Computer Science and Informatics Graduate Program Handbook

(Updated August 2023)

1 Handbook Overview

The Computer Science and Informatics Graduate Program Handbook (handbook) outlines the policies of the Computer Science and Informatics Graduate Programs at Emory University. The handbook complements the Laney Graduate School (LGS) Handbook, which contains general degree requirements and graduate school policies. In general, students should consult the latest version of the handbook. Should the handbook change, students can opt to satisfy the requirements of the version that prevailed upon their matriculation or the current version. If unsure about a policy or rule, students should consult with their advisor, the graduate program coordinator (GPC), or the Director of Graduate Studies (DGS).

2 Program Overview

The James T. Laney School of Graduate Studies is committed to graduate education that provides students with deep and broad expertise in their chosen fields, creativity to cross discipline boundaries, courage to challenge convention, and confidence to ask unexpected questions and articulate bold new perspectives.

The Computer Science and Informatics Graduate program (CSI) is offered and managed by the Departments of Computer Science (CS), Biomedical Informatics (BMI), and Biostatistics and Bioinformatics (BIOS). Faculty from these three departments collectively support the academic teaching, research and service missions of the CSI program. The set of program administrators include:
- Director of Graduate Studies (DGS);
- Graduate Program Coordinator (GPC);
- co-Directors of Graduate Studies (co-DGSes) for CS Master's degree, BMI and BIOS

3 Computer Science and Informatics Ph.D. Program

The Computer Science and Informatics (CSI) Ph.D. program is designed around departmental research strengths in data and information management, data mining, healthcare analytics, machine learning, natural language processing, security and privacy, and information access and retrieval. The program is distinguished by its interdisciplinary nature and is a joint program between the departments of Computer Science, Biomedical Informatics, and Biostatistics and Bioinformatics. The program has collaborations with Emory's computational and discrete mathematics faculty, departments of physics, biology, psychology, and chemistry, and highly regarded schools of medicine and public health.

The academic course work is expected to be finished within the first 2-3 years followed by a qualifying examination in the student's chosen concentration, and a thesis proposal followed by the thesis defense. By year 3 or often earlier, students are expected to begin working closely with an advisor on original research. On average, a PhD degree takes 5-6 years to complete.

3.1 Ethics Requirements

All PhD students must complete the LGS Jones Program in Ethics (JPE), consisting of the following three parts:
1. JPE 600*: A one-day graduate school workshop typically scheduled one week prior to the start of the fall semester during the student's first year of study.
2. CS 590: Teaching seminar on computing-related teaching pedagogy including scholarly misconduct.

CS 590 is to be completed in the fall of the first year of study or fall of the second year in exceptional circumstances. (This part may be supplemented by CS700 Graduate Seminar and an annual department meeting.)

3. JPE 610*: A minimum of 6 hours of graduate school hosted seminars to be completed over the course of the student's PhD study. Students must show their ID in order to get attendance credit.

*LGS will notify students regarding JPE 600 and 610 offerings.

3.2 Teaching Requirements

Teaching training is an important part of a student's overall preparation for possible academic careers. Students are expected to complete their teaching requirements during their first two years (fall, spring, summer of year 1, and fall and spring of year two).

Students must complete summer TATTO (TATT 600) course offered through LGS prior to serving as a Teaching Assistant (TA) or Instructor. Students register for TATT 605 during the semester of a TAship or TATT 610 during a semester as instructor of record for a course. More details on the TATTO program can be found in the LGS Handbook.

CSI PhD students must fulfill their minimal teaching requirements by completing three TATT 605 courses, i.e. serving as a TA for three courses. Alternatively, each TATT 610 instructorship can replace two TATT 605s. (A student may also serve as a TA or Instructor for additional courses after satisfying the minimal requirements.) Each graduate instructor will have a faculty mentor for the course that they are teaching or co-teaching.

CS 590 Teaching Seminar explores theoretical and practical approaches for effective teaching, with particular emphasis on the discipline of Computer Science. After this course, students will be able to demonstrate knowledge of multiple pedagogical strategies, write a syllabus, develop assessment items, and design and deliver lectures and presentations for a variety of different audiences.

Note: All departing graduate students must provide copies of their grade books (or spreadsheets) for the courses they taught in the preceding year. If you teach during the academic year, you must send an electronic grade book to the Program Administrator before the department will sign off on your degree application. If there is an outstanding or incomplete grade in a class you taught, or in your grade book, you must also leave a statement to the program coordinator stating what is left for the student to complete in order to change the grade.

3.3 Course Requirements

CSI PhD course requirements are in addition to LGS general degree requirements. Students with insufficient background in computer science may need to complete additional preparatory courses.

It is the student's responsibility to ensure that he/she meets the general degree requirements described in the Laney Graduate School Handbook. In particular, students must complete, in advanced standing, 18 hours of coursework (with no more than three hours of directed studies), and another 18 hours of research and coursework before candidacy.

Students must take three required courses and *at least* four elective courses. The specific sets of required and elective courses depend upon a student's chosen CSI PhD track, CS or BMI.

3.3.1 CS Track: Three (3) Required courses:

1. CS 526 Algorithms;
2. CS 534 Machine Learning;
3. CS 551 Systems Programming.

3.3.2 BMI Track: Three (3) Required courses:

1. BMI 500 Introduction to Ethical Data Science and Informatics.
2. BMI 510 Biostatistics for Machine Learning;
3. BMI 534 or CS 534 Machine Learning;

3.3.3 CS or BMI Track: Four or more (4+) Elective courses:

Totaling twelve or more (12+) credit hours in CS, BMI, BIOS, BMED or MATH. Common Electives for the CS and BMI tracks are listed in Appendix A: CSI Course Listing. With prior CSI DGS or co-DGS approval, other courses may be used to satisfy this requirement. The course list will be updated as course offerings evolve.

PhD Required and Elective courses must be completed with a **grade of B or higher** and an **overall GPA of 3.3 or higher**, based on the Required and Elective courses only.

3.4 Qualifying Examinations

3.4.1 Objectives:

The qualifying process assesses a student's readiness to undertake and complete a formidable and successful dissertation. To this end, the CSI PhD qualifying process requires a student to demonstrate requisite proficiencies in all of the following four objective areas:

1. *Expert area knowledge*: deep knowledge in the intended specialization area;
2. *Critical analysis skills*: the ability to perform critical scholarship review in the discipline and intended specialization area;
3. *Research readiness*: the ability to develop and conduct research, including research methods;
4. *Technical communication*: the ability to communicate effectively, both verbally and in written form.

3.4.2 Committee:

The qualifying committee must be chaired by a CSI faculty member and comprise at least three Emory faculty members who hold academic appointments, including at least two CSI faculty members. The committee chair, who cannot be the student's (intended) advisor, will shepherd the student through the qualifying exam process. The qualifying committee must be approved by a CSI DGS or co-DGS by December 1 of the student's third year.

3.4.3 Process:

The qualifying process has three components: a technical report, committee feedback and written response, and an oral examination. Each component provides the opportunity for a student to demonstrate proficiencies in one or more of the four objective areas: expert area knowledge, critical analysis skills, research readiness, and technical communication.

1. *Technical report*: Among other objectives, the technical report should demonstrate a student's research readiness and technical communication. The student must provide the committee a publication-quality[1] work that describes original research or a compelling synthesis of the state of the art. Examples of a technical report include a publishable paper, a write-up of a substantial class project, and a critical survey with an experimental comparative analysis. The qualifying committee, its chair in particular, will shepherd and advise the student towards a suitable report.

   A student must make a sufficiently substantial contribution to the authorship and scholarship of their report. However, the student need not be the only contributor. For example, part or all of the report may have been published with their advisor and potentially others as co-authors. For reports with multiple authors, the student's advisor or a committee designee must provide a written description of the student's contributions to the report with the submission. The program recommends and expects that a student submit a first author report – a student must have written approval from the committee chair if this is not the case.
   The committee must receive the student's report at least 1 month before the oral examination.

2. *Written feedback and response*: The committee will provide the student with written feedback about the technical report and related subject matter. The student will provide a written response to the committee's comments and questions as appropriate.

   The committee should consider the technical report, the broader research or subject areas, and related methodologies. They should provide written feedback that explicitly addresses the four objectives of the qualifying process on the technical report and related research areas. This written feedback may also broaden the scope of the technical report and defines the scope of the oral examination. The written feedback does not limit the extent of the oral examination: the oral exam is not limited only to questions posed in the written response.
   As explicitly requested in the committee's written feedback, the student should provide a written response that provides further corroboration of the student's expert knowledge and communication skills. The student must write the response entirely by themselves without assistance from others, including their advisor, other faculty, other students, and/or co-authors.
   The committee should provide the student with feedback within 2 weeks of receiving the technical report on a date agreed to by the committee, and the student will provide written answers to the committee within 1 week of receiving the committee's questions and at least 1 week before the oral examination.

3. *Oral examination*: The qualifying committee will moderate an oral exam during which the student presents and defends their technical report and written response.

   The oral exam is expected to be approximately 60-90 minutes, including a presentation by the student of approximately 30 minutes or as advised by the committee chair. The presentation should integrate the committee's feedback and the student's responses as appropriate but need not describe the entire technical report nor the written response in full detail.
   The written feedback broadens the scope of the technical report and defines the scope of the oral examination, but it does not limit the extent of the oral examination. The oral exam is not limited only to feedback in the written response.

3.4.4 Outcomes:

After a student has completed all components of their qualifying process, the qualifying committee will convene and determine the student's overall outcome by explicitly evaluating the student in the four objective areas. Outcome possibilities are "Pass", "Conditional Pass" or "Fail". The student must pass each of the objective areas

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[1] While the student's report must be publication quality, it does not need to be a published or submitted work.

to pass the qualifying process, and the student must pass or conditionally pass each of the objective areas to conditionally pass the qualifying exam. The committee chair shall provide a written summary of the student's qualitative performance. For "Conditional Passes", the committee must provide specific, clear criteria and timelines. Students are allowed two attempts to pass the qualifying exam within the allowed time limit; multiple attempts do not extend the time limit.

3.4.5 Timeline

Students are expected to complete all required CSI coursework within their first two years. Students must complete the qualifying process and all candidacy requirements successfully by September 1 of their fourth year

3.5 Research Requirements

3.5.1 Rotation Requirements: CS 598R

Rotation projects provide practicum opportunities to students prior to their dissertation research. The objective is to expose students to computational research problems in practical settings and to potential faculty research advisors, collaborators and thesis committee members. Rotations may also help to provide focus on a specific research area and to jump-start dissertation projects. PhD students must complete two rotation projects as part of the candidacy qualifying process; the first rotation should be completed before the start of Year 2 and the second rotation before the start of Year 3.

A rotation project is a three-credit hour, semester long activity with pre-defined deliverables and a final evaluation. Students register for CS598R for each rotation project under the supervision of a faculty advisor. Students will be helped by their thesis advisor (or appropriate DGS/co-DGS, if they don't have an advisor) when choosing a rotation faculty advisor. If the advisor is not a member of the CSI program faculty, then DGS approval and a co-advisor from the program are required.

Students must submit a project proposal with well-defined outcomes and deliverables prior to starting a rotation project and submit a final report upon completion. An accepted or published paper may serve as the final report. If software development is involved in the project, it is important to clearly specify the deliverable at the start of the project. Students must also present their work at a department seminar.

For CSI Main Track Students with interdisciplinary research interests in biomedical or public health informatics, rotation projects may involve participation in research laboratories in Biology, Chemistry, Rollins School of Public Health, the School of Medicine, or external organizations such as the CDC. BMI Students are recommended to select a domain-focused rotation faculty mentor, in addition to their advisor, who will provide the biomedical, clinical or translational domain use cases that will drive their informatics training.

A student may earn 3 hours of course credit for each rotation project through CS598R. A single multi-semester project may continue as CS599R (not another CS598R).

3.5.2 Dissertation Prospectus

The dissertation prospectus comprises a written and oral presentation of the student's proposed research. The proposal write-up, including a comprehensive bibliography must be distributed to the committee at least two weeks prior to the oral component. The proposal's oral component begins with a 30-minute presentation of the student's proposed research followed by a question-answering session by the committee. The entire exam is an hour long.

The committee assigns a grade of pass, conditional pass, or fail to each exam. In the case of conditional pass,

the committee will specify requirements that the student must satisfy for removing the contingency. In the case of fail, the student may retake the exam once more.

3.5.3 Dissertation Manuscript and Defense

Students must write a dissertation describing original research in their chosen area. They must deliver a public presentation of the dissertation before a dissertation committee consisting of the faculty advisor who is a member in the program, two additional faculty members from the program, and one or more members outside of the program with Ph.D. degrees.

Note: A student must complete his or her dissertation prospectus at least one semester prior to his or her dissertation defense and manuscript submission.

3.6 Candidacy

Admission into candidacy is guided by the principle that a Ph.D. student should possess proficiency in multiple areas and mastery in at least one area. Proficiency in breadth is assessed through the student's performance on completed courses and rotation projects, while depth in an area is determined by passing the qualifying exam and other measures such as research publications.

To be eligible for candidacy, a CSI PhD student must:
- Complete all core and elective coursework
- Complete two CS598R rotation projects
- Complete all ethics requirements, including JPE 600 and 610
- Complete all teaching requirements, including TATT 600, CS 590, and TATT 605 or 610
- Pass his or her qualifying examinations

Additionally, LGS requires that a student:
- Resolve any Incomplete (I) or In Progress (IP) grades
- Be in good standing with a minimum cumulative 2.70 GPA
- Have earned at least 54 credit hours at the 500 level or above

Students must reach candidacy by September 15 of their fourth year. Students who do not meet this deadline will be placed on academic probation, will not be eligible for PDS funds, and may forfeit financial support. These sanctions will be lifted when the student enters candidacy.

Note: Students cannot apply for Candidacy and graduate in the same semester.

A Ph.D. student must be in candidacy before they may submit an application for a Master's degree based on candidacy.

3.7 Seminar Requirements

3.7.1 Seminar Attendance

Each student in the program is required to enroll and maintain satisfactory attendance in the Computer Science Seminar (CS700) each semester that he/she is in residence. Each student is also required to present at least one thesis-related seminar prior to graduation.

3.7.2 Seminar Presentation

Each student must present one CS700 seminar on his or her thesis research. This is done while the student is in candidacy and prior to the dissertation defense.

3.8 Annual Progress Reports

Every PhD student is required to submit a yearly progress report to the Director of Graduate Studies. The report must be reviewed and signed by the student's advisor. If the student does not yet have a Ph.D. advisor, then the DGS must review and sign the report. Reports are due by the end of May and should contain information spanning the period from June 1 of the previous year to May 31 of the current year.

3.9 Probation and Dismissal Policies

A PhD is a significant undertaking that requires students to meet important milestones to succeed. Students that do not meet these milestones risk probation and a recommendation of dismissal from the program.

These actions are not taken lightly, and they are not intended to be punitive. We want all of our students to be successful, and we understand that life circumstances can make it more difficult for someone to achieve their goals and potential. We encourage any struggling student to reach out to their advisor(s), other trusted faculty members, the Director of Graduate Studies (DGS) or co-DGS, the Assistant Dean of Student Affairs in Laney Graduate School (LGS), and/or Student Health Services for support. Please ask us for help, and please see the Support section of the Computer Science and Informatics (CSI) Graduate Program Handbook for more information about the resources that Emory provides.

3.9.1 Probation

Per LGS policy, any student who meets one or more of the following criteria in a term will be placed on probation for the following term:
1. The student receives less than a 2.7 GPA in a term.
2. The student has less than a 2.7 cumulative GPA.
3. The student receives an F (Failing), a U (Unsatisfactory), an IF (Incomplete Failing), or an IU (Incomplete Unsatisfactory) grade in any course.
4. The student receives I (Incomplete) grades in two or more courses or an I (Incomplete) grade in a single course worth 9 or more credit hours.
5. The student has more than one I (Incomplete) grades on their record, including any I (Incomplete) grades from the most recent or previous terms, that have not been resolved.
6. The student has not entered candidacy by September 15 of their fourth academic year, including the timely submission of all required paperwork.
7. The student does not have an approved dissertation committee by March 15 of their fourth academic year, including the timely submission of all required paperwork.

Additionally, for the CSI Doctoral Program, any student who meets one or more of the following criteria in a term will be placed on probation for the following term:
8. The student has not satisfied the program coursework requirements, which include three required and four elective courses, by the end of the spring term of their second academic year, including not satisfying one or more of the following milestones:
    1. at least one required or elective course with a grade of B or better by the end of the fall term of their first academic year,
    2. at least three required or elective courses with grades of B or better by the end of the spring term of their first academic year,

3. at least five required or elective courses with grades of B or better by the end of the fall term of their second academic year, and
4. all seven required and elective courses with grades of B or better and an average GPA of 3.3 or better for the seven courses by the end of the spring term of their second academic year.

9. The student has not completed two 598R rotation projects with grades of B or better with different faculty by the end of the spring term of their second academic year, including one 598R rotation project with a grade of B or better by the end of the summer term of their first academic year.
10. The student does not have a formal, mutually agreed PhD advisor commitment by the end of the spring term of their second academic year, including the timely submission of all required paperwork.
11. The student has not completed their qualifying exam by the end of the summer term of their third academic year, including the timely submission of all required paperwork.

For each of the above criteria, a student will continue to be placed on probation until they have satisfied the criteria or are dismissed from the graduate program.

If a student enters probation, then they will be notified in writing by LGS of the reason(s) that they were placed on probation.

Any student who is placed on probation must submit a letter to the DGS that presents a concrete, actionable plan for leaving probation and resuming satisfactory progress. This letter must be received within two weeks after the student is notified of their probationary status.

3.9.2 Recommendation of Dismissal

Any student who meets one or more of the following criteria will be recommended for dismissal:
1. The student is placed on probation in two consecutive terms.
2. The student meets probation criteria 1, 3, or 4 in two non-consecutive terms, but the student has not yet satisfied the program coursework requirements, and the student did not take any courses that satisfy any of the program coursework requirements in the intervening terms.
3. The student is placed on probation in any three terms.
4. The student receives an F or a U in 597R, 598R, 599R, or 799R in any two terms.
5. The student receives an F or a U in 599R or 799R after completing a formal, mutual PhD advisor commitment.
6. The student fails their qualifying exam twice.

3.9.3 Dismissal Appeals

The student and their advisor(s) may petition the program for a stay of a recommendation for dismissal.

The student may submit a letter to the DGS that details any extenuating circumstances that contributed to their probationary status and presents a concrete, actionable plan for leaving probation and resuming satisfactory progress.

Additionally, the student may ask their advisor to submit a letter of support, including a plan for ongoing financial support for students who are supported by the advisor, to the DGS.

These letters must be received within two weeks after the student is notified of their probationary status. The Graduate Committee will review the appeal(s) and recommend that the appeal is either accepted or denied. Any faculty who issued grades that led to probation will be excluded from the committee. If the appeal is accepted, then the student will not be recommended for dismissal. If the appeal is denied, then the student is subject to dismissal and loss of funding. Students may petition for a maximum of two one-term extensions.

3.10 Financial Information

3.10.1 Fellowships and Assistantships

Except for students supported by non-Emory fellowships or scholarships, full time PhD students are typically supported by a Graduate School Fellowship (GSF) or a faculty research assistantship (RA). In most cases, LGS provides full support (tuition, stipend, health insurance) for the first 21 months (i.e., Fall of year one thru spring of year two including the intervening summer). After 21 months, PhD students are expected to join a research group and go on faculty grant support, i.e. receive a stipend through an RA or another form of external support. In extreme or truly exceptional circumstances, alternative arrangements may be possible on case-by-case basis, based on performance evaluation and good progress in the program. Reappointment is not automatic.

The Laney GSF is not available to students in MS Degree Programs, although other forms of paid assistantships or campus employment may be available to MS students in some cases.

3.10.2 Responsibilities

All students, regardless of funding support, participate in teaching, research and professional development activities prescribed by the program. Students are expected to complete their TATTO, JPE, coursework and rotation requirements during the first two years. The CSI program and relevant departments assign student responsibilities for non-RAs. This may involve lab and teaching assistance, grading, and teaching. For students with interdisciplinary research interest/focus, duties may involve assignments in non-departmental research and project activities at the School of Medicine, the School of Public Health, and other collaborating units on campus. Faculty advisors determine their RAs research and other scholarly duties.

3.10.3 Conditions, Evaluations and Renewal

A student receiving RA or LGS support must be registered as a full-time student. Students receiving full support from Emory sources, including grants, may not accept any remuneration for any other work either in or outside the university.
The performance of each GSF and RA recipient will be reviewed and evaluated annually by the department's Graduate Committee and when appropriate, the student's faculty advisor. In addition, the assistant's progress towards his or her degree will also be evaluated. The student must continue to make satisfactory progress toward their degrees in order to maintain the support.

Fellowships and assistantships may be reduced, suspended, or terminated by the department in advance of the stated expiration date when the student's performance is unsatisfactory. Any of the following may result in an unsatisfactory performance rating: failure to maintain the stated minimum GPA, failure to earn minimum required credits toward degree each semester, failure to advance to candidacy in a timely manner, and/or failure to perform satisfactorily in assigned teaching or work duty.

3.10.4 Program Development Funds

The LGS makes funds available to PhD students through a professional development support program (PDS). Students are eligible for up to $8000 in each of the three categories of training, research, and travel, over the course of their graduate career. These funds are not guaranteed but are subject to application and review. To receive an award, a student must be in good standing, both in the LGS and in the program. Support beyond the $2500 limits is subject to a competitive application process.

Further details on the PDS program can be found in the LGS handbook and the PDS website: http://www.gs.emory.edu/professional-development/pds/index.html.

3.10.5 Professional Conduct

A graduate student involved in any form of undergraduate instruction (e.g., classroom instructor, TA, lab assistant, grader) is expected to behave as dedicated professionals and representatives of the University. Lack of preparation and unprofessional conduct undermine the efforts of the entire program and the University. The Director of Undergraduate Studies and the Chair will investigate reports and complaints by students of graduate instructors being late, rude, or unprepared. Substantiated neglect of duty can result in full or partial rescinding of the instructor's stipend, and in serious cases result in the student reported to the Laney Graduate School for a conduct code violation.

4 Computer Science M.S. Program

The Master's program in Computer Science prepares students for professional jobs in computer industry or further graduate study. Students can choose one of the following options:

- *Course-Only Option*: 30 graduate course credits

- *Project Option*: 24+6 graduate course plus research credits

  Students conduct a major implementation or analytic project, conducted independently, accompanied by a substantial project report and code and data as appropriate. Satisfactory completion of the project requires approval by the faculty advisor.

- *Thesis Option*: 21+9 graduate course plus research credits
  A thesis involving substantial, novel, independent research and contributions of quality publishable in a refereed workshop, conference, or journal[2], to be submitted to the Laney Graduate School.

Additionally, each student must complete an internship as a part of CS596R. The internship may be done at Emory or externally (including internationally) and may be paid or unpaid. Students are expected to find their own internships, but the program may help as necessary.

4.1 Course Requirements

Students must take three required courses and *at least* four elective courses. The specific sets of required and elective courses depend upon a student's chosen CSI MS track, CS or BMI.

4.1.1 CS Track: Three (3) Required courses:
1. CS 526 Algorithms OR CS 523 Data Structures and Algorithms;
2. CS 534 Machine Learning;
3. CS 551 Systems Programming.

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[2] While the student's thesis must be publication quality, it does not need to be a published or submitted work.

4.1.2 BMI Track: Three (3) Required courses:

1. BMI 500 Introduction to Ethical Data Science and Informatics.
2. BMI 510 Biostatistics for Machine Learning;
3. BMI 534 or CS 534 Machine Learning;

4.1.3 CS or BMI Track: Four or more (4+) Elective courses:

Totaling twelve or more (12+) credit hours in CS, BMI, BIOS, BMED or MATH. Common Electives for the CS and BMI tracks are listed in [Appendix 1: CSI Course Listing](#). With prior CSI DGS approval, other courses may be used to satisfy this requirement. *The course list will be updated as course offerings evolve.*

MS coursework must be completed with a grade of **C or higher** and an **overall GPA of 3.0 or higher**, based on the Required, Elective and additional coursework only.

4.2 CS596R: Computer Science Master's Practicum

This course aims to expose Master's students to real life problems that Computer Science and Informatics professionals face in their working environment, and to help students to acquire crucial skills and experience in applying their Computer Science and Informatics skills in solving practical problems.

Students perform a project under direction of an Emory faculty member or supervised by a Computer Science/Informatics expert in the industry. In both cases, the project to be undertaken should be described by the student and submitted for approval by the Director of Graduate Studies.

The course is nominally taken for 1 (one) credit hour and is repeatable for up to two (2) times. CS596R is taken for S/U only. The amount of work for the course varies from full time (i.e., in case of external internship) to part time of at least 10 hours per week (i.e., in case of internal internship). 596R cannot be the last solitary course in a student's program of study.

4.3 MS Degree by Candidacy

Students enrolled in the CSI PhD program may also obtain a Master's degree in Computer Science by Advancing to PhD Candidacy. The specific concentration within the MS CS received by Candidacy will correspond to the particular set of coursework and other requirements completed by the student. No more than one M.S. may be obtained via Candidacy.

5 Annual Evaluation

The Laney Graduate School and each program have standards for academic performance that students must meet, including making satisfactory progress through the program. Students will be reviewed at the end of each semester and will receive a written evaluation at the end of each year. The evaluation will be based on an assessment of the student's overall performance including coursework, exams, research and work duties (e.g., teaching). The result of the evaluation is either (1): Satisfactory progress; (2) unsatisfactory progress. Unsatisfactory progress can result in **academic probation**, which requires the student to correct the problem over the following semester. Lack of satisfactory progress while on probation may result in termination from the program.

6 Other Policies and Services

6.1 Grievance Policy

Students who have a grievance related to the CSI graduate program should report it to the Director of Graduate Studies. The student should describe the grievance and relevant details in a letter addressed to the DGS, who will try to resolve the grievance in conversations with the student and relevant parties. If this is unsuccessful, the Director will appoint a committee of three program faculty members or use an existing standing committee, who will review the grievance and propose an appropriate response. If it is not possible to resolve the grievance within this committee or the framework of the program's administrative structure, the Director will forward the grievance to the Office of the Senior Associate Dean of the Laney Graduate School. At that time, the grievance will be handled according to the Grievance Procedure described in the Laney Graduate School Handbook. If the grievance is with the Director, the student submits the grievance directly to the Senior Associate Dean of the Laney Graduate School.

6.2 Parental Accommodation Policy

LGS Parental Accommodation Policy is for students with substantial parenting responsibility as a result of childbirth, care of newborn, or a newly adopted child. This policy guarantees PhD students a minimal level of accommodation during the transition of parenthood. For more information on the policy, eligibility requirements, and application procedure, go to this link:
https://www.gs.emory.edu/academics/policies-progress/parental-arrangement.html

6.3 Office of Accessibility Services (OAS)

Emory provides all persons an equal opportunity to participate in and benefit from programs and services afforded to others. The Office of Accessibility Services (OAS), part of the Office of Equity and Inclusion, assists qualified students, faculty and staff with obtaining a variety of services and ensures that all matters of equal access, reasonable accommodation, and compliance are properly addressed." OAS "is committed to providing access to campus resources and opportunities to allow students with disabilities to obtain a quality educational experience.

Qualified students need to register with OAS and make a request for services. Confidentiality is honored and maintained. (Emory OAS website): http://accessibility.emory.edu/students/index.html

6.4 Student Support Services

Graduate school can be a stressful time on your body and mind. Be sure you are taking care of yourself. Go to Laney Graduate School student support page and the LGS/GDBBS support page for links to all student support services available to you:

http://www.gs.emory.edu/guides/students/support.html

https://biomed.emory.edu/resources/students/index.html

6.5 University Policies

A selection of university policies can be found at this link:
https://policies.emory.edu/

Every effort has been made to make this document as accurate and complete as possible. Policies are subject to change without notice. Refer to the LGS Handbook (https://gs.emory.edu/handbook/index.html) and GDBBS Handbook (https://biomed.emory.edu/_includes/documents/handbooks/gdbbs.pdf) for other policies such as:
• University Policies
• Honor Code
• Minimum Degree Requirements
• Professional Development Funds
• Withdrawals and Leaves of Absences
• Parental Accommodations and Leaves
• Degree Completion & Graduation

7 Appendix A: CSI Course Listing

R = Required
R* = MS students Required to take CS 523 or CS 526
E = Elective
E* = Elective if and only if course is formally taught and evaluated; i.e. seminar style or directed study courses may not be used to fulfil elective requirements
O=Other (Does not count as either a Required nor as an Elective Course.)

Course Number	Course Name	Credits	PhD CS Track	PhD BMI Track	MS CS Track	MS BMI Track
BIOS 506	Foundations of Biostatistical Methods	4	E	E	E	E
BIOS 507	Applied Regression Analysis	4	E	E	E	E
BIOS 510	Intro. to Probability Theory	4	E	E	E	E
BIOS 511	Introduction to Statistical Inference	4	E	E	E	E
BIOS 516	Intro to Large-Scale Biomed Data Analysis	1	O	E	O	E
BIOS 534	Machine Learning	3	O	O	O	O
BIOS 540	Introduction to Bioinformatics	2	O	E	O	E
BIOS 555	High-throughput Data Analysis using R	2	O	E	O	E
BIOS 707	Advanced Linear Models	4	E	E	E	E
BIOS 709	Generalized Linear Models	4	E	E	E	E
BIOS 711	Statistical Inference II	4	E	E	E	E
BIOS 731	Advanced Statistical Computing	2	E	E	E	E
BIOS 738	Bayesian and Empirical Bayes Methods	2	E	E	E	E
BIOS 770	Advanced Statistical Genetics	2	E	E	E	E
BMED 6041	Analytical Methods for BME	3	O	E	O	E
BMED 6517	Machine Learning in Biosciences	3	E	E	E	E
BMED 6700	Biostatistics	3	E	O	E	O
BMED 8813	Special Topics in BME (Various)	3	O	E*	O	E*
BMI 500	Introduction to Ethical Data Science and Informatics	3	E	R	E	R
BMI 510	Biostatistics for Machine Learning	4	E	R	E	R
BMI 520	Practical Computing for Informatics	3	O	E	O	E
BMI 532	Model-Based Machine Learning	3	E	E	E	E
BMI 534	Introduction to Machine Learning	3	E	R	E	R
BMI 536	Introduction to Deep Learning	3	E	E	E	E
BMI 539	Topics in Machine Learning	3	E	E	E	E
BMI 540	Time Series Analytics and Modeling	3	E	E	E	E
BMI 550	Applied Biomedical Natural Language Processing	3	E	E	E	E
BMI 555	Computational Methods for Biomedical Image Analysis	3	E	E	E	E
BMI 562	Cancer Single Cell Analytics	3	O	E	O	E
BMI 585	Topics in Biomedical Informatics (Various)	3	E*	E*	E*	E*

CS 523	Data Structure & Algorithms I	3	O	E	R*	E
CS 524	Theory of Computing	3	E	E	E	E
CS 526	Algorithms	3	R	E	R*	E
CS 534	Machine Learning	3	R	R	R	R
CS 540	Software Engineering	3	E	E	E	E
CS 541	Information Visualization	3	E	E	E	E
CS 551	Systems Programming	3	R	E	R	E
CS 553	Info. and Computer Security	3	E	E	E	E
CS 554	Database Systems	3	E	E	E	E
CS 555	Parallel Processing	3	E	E	E	E
CS 556	Programming Languages and Compilers	3	E	E	E	E
CS 557	Artificial Intelligence	3	E	E	E	E
CS 558	Networking	3	E	E	E	E
CS 559	Distributed Processing	3	E	E	E	E
CS 563	Digital Image Processing	3	E	E	E	E
CS 570	Data Mining	3	E	E	E	E
CS 571	Natural Language Processing	3	E	E	E	E
CS 572	Information Retrieval	3	E	E	E	E
CS 573	Data Privacy and Security	3	E	E	E	E
CS 580	Operating Systems	3	E	E	E	E
CS 581	High Performance Computing: Tools and Applications	3	E	E	E	E
CSI 584	Topics in Computer Science (Various)	3	E*	E*	E*	E*
MATH 511	Analysis I	3	E	E	E	E
MATH 512	Analysis II	3	E	E	E	E
MATH 515	Numerical Analysis I	3	E	E	E	E
MATH 516	Numerical Analysis II	3	E	E	E	E
MATH 517	Iterative Methods	3	E	E	E	E
MATH 531	Graph Theory	3	E	E	E	E
MATH 557	Partial Differential Equations I	3	E	E	E	E
MATH 558	Partial Differential Equations II	3	E	E	E	E
MATH 571	Numerical Optimization	3	E	E	E	E
MATH 572	Numerical Partial Differential Equations	3	E	E	E	E