College of Health Solutions
Arizona State University

GRADUATE HANDBOOK

Master of Science (MS) in Biomedical Informatics
Doctor of Philosophy (PhD) in Biomedical Informatics

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Revised June 2018 Academic Year 2018-2019

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Biomedical Informatics: Student Handbook

This handbook is a guide for prospective and current graduate students in Biomedical Informatics (BMI). The handbook provides an initial resource for answers to questions about the program, but additionally students are also encouraged to consult with the Graduate Coordinator, their Faculty Advisor, or the Academic Program Lead, for any additional questions about the program.

Graduate College requirements define the basic policies for obtaining a degree from ASU, these policies can be found on the ASU Graduate College website located here. BMI has several additional requirements, beyond the standard ASU policies, which are identified in this handbook.

Biomedical Informatics

Biomedical informatics is an interdisciplinary research field that focuses on collaborating among computer scientists, cognitive, social and decision scientists, engineers, mathematicians, biologists and clinicians. These collaborations lead to advancements in information technology, data and knowledge management and analysis methodologies to improve our understanding of health care practice, public health and biological systems. The goal of this research is to enhance patient care and overall human health by expediting the process of transferring basic biomedical research to clinical use effectively and safely.

Degrees Offered

Biomedical Informatics offers the Master of Science (MS) and Doctor of Philosophy (PhD) degrees in Biomedical Informatics. The MS program is designed to meet the rapidly growing need for professionals with expertise in informatics, computer sciences and statistics in addition to knowledge of the biomedical sciences and the clinical environment in the health care professions. The PhD program prepares graduates to undertake advanced informatics research and development and to assume leadership roles in the field of biomedical informatics.

Admissions

BMI encourages applications from individuals with educational backgrounds and experience relevant to BMI. Before applying, the prospective student should discuss with a BMI Graduate Coordinator or a BMI faculty member whether or not BMI offers a graduate degree that will meet the student's needs. Additionally, the MS and PhD programs are offered during the day, and although there are a few online and evening courses, the programs cannot be completed online or in the evening.

Priority Application Deadlines:

- PhD: January 15th - A competitive application should be completed by January 15th, after that date applicants should follow up with the BMI Graduate Coordinator, to see if applications are still being reviewed/accepted
- MS: February 15th – BMI will continue to accept and review MS applications as they are completed prior to the start of the Fall term

For a complete BMI MS/PhD application, students will be required to submit the following items:

- Official transcripts
- 3 Letters of Recommendation (Academic/Professional preferred)
- Personal Statement (1-2 pages)

- Resume/CV
- GRE (Target scores: 159 for Verbal, 162 for Quantitative) taken within 5 yrs
- TOEFL/English Proficiency (Target score: 100) taken within 2 yrs

Competencies: Transcripts will be used to evaluate basic competencies for graduate study in BMI. All students admitted to the program must have basic competencies in general biology, statistics and computer programming. Exceptionally well-qualified applicants who lack basic competencies in general biology, statistics, or computer programming and who are not able to complete the courses described prior to the start of their BMI studies may be required to remediate deficiencies as part of their program requirements.

Deficiency Coursework: The Faculty Admissions Committee will look to see if the applicant has had prior coursework in Biology (BIO 181 & 182), as well as, Java (CSE 110) and Statistics (STP 226). The faculty will note deficiencies on the student's offer letter if admitted without sufficient background in any one of those areas. Students should make sure to complete the requirements in the allotted timeframe, as indicated on their offer letter. Deficiency courses can be completed prior to the start of the term at ASU or at any community college. The course must be completed with a passing grade. If a student is not sure if the course will count for transfer credit, the student can contact the BMI Graduate Coordinator to be reviewed/approved.

GRE Waiver: Waivers to the GRE exam are not generally provided to prospective students applying for the BMI MS/PhD program. However, GRE waivers will be reviewed on a case-by-case basis for candidates holding a PhD/MD professional level degree from a US institution. Prospective students that meet that requirement can contact the BMI Graduate Coordinator for additional information; final approval regarding GRE waivers will be made by the BMI Faculty Admissions Committee.

Review Process: The BMI Faculty Admissions Committee will review an application when ASU Graduate Admissions has received all application materials and the student is in review status. This status can be monitored in MyASU, official admission decisions will be emailed to the student. Once admitted to the BMI graduate program, students have access to the BMI Graduate Student Blackboard site, where they will be able to find many of the materials in this handbook. Admitted students can access the site through their MyASU.

Admission to the 4+1 Accelerated Master's Program

The College of Health Solutions and Biomedical Informatics offers the following joint accelerated programs designed to enable highly qualified undergraduate majors to earn both a Bachelor of Science degree and a Master of Science degree in five years. Students accepted into this program share designated 400 and 500-level coursework, allowing the student to complete both degrees more quickly.

4+1 Eligibility

To be eligible for admission to a 4+1 program, a student must:

- be a declared BMI major enrolled in the undergraduate degree at the time of application
- have accumulated at least 75 hours toward the BMI undergraduate degree at the time of application; 90 hours are required to begin the program
- have completed at least six credits of upper-division coursework in BMI
- have at least a 3.0 cumulative ASU GPA at the time of application

- be on track to graduate with the BMI undergraduate degree two semesters after being accepted into the program (one calendar year later than the acceptance date)

Students who do not meet these criteria may still apply to the MS degree in which they are interested upon graduation with a BS degree.

4+1 Application Process
The application deadline is April 1 of the year prior to participation. Applicants will be notified by email within a week of the application deadline of their admission status. Admitted students must submit an application to Graduate College by June 15 and pay the application fee.

Application Packet: All applications must be submitted to the BMI Graduate Coordinator electronically. Each electronic application packet should be sent in one email and include three attached documents:

- Copy of unofficial transcript
- Academic writing sample (2-5 pages)
- Personal statement (2-5 pages). Within this statement, identify the faculty member in the major that will serve as the 4+1 Faculty Advisor. Be sure to request this of the faculty member before identifying them.
- Letters of Recommendation: Three letters of recommendation must be sent directly from the faculty to the BMI Graduate Coordinator in an attached Word/PDF document. Two of the letters must be from faculty members in any discipline. The third letter should be from the BMI faculty that has agreed to serve as the student's Faculty Advisor.

Financial Support
BMI aims to provide financial support opportunities for its students, but admittance into the program is not a guarantee of funding. Not all students will receive financial support through BMI. Students seeking financial support should ask their Faculty Advisor about available research opportunities, fellowships and awards, and employment possibilities.

Applicants to the PhD program will automatically be considered for funding available through BMI at the time their applications are reviewed.

Students should also visit the Graduate College web site and other links for student funding resources:

- ASU Financial Aid
- ASU Resources
- Federal Student Aid (Student Loans)
- Working at ASU
- National Science Foundation Graduate Research Fellowship Program
- National Institutes of Health Grants
- National Research Service Award (NRSA) Research Training Grants and Fellowships

Student Responsibility
It is our expectation that all students enrolled in Biomedical Informatics will observe the policies expressed in this handbook as well as the academic policies of Arizona State University. Above all, we expect each student to maintain a high level of

academic integrity. Each student must act with honesty and integrity, and must respect the rights of others in carrying out all academic assignments. The policies that our program abides by include the student academic integrity policy, the student code of conduct and the misconduct in research policy of ASU. We require students to review and observe these policies described in the Board of Regents Policy Manual available online.

Other information concerning administrative procedures and university policies can be viewed online through the Student Services Manual (SSM).

We expect our students to be accountable for any and all of the policies defined above. Violations of a Graduate College, Biomedical Informatics or Arizona State University policy will result in academic review and may consequently result in student disciplinary procedures.

Academic Integrity

Graduate students are expected to be ethical in their multiple roles as students, researchers, teachers or supervisors of undergraduate students, and representatives of the College and University. When in doubt about appropriate conduct, students should consult a faculty mentor to seek clarification. Breaches of academic integrity include, but are not limited to, the following:

- Engaging in any form of academic deceit, e.g., referring to materials, sources, or devices (camera phones, text messages, crib sheets, solution manuals, materials from previous classes, or commercial research services) not authorized by the instructor for use during an evaluation or assignment;
- Providing inappropriate aid to another student in connection with any evaluation or assignment;
- Engaging in plagiarism by using the ideas, words, or data of another person or persons without full and appropriate attribution;
- Engaging in plagiarism by claiming credit for the ideas, words, or data of another person or persons, or submitting work done by another as one's own;
- Failing to follow ethical procedures for research involving human subjects, such as violating participants' confidentiality, or failing to maintain confidential or sensitive research data in a secure location;
- Knowingly using data that do not meet appropriate standards for reliability and validity;
- Failing to meet responsibilities to undergraduate students, such as failing to provide assistance during designated office hours;
- Engaging in a romantic relationship with an undergraduate student whom you supervise or evaluate in a classroom or research setting;
- Falsifying or misrepresenting hours or activities in relationship to an internship, externship, research assistantship, field experience, workshop, or service learning experience;
- Repeatedly failing to meet commitments and responsibilities, such as chronically missing deadlines, or failing to provide work promised to colleagues; and
- Behaving in a way that reflects poorly on the School, Institute, and University while conducting research or participating in community activities as a representative of the School.

The College of Health Solutions and Biomedical Informatics has a zero-tolerance policy for any form of academic malfeasance. Penalties for unethical behavior range from being placed on academic probation to dismissal from the program. Additional information about academic integrity policies of the University is available on the

Student Rights and Responsibilities web site. Graduate College information regarding academic integrity is available on the Academic Integrity web site.

Academic Integrity Required Module

Additionally, all new BMI students are required to complete the Academic Integrity Module, which is available for students on Blackboard (*ASU Academic Integrity Module Training*). Students must register for this course in Blackboard, review the presentation, and complete the Quiz by **September 1st**, with a passing score of 80% or higher. An additional reminder should be listed in MyASU under the priority task list. The BMI Graduate Coordinator will be reviewing the course records to ensure all graduate students have completed the academic integrity modules successfully.

Campus

Arizona State University is "One university in many places" — with many campuses throughout metropolitan Phoenix that create a federation of unique colleges and schools. The College of Health Solutions is located in downtown Phoenix. The faculty, students and staff associated with Biomedical Informatics are primarily located at the ASU Mayo Clinic Campus. Research and advising activities take place at both the ASU/Mayo campus and the Tempe campus. Additionally, students will take classes at the Tempe campus location.

- **ASU and Mayo Clinic Campus:** Biomedical Informatics is located at the Mayo Clinic Scottsdale Campus, at the Johnson Research Building, 13212 E Shea Blvd, Scottsdale, Arizona 85259, (located on the 2nd floor). BMI can be reached at phone number: 480-884-0220.
- **Tempe:** Classes are primarily on the Tempe campus, campus map found here.
- **Downtown:** The College of Health Solutions is located at the ASU Downtown Phoenix campus, 500 North 3rd Street, Phoenix AZ 85004.

Campus Transportation & Parking

- **Transportation:** transportation options to and from Tempe and Downtown for students and staff can be found here.
- **Parking:** Parking options for Tempe and Downtown can be located here. Mayo parking is open and available to all visitors, at no cost.
- **ASU/Lyft Program:** To connect students, staff and faculty to the ASU Tempe and ASU Mayo Clinic campus, BMI participates in the ASU/MAYO Lyft program, which provides free Lyft service between the hours of 7:00am-6:30pm, Monday-Friday. The ASU drop-off and pick-up point is north of the Biodeisgn Institute on Tyler Street. The Mayo drop-off and pick-up point is the Johnson Research Building. Lyft signs are posted at both pick-up/drop-off locations. To register for the Lyft program, all students will receive an e-mail and instructions from Lyft to sign up; questions about this program can be directed to the BMI Graduate Coordinator.

Tuition and Fees
For tuition expenses, students can view their student account on the *finances* tab in MyASU.

Students enrolled in the MS in Biomedical Informatics are applied a BMI program fee, for up to date information regarding tuition and fees, please visit the tuition and fee calculator.

BMI Faculty
BMI faculty can be found here.

Campus Safety
To report an emergency on campus, students can simply dial 911 or use one of the emergency call boxes found on campus. Non-emergency ASU Police or campus-safety matters should be directed to 480-965-3456. ASU has an opt-in, text-message alert system by which students can choose to receive a text message from ASU in times of an emergency. For safety resources and contacts, such as Counseling Services, Police, and Safety Escort Services, click here.

Policy Against Discrimination, Harassment, and Retaliation
Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information. Additional information about this policy can be found here.

The Office of Student Rights and Responsibilities is responsible for reviewing and handling incidents involving students. The staff works closely with many other department and program staff on campus to ensure that all students can live, work, and learn in a mutually satisfying and secure environment. Students can get additional information about reporting an incident here.

Title IX
Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university.

Additional University Resources

Bookstore
Campus Health Services
Career and Professional Development Services
Counseling and Consultation
Disability Resource Center (DRC)
Graduate Admissions Office
Graduate College - Current Student Academic Resources
Graduate College - Format Evaluation
Graduate and Professional Student Association
Graduation Office (Registrar)
International Student Office
MyASU
Parking and Transit Services
Records (Academic)
Residency
Scholarship Office
Student Accounts (Student Business Services)
Student Employment
Student Financial Assistance
Student Recreation Complex
Sun Card Office
Sun Devil Ticket Office
Testing Services, University
University Housing
University Technology Office

ASU Graduate College Requirements

Graduate College requirements define the basic policies for obtaining a degree from ASU. Students can access the policy manual here: Graduate Policies and Procedures

Satisfactory Academic Progress

All graduate students are expected to make systematic progress toward completion of their degree. This progress includes satisfying the conditions listed below, and achieving the benchmarks and requirements set by the individual degree programs. Each degree program should have in place policies for satisfactory academic progress. Students are responsible for verifying additional satisfactory progress policies as required by their degree program. If a student fails to satisfy the requirements of their degree program and/or the benchmarks outlined below, the student may be dismissed from their program based on the academic unit's recommendation to the Graduate College. The Dean of the Graduate College makes the final determination.

1. Graduate students must maintain a minimum 3.00 grade point average (GPA) to maintain satisfactory academic progress and to graduate. The minimum 3.00 GPA must be maintained on all GPA's (Plan of Study (iPOS) GPA, Overall Graduate GPA and Cumulative GPA). If either GPA falls below 3.00, the student must develop, with their advisor, an academic performance improvement plan that includes the conditions and timeframes for making satisfactory academic progress in their degree program.
    1. The iPOS GPA is calculated from all courses that appear on the student's approved iPOS.
    2. Cumulative ASU GPA represents all courses completed at ASU during the graduate career.
    3. The Overall Graduate GPA is calculated from all courses numbered 500 or higher that appear on the transcript, with the exception of courses counted toward an undergraduate degree at ASU (unless shared with a master's degree in an approved bachelor's/master's degree program); and courses identified as deficiencies in the original letter of admission. The student is considered to be on academic probation until the conditions specified in the academic performance improvement plan are met and both GPAs are above 3.00.
2. Satisfy all requirements of the graduate degree program.
3. Satisfy the maximum time limit for graduation from the student's graduate degree program (six years for master's, ten years for doctoral).
4. Doctoral students must comply with the five year time limit for graduation after passing the comprehensive examinations.
5. Successfully pass comprehensive exams, qualifying exams, foreign language exams, and the oral defense of the proposal/prospectus for the thesis or dissertation.
6. Successfully complete the culminating experience and, if required, the oral defense of the culminating experience.

Graduate students must stay continuously enrolled in their degree program. Failing to do so without a Graduate College approved *Request to Maintain Continuous Enrollment* is considered to be lack of academic progress and may lead to automatic dismissal of the student from the degree program. Persistent "W" and "I" grades during multiple semesters on a plan of study or transcript may reflect lack of academic progress.

Note: ASU Graduate College requirement for Satisfactory Academic Progress, does not meet the minimum departmental requirements (listed under *Grade Requirements*).

Continuous Enrollment
Once admitted to a graduate degree program or graduate certificate program, students must be registered for a minimum of one credit hour during all phases of their graduate education, including the term in which they graduate. This includes periods when students are engaged in research, conducting a doctoral prospectus, working on or defending theses or dissertations, taking comprehensive examinations, taking Graduate Foreign Language Examinations, or in any other way utilizing university resources, facilities or faculty time.
Registration for every fall semester and spring semester is required. Summer registration is required for students taking examinations, completing culminating experiences, conducting a doctoral prospectus, defending theses or dissertations, or graduating from the degree program.

To maintain continuous enrollment the credit hour(s) must:

- Appear on the student's *Plan of Study,* OR
- Be research (592, 792), thesis (599), dissertation (799), or continuing registration (595, 695, 795), OR
- Be a graduate-level course.

Grades of "W" and/or "X" are not considered valid registration for continuous enrollment purposes. "W" grades are received when students officially withdraw from a course after the drop/add period. "X" grades are received for audit courses. Additionally, students completing work for a course in which they received a grade of "I" must maintain continuous enrollment as defined previously. Graduate students have one year to complete work for an incomplete grade; if the work is not complete and the grade changed within one year, the "I" grade becomes permanent. Additional information regarding incomplete grades can be found here.

Leave of Absence, Request to Maintain Continuous Enrollment
Graduate students planning to discontinue registration for a semester or more must submit a *Request to Maintain Continuous Enrollment form*. This request must be submitted and approved before the anticipated semester of non-registration. Students may request to maintain continuous enrollment without course registration for a maximum of two semesters during their entire program.

Having an approved *Request to Maintain Continuous Enrollment* by Graduate College will enable students to re-enter their program without re-applying to the university. Students who do not register for a fall or spring semester without an approved Request are considered withdrawn from the university under the assumption that they have decided to discontinue their program. Students removed for this reason may reapply for admission to resume their degree program; the application will be considered along with all other new applications to the degree program.

A student with a Graduate College approved *Request to Maintain Continuous Enrollment* is not required to pay tuition and/or fees, but in turn is not permitted to place any demands on university faculty or use any university resources. These resources include university libraries, laboratories, recreation facilities or faculty time.

Students will work with the BMI Graduate Coordinator to submit these forms to Graduate College, forms are provided here for MS, and here for PhD.

Pre-Admission Credits

Credit hours completed at ASU or from another regionally accredited US institution or international institution officially recognized by that country, before the semester and year of admission to an ASU graduate degree program, are considered pre-admission credits. With the approval of the degree program and the Graduate College office, students may include a maximum of 12 graduate-level credit hours with grades of "B" or better that were not used towards a previous degree. Preadmission credits must have been taken within three years of admission to the ASU degree program to be accepted. Official transcripts must be sent to Graduate Admission Services from the records office of the institution where the credits were earned.

Accelerated Bachelor's/Master's (4+1) programs may use a maximum of 12 pre-admission credits which may include up to a maximum of 12 hours shared between the Bachelor's and Master's program. Students in accelerated programs should contact their Graduate Coordinator to ensure proper sharing of credit hours.

Time to Degree Limit

Master's students: All work toward a master's degree must be completed within six consecutive years.

Doctoral Students: Doctoral students must complete all program requirements within ten consecutive years or five years from passing comprehensive exams (whichever comes first).

Note: ASU Graduate College requirement for Time to Degree Limit, does not meet the minimum BMI departmental requirements (listed under *Time Limit*).

Biomedical Informatics Requirements

For All Graduate Students, including 4+1, Master's and PhD students

Deficiency Coursework

The Faculty Admissions Committee will determine if a student requires deficiency coursework during admission. Courses include Biology (BIO 181 & 182), Java (CSE 110) and Statistics (STP 226). Deficiency course work must be completed with a passing grade by the term indicated in their admission letter. Deficiency courses can be completed prior to the start of the term at ASU or at any community college. If a student is not sure if a course will count for credit, the student can contact the BMI Graduate Coordinator to be reviewed/approved.

Pre-Admission Credits

Requests for transfer credits will be reviewed on a case-by-case basis by the Academic Programs Committee (APC) and in accordance with Graduate College policy. Students must submit a proposal to the BMI Graduate Coordinator including a list of courses for which pre-admission credit is sought. The proposal should include a description of each course that includes course outcomes and how they relate to BMI along with the student's plan of study for the BMI degree. The Graduate Coordinator will work with the Academic Programs Committee (APC) to consider the coursework for pre-admission credit in light of the student's area of interest and their Plan of Study.

The taking of courses for graduate credit as an undergraduate or non-degree student does not ensure admission to the program or acceptance of the acquired graduate credit hours as part of the Plan of Study.

Plan of Study

The Plan of Study (iPOS) is a formal plan to meet degree requirements. The iPOS is an agreement that the work specified on the iPOS will be sufficient for the desired degree.

Students should strive to submit the iPOS online by the end of their first semester (MS students) or second semester (PhD students) and are required to submit it when 50% of the minimum credit hours for the degree being pursued have been completed.

A Plan of Study (iPOS) must be filed online via MyASU with Graduate College. It includes all courses to be taken, Faculty Advisor/Chair, and for PhD students a list of supervisory committee members. An approved Plan of Study must be on file before a student can register for a final culminating experience (BMI 593 Applied Project, BMI 799 Dissertation) or schedule their comprehensive exam.

Change of Faculty Advisor

If a change of Faculty Advisor is desired, the student will need to change the advisor listed on their iPOS. Once the student has updated the advisor section of the iPOS, the student will need to print their Plan of Study and obtain signatures of approval from the old advisor and the new advisor (for PhD students, student must submit the *Supervisory Committee Change Form* - with signatures from the old and new committee members). The signed iPOS should be submitted to the Graduate Coordinator for review and approval, then subsequent routing for auditing by the Graduate College.

Change of Supervisory Committee
For PhD students: If a change of supervisory committee member(s) is desired, the student will need to submit the *Supervisory Committee Change Form* (with signatures from the old and new committee members) and change the supervisory committee member(s) listed on their iPOS. If a faculty member has been chosen who is not on the approved list, the student must submit a *Committee Approval Request* to the Graduate College before they can change their iPOS. Once the student has updated the supervisory committee section of the iPOS, the student will need to print their Plan of Study and obtain signatures of approval from the Faculty Advisor and supervisory committee members. The signed iPOS should be submitted to the Graduate Coordinator for review and approval, then subsequent routing for auditing by the Graduate College.

Change of Coursework
If a student would like to change the coursework listed on the Plan of Study, the student will need to submit a course change request on their iPOS. Once the student has updated their coursework, they will need to print their updated Plan of Study and obtain signatures of approval from the Faculty Advisor (and supervisory committee members, for PhD students). The signed iPOS should be submitted to the Graduate Coordinator for review and approval, then subsequent routing for auditing by the Graduate College.

Courses Requiring Department Consent
The following courses require department consent for registration:

- BMI 560 Teaching Assistantship
- BMI 584 Internship
- BMI 590/790 Reading and Conference
- BMI 593 Applied Project
- BMI 792 Research
- BMI 799 Dissertation

Students must complete the required BMI course registration form, and submit to the instructor for approval, before the student will be eligible for registration.

Completed forms must be filed with the Biomedical Informatics Graduate Coordinator to receive the override necessary to register in these courses. Students must be in Good Academic Standing to register in any course that requires department consent.

Elective Courses
After satisfying pre-requisites and co-requisites, students must select elective courses from the Pre-Approved Electives List (See *Appendix I*). All Students must have prior approval before including electives on their iPOS. Electives should be chosen in consultation with the student's Faculty Advisor or for PhD students the Supervisory Committee (if the student has determined the Supervisory Committee).

Electives other than those on the BMI pre-approved elective list can be approved for inclusion on a student's iPOS if the elective is integral to the student's program of research. Students may make a request to their Faculty Advisor and notify the BMI Graduate Coordinator.

The following procedure should be followed by students who wish to take outside electives:

1. The student should prepare a written request which includes:

a. A description of the course;
b. The objectives of the course;
c. How the course enhances the ability of the student to conduct research.

2. This request should be approved by the student's Faculty Advisor
3. The request would then be forwarded by email to the Graduate Coordinator two weeks before the start of the semester, to be reviewed and approved by the Academic Program Committee Chair
4. If the Academic Program Committee Chair approves the elective, the approval will be forwarded to the Graduate Coordinator.

Grade Requirements

All students must comply with the ASU Graduate College requirements for maintaining satisfactory progress. Additionally, BMI students must obtain a B or better in all BMI core courses (). If the core course grade requirement is not met, the default procedure is for students to re-take the deficient course (or courses).

Note: If a student has to retake a course to meet the minimum requirement (B or better), the grade will NOT be replaced on the official ASU transcript. Both courses will be recorded on the graduate transcript and calculated for GPA purposes, per Graduate College policy.

Students will not be able to register for milestones (BMI 593 Applied Project, BMI 799 Dissertation, or schedule their comprehensive exam), until the grade requirement has been met.

Grades

The University Registrar assigns a general grading policy for all students. The instructor of a course has full discretion in selecting which grades to use and report from the available grading options. Grades are assigned as follows:

Grade	Graduate Definition	Value
A+		4.33
A	Excellent	4.00
A–		3.67
B+		3.33
B	Good	3.00
B–		2.67
C+		2.33
C	Passing	2.00
D	No Graduate Credit	1.00*
E	Failure	0.00*

Grade	Graduate Definition	Value
W	Withdrawal**	--
I	Incomplete	--
X	Audit	--
Y	Satisfactory	--
Z	Course in progress***	--
XE	Academic Dishonesty	0.00*
NR	No Report	--
EN	Failing Never Participated	0.00*

Although the plus/minus scale includes a grade of A+ with a value of 4.33, the cumulative GPA is capped at 4.00. Questions about the grade scales may be referred to the University Registrar Services at registrar@asu.edu

*This grade cannot be applied to a graduate degree but is included in the calculation of a grade point average.

**This grade is given whenever a student officially withdraws from a class.

***This grade is usually given pending completion of courses such as research, thesis, dissertation or practicum. All grades of "Z" must be changed to "Y" before graduation.

Grades (Continued)
A grade of "P" (pass) in a 400 or higher level course may not appear on a Plan of Study. Grades of "D" or "E" cannot be used to meet the requirements for a degree although they are used to compute the grade point averages. A student receiving a grade of "D" or "E" must repeat the course in a regularly scheduled (not an independent study) class if it is to be included in the Plan of Study. However, both the "D" or "E" and the new grade are used to compute the grade point averages. Grades on transfer work will not be used in computing grade point averages.

Incomplete Grades
Students will work with the instructor to complete the Incomplete Grade Form and submit to the Graduate Coordinator. Ultimately the timeframe for completion is determined by the instructor, in conjunction with the student. Once coursework has been fulfilled, a grade will be assigned. If the student does not complete coursework within one calendar year, the incomplete will become permanent and the student will have to re-take the course, if required to meet the degree requirements.

Research Assistant Requirements
Biomedical Informatics requires students who are receiving support as research assistants to be enrolled in nine credit hours during all semesters of their appointment as a research assistant. Neither audit enrollment nor enrollment in courses taken to meet a deficiency requirement count toward the requirement for enrollment in nine credit hours.

Note: The ASU Graduate College and the International Students and Scholars Center policy for maintaining a full course of study for RAs, does not meet the minimum departmental requirements.

Time Limit and Satisfactory Progress
Doctoral students are expected to complete the PhD degree program within 4-5 years. However, the student must complete the following within the allotted time frame:

- PhD students are expected to complete the PhD degree within three years of achieving candidacy.

Exceptions to the time limit rules must be approved by the Academic Programs Committee and the student's supervisory committee.

Additionally, satisfactory progress will be reviewed by the Academic Program Committee, bi-annually. If a student is deemed to not be making progress towards completion, the student may be placed on probation. Terms of probation for not meeting time limit rules will by outlined by the APC committee.

Advising
To ensure that academic programs run as smoothly as possible, students should consult with the BMI Graduate Coordinator prior to registering for classes each semester. For advising meetings, students can access the BMI Graduate Coordinator at the ASU Mayo Clinic Campus, JRB 208, on Monday/Wednesday/Friday, or on the Tempe Campus, at the Biodesign Institute, B210CD on Tuesday/Thursday.
Scheduling an appointment is preferred, but walk-ins are also welcome.
For immediate questions/concerns, students can reach Biomedical Informatics administration at phone number: 480-884-0220.

Application for Graduation
Students should apply for graduation during the semester of planned graduation and no later than the date specified at the Graduate College website for Graduation Dates/Deadlines.

Students must be in good academic standing and have an approved iPOS on file to apply for Graduation. Students can apply for graduation online through MyASU or in-person through the ASU Graduation Office, located in the Student Services Building.

Graduation Ceremonies: Information on Graduation Ceremonies can be found here.

- **Convocation** is held for students graduating from the College of Health Solutions, details provided here.
- **Graduate Commencement** is ASU-wide and is hosted by the Graduate College, details provided here.

Diploma: Information on the diploma can be found here. Diplomas are mailed approximately six to eight weeks after the degree conferral date. Students can review/manage their home address in MyASU.

Master's Degree (MS)

The MS program is designed to meet the rapidly growing need for professionals with expertise in informatics, computer sciences and statistics in addition to knowledge of the biomedical sciences and the clinical environment in the health care professions.

Course and Graduation Requirements

A Sample Plan of Study is provided below. This is provided as an example only. Each student's program will be unique to the student's individual needs and interests.

Year	Term (Session)	Course	Credits	Title
1st Year	**Fall (Required 1st Term)**	**BMI 601**	**3**	**Fundamentals of Health Informatics (BMI Core Course)**
1st Year	**Fall (Required 1st Term)**	**BMI 502**	**3**	**Foundations BMI Methods I (BMI Core Course)**
1st Year	**Fall**	**BMI 504**	**3**	**Introduction to Clinical Environments (BMI Core Course)**
1st Year	**Fall**	**BMI 570**	**1**	**BMI Symposium (BMI Core Course)**
1st Year	**Spring (Required 2nd Term)**	**BMI 505**	**3**	**Foundations of BMI Methods II (BMI Core Course)**
1st Year	Spring	BMI 515	3	Applied Biostatistics in Medicine and Informatics
1st Year	Spring	Elective	3	BMI Graduate Level Elective Course
1st Year	**Spring**	**BMI 570**	**1**	**BMI Symposium (BMI Core Course)**
2nd Year	**Fall**	**BMI 540**	**3**	**Problem Solving in BMI (BMI Core Course)**
2nd Year	Fall	Elective	3	Elective - Pre-Approved List in *Appendix I*
2nd Year	Fall	Elective	3	Elective - Pre-Approved List in *Appendix I*
2nd Year	Spring	BMI 593	3	Applied Project (Applied Project)
			32	**Total Credits**

Core BMI courses are offered on a once-a-year basis. Thus, failure to complete a required graduate course during the appropriate semester of enrollment may delay graduation.

Required Core Courses

The core courses are designed to provide students from diverse backgrounds with a solid grounding in the research methods in BMI and in the applications of BMI in health and biology. Required core courses for the MS are as follows:

- BMI 601: Fundamentals of Health Informatics (3 credits)
  (Required for all students in the first semester)
- BMI 502: Foundations of Biomedical Informatics Methods I (3 credits)
  (Required for all students in the first semester)
- BMI 504: Introduction to Clinical Environments (3 credits)
- BMI 505: Foundations of Biomedical Informatics Methods II (3 credits)
  (Required for all students in the second semester)
- BMI 540: Problem Solving in Biomedical Informatics (3 credits)
- BMI 570: Symposium (2 credits)

Additional Requirements for Master's degree:

- BMI 515: Applied Biostatistics in Medicine and Informatics (3 credits)
- BMI Electives (6 credits), choose from BMI graduate level electives
- Electives (3 credits), choose from pre-approved list, or propose an additional course
- BMI 593: Applied Project (3 credits)

Core BMI courses are offered on a once-a-year basis. Thus, failure to complete a required graduate course during the appropriate semester of enrollment may delay graduation.

4+1 Accelerated Master's
Students admitted to the accelerated (4+1) MS degree program will work with the BMI Graduate Coordinator and BMI Undergraduate Advisor to determine which courses will be required. Students can share a maximum of 12 credits, which will be applied as pre-admission credits on the student's MS plan of study. Students may not share any credit hours taken as an undergraduate student unless they have been formally admitted to an approved accelerated program.

Applied Project
To complete the Master's of Science in Biomedical Informatics, all students must complete a final culminating experience (BMI 593 Applied Project). BMI 593 must be completed after the first year of study.

The Faculty Advisor/chair will serve as instructor for the BMI 593 Applied Project course. If you choose to complete your project external of BMI, you will choose the Applied Project Coordinator as your instructor upon registration of the course. The external project mentor will be the Site Preceptor. Prior to registration, you must complete an Interest Statement which lists your mentors and contains an abstract of your proposed project. This statement must be signed by your Advisor and returned to the Applied Project Coordinator.

A full Project Plan will be required at the beginning of the semester and should be agreed upon by your advisor. It will include project information such as title, research location, objectives, resources required, and a project timeline. Throughout the course of the Applied Project, you will be expected to submit progress reports and project updates to the Applied Project Coordinator, with the approval of your advisor. Should any issues arise that may jeopardize the timely completion of the project, it is important that you communicate immediately to both your Advisor and the Applied Project Coordinator.

The project itself can range from pure literature research (e.g. literature review; perspectives) to laboratory science (e.g. isolation of DNA for sequencing) to the clinical setting (e.g. surveys for clinicians or patients). The important part is that the project is in the field of biomedical informatics, which is very broad and interdisciplinary. You should start thinking about your interests and future project ideas as you go through your classes to consider potential faculty advisors and project topics. Many students obtain an internship in a biomedical informatics organization and the work you do there may quality for a project as well. It is suggested that you contact the Applied Project Coordinator at least three months before the Applied Project semester so that you can have a successful and timely project start.

Final submission should be approximately 15-20 pages (actual text pages *excluding* cover page and references). A longer paper does not mean a better paper; it is often harder to be concise and to the point. The final paper should follow a journal article's sections (abstract, introduction/background, methods, results, discussion, conclusion, references, appendices, supplemental information) but depending on your specific project, may need to be altered. Submission of the project report written as a journal publication is also encouraged, but not required. Students in the Applied Project are highly encouraged to prepare a poster for a future poster session (e.g. AMIA, ASU student poster session) as well. Students must receive a B or better in the BMI 593 course to be eligible for graduation.

Faculty Advisor, Master's
After admission to the Master's program, new students will use the assigned Faculty Advisor or Academic Program Committee Chair as the Initial Faculty Advisor. The Initial Faculty Advisor will serve as their temporary advisor, until the student determines a Faculty Advisor they will ultimately work with on their Applied Project.

Students should select a Faculty Advisor that works with BMI in the student's area of interest (bioinformatics, population health, clinical informatics, or imaging).

Role of the Faculty Advisor:

- Advise students on their overall academic program, evaluate academic progress, moderate concerns
- Ensure students have a broad education base covering all areas in biomedical informatics
- Initial requests to take electives (not on the pre-approved list) must be approved through the Faculty Advisor, as well as the Academic Program Committee, if applicable

The student's Faculty Advisor will serve as chair of their Applied Project. The Faculty Advisor will work in conjunction with the student and the Applied Project Coordinator on the final culminating experience (BMI 593 Applied Project).

Steps to Achieve the BMI Master's Degree
In addition to the required coursework, the additional steps below are to achieve a MS in Biomedical Informatics. The program is designed to be completed in 2 years.

Year 1

Fall Semester
Meet with Initial Faculty Advisor
(Student Should Determine Permanent BMI Faculty Advisor in 1st or 2nd Semester)

⇓

Spring Semester
Identify BMI Faculty Advisor, Discuss Applied Project and Coursework Options
Submit iPOS, Have Faculty Advisor Approve the iPOS, Submit to Grad Coordinator

⇓

Summer Semester
Internship (Optional)

⇓

Year 2

Fall Semester
Check iPOS, Make sure it has Been Approved and There Are No Pending Changes
Work with Applied Project Coordinator to Finalize Topic and Register for BMI 593

⇓

Spring Semester
Apply For Graduation in MyASU before the Deadline
Make sure to complete all steps required on the graduation checklist:
(https://graduate.asu.edu/sites/default/files/how-to-graduate-applied-project.pdf)
Complete the Applied Project and Receive a "B" or Better

⇓

Graduation

Doctoral Degree (PhD)

The PhD program prepares graduates to undertake advanced informatics research and development and to assume leadership roles in the field of biomedical informatics.

Course and Graduation Requirements

The Plan of Study comprises a minimum of 84 semester hours of academic credit as described in the table. There is a requirement that the student have B or better grade (B-, B, or B+ qualify as meeting the requirement) in all BMI required core course. There are requirements to 1) pass a comprehensive examination; 2) prepare a research prospectus and defend it orally; and 3) conduct research, prepare a dissertation based on the research, and defend the dissertation orally.

Sample Plan of Study: PhD

A Sample Plan of Study is provided as an example only. Each student's program will be unique to the student's individual needs and interests.

Year	Term (Session)	Course	Credits	Title
1st Year	**Fall (Required 1st Term)**	**BMI 601**	**3**	**Fundamentals of Health Informatics (BMI Core Course)**
1st Year	**Fall (Required 1st Term)**	**BMI 502**	**3**	**Foundations BMI Methods I (BMI Core Course)**
1st Year	**Fall**	**BMI 504**	**3**	**Introduction to Clinical Environments (BMI Core Course)**
1st Year	**Fall**	**BMI 570**	**1**	**BMI Symposium (BMI Core Course)**
1st Year	**Spring (Required 2nd Term)**	**BMI 505**	**3**	**Foundations of BMI Methods II (BMI Core Course)**
1st Year	**Spring**	**BMI 515**	**3**	**Applied Biostatistics in Medicine and Informatics (BMI Core Course)**
1st Year	Spring	Elective	3	BMI Graduate Level Elective Course
1st Year	**Spring**	**BMI 570**	**1**	**BMI Symposium (BMI Core Course)**
2nd Year	**Fall**	**BMI 540**	**3**	**Problem Solving in BMI (BMI Core Course)**
2nd Year	Fall	Elective	3	BMI Graduate Level Elective Course
2nd Year	Fall	Elective	3	BMI Graduate Level Elective Course
2nd Year	Spring	Elective	3	BMI Graduate Level Elective Course
2nd Year	Spring	Elective	3	BMI Graduate Level Elective Course
2nd Year	Spring	Elective	3	Elective - Pre-Approved List in *Appendix I*
2nd Year				**Comprehensive Exam**
2nd Year	Summer	Elective	3	Elective - Pre-Approved List in *Appendix I*
3rd Year	**Fall**	**BMI 560**	**1**	**Teaching Biomedical Informatics (BMI Core Course)**
3rd Year	Fall	Elective	3	Elective - Pre-Approved List in *Appendix I*
3rd Year	Fall	Elective	3	Elective - Pre-Approved List in *Appendix I*
3rd Year	Fall	BMI 792	3	Research
3rd Year	**Spring**	**BMI 560**	**1**	**Teaching Biomedical Informatics (BMI Core Course)**
3rd Year	Spring	BMI 792	3	Research
3rd Year	Spring	Elective	3	Elective - Pre-Approved List in *Appendix I*
3rd Year	Spring	Elective	2	Elective - Pre-Approved List in *Appendix I*
3rd Year	Summer	BMI 792	1	Research
4th Year	Fall	BMI 792	5	Research
4th Year	Fall	Elective	3	Elective - Pre-Approved List in *Appendix I*
4th Year	Fall	Elective	3	Elective - Pre-Approved List in *Appendix I*
4th Year	Spring	BMI 799	12	Dissertation
			84	**Total Credits**

Core BMI courses are offered on a once-a-year basis. Thus, failure to complete a required graduate course during the appropriate semester of enrollment may delay graduation.

Required Core Courses

The core courses are designed to provide students from diverse backgrounds with a solid grounding in the research methods in BMI and in the applications of BMI in health and biology. Required core courses for the PhD are as follows:

- BMI 601: Fundamentals of Health Informatics (3 credits) (Required for all students in the first semester)
- BMI 502: Foundations of Biomedical Informatics Methods I (3 credits) (Required for all students in the first semester)
- BMI 505: Foundations of Biomedical Informatics Methods II (3 credits) (Required for all students in the second semester)
- BMI 504: Introduction to Clinical Environments (3 credits)
- BMI 515: Applied Biostatistics in Medicine and Informatics (3 credits)
- BMI 540: Problem Solving in Biomedical Informatics (3 credits)
- BMI 560: Teaching Biomedical Informatics (2 credits)
- BMI 570: Symposium (2 credits)

Additional Requirements for PhD degree:

- BMI Electives (15 credits), BMI graduate level course
- Additional Electives (23 credits), choose from pre-approved list, or propose an additional course
- BMI 792: Research (12 credits)
- BMI 799: Dissertation (12 credits)

•No more than 9 credit hours of reading and conference (independent study) courses (BMI 790) can be used to satisfy the credit hour requirement.

•A maximum of 18 credit hours of research (BMI 792) be used to satisfy the credit hour requirement. A minimum of 12 credit hours of research are required to satisfy the credit hour requirement. Only 6 credits of 792 can be taken prior to passing the comprehensive exam.

•No more than 12 credit hours of dissertation (BMI 799) can be used to satisfy the credit hour requirement.

Research

After advancing to candidacy, students register for BMI 792 (Research) to conduct the research described in their prospectus.

NOTE: The student may also register for up to 6 credits of academic credit (BMI 792) prior to taking the comprehensive examination (but are not required to register for BMI 792 to prepare the prospectus). To register for BMI 792 to prepare the prospectus, the student must prepare a one to two page (single-spaced) high-level description of the proposed work that will be done to prepare the prospectus. Each member of the student's supervisory committee must sign the BMI 792 Research Application form after reviewing this description.

Exceptions to this policy will be considered on a case by case basis, and must be reviewed by the Academic Programs Committee.

Required Teaching Assistant

BMI PhD students are required to gain skills in teaching by acting as a limited Teaching Assistant (TA) in two different BMI courses in two different semesters (BMI 560). Students serving in the role as limited TA are encouraged, but not required, to take the TA Development Program offered by Graduate College.

Students may act as limited TAs for courses they have not taken at ASU if they have suitable training and skills. The course instructor determines whether a student is qualified to be a limited TA in a course not taken at ASU. Students CANNOT enroll simultaneously for course and limited TA credit in the same course.

Students earn one academic credit per limited TA course. Students do not receive funding support for being a limited TA. It is expected that the course duties for the limited TAship will take 2-3 hours per week.

Duties provided as a limited TA include the following:

- Blackboard
  - Assist instructor with initial set up and organization
  - Post items to Blackboard
  - Troubleshoot student access to Blackboard
- Assist Students
  - Communicate concerning assignments and other materials
  - Locate online tutorials and other assistance for students who need help
- Prepare Assignments
  - Locate and post files for course readings
  - Design homework exercise or other assignment
- Prepare and Present Lecture(s)
- Attend selected classes
- Support Instructor in Classroom Set-up (ie. AV equipment)

Faculty Advisor, PhD

Upon admission to the BMI PhD program, students are assigned an initial Faculty Advisor. The Initial Faculty Advisor will serve as their temporary advisor, until the student determines a Faculty Advisor they will ultimately work with for their research and dissertation work.

Students must meet with their Faculty Advisor at least two times per year, usually at mid-semester, in a formal advising session to do the following:

- Advise students on their overall academic program and evaluate academic progress
- Ensure students have a broad education base covering all areas in biomedical informatics
- Moderate student concerns
- Approve requests to take non-BMI electives outside of the list of non-BMI electives that have been approved as counting toward the course credit requirement for the PhD degree

A faculty advisor should be selected no later than the students second semester, so that the Faculty Advisor can provide effective direction for the remainder of the student's program.

Formation of a Supervisory Committee

Once a Faculty Advisor has been identified, students consult with the Faculty Advisor to form a supervisory committee. ASU Graduate College policy requires the PhD supervisory committee to have at least three members. Two members must be BMI tenured or tenure-track faculty members. The Faculty Advisor will act as chair of the student's supervisory committee. To formalize the committee, the student contacts potential members of the supervisory committee and obtains their agreement to serve as a member of the supervisory committee. The agreement of each member to

serve on the Committee should be sent to the chair of the supervisory committee. Students will also need to submit a *Supervisory Committee Change Form* to the BMI Graduate Coordinator. The remaining supervisory committee members should be selected by the third semester.

If the student performs research outside of the department, a BMI core faculty will be designated to oversee that student's research in collaboration with the Faculty Advisor off-site. In this situation, the BMI core faculty member will also serve as chair of the student's supervisory committee.

Qualified individuals outside the university, upon recommendation of BMI and approval of Graduate College, may serve as members of the supervisory committee in addition to the two core faculty members from BMI. The request to have an individual outside the university serve on a supervisory committee should be made using the Committee Approval Request form found here. The completed form must be accompanied by a copy of the nominees' current curriculum vitae. Please check with the Graduate Coordinator about supervisory committee eligibility for BMI.

Once the supervisory committee is established, changes to the committee are discouraged. Any changes to the committee must be approved by all members of the student's committee. The student must submit an updated *Supervisory Committee Change Form* with signatures from the old and new committee members to the BMI Graduate Coordinator.

Masters in Passing

The Master's in Passing (MIP) option is available to exemplary students accepted into the PhD program without a prior master's degree. The Master's in Passing option is not automatically available to all PhD students. Information on the specific requirements and the process is available from the BMI Graduate Coordinator.

Comprehensive Examination

BMI doctoral students will take the comprehensive examination, generally in their fourth semester of studies in their doctoral degree program. When students have completed their core and BMI approved elective courses, have chosen an area of research, and have an approved Plan of Study, they may take the comprehensive examination. The comprehensive examination is administered by the Academic Program Committee Chair and an oral examination committee, consisting of 3 BMI core faculty.

The comprehensive examination will be comprised of two components (written exam and oral exam). Students will take the written examination utilizing a one-day format with a morning session, along with an afternoon session. Written examination questions will focus on BMI core and BMI elective courses that students have taken as part of their BMI doctoral studies. The comprehensive exam will be a closed book examination for students. The comprehensive examination committee will review the written responses and will assign any of the following designations: pass as written, pass dependent on satisfactorily rewritten or revised questions, or fail. Students who pass the written examination component will be notified and scheduled to take the oral examination component within 5-10 business days after passing the written exam.

The oral examination component will consist of questions that focus primarily on written examination material and adjacent areas. However, the first 20 minutes or so of the exam will be devoted to the student's area of research. The student will begin

by giving a 5 minute or so informal presentation (no slides necessary) about their research or their area of research. This will be followed by 15 minutes in which the examiners will ask the student related questions. We fully recognize that students may not yet know their specific topic of research and questions will be at a more general level. The next phase will focus on questions emanating from the student's responses to the written exam. Please note that general questions from other areas of discussion within BMI may be included, however, the focal point will be the student's written exam.

Once completed, examination results will be recorded by the oral examination committee and submitted to the BMI Graduate Coordinator to be entered officially with Graduate College. Failure in the comprehensive examination is considered final unless the supervisory committee and the head of the academic unit recommend, and the Vice Provost for Graduate College approve a re-examination. Only one re-examination is permitted. A petition for re-examination, endorsed by the members of the student's supervisory committee and the head of the academic unit, must be approved by the Vice Provost for Graduate College before a student can take the second examination. Re-examination may be administered no sooner than three months and no later than one year from the date of the original examination. Graduate College may withdraw a student from his/her degree program if the student's petition for re-examination is not approved, or if the student fails to successfully pass the retake of the comprehensive exam.

Dissertation Prospectus

BMI doctoral students must complete a dissertation proposal/prospectus, defend the prospectus orally and once completed, submit the *Results of the Doctoral Dissertation Proposal/Prospectus* form.

The prospectus must contain:

1. a statement of the proposed research and why it is important.
2. an overview of bibliography of the relevant literature.
3. a description of the student's competence in conducting the research.
4. a discussion of how the research will be approached (including specific criteria for the completion of the research broken down by research tasks, and the order in which the tasks will be completed).
5. a projected time-table and outline of the dissertation.

The length of the written dissertation prospectus should be 20-30 pages double-spaced.

The required oral examination in defense of the dissertation prospectus administered by the supervisory committee, generally taken six months after a student passes the comprehensive examination. The defense will be public but the committee will also meet privately with the candidate.

The student must schedule a room for the oral presentation through BMI for a date and time agreed to by the supervisory committee. The presentation must be announced (this is done by the BMI administrative support staff upon request from the student) and open to BMI faculty. Attendance by others is left to the discretion of the supervisory committee. The announcement must include an abstract, the name of the student, the names of the supervisory committee members along with the time, date and place of the presentation of the dissertation prospectus.

The student must submit a copy of the dissertation prospectus to each member of the supervisory committee at a suggested 2 weeks before the presentation.

The committee evaluates the prospectus in terms of:

- The value of the research.
- The feasibility of the research plan.
- The student's preparation for carrying out the proposed research.

The committee accepts the dissertation prospectus, accepts it with changes, or rejects it (failure). If the committee accepts the dissertation prospectus with changes, the student must submit the revised dissertation prospectus to the supervisory committee no later than one month after the oral presentation of the prospectus. The committee must evaluate the revised prospectus no later than one month following the student's submission of the revision.

After the dissertation prospectus has been submitted, the oral defense completed, and all follow-up done, the student must submit the *Results of the Doctoral Dissertation Proposal/Prospectus* form, with committee signatures to the BMI Graduate Coordinator to be entered officially with Graduate College.

Failure of the doctoral dissertation prospectus defense is considered final unless the supervisory committee and the head of the academic unit recommend, and the Vice Provost for Graduate College approve a second proposal defense. If a petition is approved, the student must submit the new prospectus by the end of six months (the six months start from the date that the first doctoral dissertation proposal defense was held). If the academic unit does not grant the student permission to retake the proposal defense, or if the student fails to pass the retake of the proposal defense, Graduate College may withdraw the student from the degree program.

Admission to Candidacy

PhD students achieve candidacy status in a letter from the Vice Provost for Graduate College after passing the comprehensive examination and successfully defending the dissertation prospectus. The Vice Provost for Graduate College sends an electronic letter admitting the student to candidacy after receiving the Results of the Doctoral Dissertation Proposal/Prospectus. Candidacy status is updated through MyASU.

Dissertation

The written doctoral dissertation is based on an original and substantial scholarly research that constitutes a significant contribution to knowledge in BMI. The dissertation research must be conducted during the time of the student's doctoral studies at ASU, under guidance of ASU Graduate Faculty, and in accordance with graduate policies.

PhD student's Plan of Study (iPOS) must include twelve credit hours, and no more than twelve credit hours, of BMI 799 Dissertation, which must be taken after the successful defense of the dissertation prospectus and advancement to candidacy. Before enrolling for BMI 799, the supervisory committee chair and all members of the supervisory committee must sign the BMI 799 Dissertation Application.

After enrolling in BMI 799, students must prepare a dissertation and successfully defend the dissertation in a final oral examination.

Graduate College publishes information regarding the details of dissertation preparation, formal requirements, deadlines and oral examinations. The student must comply with all guidelines that Graduate College publishes regarding the submission of a dissertation and the scheduling of a final oral examination. The following information should be reviewed:

- Thesis/Dissertation Format Preparation and Support
- Doctoral Defense Schedule Requirements
- Defense Announcement - posting of the defense is a state law. If the defense announcement is not posted 10 working days before the defense, then the defense MUST be re-scheduled to meet state law.

The student's supervisory committee will conduct the oral examination in defense of the dissertation.

Doctoral dissertation defenses are open to all members of the university community. Oral defenses are to be held on an ASU campus during regular business hours to facilitate student, faculty, and public accessibility. Students are encouraged to defend the dissertation during the fall or spring semester since many faculty members are not on campus over the summer and Graduate College has strict rules about committee members being present at the defense.

Additional requirements are as follows. A student must be enrolled in at least one graduate-level course at the time of the defense. Students holding the defense during the interim period between semesters must be registered in the following semester. If defending during the period between the Spring and Summer semester, students must be registered for the Summer session. If defending during the period between the Summer session and Fall semester, students must be registered in the Fall semester. Please see Graduate College policies.

At a date agreed upon by the supervisory committee but at a minimum of two weeks prior to the oral defense, the student must submit a final draft of the dissertation to all committee members for review. Failure to meet this deadline may result in the postponement of the defense date.

At least ten working days prior to the oral defense, the student must submit the materials for format evaluation and schedule the defense with Graduate College. No exceptions to this rule will be made.

Please consult the Graduate College *Graduation Deadlines and Procedures* website and the 10 Working-Day Calendar. All dissertations must be formatted according to instructions provided by Graduate College.

After the defense is scheduled with Graduate College, the student should send the Graduate Coordinator the dissertation title page, abstract page, list of committee members, and the date, time, and location of the defense. The Graduate Coordinator will then post the announcement and send an e-mail notice to students and faculty prior to the defense.

Revisions to the dissertation are normal and must be completed in a timely manner. If the student is unable to complete revisions to the dissertation and meet the ASU deadline for the semester in which the defense is held, the student must complete the revisions, remain registered, and present the finished document to ASU within one year of the defense. Failure to do so will require the re-submission of the

document for format review and may result in re-defense of the dissertation to ensure currency of the work.

After the oral defense of their dissertation, students must submit any required revisions and forms. They must also submit their dissertation to ASU through UMI/ProQuest.

Steps to Achieve the BMI PhD Degree

In addition to the required coursework, the additional steps to achieve a PhD in Biomedical Informatics are listed below. The PhD program is designed to be a 4-5 year program.

Year 1

Fall Semester
Meet with Initial Faculty Advisor
Investigate and apply for grant, fellowship, and funding opportunities outside of the School and ASU

⇓

Spring Semester
Meet with Initial Faculty Advisor
Identify Faculty Advisor/Chair and Supervisory Committee
Work on developing Research Interests & Plan of Study with Supervisory Committee
Submit *iPOS* to Graduate Coordinator (with approval signatures from committee)

⇓

Summer Semester
Internship (Optional)

⇓

Year 2

Fall Semester
Meet with Faculty Advisor & Supervisory Committee
Start Preparing for Comprehensive Examination
Investigate and apply for grant, fellowship, and funding opportunities outside of the School and ASU

⇓

Spring Semester
Meet with Faculty Advisor & Supervisory Committee
Schedule Comprehensive Examination
Pass the Comprehensive Examination

⇓

Summer Semester
Defend Dissertation Prospectus (within 6 months of comprehensive Exam), Submit *Results of the Doctoral Dissertation Proposal/Prospectus Form*
Internship (Optional)

⇓

Year 3

Fall Semester
Meet with Faculty Advisor & Supervisory Committee
Work on Research
Investigate and apply for grant, fellowship, and funding opportunities outside of the School and ASU

⇓

Spring Semester
Meet with Faculty Advisor & Supervisory Committee
Work on Research
Update iPOS (if necessary) required for course changes, committee changes

⇓

Summer Semester
Internship (Optional)

⇓

Year 4

Fall Semester
Complete research and prepare for Dissertation work

⇓

Spring Semester
Work on Dissertation
Update iPOS (if necessary)
Make sure to complete all steps required on the graduation checklist:
https://graduate.asu.edu/sites/default/files/how-to-graduate-dissertation.pdf
Apply for graduation
Schedule the Dissertation defense in MyASU (within 10 working day calendar)
Submit Dissertation to Committee and the Graduate College for Format Approval,
Survey of Earned Doctorates
Pass Dissertation Defense, Submit *Dissertation Pass/Fail* form
Apply for commencement
Submit the approved dissertation to UMI/ProQuest

⇓

Graduation

Appendix I

BMI Pre-Approved Elective Courses

Any BMI graduate level course is pre-approved for graduate students to take as a BMI graduate elective. Additionally the following courses are options for additional elective requirements:

APM 504 Applied Probability and Stochastic Processes
APM 506 Computational Methods
APM 525 High-Performance Computing
APM 531 Mathematical Neuroscience I
APM 533 Mathematical Population Biology
APM 534 Mathematical Population Bio 2
APM 535 Mathematical Models in Medicine
APM 598 Topic: Math Methods for Complex Adaptive Systems
BIO 517 (SEM) Uncertainty & Decision Making
BIO 545 Populations Evolution Genetics
BIO 546 Principles of Human Genetics
BIO 552 Developmental Genetics
BIO 564 Cellular Physiology & Signalng
BIO 591 (SEM) Topic: Sociogenomics
BIO 591 (SEM) Topic: Grant Writing
BIO 591 (SEM) Topic: Evolutionary Medicine
BIO 598 Topic: Non-coding RNA
BIO 598 Topic: Functional Biogeography
BIO 598 Topic: Genomic Analysis
BIO 598 The RNA World
BIO 598 Topic: Evolutionary biology of parasites and pathogens
BIO 614 Biometry
BIO 691 (SEM) Topic: Genetics and the Law
BMD 511 Health Economics, Policy and Payment Models
CSE 510 Database Mgmt Sys Implementn
CSE 515 Multimedia and Web Databases
CSE 535 Mobile Computing
CSE 545 Software Security
CSE 551 Foundations of Algorithms
CSE 561 Modeling and Simulation Theory and Application
CSE 564 Software Design
CSE 565 Software Verif/Validation/Test
CSE 566 Software Proj/Process/Qual
CSE 569 Fundamentals of Stat. Learning
CSE 571 Artificial Intelligence
CSE 572 Data Mining
CSE 573 Semantic Web Mining
CSE 575 Statistical Machine Learning
*CSE 576 Topics/Natural Language Proc
*CSE 591 Topic: Data Visualization
CSE 591 Topic: Machine Learning
CSE 598 Topic: Database Management
*CSE 598 Topic: Information Retrieval, Mining, and Integration
*CSE 691 (SEM) Topic: Logical & Distributional Semantics of Natural Lang
*CSE 691 (SEM) Topic: Advanced Topics on Social Media Analysis
DCI 691 (SEM) Topic: Seminar on Writing Research
DCI 791 (SEM) Topic: Scholarly Writing
DCI 791 (SEM) Topic: Proposal Writing - Seminar
DCI 791 (SEM) Topic: Schlrly Practices Smnr: Proposal Writing
EVO 598 Topic: Software Carpentry
EVO 598 Software carpentry
GIS 598 Topic: Location and analysis modeling
GIS 603 Spatial Statistics/Modeling
HCR 561 Responsible Conduct of Research
IEE 505 Information Systems Engineering
IEE 547 Human Factors Engineering
IEE 572 Design of Experiments
LIN 514 Syntax
STP 530 Applied Regression analysis
STP 533 Applied Multivariate Analysis
STP 598 Topic: Computational Statistics
STP 598 Topic: Mixed Models
STP 598 Topic: Bayesian Statistics
TWC 514 Visualizing Data & Information
TWC 544 User Experience

* Requires Advisor Review/Approval