level. A broad range of funding opportunities can found at the Open Education Database. Another list of funding opportunities is available at the UMass Boston Graduate Research Opportunities website:

https://www.umb.edu/research/info_for_students/graduate_research_opportunities_funds
Section VII
Academic Policies

General Academic Regulations

Students should carefully review and understand the general academic regulations that govern their participation in a graduate program at UMass Boston. In this section of the student handbook, several of these regulations are described and explained in relation to the context of the Computational Doctoral Program. But a more comprehensive set of academic policies can be found on the website for the Office of Graduate Studies. In the event of any discrepancy between this student handbook and the Graduate Studies website, the Graduate Studies website shall be considered the governing policy.

http://catalog.umb.edu/content.php?catoid=14&navoid=1766

Transfer Credit Policy

Students can transfer up to six credits from coursework taken at other institutions. These six credits can be comprised of courses taken prior to admission to the UMass Boston doctoral program, and/or courses taken while the student is enrolled in the UMass Boston program. If the student seeks to transfer credits from courses taken prior to admission to UMass Boston, then the student must have taken these courses no more than seven years prior to the date of admission to the program. The university will not accept transfer credits from courses taken more than seven years prior to admission. Note that the total number of transferred credits, including both prior coursework and courses taken while a student at UMass Boston, cannot exceed six.

Students can transfer an additional six credits from courses taken at UMass Boston within seven years prior to admission to the doctoral program. Thus, students can transfer a total of 12 credits: 6 from prior or concurrent coursework at other institutions, and 6 from prior coursework at UMass Boston.

Students who transfer to the IB Program will receive transfer credit for their previous work, if they can demonstrate course equivalency. Credits for previous work are given at the discretion of the Program Committee. Transfer students are still required to pass written and oral qualifying exams and fulfill all other candidacy requirements.

Course Waiver Policy

Students can be admitted to the program with Advanced Standing. PhD Program Director, in consultation with PhD Committee members will review the requests on a case-by-case basis.

Statute of Limitations: Maximum Time Allowed for Degree Completion

Rather than being merely a collection of courses, a graduate degree requires intense commitment to scholarship and practice within a specific period of time. Such focus and coherence is lost if the degree is not completed within a reasonable time period. Therefore, each graduate program at UMass Boston requires that students complete their program of study within designated time limits. The statute of limitations (i.e. maximum time) to complete the Computational Sciences doctoral degree is seven years for the PhD.
Students who are unable to complete degree requirements within the seven-year statute of limitations can appeal to the Program Committee for an extension beyond this period. To request an extension, the student must provide the Program Committee with an explanation of the circumstances that precluded degree completion within the seven-year period. The request must also include a detailed plan for completing the degree within one year. The Program Committee will grant extensions only if the student is making satisfactory progress toward degree completion and has already successfully passed both written and oral portions of the Qualifying Exam. Students who have not passed their Qualifying Exam are not eligible to be considered for a statute-of-limitations extension.

If the extension request is approved by the Program Committee, then the student must submit a **statute of limitations extension form** to the Program office. The form must then be signed by the Program Director, who will submit the form to the Registrar and the Office of Graduate Studies. These forms can be found on the website for the Registrar. [www.umb.edu/registrar/forms/](http://www.umb.edu/registrar/forms/)

**Full- and Part-time Status**

Currently the program admits full-time students. Admitting students on a part-time basis may be reviewed on a case-by-case basis.

**Required Grade Point Average**

The University specifies that students must obtain a cumulative grade point average (GPA) of 3.0 (average grade of B or above) in order to be awarded their graduate degree. When students fall below a GPA of 3.0 for two or more consecutive semesters, they will be placed on academic probation by the Office of Graduate Studies. Students who are placed on academic probation will be removed from any Graduate Assistantship positions that they hold, and they will be subject to dismissal if they are unable to return to a cumulative GPA of 3.0 or above.

**Incomplete Work**

Students with incomplete work in more than one course may be suspended from the program. Specifically, they will not be allowed to enroll in either second-year or third-year courses until such time as incomplete work from the prior year has been completed.

Students should communicate with their instructors to request an incomplete grade. Students should not simply assume that because they did not submit all assignments to their instructor, that their instructor will give them an incomplete grade. Specifically, students should complete and send to their instructor an incomplete grade form. On this form, the instructor and student will agree to a new date at which time the remaining assignments will be submitted. The student should then submit the completed form to the Program Coordinator. The incomplete course form can be requested from the Program’s office.

**Removing an Incomplete Grade**

The specific requirements and arrangements for successfully removing a grade of Incomplete (INC) are determined by the instructor of the course. Typically, all grades of Incomplete must be resolved within six weeks of the end of the course. Except in extenuating circumstances agreed to by the faculty member, no work necessary to remove a grade of Incomplete will be accepted later than 12 weeks after the end of the course. The maximum allowable time to remove an incomplete grade is one year, but this
amount of time is permitted only when extreme circumstances intervene.

After one year, an incomplete grade will revert to an “F,” which cannot be changed. **No appeals will be considered by the Office of Graduate Studies.** Failure to successfully remove an incomplete grade will result in a grade of “F” for the course and will necessitate that the student retake the course, if the course is a requirement for the degree. The responsibility to address incomplete work resides entirely with the student.

**Leave of Absence from the Program**

A student who has been accepted into a graduate program is expected to remain in continuous enrollment until graduation. However, if circumstances arise that cause an interruption in graduate study, a student can apply for a leave of absence (LOA). Leaves of absence are generally granted only in cases of substantiated illness or disability of the student or family member, military service, or one semester maternity or paternity leave. A student should document the basis for the leave. If a student is providing medical information on another person (e.g., a family member) as the basis for a medical leave of absence, s/he must have the permission of that person to release the information.

A leave of absence must be approved by the graduate program director and the dean of graduate studies.

- Leaves of absence are granted in yearly increments, and students may not be granted more than three years total LOA.
- Time spent on leave approved by the Office of Graduate Studies does not count toward the statute of limitations (SOL). The “SOL clock” is stopped for the period of the leave.
- Students on LOA will not be covered by the health insurance plan until they return to registration.
- Students on LOA do not pay the program continuation fee while on leave, and a leave of absence does not make a student eligible for student loan deferments.

**Program Continuation: Registration After Course Work is Completed**

Students who do not register for any UMass Boston courses in a particular fall or spring semester must maintain continuous enrollment in the University by registering for “program continuation.” The program continuation fee is $225 per semester.

Students can register for **program continuation** on the WISER online registration system. This process must be completed prior to the registration deadline for the semester in which the student is registering. Late registrations will be subject to a $110 fee.

All students must maintain continuous registration in the University until the degree sought by the student has been formally awarded. Continuous registration through program continuation must be maintained even when a student is working on dissertation research.

**Failure to Remain an Active Student**

A student who does not register for any classes and fails to register for program continuation will be classified as inactive. To become active again, students will need to submit a **readmission application** (available on the Registrar's Office website) along with a readmission fee and any owed program
continuation fees from previous semesters. Readmission to the program is not automatic and must be approved by the Program Committee.

**Withdrawal from the Program**

A student who seeks to withdraw from the CSci Program should submit a letter of intent to his or her advisor. The student is strongly encouraged to have an advising session with his or her advisor and the Program Director before starting the withdrawal process. The effective date of withdrawal from the University is that on which the withdrawal form is completed, signed, and returned to the Registrar. Failure to complete a withdrawal form will result in the recording of the grade of “F” for all courses at the end of the term.

**Academic Integrity: The Code of Student Conduct**

Graduate students at UMass Boston should adhere to the highest standards of academic integrity. Students are obligated to uphold the scholarly responsibilities described in the University’s Code of Student Conduct. Consequences for failing to adhere to these responsibilities may include (but are not limited to) failure in the course in which the violation occurred and/or dismissal from the University. For more information, visit the website below:

https://www.umb.edu/life_on_campus/dean_of_students/students/student_conduct
Section VIII
CSci Faculty and Contact Information

For up to date CSci Faculty please visit Program Website:

www.csci.umb.edu

For additional information or questions, please contact:

CSci Program
- The CSci Program Director, Dr. Ricardo Castano-Bernard, r.castanobernard@umb.edu
- The CSci Program Coordinator, Velina Batchvarov, velina.batchvarov@umb.edu

University
Main Number (Information) 617-287-5000
CSM Dean’s Office 617-287-5700
Bursar’s Office 617-287-5350
Computing Services, Main Office 617-287-5200
Graduate Admissions/Registrar 617-287-6400
Office of Graduate Studies 617-287-5700
UMass Bookstore 617-287-5090
Public Safety 617-287-7799

- The Office of Graduate Admissions, Quinn Building, 1st floor, 617.287.6400 | graduate.admissions@umb.edu
- The Office of Graduate Studies, Quinn Building, 1st floor, 617.287.5700
- The College of Science and Mathematics website, www.csm.umb.edu
## CSci Program Curriculum Outline

### Required (Core) Courses for all three tracks (Total # of courses required = 4)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 625</td>
<td>Numerical Analysis</td>
<td>4</td>
</tr>
<tr>
<td>MATH 626</td>
<td>Numerical Linear Algebra</td>
<td>4</td>
</tr>
<tr>
<td>MATH 647</td>
<td>Probability Models</td>
<td>4</td>
</tr>
<tr>
<td>MATH 648</td>
<td>Computational Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

SubTotal # Core Credits Required 16

### Data Analytics Track Required (Core) Courses (Total # of courses required = 5: 3 from this track +1 from each of the other two tracks)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 624</td>
<td>Analysis of Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CS 670</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>CS 671</td>
<td>Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>CS 672</td>
<td>Neural Networks</td>
<td>3</td>
</tr>
<tr>
<td>CS 738</td>
<td>Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>CS 724</td>
<td>Topics in Algorithm Theory and Design</td>
<td>3</td>
</tr>
<tr>
<td>CS 752</td>
<td>Parallel Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

SubTotal # Track Core Credits Required 9 + 6

### Computational Physics Track Required (Core) Courses (Total # of courses required = 5: 3 from this track + 1 from each of the other two tracks)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSIC 610</td>
<td>Topics in Medical Imaging</td>
<td>4</td>
</tr>
<tr>
<td>PHYSIC 611</td>
<td>Theory of Classical Mechanics and Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYSIC 614</td>
<td>Statistical mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYSIC 616</td>
<td>Mathematical Physics</td>
<td>4</td>
</tr>
<tr>
<td>PHYSIC 637</td>
<td>Introduction to Stochastic Processes</td>
<td>4</td>
</tr>
<tr>
<td>Course Number</td>
<td>Course Title</td>
<td>Credit Hours</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>BIOL 370</td>
<td>Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 625</td>
<td>Genomics and Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 664</td>
<td>Bioinformatics for Molecular Biologists</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 674</td>
<td>Cell Signaling</td>
<td>3</td>
</tr>
<tr>
<td>CS 612</td>
<td>Algorithms in Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>CS 624</td>
<td>Analysis of Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>MATH 604</td>
<td>Mathematical Biology: A Molecular Approach</td>
<td>3</td>
</tr>
</tbody>
</table>

**Bioinformatics Track Required (Core) Courses (Total # of courses required = 5: 3 from this track + 1 from each of the other two tracks)**

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 615</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 626</td>
<td>Molecular Genetics of Bacteria</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 641</td>
<td>Quantitative Population Modeling</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 677</td>
<td>Advanced Eukaryotic Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 681</td>
<td>Network Biology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 601</td>
<td>Thermodynamics and Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 602</td>
<td>Quantum Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM TBA</td>
<td>Molecular Simulations</td>
<td>3</td>
</tr>
<tr>
<td>CS 630</td>
<td>Database Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>CS 636</td>
<td>Database Application Development</td>
<td>3</td>
</tr>
<tr>
<td>CS 680</td>
<td>Object-Oriented Design and Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS 681</td>
<td>Object-Oriented Software Development</td>
<td>3</td>
</tr>
<tr>
<td>CS 682</td>
<td>Software Development Laboratory I</td>
<td>3</td>
</tr>
<tr>
<td>CS 683</td>
<td>Software Development Laboratory II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 620</td>
<td>Combinatorial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 640</td>
<td>Computational Algebraic Topology</td>
<td>3</td>
</tr>
<tr>
<td>MATH 673</td>
<td>Structure and Dynamics of Complex Networks I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 674</td>
<td>Structure and Dynamics of Complex Networks II</td>
<td>3</td>
</tr>
</tbody>
</table>

**SubTotal # Track Core Credits Required** 12 + 6

**Elective Course Choices (Total courses required = 3; attach list of choices if needed)**

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 685</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 686</td>
<td>Molecular Genetics of Bacteria</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 687</td>
<td>Quantitative Population Modeling</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 688</td>
<td>Advanced Eukaryotic Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 689</td>
<td>Network Biology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 603</td>
<td>Thermodynamics and Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 604</td>
<td>Quantum Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM TBA</td>
<td>Molecular Simulations</td>
<td>3</td>
</tr>
<tr>
<td>CS 631</td>
<td>Database Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>CS 637</td>
<td>Database Application Development</td>
<td>3</td>
</tr>
<tr>
<td>CS 684</td>
<td>Object-Oriented Design and Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS 685</td>
<td>Object-Oriented Software Development</td>
<td>3</td>
</tr>
<tr>
<td>CS 686</td>
<td>Software Development Laboratory I</td>
<td>3</td>
</tr>
<tr>
<td>CS 687</td>
<td>Software Development Laboratory II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 621</td>
<td>Combinatorial Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 641</td>
<td>Computational Algebraic Topology</td>
<td>3</td>
</tr>
<tr>
<td>MATH 674</td>
<td>Structure and Dynamics of Complex Networks II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 675</td>
<td>Structure and Dynamics of Complex Networks III</td>
<td>3</td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
<td>Credits</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>MATH 677</td>
<td>Symbolic Computations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 680</td>
<td>Introduction to Computational Algebraic Geometry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>SubTotal # Elective Credits Required</strong></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td><strong>Required Dissertation Research for all three tracks</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dissertation Research</td>
<td>20 credits minimum</td>
</tr>
</tbody>
</table>

**Curriculum Summary**

<table>
<thead>
<tr>
<th>Category</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of courses required for the degree</td>
<td>40</td>
</tr>
<tr>
<td>Dissertation Research</td>
<td>20 credits minimum</td>
</tr>
<tr>
<td>Program Seminar</td>
<td>2</td>
</tr>
<tr>
<td>Minimum credit hours required for degree</td>
<td>62</td>
</tr>
</tbody>
</table>

**Prerequisite, Concentration or Other Requirements:**

**Program Seminar**
- INTR-D 601 Program Seminar (1 credit)
- INTR-D 602 Scientific Communication (1 credit)

Click the link below to the graduate catalogue to view course descriptions: [https://www.umb.edu/academics/course_catalog/listing/grd](https://www.umb.edu/academics/course_catalog/listing/grd).

Contact Program office to receive the most up to date CSci Program Forms.
Student Name: ________________________________  Student ID: ________________

This form outlines the 6 steps of your degree progress and indicates the forms you will need to fill out during that process. For each of these forms, you should keep a photocopy for your own records and the originals will be in your graduate file.

1. Requirements
   a. Track: ___ Data Analytics ___ Computational Physics ___ Bioinformatics
   b. Research Advisor(s)
      i. Primary Advisor __________________________
         (Newly enrolled students are assigned the Primary Advisor by the GPD).
      ii. Secondary Advisor __________________________
         (Students select a Secondary Advisor from a different discipline).
      iii. Advisor Change? Name __________________________
   c. Selection of Academic Advisory Committee (CSC01)
      *(Due by the end of 2nd semester).*
   d. Program of Study (CSC02)
      *(Filled at the start of program and revised as often as needed).*

2. Qualifying Exam and Notification of Candidacy
   a. Written Comprehensive Exam
      Email GPD and Program Coordinator 2-4 weeks prior to exam date to schedule room
      i. Results of Written Comprehensive Exam (CSC03)
         *Due after the exam completion*
   b. Oral Qualifying Exam
      Email GPD and Program Coordinator 2-4 weeks prior to exam date to schedule room
      i. Results of Oral Qualifying Exam (CSC04)

3. Candidacy, Dissertation Committee, and Proposal Acceptance
   After successfully passing qualifying exam and completing required coursework, student and GPD complete the following OGS forms and submit them to OGS for Dean of Graduate Studies approval. A Dissertation Committee typically has 3 AAC members from the program and 1 external member.
   a. Dissertation Tracking/Notification of Candidacy (OGS1)
      Submit when you have passed the qualifying examination and you are ready to begin working on a dissertation proposal.
   b. Dissertation Tracking/Dissertation Committee (OGS2)
      Submit for approval by the Dean of Graduate Studies. This must be done prior to the committee's approval of your dissertation proposal. If at any time a dissertation committee member is replaced, submit a revised form to OGS.
c. Dissertation Tracking / Notification of Proposal Acceptance (OGS3)  

Submit when your dissertation proposal has been accepted. Attach a copy of the approved proposal.

4. Graduation Intent
   a. Check PhD graduation deadlines, usually April 10 for June degree date and December 1 for December degree date.
   b. Intent to Graduate (CSC05)
   c. Registrar’s Graduate Degree Application Form. For up to date form visit: https://www.umb.edu/registrar/graduation/applying_for_graduation

5. Dissertation Defense
   https://www.umb.edu/academics/graduate/info_for_graduate_students/graduating_from_umass_boston/theses_dissertations
   a. Dissertation Tracking/Notification of Intent to Defend Dissertation (OGS4)

Submit as soon as you received approval by all committee members to schedule your dissertation defense. This is a public event and it needs to be circulated to the University Community.

   b. Dissertation Tracking/Results of Dissertation Defense (OGS5)

Bring this form to your defense to include the committee members’ vote.

   c. Dissertation Signatory Page

Consult with dissertation format editor for acceptable format. Bring this form to your defense to collect committee members’ signatures.

6. Dissertation Completion
   a. Initial online dissertation submission

Due by April 10 or December 1 for June/December graduation dates, respectively

   b. Order thesis binding

Add 2 mandatory copies – Library and CSci Program copy

   c. Original Dissertation Signatory Page

Due to format editor to format editor and a copy to IB Program Office

   d. Submit final online submission

Due by May 15th and December 20 for June/December graduation dates, respectively.
Academic Advisory Committee Form (CSC01)
Computational Sciences PhD Program
University of Massachusetts Boston

By the end of the students second semester in the PhD Program, the student and the academic advisor will choose an Academic Advisory Committee (AAC) and will submit this proposed committee for approval to the Graduate Program Director (GPD). The AAC consists of the primary research advisor and a minimum of 2 additional faculty members in the student’s area of interest. For a list of participating faculty members check out the faculty tab on http://www.csci.umb.edu website. Changes to the AAC must be documented in a memo to the GPD and the change is to be recorded in this form.

____________________________  ______________________________  __________
Student Name                        Signature                                    Date

____________________________  ______________________________  __________
Primary Advisor                     Signature                                    Date

____________________________  ______________________________  __________
Secondary Advisor                   Signature                                    Date

____________________________  ______________________________  __________
Member                             Signature                                    Date

____________________________  ______________________________  __________
Member                             Signature                                    Date

____________________________  ______________________________  __________
Member                             Signature                                    Date

____________________________  ______________________________  __________
Member                             Signature                                    Date

____________________________  ______________________________  __________
Member                             Signature                                    Date

Notes:

____________________________  ______________________________  __________
Graduate Program Director         GPD Signature                                Date

Rev. April 2019
FORM CSC01. PhD Academic Advisory Committee Selection
Program of Study Form (CSC02)
Computational Sciences PhD Program
University of Massachusetts Boston

Student Name: ___________________________________________ Student ID: __________________________
List courses completed for the degree. The distribution of courses must comply with the requirements of the program/track under which the student intends to graduate. Under “Semester”, choose FAYY, SPYY, or SUYY.

<table>
<thead>
<tr>
<th>Required (Core) Courses for all three tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Total number of courses required: 4)</td>
</tr>
<tr>
<td>Course Title</td>
</tr>
<tr>
<td>MATH 625</td>
</tr>
<tr>
<td>MATH 626</td>
</tr>
<tr>
<td>MATH 647</td>
</tr>
<tr>
<td>MATH 648</td>
</tr>
<tr>
<td>SubTotal # Core Credits Required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Analytics Track Required Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total # of courses required: 5 (3 from this track + 1 from each of the other two tracks)</td>
</tr>
<tr>
<td>Course Number</td>
</tr>
<tr>
<td>CS 624</td>
</tr>
<tr>
<td>CS 670</td>
</tr>
<tr>
<td>CS 671</td>
</tr>
<tr>
<td>CS 672</td>
</tr>
<tr>
<td>CS 738</td>
</tr>
<tr>
<td>CS 724</td>
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<tr>
<td>CS 752</td>
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<td>SubTotal # Track Core Credits Required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computational Physics Track Required Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total # of courses required: 5 (3 from this track + 1 from each of the other two tracks)</td>
</tr>
<tr>
<td>Course Number</td>
</tr>
<tr>
<td>PHYSIC 610</td>
</tr>
<tr>
<td>PHYSIC 611</td>
</tr>
<tr>
<td>PHYSIC 616</td>
</tr>
<tr>
<td>PHYSIC 637</td>
</tr>
<tr>
<td>PHYSIC 638</td>
</tr>
<tr>
<td>PHYSIC 640</td>
</tr>
<tr>
<td>SubTotal # Track Core Credits Required</td>
</tr>
</tbody>
</table>
## Bioinformatics Track Required Courses

Total number of courses required: 5 (3 from this track + 1 from each of the other two tracks)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 370</td>
<td>Molecular Biology</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>BIOL 625</td>
<td>Genomics and Biotechnology</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 664</td>
<td>Bioinformatics for Molecular Biologists</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 674</td>
<td>Cell Signaling</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 612</td>
<td>Algorithms in Bioinformatics</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 624</td>
<td>Analysis of Algorithms</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 604</td>
<td>Mathematical Biology: A Molecular Approach</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SubTotal # Track Core Credits Required: 9 + 6

## Elective Course Choices

Total courses required: 3 (attach list of choices if needed)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 615</td>
<td>Immunology</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 626</td>
<td>Molecular Genetics of Bacteria</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 641</td>
<td>Quantitative Population Modeling</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 677</td>
<td>Advanced Eukaryotic Genetics</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 681</td>
<td>Network Biology</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 601</td>
<td>Thermodynamics and Kinetics</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 602</td>
<td>Quantum Mechanics</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM TBA</td>
<td>Molecular Simulations</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 630</td>
<td>Database Management Systems</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 636</td>
<td>Database Application Development</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 680</td>
<td>Object-Oriented Design and Programming</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 681</td>
<td>Object-Oriented Software Development</td>
<td>3</td>
<td></td>
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<tr>
<td>CS 682</td>
<td>Software Development Laboratory I</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>CS 683</td>
<td>Software Development Laboratory II</td>
<td>3</td>
<td></td>
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<tr>
<td>MATH 620</td>
<td>Combinatorial Analysis</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>MATH 640</td>
<td>Computational Algebraic Topology</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 673</td>
<td>Structure and Dynamics of Complex Networks I</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 674</td>
<td>Structure and Dynamics of Complex Networks II</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 677</td>
<td>Symbolic Computations</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 680</td>
<td>Introduction to Computational Algebraic Geometry</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SubTotal # Elective Credits Required: 9
### Required Dissertation Research (all tracks)
**Total 20 credits minimum**

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTR-D 899</td>
<td>Dissertation Research</td>
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<tr>
<td>INTR-D 899</td>
<td>Dissertation Research</td>
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</tr>
</tbody>
</table>

### Curriculum Summary

<table>
<thead>
<tr>
<th>Total number of courses required for the degree</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissertation Research</td>
<td>20 credits minimum</td>
</tr>
<tr>
<td>Program Seminar</td>
<td>2</td>
</tr>
</tbody>
</table>

| Minimum credit hours required for degree      | 62 |

### Prerequisite, Concentration or Other Requirements:

**Program Seminar**
- INTR-D 601 Program Seminar (1 credit)
- INTR-D 602 Scientific Communication (1 credit)

* Transcripts will be required for transferred courses and will be approved by the GPD for use toward completion of degree requirements.

**NOTE:** This form will be updated each semester. A final completed version of this form, and a copy of your transcripts need to be turned in with the “Registrar’s Office Graduate Degree Application” form.

**Remarks:**
Results of Written Qualifying Exam Form (CSC03)

Computational Sciences PhD Program
University of Massachusetts Boston

This is to certify the results of the written qualifying examination taken by:

_____________________________ from _____/____/20___ to _____/____/20___
Name

Math Core Exam 1: ____________________________  ___High Pass  ___Pass  ___Fail
Topic
Examiner ____________________________________________  _______________________
Sign & Date
Examiner ____________________________________________  _______________________
Sign & Date

Math Core Exam 2: ____________________________  ___High Pass  ___Pass  ___Fail
Topic
Examiner ____________________________________________  _______________________
Sign & Date
Examiner ____________________________________________  _______________________
Sign & Date

Track-Specific Exam: ____________________________  ___High Pass  ___Pass  ___Fail
Topic
Examiner ____________________________________________  _______________________
Sign & Date
Examiner ____________________________________________  _______________________
Sign & Date

_________________________________________  _______________________
Student ID #  Student Signature  Date

_________________________________________  _______________________
GPD  Signature  Date

Rev. April 2019
FORM CSC03: Qualifying Exam Results – Written
Results of Oral Qualifying Exam Form (CSC04)
Computational Sciences PhD Program
University of Massachusetts Boston

This is to certify the results of the oral comprehensive examination taken by:

_________________________________________________ on ___/___/20___
Student Name

Overall: ______High Pass ______Pass ______Fail

Academic Advisory Committee’s suggested course of action to rectify any perceived deficiency with the Oral Qualifying Exam:

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Primary Advisor, Chair AAC _________________________________ Advisor Signature _____________________________ Date __________

Secondary Advisor, AAC _________________________________ Advisor Signature _____________________________ Date __________

AAC Member _________________________________ Signature _____________________________ Date __________

Other Examiner _________________________________ Signature _____________________________ Date __________

____________________________________ Student ID # _________________________________ Student Signature _____________________________ Date __________

GPD _________________________________ Signature _____________________________ Date __________

Rev. April 2019
FORM CSC04: Qualifying Exam Results – Oral
Intent to Graduate Form (CSC05)
Computational Sciences PhD Program
University of Massachusetts Boston

Before filling out the form, the graduate student must have received the approval of their advisory committee. This form is to be filled out by the graduate student and advisor and submitted to the Graduate Program Director (GPD). After this form has been signed by the GPD, the student may fill out Part I of the “Registrar Office Graduate Degree Application” form and submit it to the GPD.

We certify that ______________________________ has discussed their plans to finish their degree in the ___________ semester with their advisory committee and the committee has agreed. The graduate student may fill out the Graduate Studies Intent to Graduate Form and pay their graduation fees.

NOTES:

__________________________________________
Student Signature

__________________________________________
Date

__________________________________________
Research Advisor Signature

__________________________________________
Date

__________________________________________
GPD Signature

__________________________________________
Date

Rev. April 2019
FORM CSC05: Intent to Graduate
University of Massachusetts - Boston
Dissertation Tracking Form

Stage 1 - Notification of Candidacy

Graduate Program Directors should complete and forward the appropriate portion of this form to the Office of Graduate Studies at each stage of the dissertation process. Signed copies will be returned when notification of each stage is received and approved, if required, by the Dean of Graduate Studies.

Submit when a student has passed the preliminary or comprehensive examination and is ready to begin working on a dissertation proposal.

Graduate Program: Computational Sciences

Student Name and ID:

Date of Admission to program:

Date of Admission to Candidacy:

Major Advisor:

Approved by Graduate Program Director

__________________________________  __________________
Signature                              Date

Received by Dean of Graduate Studies

__________________________________  __________________
Signature                              Date

Revised December 2017
University of Massachusetts - Boston  
Dissertation Tracking Form 

Stage 2 - Notification of Proposed Dissertation Committee  

Student Name and ID: 

Department/Program: Computational Sciences 

Submit for approval by the Dean of Graduate Studies. This must be done prior to the committee's approval of a student's dissertation proposal. 

Proposed Dissertation Committee. If a committee member is external to the university, please attach a CV and indicate their relationship to the candidate. If you would like to nominate a member outside your program to be the Dean of Graduate Studies representative*, please indicate with an X in the appropriate column. The Dean's initials will indicate approval of your nomination. 

<table>
<thead>
<tr>
<th>Proposed Committee</th>
<th>Department/Affiliation</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Dean, OGS</td>
</tr>
</tbody>
</table>

Chair: 

Member: 

Member: 

Member: 

Approved by Graduate Program Director 

__________________________________  ____________________  
Signature    Date 

Approved by the Dean of Graduate Studies 

__________________________________  ____________________  
Signature    Date 

*According to the 1997-99 Graduate Catalog, "Each dissertation committee must have one external member designated by the Dean of Graduate Studies as the Dean's representative. At the option of the program, the Dean's representative may serve as a working member from the inception of the committee, or may participate only at the time of the defense. In either case, the Dean's representative is a voting member of the committee and must sign the dissertation. 

Revised December 2017
University of Massachusetts - Boston
Dissertation Tracking Form

Stage 3 - Notification of Proposal Acceptance

Student Name and ID:

Department/Program: Computational Sciences

Submit when a student's dissertation proposal has been accepted. Attach a copy of the approved proposal.

Title of Accepted Dissertation Proposal:

Dissertation Committee and their vote on the proposal. ("A" = approve, "AR" = approve with reservations, or "N" - do not approve)

Dissertation Committee | Department/Affiliation | Proposal Vote
--- | --- | ---
Chair: | | 
Member: | | 
Member: | | 
Member: | | 

Approved by Graduate Program Director:

_________________________________  __________________________
Signature  Date

Received by the Dean of Graduate Studies:

_________________________________  __________________________
Signature  Date

Revised December 2017
University of Massachusetts - Boston
Dissertation Tracking Form

Stage 4 - Notification of Intent to Defend Dissertation

Student Name and ID:

Department/Program: Computational Sciences

Proposed Date of Dissertation Defense:

Final Dissertation Title:

Date of Dissertation Defense (if different from above):

A student’s readiness to defend a dissertation must be approved by all parties listed below, and adequate time must be allowed for review of the dissertation by the Dean of Graduate Studies or a representative. Notice of the defense shall appear in the "Mass Media" and "The University Reporter".

Final Dissertation Committee

Chair:

Member:

Member:

Member:

Approved by Dissertation Committee Chair Advisor – Signature

Date

Approved by Graduate Program Director – Signature

Date

Received by the Dean of Graduate Studies – Signature

Date

Revised December 2017
University of Massachusetts Boston
Dissertation Tracking Form

Stage 5 - Results of Dissertation Defense

Student Name and ID:

Department/Program: Computational Sciences

Date of Dissertation Defense:

Report on the results of the dissertation defense, include the committee's vote.

<table>
<thead>
<tr>
<th>Action by the Committee:</th>
<th>Approve</th>
<th>Disapprove</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dissertation Committee</th>
<th>Dept/Affiliation</th>
<th>Vote</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair:</td>
<td></td>
<td></td>
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<tr>
<td>Member:</td>
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<td>Member:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>External Member:</td>
<td></td>
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</tr>
</tbody>
</table>

___________________________________________________  __________
Approved by Dissertation Committee Chair Advisor - Signature  Date

___________________________________________________  __________
Approved by Graduate Program Director - Signature  Date

___________________________________________________  __________
Received by the Dean of Graduate Studies - Signature  Date

Revised December 2017