GRADUATE STUDENT HANDBOOK
BIOMEDICAL INFORMATICS GRADUATE PROGRAM
UNIVERSITY OF CINCINNATI

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Introduction

The Doctor of Philosophy in Biomedical Informatics Program at the University of Cincinnati provides an in-depth knowledge of the key analytical concepts that underlie applications of informatics and data science to biomedical research. The program leverages partnerships between the UC College of Medicine, Cincinnati Children's Hospital Medical Center, and the UC College of Engineering and Applied Sciences in order to provide a framework of transdisciplinary educational opportunities. An environment of professionalism and collaboration among world-class research groups, faculty, and students is the foundation to educating the next generation of biomedical data scientists.

The goals of the Biomedical Informatics Graduate Program are: (1) to develop outstanding new scientists through unique research opportunities within one of the top medical centers in the nation; (2) to provide formal courses, seminars, and clinical informatics training to enhance the breadth and depth of scientific expertise in biomedical informatics; and (3) to contribute to the mission of the University of Cincinnati and Cincinnati Children's Hospital as centers for research-driven, improved healthcare delivery.

This *Graduate Student Handbook* is intended to guide students through their studies, identify available resources, and help them understand policies pertaining to the program. Graduate students are subject to the most current university rules and regulations. The UC Graduate Handbook clarifies minimum university-level requirements and policies that apply to all graduate students throughout the University of Cincinnati.

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I. ADMISSION TO THE BIOMEDICAL INFORMATICS PHD PROGRAM

A. Application Process

The application process begins with an online application to the University of Cincinnati (UC) Graduate School. Applications and all supporting documents are accepted beginning August 1 for admission in the fall of the following year. The deadline for applications to the UC Doctor of Philosophy in Biomedical Informatics Program is February 15, however all applicants are encouraged to apply as soon as possible. Applicants seeking scholarship/financial aid should apply before the end of January. A non-refundable application fee is required, and it is only payable by credit card or electronic check. We advise prospective students to contact the Program Coordinator during the application process.

It is Graduate School policy to only process official transcripts of those students who have accepted an offer to attend UC. Applicants will be required to upload unofficial copies of their transcripts while completing the online application, which will be used for admission decisions.

Applications will be reviewed beginning March 1 and successful applicants will be notified by April 15. An offer of admission may be withdrawn if a candidate does not accept within six weeks of the offer.

New students are admitted in the fall semester. Admission deferrals are granted only in exceptional circumstances.

International students should review the International Student Services Office website for University admissions information and requirements.

Accepted students will be required to submit official, final transcripts as soon as possible and no later than one week before the start of the semester.

B. Requirements

The prospective student is expected to have a strong quantitative and/or computational background.

1. Complete online application
   Payment of the application fee is required in order to submit the application. For further instructions please see application instructions on the Graduate School website.

2. Baccalaureate Degree from an approved accredited college or university

3. GPA 3.5 or higher (on a 4.0 scale)

To account for differences in grading scales, candidates with GPAs in the top 10% of their class from highly selective programs of study will be considered.

4. Unofficial Transcript(s)
   Applicants are required to upload images/scans of unofficial transcripts as part of their application. The Graduate School defines unofficial transcripts as copies (or translations) of transcripts given or degree audits showing course work. Unofficial transcripts will be used only for admissions decisions by individual programs and will not be accepted as official documentation of baccalaureate or higher degree conferral by the Graduate School. Any significant discrepancies later found between student-provided unofficial transcripts and official transcripts will be grounds for dismissal.

5. Graduate Record Exam (GRE)
   All applicants are expected to take the general test (Quantitative, Analytical and Verbal) of the Graduate Record Exam (GRE), administered by the Educational Testing Service. The student must request official GRE Scores to be sent to the UC Graduate School Office, institution code 1833.

6. English Proficiency Test (international students)
   Minimum requirements are TOEFL (minimum 100) or IELTS (minimum 7).

7. Statement of Purpose
   A one-page statement of purpose must be submitted. Include academic background, research experience, and career goals.

8. Letters of recommendation
   A minimum of three letters of recommendation must be submitted. The online application will direct applicants to submit names and contact information for their recommenders. Listed recommenders will receive an email with instructions for submitting letters approximately 1-2 days after the student submits an online application.

C. Admission Decisions

The program's Admissions Committee, in consultation with the Biomedical Informatics (BMI) Program Director, makes all decisions concerning admissions to the graduate program. The committee has the authority to set application deadlines, require certain pre-admission examinations, require satisfactory completion of certain coursework prior to admission, and to establish other pre-admission requirements.

Full graduate status may be granted to an applicant who meets the criteria discussed in the above "Requirements" section and is approved by the Admissions Committee. Note that a student is not considered "fully matriculated" until all criteria are met. On the 15th day of the term in which a student begins, the student must be fully matriculated.

Students who do not satisfy matriculation requirements by the deadline will be removed from the program.

D. International Student Admission

The Test of English as a Foreign Language (TOEFL) is required of all applicants whose native language is not English. The test must be taken before admission is granted and test scores are only good for two years. This requirement may be waived for international students who have a degree from an accredited American college or university and who have studied oral and written English while a student in the American college or university, as defined by the International Student Services Office (ISSO) at the University of Cincinnati.

Before their admission to the university is completed, all international students must fulfill U.S. Immigration Service requirements and register with the ISSO at the University of Cincinnati.

Upon arrival at the University of Cincinnati, all international students are required to carry student health insurance. Insurance fees (reflecting the number of accompanying dependents) will be assessed at each registration period.

It is recommended that all international applicants review The Graduate School Handbook for additional admission requirements. For more information contact International Student Services.

E. Medical Scientist Training Program

The Medical Scientist Training Program (MSTP) incorporates a PhD into the medical school curriculum. Students at the University of Cincinnati, College of Medicine interested in Biomedical Informatics complete their first two years of medical school and then shift their study to graduate school training. Students finish the final two years of medical school after meeting the requirements for the PhD. The admission process begins with the MSTP. For more information see Appendix C and the MSTP webpage.

II. PROGRAM POLICIES and PROCEDURES

Admitted students should become familiar with One Stop, a good UC online resource, found on the UC Tools selection list. The webpage provides information concerning financial aid, calendars, registration, newsletters, contacts, upcoming dates, announcements, and other topics.

A. Transcripts

Once an applicant has been accepted and the program has received written confirmation of offer acceptance, the applicant will need to arrange for an official transcript to be sent directly to the Graduate School. Official final transcripts should be sent as soon as all baccalaureate coursework has been finished and degrees conferred. Final official transcripts submitted from awarding institutions must explicitly state in English the degree conferred and the date of degree conferral. If transcripts do not explicitly state that this information, the educational institution must separately document in English the earned degree and date of conferral (ideally in a letter sent with the official transcript). The deadline for submission of these final official transcripts is ONE WEEK BEFORE THE START OF THE STUDENT'S FIRST SEMESTER.

Students will be allowed to register for classes, obtain information technology (UCIT) credentials and apply for student visas during the provisional acceptance period before official transcripts are received by the Graduate School. However, students will not be allowed to complete a full semester of graduate school without appropriate qualifications being verified. Any significant discrepancies between student-provided unofficial transcripts and official transcripts obtained after admission is grounds for dismissal. For international students, lack of an official transcript can lead to the revoking of their student visas.

Transcripts are considered official when they arrive directly from the school in a sealed envelope or electronically. The Graduate School also accepts transcripts that were first received by the applicant and then forwarded to the Graduate School, provided that the transcripts stay in their original, sealed envelope. Once the applicant or someone outside the University of Cincinnati opens the transcript envelope, the Graduate School can no longer accept the transcript as official.

Official transcripts can be sent to the following addresses:

Regular U.S. postal mail:
Graduate School
University of Cincinnati
110 Van Wormer Hall
P.O. Box 210627
Cincinnati, Ohio 45221-0627

Delivery via FedEx, etc.:
Graduate School
University of Cincinnati
2614 McMicken Circle
110 Van Wormer Hall
Cincinnati, OH 45221-0627

Electronic delivery:
UCGS@ucmail.uc.edu.
Kyle Johnson is the contact person.

B. Financial Aid

Typically, full-time students entering the Biomedical Informatics PhD Program receive offers covering the cost of tuition, student fees, and a full stipend in the first year of study. After the first year the Research Advisor will be responsible for providing stipend support while the tuition and student fees would typically be covered by the program depending on the availability of funds.

All students in good academic standing in the program will be eligible for tuition support as granted by the University of Cincinnati. Tuition support will be provided to all full-time students in the program, based on performance, accumulated credit hours, and availability of funds.

Under ordinary circumstances, assistantships and tuition scholarships will not be awarded to students who have accumulated 174 or more graduate credit hours (140 for those entering the program with an MS). Refer to The Graduate School Handbook for more information.

Selected outstanding entering students may receive tuition and stipend support for up to 4 years of study in the form of the Cincinnati Children's Biomedical Informatics Graduate Fellowship award.

C. Health Insurance

Student Health Insurance premiums are covered by the program during the first year and by the Research Advisor thereafter. The student will be responsible for covering the cost of health insurance for any family members. Students should inform the Program Coordinator if they have insurance coverage from a spouse, partner, or guardian, or if they plan to waive coverage.

Students requesting coverage during summer semester beginning early May, must complete and submit a UC Health Insurance Enrollment Form prior to their start date. Students must be registered for a minimum of 1 or more credit hours for summer semester to be eligible and receive coverage.

D. Initial Start Date

All incoming students will be required to start on the first day of the fall semester unless there are extenuating circumstances approved by the program.

E. Immunization Records

A copy of each student's immunization records will be required at the time of acceptance into the program according to UC processes.

F. Cincinnati Children's Lab Work

A badge is required for all students working in Cincinnati Children's labs. Students must submit all necessary documents for the Cincinnati Children's badging process to the BMI Program Coordinator. Students will pay a fee to the Cincinnati Children's Cashier's office for their name badge.
Protective Services will fingerprint, conduct background checks, and issue a name badge to the student. Students may be required to take and pass the Cincinnati Children's background check conducted on campus during Cincinnati Children's badging process. Students who fail to meet this requirement will by default be dismissed from the program.
Immunization records will be released to Employee Health at Cincinnati Children's for review. If additional immunizations are needed prior to Cincinnati Children's badging the student must obtain the required immunizations and provide documentation prior to their start date. Failure to fulfill this requirement, and any others mandated by Cincinnati Children's, may result in the student's expulsion from the program.
Additional required paperwork will be completed at orientation. Cincinnati Children's requires that all personnel working in Cincinnati Children's labs complete required trainings in their first 30 days. Additional trainings may also be required by specific labs throughout rotations, or by a student's research mentor.

G. Course Load

Students are expected to register and complete all classes for their degree in a timely and professional manner. Dropping classes will not be permitted except in cases of personal emergency as determined and approved by the Program Director. Dropping required courses without permission will subject a student to probation. Students must complete their doctoral degree within nine consecutive academic years of the date of matriculation into the program.

Student progress in the program will be monitored by the Program Director after completion of each semester in the program. The progress of each student will be reviewed in terms of success in didactic course work and research progress. It should be understood that continued support depends on both the acceptable performance of the student and the availability of funds for stipend/tuition support.

Prior to admission to doctoral candidacy, all doctoral students shall complete a residency requirement by enrolling in 10 graduate credit hours (12 if funded by a Graduate Assistantship) per semester for two out of three consecutive semesters of study (including summer). Part-time students are not exempt from enrollment requirements to achieve residency. All doctoral students must complete a residency requirement prior to achieving candidacy.

Full-time students must register for a minimum of ten graduate credit hours per semester. Students receiving scholarships must register for the number of graduate credit hours each semester for which they are funded. Students receiving university-sponsored

assistantships or fellowships must register for a minimum of 12 graduate credit hours for each semester they are funded. Audit credits do not count toward full-time status and may not be supported by a University Graduate Award.

H. Adding and Dropping Classes

The webpage Registration Information includes links to “View Planning Guide” and “View Class Offerings” which are course guides for the current or upcoming semester. To register for classes click the link Add/Drop Classes on the Registration Information webpage. Add/drops are processed on a first-come, first-served basis. If space is not available in the section that the student wishes to add, the student may attempt to add other sections of that class (if offered).

I. Withdrawing from Class

1. Academic Considerations

   After the 15th calendar day of the term (consult the appropriate academic calendar), but within the term, the student may withdraw from one or more classes, as follows:

   a. Students may withdraw from classes through web registration if the instructor permits web withdrawals (refer to the instructor's class syllabus). Students and instructors both will receive e-mail notification of the withdrawal. Students are assigned a "W" grade at the time of the withdrawal, but instructors reserve the right to change the "W" to an "F" through the final grading process.
   b. Students may also withdraw from classes in person by submitting a completed "Registration Change" form to the One Stop Student Service Center (University Pavilion, 2nd floor) for processing. The last day to withdraw from a class is the 58th calendar day of the term (consult the appropriate academic calendar for the specific date).

2. Financial Considerations

   Officially dropping from individual courses or completely withdrawing from the University must be initiated by the student in writing through the appropriate graduate office. Examples of actions that are not considered official notice of withdrawal are:

   a. Failure to attend class;
   b. Giving notice to an instructor;
   c. Stopping a payment on a check used to pay fees;
   d. Verbal notice to any University office.

   A refund will not be issued to a student who has been awarded a University Graduate Scholarship (UGS) to support their tuition. In the event of disciplinary suspension or dismissal, fees will not be refunded in whole or in part. Questions

concerning interpretation of the regulations governing refund of student fees should be referred to the Registrar.

3. Audit Regulations

   The audit option is intended for cases in which course work is desired or advised but in which a grade for credit purposes is deemed unnecessary by the student in consultation with their Advisor. Students may elect to audit a course instead of receiving academic credit for a course up to the 7th calendar day of the term. Prior to the 7th calendar day of the term, a student may elect to take the course for credit. However, after the 7th calendar day of the term, the student will not be permitted to take the course for credit during that specific term.

   Graduate students generally register to audit a course to obtain remedial/deficiency instruction in major or minor areas of their program of study. The student must discuss the coursework expectations with the instructor (e.g., attendance only) prior to auditing the course. Audit hours do not count toward the 174 credit hour limit (as a condition of eligibility for UGS), nor are they included in the determination of full-time status.

J. Grades Assigned to Research Courses

If students are working on dissertation or thesis research beyond the required number of research credits for dissertation or thesis by their program, they should be registered in the appropriate research course* and the course work should be graded as *P* or *a letter grade*, until the semester in which they submit the dissertation and are graded for it. This will reflect the reality that the dissertation or thesis is in progress.
**Note*: In this context, the definition of a "research course" is a course outside of formal class work or instruction that allows a student to be registered as a graduate student while he/she is working independently on his/her thesis or dissertation under the guidance of his/her adviser or PhD Committee.

K. Grade Changes

See Graduate School Handbook for procedures regarding grade changes.

L. Time Related Definition of Progress

Doctoral degrees are conferred on the basis of sustained study and high scholarly attainment in a special field of learning. In no case will the Doctor of Philosophy degree be granted for less than three years of full-time graduate study or its equivalent, of which the last year must be in residence at the University of Cincinnati or under the university's direction. The last 30 credits must be completed while matriculated in the Biomedical Informatics PhD Program under the direction of University of Cincinnati faculty. Eligibility for graduation requires either a minimum of 90 graduate credits beyond the bachelor's

degree or 60 graduate credits beyond a master's degree with approved advanced standing. All requirements for the doctoral degree must be completed within nine consecutive academic years of the date of matriculation into the program.

M. Academic Standards

1. Students in the Biomedical Informatics Program are required to maintain a minimum of a B (3.0 GPA) average.

2. Any student who fails to obtain a B average (3.0 GPA) will be placed on academic probation for the following semester and will remain on probation until the GPA has been raised to a 3.0 which is expected to occur within the following semester.

3. The Foundation of Biomedical Informatics Exams are additional components of the Oral Qualifying Examination to be administered if a student receives a grade of B+ or less in any one of the following classes: BMIN7053 Introduction to Medical Informatics; BMIN7099 Introduction to Bioinformatics; or BMIN7054 Data Science for Biomedical Research. See page 18 for more details. Students earning an A- and above in each of these classes are exempt from these components of the Oral Qualifying Examination.

4. Any student who receives less than a B- in any didactic course is required to repeat the course and obtain at least a B- in the class.

5. Obtaining a single grade of an F in any course is grounds for immediate dismissal from the program.

N. Academic Probation

Any student who fails to meet any or all of the Academic Standards as set forth by either the program or the University of Cincinnati Graduate School will be placed on academic probation. The student will be notified of his/her status with a letter from the Program Director, which will outline the offense and clearly state the terms of probation. Decisions are based on:

1. No action: If the student takes no action then his/her standing will be brought before the faculty at the next Graduate Committee meeting where the Program Director will present the case to the committee which will vote whether to dismiss the student from the program.

2. Extenuating circumstances: If the student believes there are extenuating circumstances why his/her performance has not met the minimum requirements of the program, he/she may submit a written petition to the Program Director explaining these circumstances. This will then be taken before the Graduate

Committee and presented, whereupon the committee will either vote to accept or reject the petition. A vote to reject the petition constitutes a vote to dismiss the student from the program.

3. Withdrawal: A student may elect to submit a request to withdraw from the program prior to the faculty taking a dismissal vote. This allows the student to prevent a dismissal action from appearing on their academic transcript.

Students placed on academic probation two times will be subject to dismissal from the program. Academic probation will last for one semester and the official notice of academic probation becomes part of the student's permanent academic record. No student who is currently on academic probation can be nominated for any awards. Past instances of academic probation will be a consideration in the nomination and presentation for all awards.

O. Academic Dishonesty

All students are required to present their own original work and give honest credit where it is due. Academic dishonesty in any form is a serious offense and cannot be tolerated in an academic community. Dishonesty in any form, including cheating, plagiarism, deception of effort, or unauthorized assistance, will result in disciplinary action ranging from a failing grade in a course to suspension or dismissal.

The student's Advisor or members of a student's committee may be contacted initially if a complaint concerning the student's conduct is received. If the complaint can be resolved at this level, no further action is required. If not resolved, a formal complaint should be made to the Program Director. If resolved at the program level, no further action is required. If not resolved, the complaint is forwarded to the Dean of the Graduate School, who will appoint a committee to review the matter. The Program Director will then convene with the Dean of the Graduate School to discuss the allegation and decide on a proper course of action. These procedures must take into account due process and rules of evidence, and they must conform to the university's Student Code of Conduct.

P. Outside Employment

Students supported by fellowships or stipends must not seek employment outside the program. In exceptional situations short term laboratory, research, or teaching jobs may be permitted but other jobs requiring significant time away from their research will not be allowed and such employment may result in loss of stipend support. Any student considering outside employment must first discuss this with his/her mentor and the Program Director.

Q. Participation and Presentations

Students are expected to participate in Journal Clubs, Seminars, and the BMI Speaker Series. All PhD students in their second, third and fourth year are expected to present at a Student/Post Doc Forum or scientific/professional meetings. The seminar presentation will be evaluated by faculty as one criterion of student progress.

R. Leave Policies

Under special circumstances, graduate students may apply for leave of absence from full-time study at the university for a specific period up to one academic year. Assuming appropriate documentation is provided, the circumstances justifying a leave include but are not limited to personal or family medical conditions, call to active military duty, maternity leave, or death in immediate family. The rationale must be documented by the applicant.

An approved leave of absence preserves the student's status in his or her degree program, and the time off will not be counted against the time limits for awarding degrees. Consequently, registration is not required during the leave period. A leave may be renewed for up to one additional academic year if the student applies for a leave extension at least four months prior to the end of his or her initial leave. Renewal of a leave is subject to the approval of the program, college, and the Graduate School. In no case may any student be granted a leave for more than two years.

To apply, a student must download the Request for Leave Absence Form from the Graduate School website and submit the completed form with appropriate documentation to the Program Director. The Program Director, the Dean of the College of Medicine, and the Associate Dean of the Graduate School must all approve the leave.

Note: Students with financial aid or student loans should confer with the Financial Aid Office prior to requesting a leave of absence to ascertain the consequences of a leave on their loan status.

III. DOCTORAL DEGREE REQUIREMENTS

A. Course Requirements

Earn at least a grade of B- in all of the Core Courses, the two General Medical Science Electives, and the four Technical Electives.

Program coursework requirements:

Core Courses		Credit Hours	# Credits Required
BMIN7053	Introduction to Medical Informatics	3	3
EECE6010	Database Management	3	3
BMIN7099	Introduction to Bioinformatics	3	3
BMIN7054	Data Science for Biomedical Research	3	3
BE7068C	Clinical Decision and Cost-Effectiveness Analysis	3	3
BMIN8001	Biomedical Informatics Practicum	3	3
GNTD7003	Ethics in Research	1	1
BMIN8089	Dissertation Research *Taken for variable credit up to 15 credit hours per semester after successful completion of Qualifying Exams*	~	~
General Medical Sciences*	2 Electives	3 each	6
Technical Electives**	4 Electives	3 each	12

General Medical Sciences Electives* (Choose 2)
Molecular and Cellular Biology (GNTD7001)
Introduction to Functional Genomics (GNTD8001C)
Introduction to Epidemiology (BE7076)
Principles of Clinical Trials (BE7066)

Technical Electives** (Choose 4)
Artificial Intelligence I (CS6033)
Digital Image Processing (EECE6042)
Intelligent Data Analysis (CS6052)
Advanced Algorithms (CS7081)
Introduction to Cloud Computing (CS6065)
User Interface I(CS6067)
Pattern Recognition (CS8021)
Data Warehousing and Mining (EECE8075)
Biostatistics in Research (BME7061)
Advanced Statistical Methods in Biomedical Research (BME8064)
Introduction to Biostatistics (BE7022)
Applied Bayesian Analysis (STAT6043)
Advanced Health Care Data Analytics, Business Intelligence and Reporting (BANA7015)
Community-Based Participatory Research (BE7074)
Quality Improvement and Patient Safety (BE7071)
Healthcare Operations Management (OM7022)
Quantitative and Qualitative Data Collection Methods for Health Services Research

(BE7070)
Analysis of Internet Health Data (BE7080)

B. Selection of a Research Advisor

The Research Advisor is the student's primary mentor and directs the student's research that will constitute the PhD.

In order to facilitate the selection of a Research Advisor, students should discuss their research, short projects, and lab rotations with faculty and the Program Director. It is recommended that selection of a Research Advisor is finalized prior to the second academic year in the program.
At least two informal lab rotations must occur prior to the student selecting a Research Advisor. At the conclusion of each rotation students will complete the Lab Rotation Form describing the project. Grades are not given for lab rotations but faculty must sign the form.

A Research Advisor Selection form must be signed by the student, Research Advisor, and Program Director. The Research Advisor is responsible for supporting the student thereafter. An Annual Letter of Funding can be used to state explicitly the funding obligations on the part of the Research Advisor. An Advisor Transfer form is required in the event there is a change of Research Advisor.

The Research Advisor shall be a member of the Biomedical Informatics PhD Program and serves as the chairperson for the Dissertation PhD Committee. An affiliated member of the Biomedical Informatics PhD Program may serve as a Research Advisor but not as the chairperson for the PhD Committee.

As Chairperson of the PhD Committee the Research Advisor will assure that committee meetings with the student occur at least twice a year and are documented by completion of evaluation forms to be kept in the student's file. Review of the written dissertation and the oral defense of the dissertation will be proctored by this committee.

C. Qualifying Examination

Every student must pass a two component oral Qualifying Examination: the Foundation of Biomedical Informatics Exam and the Critical Assessment of Current Research Papers.

D. Candidacy Examination

Every student must pass the Doctoral Candidacy Examination.

E. Dissertation

Each PhD student must propose, produce and defend a dissertation showing high scholarly achievement based on his/her research. The student is expected to submit an electronic document as evidence of this research. For more information review Electronic Thesis/Dissertation Information on the Graduate School website.

F. Graduation Process

The following activities are required for graduation eligibility:

1. Review the Graduation Tutorial for a doctoral student on the Graduate School website;

2. Make an appointment with the Program Coordinator to discuss the graduation checklist;
3. Successfully complete all course requirements;

4. Complete the Application for Thesis Defense and return to the Program Coordinator with all required signatures;

5. Complete the official online Application to Graduate and pay the application fee required by the Graduate School by the deadline for the semester in which the student expects to graduate. Per Graduate School policy, deadlines are firm and failure to meet them will delay graduation until the following semester, requiring submission of a new application for the revised graduation date;

6. Announce defense with the Graduate School and notify the Program Coordinator of defense details for UC/Cincinnati Children's announcements;

7. Submit Electronic Thesis Dissertation (ETD) for Advisor approval. Once the Advisor has approved the thesis it will automatically be submitted to the Graduate School;

8. Check graduation status online.

G. Exit Survey

The Office of Graduate Research and Assessment, at its discretion, will conduct an exit survey on the doctoral experience of all graduating doctoral students. The results will be shared with the doctoral programs. In most cases, the student will be asked to complete this survey upon applying for graduations.

IV. QUALIFYING EXAMINATION

This section contains the rules by which the Qualifying Examination will be conducted. All PhD students in Biomedical Informatics must pass the Qualifying Examination, which is administered by an ad-hoc committee of at least three faculty members appointed by the Program Director. The purpose of the Qualifying Examination is to evaluate whether a student has acquired the breadth and depth of knowledge of the field and is ready to perform independent research leading to a successful completion of doctoral studies. The Qualifying Examination is comprised of two parts: Foundation of Biomedical Informatics Exam and the Critical Assessment of Current Research Papers.

A. Part 1: Foundation of Biomedical Informatics

The Foundation of Biomedical Informatics Exam depends on the student's performance in the following courses: Introduction to Medical Informatics; Introduction to Bioinformatics; and Data Sciences for Biomedical Research. For each class students must either earn a grade of A- or successfully pass an oral exam for that class. If transfer credit has been approved from another institution the student must take the oral exam.

For courses taken during the first year and in cases where the student did not earn a grade of A- or better, the oral exams are held at the beginning of the third semester. For courses taken during the third semester, the oral exam is held at the beginning of the fourth semester. Students must submit a letter to the Graduate Committee to petition for any changes. The letter has to justify in detail as to why the changes should be granted. Exams for separate courses are on separate days.

B. Part 2: Critical Assessment of Current Research Papers

Each student presents a critical assessment of a research paper selected from a collection submitted by BMI faculty as part of the Qualifying Examination. This component of the QE shall take place in the beginning of the third semester for full-time students and at the end of the second year for part-time students. The presentation is evaluated by at least three graduate faculty members (appointed by the Program Director) who ask the student questions related to the paper.

The Program Director determines which research paper a student presents based on preference-order rankings provided by all third-semester students. Only one student presents a given paper, therefore a student may be assigned her/his second or third choice. The exam will be scheduled no later than two weeks from the date the paper was assigned. Students are informed of the faculty member who submitted the paper so that the student can consult with the member if need be, keeping in mind that the student's independence in mastering the paper is being considered.

C. Final Decision

The overall decision of the ad-hoc committee takes into account all relevant materials such as performance in all courses and evaluations by faculty members who have had an opportunity to assess the student's research promise. Each oral examination will be administered as pass/fail and students will be allowed at most one re-take for a failed exam which must be completed within one month of the original oral exam and no later than the end of the second year of coursework.

V. DOCTORAL CANDIDACY EXAMINATION

The Doctoral Candidacy Examination is a requirement of the University of Cincinnati. It represents one of the most careful evaluations of students' intellectual development and capability by the University and the program. This section contains the rules and guidelines by which the examination will be conducted.

To fulfill the basic requirement the student must formulate a research proposal in some aspect of Biomedical Informatics, using the format of a short National Institutes of Health style grant application. The subject of the research proposal should be the same, or closely related, to the topic of the student's dissertation research. The candidacy examination will be administered by the PhD Committee which must be chosen and assembled by the student.

A. Steps of the Candidacy Examination

Students must:

1. Successfully pass both sections of the Qualifying Examination;
2. Declare their PhD Committee members;
3. Schedule a Preliminary Proposal meeting. This should occur no later than the end of the third year;
4. Write the preliminary proposal;
5. Submit the preliminary proposal to the PhD Committee members at least one week prior to the meeting;
6. Present the preliminary proposal at the Preliminary Proposal meeting;
7. Schedule a three hour meeting for the Proposal Defense Candidacy Examination;
8. Write the full proposal;

9. Submit the full proposal to the PhD Committee members at least one week before the Proposal Defense;

10. Present the full proposal at the Proposal Defense Candidacy Examination;

11. Program submits Candidacy Verification;

12. The Graduate School notifies student of admission to candidacy.

B. PhD Committee

The selection of the PhD Committee is to be initiated by the student in accordance with program policies and in consultation with the Research Advisor. The committee consists of the Research Advisor and at least 3 additional faculty members, of which at least 2 members are from the Biomedical Informatics Program. The Research Advisor serves as the chairperson of the committee except in the case of affiliated members. The PhD Committee is responsible for providing help and guidance to the student during the candidacy examination process and for proctoring of the Doctoral Candidacy Examination.

C. Preliminary Proposal Guidelines for the Student

The student shall prepare an outline of their preliminary proposal describing the Aims and scope of their dissertation research (no more than 4 pages, preferably 2-3 pages), and should include:

1. The overall significance of the work (big picture);

2. Current state of knowledge; what is not known and any preliminary data the student has generated;

3. An outline of the Aims of the proposal.

The preliminary proposal should contain enough detail to allow the committee to assess whether the proposal and the student's knowledge is of sufficient depth to be developed into a full proposal.

At least one week prior to the preliminary proposal meeting, the student provides a copy of the preliminary proposal to each of the committee members. At the preliminary proposal meeting, the student should give a presentation providing background, the Aims and sub-Aims, preliminary data, research methodology, an outline of expected results and interpretation, as well as potential pitfalls and alternative approaches. If uninterrupted, this talk should take the student between 30-45 minutes, preferably closer to 30 minutes.

Students are encouraged to: practice presentations and get feedback from fellow students; and receive feedback about the technical feasibility of certain proposed

experiments from experts (i.e. faculty) outside of the committee. Faculty should not provide theoretical or conceptual advice on the Aims or hypotheses.

D. Preliminary Proposal Guidelines for the PhD Committee

For the preliminary proposal, the role of the committee is to determine whether the proposal is generally acceptable. After the presentation, the student will be asked to leave the room while the committee discusses and makes its decision. If the committee decides that they need additional information that the student is unable to provide, they may request it from the Advisor. If the proposal is deemed unacceptable, the committee should explain in broad terms why the proposal is flawed, (e.g. lack of focus, overambitious, technically infeasible, etc.). The committee will determine if the student needs to submit a revised preliminary proposal that addresses the deficiencies. The timeframe for submission of the revised proposal will be determined by the committee but should not be longer than 4 weeks.

E. Candidacy Examination Guidelines for the Student

Once the student receives approval from the committee on the preliminary proposal, he/she will start writing the full proposal. The student should schedule a 3-hour meeting for the proposal defense. The student will hand out the full proposal to the committee one week before the proposal defense.

F. Candidacy Examination Guidelines for the PhD Committee

After the proposal presentation is complete, the student will be asked to leave the room. The committee will discuss the student's performance and the content of the proposal. If necessary, the chair will take a vote of the committee members.

Possible outcomes of the examination (as judged by the majority of the committee):

1. Pass without stipulations;

2. Pass with stipulations – completion of additional requirements as decided by the committee (refresh knowledge of the literature, etc.);

3. Fail – a failing performance may be reversed by the completion of additional requirements which are set by the committee. The student will be allowed only a single chance to defend another proposal.

The chair will discuss the strengths and weaknesses of the written proposal and oral defense of the proposal as well as any other suggestions or additional requirements.

G. Candidacy Verification

The student's program must promptly submit candidacy verification on behalf of the student to the Graduate School upon the student's completion of the requirements noted above. The Graduate School will then send a formal letter to the student notifying her/him of admission to candidacy. Once admitted, the student must register for at least one graduate credit hour in each academic year in the program to maintain graduate student and candidacy status.

VI. DISSERTATION

Each Biomedical Informatics PhD student must submit and defend a dissertation showing high scholarly achievement based on his/her research.

A. Format

The dissertation should be based on research papers co-authored by the student. If appropriate these papers could be directly incorporated into the dissertation, together with additional sections describing the relationship of each paper with the overall dissertation theme. As an overall guideline the following structure of the dissertation can be considered:

1. Introduction
   The introduction lays the groundwork for what is to come. The introduction should include:
   a. A comprehensive review of the literature organized in sections that are relevant to the dissertation;
   b. The introduction should be broad enough to cover, in depth, all topics related to the dissertation work;
   c. At the end of the introduction there should be a page or so that briefly outlines the overall thrust of the dissertation: the major underlying questions set out to address, the hypothesis and the Aims of the work. This is an appropriate "set up" to the upcoming research section.

2. Materials and Methods
   Include a complete description of the materials and methods employed in carrying out the research.

3. Research Chapters
   These chapters are a presentation of most or all of the relevant graduate research incorporating necessary tables, illustrations and photographs, and diagrams.

4. Discussion Chapter
   Discuss the major points of the dissertation work and how it contributes to the knowledge in the field. For each point there should be at least a page of discussion. Next focus on the direction of the research – the unanswered questions, proposed experiments and expected outcomes, and how this would move the field forward in an exciting way, possibly including a model figure that demonstrates what has been accomplished in the research.

5. Bibliography
   List all of the cited literature references, including authors, titles, dates, volume, and inclusive pages.

6. Appendix
   Additional materials including tables or figures.

B. PhD Committee

The PhD Committee will monitor the progress of dissertation research on a continuing basis. Committee meetings with the student should occur at least twice a year and will be documented by completion of an evaluation form by the Research Advisor to be kept in the student's file. Review of the written dissertation and the oral defense of the dissertation will be proctored by this committee.

A copy of the completed dissertation must be submitted to each committee member for critical evaluation. If it is considered to be satisfactory with respect to form and content by the committee, a final defense of the dissertation can be scheduled.

C. Final Defense of Dissertation

Students should check with the Program Coordinator for the final deadline for their dissertation defense. This date may not be less than six weeks prior to the end of the semester in which the student will graduate. An Application for Thesis Defense must be completed and signed by the student, all PhD Committee Members, and the Program Director. The student's final defense of the dissertation will be open to the public and all members of the academic community. Students are required to enter details of their dissertation defense, such as time, date, and location, online at the Graduate School website. Students can also browse scheduled dissertation defenses by visiting the defense announcement page. It is the responsibility of the student to see that she/he is in compliance with these regulations.

The candidate answers questions posed by members of the committee following an oral presentation of his/her dissertation. After the committee members have completed their questioning, others present may pose questions or comments. At the conclusion of the defense, the committee will withdraw, make a decision with regard to the acceptability of the dissertation and its defense, and report its decision to the candidate.

D. Submission of Dissertation

After a dissertation has been approved, the candidate for the doctoral degree must submit his/her electronic dissertation by following the most current detailed instructions found at Electronic Thesis/Dissertation Information.

Appendix A

ADMINISTRATION of PROGRAM

The Department of Biomedical Informatics is the academic home for the program.

Role of the BMI Department Chair

The Department Chair is responsible for assuring that activities related to the program are carried out in compliance with University policies and needs. The Chair is responsible for evaluating the applications for faculty membership in the program, for evaluating faculty reappointment to the program and for making recommendations to the faculty with regard to new appointments and reappointment to the program. The Chair shall bring appropriate issues to the faculty for resolution, and carry out policy decisions of the faculty.

Role of BMI Program Director

The BMI Program Director shall have responsibility for administration of the program. Duties shall include advising students on matters including curricula, maintaining student records, informing faculty of student progress, and informing students of probationary or terminal status. The BMI Program Director will represent the program at the monthly meetings of the Committee on Graduate Education in the College of Medicine. The BMI Program Director is the chairperson of the Admissions Committee and Graduate Committee, and is responsible for recruitment, admission and arranging financial support for incoming students.

Role of BMI Program Coordinator

The Program Coordinator is the administrator and point of contact for the program. The Program Coordinator attends to and coordinates the day-to-day activities of the program including providing clerical support, tracking student progress, providing guidance to faculty, and coordinating committee activities. The Program Coordinator is also responsible for developing and updating a procedure manual for activities related to the graduate program. The Program Coordinator will also schedule and attend the Admissions Committee meetings and coordinate all activities related to the recruitment and admission of students to the program. Duties shall include communicating with applicants, arranging interviews when appropriate, and updating and maintaining recruitment material. Questions or concerns related to the program should first be brought to the attention of the Program Coordinator who will forward them to the appropriate individual when necessary.

Graduate Committee

The Graduate Committee is responsible for the program policy and standards and dealing with student grievances according to University policy as described elsewhere in these program guidelines. Members of the committee will consist of the BMI Program Director (chairperson) and at least three other faculty members in the Biomedical Informatics Program. The Program Coordinator is a non-voting member of this committee.

Admissions Committee

The Admissions Committee is responsible for selecting graduate students for admission to the program. Members of the committee will consist of the Program Director (chairperson) and at least

two other faculty members in the Biomedical Informatics Program. The Program Coordinator is a non-voting member of this committee.

Appendix B

INSTITUTIONAL RULES, POLICIES, and PROCEDURES

Student Code of Conduct

Students are expected to adhere to the highest academic standards. For details please refer to the Student Code of Conduct and The Graduate School Handbook.

Individual Development Plans for NIH and NSF Funded Students

The University of Cincinnati recognizes the importance of mentoring students and trainees in career development. The plan is to enhance this effort by phasing in the use of Individual Development Plans (IDPs) as part of career development for our graduate students and postdoctoral trainees over the upcoming years. IDPs include trainee self-assessment, career exploration, and setting short- and long-term career goals. More information is available in The Graduate School Handbook.

Graduate Student Grievance Procedures

The University of Cincinnati provides an opportunity for the resolution of disputes involving graduate students in a fair and collegial manner. The Graduate Student Grievance Procedures establish a formal academic process for graduate students to request review and redress of certain grievances arising out of their academic relationships with their programs, their colleges, or the university.

Discrimination

The University of Cincinnati reaffirms its policy that discrimination on the basis of race, color, religion, national origin, sex, sexual orientation, disability, status as a disabled veteran or veteran of the Vietnam era, or age shall not be practiced in any of its activities. University policy is available through the Office of Equal Opportunity and Access.

Restricted Research

The right to open exchange of information and opinion in faculty relations with students carries the obligation to avoid comments or violations of confidentiality that would reduce free expression or inquiry by students. Student involvement in industrial proprietary projects should be permitted only when these projects in no way restrict the student's ability to fulfill his/her degree requirements, which includes the obligation to publish dissertation results.

Faculty members have the right to publish their research findings and the right to protection against retaliation because of displeasure over their conclusions by the public, administration, government, or others. They have the concomitant responsibility to refrain from conducting secret, non-publishable research as part of their university duties.

Appendix C

MEDICAL SCIENTIST TRAINING PROGRAM
MD/BMI PHD

This section pertains to requirements for students in the Medical Science Training Program (MSTP) earning a Biomedical Informatics PhD. If not otherwise stated, all other requirements are the same as the Biomedical Informatics PhD Program.

Admission
Students previously admitted into the MSTP must complete the online application, and submit official transcripts, a statement of purpose and three letters of recommendation to the BMI Program Coordinator.

Course Credit Agreement
Course work is evaluated by the Program Director for transfer credit.

Rotations
MSTP students must complete three lab rotations.

Qualifying Timeline
MSTP students should qualify by the middle of their second year in the graduate program, but no later than the end of their second year, in order to apply for an F30 Individual Fellowship Grant.

Dissertation
A student's committee must include an additional MSTP faculty and a faculty member with a MD. Students are required to have a committee meeting every six months. A student must defend and have an accepted paper in order to return to Medical School.

Evaluation of Progress
Dissertation progress forms completed by the Advisor and committee members must be sent to the MSTP for annual Individual Development Plans.

Appendix D

RESOURCE LINKS

Application to Graduate http://grad.uc.edu/student-life/graduation.html

Apply online https://gradapps.uc.edu/StartMyApplication/GradApplication.aspx

Biomedical Informatics PhD Program http://med.uc.edu/bmigrad

Defense Announcements http://grad.uc.edu/research/defense.html

Dissertation Information http://grad.uc.edu/student-life/etd.html

Educational Testing Services (GRE) http://www.ets.org/gre

Electronic Thesis/Dissertation Information http://grad.uc.edu/student-life/etd.html

Graduation Tutorial http://gradapps.uc.edu/Tutorials/ETDDoctoral/ETDDoctoral.htm

International Student Services Offices http://www.uc.edu/international/services.html

Medical Scientist Training Program (MSTP) http://med.uc.edu/MSTP

One Stop (UC resources such as registration, billing, etc.) http://onestop.uc.edu/?from=uctools

Registration Information http://onestop.uc.edu/classes.html

Request for Leave of Absence Form
http://grad.uc.edu/content/dam/grad/docs/Forms_Student/leaveofabsence_form.pdf

Student Code of Conduct http://www.uc.edu/conduct/Code_of_Conduct.html

The Graduate School http://grad.uc.edu/

The Graduate School Handbook
http://grad.uc.edu/content/dam/grad/docs/Publications/handbook.pdf

University of Cincinnati http://www.uc.edu/?from=globalnav

View Class Offerings (for a specific semester) https://webapps2.uc.edu/scheduleofclasses/

View Planning Guide (select discipline and course level) for all courses offered
http://webapps.uc.edu/registrar/courseplanningguide/SemesterCoursePlanningGuide.aspx

Appendix E

FORMS

Lab Rotation

Research Advisor Selection

Oral Qualifying Examination

PhD Committee Selection

Preliminary Proposal

Proposal Defense

Summary of Dissertation Committee Meeting Research Advisor Evaluation

Summary of Dissertation Committee Meeting PhD Committee Member Evaluation

Application for Thesis Defense

LAB ROTATION
Biomedical Informatics Ph.D. Program

Student:_____ Date:_____

Rotation Begin Date:_____ Rotation End Date:_____

Faculty Lab Advisor: _____

Briefly summarize the project and your accomplishments/learning objectives during this lab rotation.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ _____

Student Signature Date

_____ _____

Faculty Signature Date

RESEARCH ADVISOR SELECTION

I have chosen _____ as my Research Advisor for my thesis research.
Printed Name of Faculty

_____
Printed Name of Student Student's UC ID # (MXX-XX-XXXX)

_____
Student Signature Date

I have agreed to accept this student in my laboratory for his/her thesis research in the Biomedical Informatics PhD Program in accordance with department policy.

_____
Printed Name of Faculty Faculty Division Name

_____
Faculty Signature Date

I hereby acknowledge that the above-mentioned faculty has agreed to accept the above-mentioned student in his/her lab to complete thesis work for the Biomedical Informatics Ph.D. Program.

_____
Printed Name of Program Director

_____
Program Director Signature Date

ORAL QUALIFYING EXAMINATION
BIOMEDICAL INFORMATICS

Name:_____ UC ID #: M_____

Foundation of Biomedical Informatics Exam

Course	Grade	Term	Exam Date	Pass	Fail
BMIN 7053 Introduction to Medical Informatics	_____	_____	_____	☐	☐
CS 7099 Introduction to Bioinformatics	_____	_____	_____	☐	☐
BMIN 7054 Data Sciences for Biomedical Research	_____	_____	_____	☐	☐

Second Attempt

Course	Exam Date	Pass	Fail
_____	_____	☐	☐

Critical Assessment of Current Research Papers

Research Paper:_____

Author:_____

Presentation Date:_____ ☐ Pass ☐ Fail

Comments:_____

_____

_____

Second Attempt Date:_____ ☐ Pass ☐ Fail

Final Decision: ☐ Pass ☐ Fail

Committee Members:

_____	_____	_____
Faculty Name	Faculty Signature	Date
_____	_____	_____
Faculty Name	Faculty Signature	Date
_____	_____	_____
Faculty Name	Faculty Signature	Date

PHD COMMITTEE SELECTION

_____

Printed Name of Student Student's UC ID # (MXX-XX-XXXX)

PhD Committee Members:

_____	_____	_____
Committee Chair	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date

Preliminary Proposal Meeting Date:_____

_____	_____	_____
Student Name	Student Signature	Date
_____	_____	_____
Program Director Name	Program Director Signature	Date

PRELIMINARY PROPOSAL
DOCTORAL CANDIDACY EXAMINATION

The PhD Committee of _____ met on _____ and made the
Student Name Date
following decision:

Acceptable Candidacy Examination date/time:_____

Unacceptable Revised Proposal date/time: _____

Comments:_____

_____

_____

_____

_____

_____

_____	_____	_____
Committee Chair	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Student Name	Student Signature	Date
_____	_____	_____
Program Director Name	Program Director Signature	Date

PROPOSAL DEFENSE
DOCTORAL CANDIDACY EXAMINATION

The PhD Committee met on _____. This is to certify that _____
Date Student Name

☐ Passed without stipulations ☐ Passed with stipulations: _____

_____

_____

☐ Failed Additional Requirements/Comments: _____

_____

_____

_____	_____	_____
Committee Chair	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Print Student Name	Student Signature	Date
_____	_____	_____
Program Director Name	Program Director Signature	Date

SUMMARY OF DISSERTATION COMMITTEE MEETING
RESEARCH ADVISOR EVALUATION

Research Advisor Name:_____ Date of Committee Meeting: _____

Student Name:_____ UC ID#:_____

Summary of Student Progress: ☐ Satisfactory ☐ Unsatisfactory

Is the student regularly attending lab? ☐ Yes ☐ No

Has the student published any papers as first author? ☐ Yes ☐ No Middle author? ☐ Yes ☐ No

What is the target date for first-author publication?_____

Has the student presented his/her work (regional/national/international meeting)? ☐ Yes ☐ No

What is the target date for thesis defense?_____

When should the next committee meeting take place (time frame)? _____

Has the student met the goals set during the last committee meeting? ☐ Yes ☐ No

Please list any specific requests or areas of improvement for the student to focus on prior to the next meeting:

_____

_____

_____

_____

_____ _____
Research Advisor Signature Date

_____ _____
Student Signature Date

SUMMARY OF DISSERTATION COMMITTEE MEETING
PHD COMMITTEE MEMBER EVALUATION

Committee Member Name:_____ Date of Committee Meeting:_____

Student Name:_____ UC ID#:_____

Summary of Student Progress: ☐ Satisfactory ☐ Unsatisfactory

What is the target date for first-author publication?_____

What is the target date for thesis defense?_____

When should the next committee meeting take place (time frame)? _____

Has the student met the goals set during the last committee meeting? ☐ Yes ☐ No

Please comment on any deficiencies in meeting goals set at the last meeting:

_____

_____

_____

Please list any specific requests or areas of improvement for the student to focus on prior to the next meeting:

_____

_____

_____

_____

_____ _____

Committee Member Signature Date

_____ _____

Student Signature Date

APPLICATION FOR THESIS DEFENSE

Name: _____ Date:_____

Thesis Title:_____

_____

Proposed Date and Time of Defense*_____

*Please note that this date may NOT be less than 6 weeks prior to the end of the semester in which you wish to graduate.

Do you need to schedule a room? ☐ Yes ☐ No, I have scheduled the following:_____

Committee Approval:

By signing below you agree that this student is well prepared for defense of his/her thesis and you approve their moving forward with both defense and graduation pursuant to College and Program requirements.

_____	_____	_____
Committee Chair	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Committee Member	Signature	Date
_____	_____	_____
Print Student Name	Student Signature	Date

As Biomedical Informatics Program Director, I hereby approve the proposed thesis defense as outlined above.

_____	_____	_____
Program Director Name	Program Director Signature	Date