College of Health Solutions

Arizona State University

Biomedical Informatics, MS & PhD

Student Handbook

2022-2023 Catalog

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ASU Charter

ASU is a comprehensive public research university, measured not by whom we exclude, but rather by whom we include and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural and overall health of the communities it serves.

Justice, Equity, Diversity and Inclusion at the College of Health Solutions

At the College of Health Solutions, we are focused on improving the health of the communities we serve. Every student, every faculty and staff member, every individual and community member should have the opportunity for better health throughout their lifespan. To improve health, we must embrace and support greater diversity, equity and inclusivity in everything we do, including teaching, research and service. We are committed to doing better. You are welcome at the College of Health Solutions, and this is what you can expect from us.

Commitments to Justice, Equity, Diversity and Inclusion

We create leaders who advance the principles of justice, diversity, equity and inclusion, shaping a future in which all community members can fully realize their potential.

We embed diversity, equity and inclusion as a transformational force in every aspect of our teaching, research and service as we work to address the challenges facing people and communities to stay healthy, improve their health and manage chronic disease.

We believe that diversity and inclusion are essential for excellence and innovation, and thus it is stated in our college values: We maximize opportunities for people of diverse backgrounds, abilities and perspectives.

We support underrepresented and historically marginalized groups and will not tolerate discrimination or hate of any kind.

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Introduction

Welcome

Welcome from the Biomedical Informatics faculty at ASU! 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 support coordinator, their faculty advisor, or program director, 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.

Vision and mission

Master: The mission of the biomedical informatics MS program is to advance the science and technology of biomedical informatics, inform and influence policy, and improve individual and population health. The program is committed to excellence and leadership in 1) research and development that, through a diverse community of clinical and interdisciplinary collaborations, advances basic science, contributes broadly to knowledge, and solves real life problems in the biomedical sciences and health care; 2) education, through the creation and delivery of innovative curricula and instructional methods aimed across the spectrum of professional development, community engagement aimed at developing and fostering mutually beneficial relationships and collaborations that are relevant and responsive to community needs; and 3) service, through provision of resources and capabilities that foster education, inclusion and research and address local, regional and national problems.

Doctorate: To advance the science and technology of biomedical informatics, inform and influence policy, and improve individual and population health, the Biomedical Informatics PhD Program is committed to excellence and leadership in research training that advances basic science, contributes broadly to knowledge, and solves real life problems in biomedical sciences and health care through creation and delivery of innovative curricula and instructional methods, community engagement, and provision of resources and capabilities to foster education and research to address local, regional and national problems.

Program overview

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.

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.

Program contacts

Program director (MS): Valentin Dinu, valentin.dinu@asu.edu

Program director (PhD): Dongwen Wang, dongwen.wang@asu.edu

Graduate support coordinator: Aaron Falvey, chsgrad@asu.edu

Program faculty: see Appendix A

Admission

Admission to the Biomedical Informatics, MS and the Biomedical Informatics, PhD is available for Fall terms. Deadlines to apply can be found here (MS) and here (PhD). Applications will be reviewed by the admissions committee only once all materials have been received. Application status can be monitored in MyASU. Official admission decisions will be emailed to the student.

Quick Facts:

- Location: Tempe campus
- Start terms: Fall
- Time to completion: 2 years (master), 4 years (doctorate)

Graduate admission requirements

ASU maintains minimum standards for consideration for admission to graduate programs. The program may establish requirements in excess of those established by the university.

- An earned bachelor's degree or higher from a regionally accredited institution in the U.S., or the equivalent of a U.S. bachelor's degree from an international institution officially recognized by that country.
- A minimum grade point average of 3.00 (scale is 4.00 = "A") in the last 60 semester hours or 90 quarter hours of undergraduate coursework is required to be considered for admission to an ASU graduate degree program.
- International applicants must provide proof of English proficiency. The following are accepted to meet his requirement
    - Test of English as a Foreign Language (TOEFL): score of at least 550 (PBT) or 80 (iBT). ASU's institutional code is 4007. Only electronic copies of scores are accepted.
    - International English Language Testing System (IELTS): overall band score of at least 6.5. No institutional code is needed.
    - Pearson Test of English (PTE): score of at least 60.
    - Individual academic units or programs may have higher requirements for English proficiency

Academic program requirements

In addition to the graduate admission requirements, the program requires the following as part of the application:

Undergraduate or graduate degrees – bachelor's or master's degree from a regionally accredited institution; Prior degrees in biology, computer science, engineering or statistics, or post-baccalaureate training as a health professional in medicine, nursing or pharmacy is preferred; Applicants who have earned degrees in other unrelated fields with appropriate academic backgrounds also will be considered.

Prerequisite coursework – students admitted to the program must have basic competencies in general biology (BIO 181), statistics (HCD 300 or STP 226) and computer programming (CSE 110); Exceptionally well-qualified applicants who lack basic competencies in general biology, statistics, or computer programming and who are not able to complete the indicated courses prior to the start of BMI graduate studies may be admitted with a deficiency (see Provisional acceptance guidelines).

GRE scores – required

Statement of purpose – one to two pages; indicate interest in the program and knowledge of the field; emphasize career plans; Applicants to the PhD program are encouraged to connect with BMI faculty who could be their potential research advisors and include this information in their statement, if available at the time of application.

Three letters of recommendation – academic or professional sources, preferred

Resume – include relevant personal, professional, educational and community activities (one to two pages).

Note: Waivers to the GRE exam are not generally provided to applicants 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 graduate support coordinator for additional information; final approval regarding GRE waivers will be made by the program admissions committee.

Provisional acceptance guidelines

In some instances, a student may be admitted provisionally and/or with a deficiency. Students should refer to the official admission letter sent by the Graduate College via MyASU to determine if they have been admitted with a provision and/or deficiency.

A provisional admission requires a student to maintain a 3.0 or higher GPA within a specified timeframe. If the 3.0 is not achieved by the end of the timeframe specified on the official admission letter, the student will be automatically dismissed from the degree program.

A deficiency requires a student to fulfill a competency area within a given timeframe. The academic program will monitor students with deficiencies. If a deficiency is not completed within the timeframe indicated on the official admission letter, the student may be recommended for dismissal from the academic program.

Pre-admission credit policy

Credit hours completed at ASU or at another regionally accredited U.S. 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 academic unit and the Graduate College, students may include a maximum of 12 graduate-level credit hours with grades of “B” or better that were not used toward a previous degree. Preadmission credits must have been taken within three years of admission to the ASU degree or certificate 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 program (4+1)

The College of Health Solutions offers an accelerated 4+1 program designed to enable highly qualified undergraduate majors to earn a Bachelor of Science in Biomedical Informatics and a Master of Science in Biomedical Informatics in five years. Undergraduates interested in this program should connect with an advisor regarding the program in the first semester of their junior year. The preliminary application

deadline is June 1st of the calendar year prior to participation. For more information about the MS BMI 4+1, please visit the 4+1 Accelerated MS Programs page.

All applications must be submitted electronically to the graduate support coordinator. The application packet should be sent in one email and include the following attached documents:

- Copy of unofficial ASU transcript (3.0 minimum cumulative GPA)
- Statement of purpose (1-2 pages)
- Three (3) letters of recommendation from academic sources are preferred (recommenders should be instructed to e-mail the letter of recommendation directly to the graduate support coordinator)

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 advisor to ensure proper sharing of credit hours.

Tuition and assistance

Tuition and fees

Tuition is set by ASU and the Arizona Board of Regents each year. View the general Tuition and Fees Schedule, or calculate a more specific estimate of charges using the ASU Tuition Estimator. Information on residency requirements can be found at Residency for Tuition Purposes.

The Biomedical Informatics, MS has a program fee of $222 per credit ($2,000 max per semester). The Biomedical Informatics, PhD does not have a program fee.

Financial assistance

Financial assistance is available through a variety of sources, including:

- College of Health Solutions scholarships
- Graduate College fellowships
- Traditional financial aid (loans and grants). Visit the Financial Aid website.
- National Science Foundation Graduate Research Fellowship Program
- National Institutes of Health Grants
- National Research Service Award (NRSA) Research Training Grants and Fellowships

Assistantships

All funded RA and TAships within the program are competitive. Doctoral students are prioritized for these opportunities. In rare cases, dependent on funding and student credentials, students in the master's degree program may be considered. Funded RA and TA positions consist of a nine-month position (August – May) and include a tuition waiver. In the College of Health Solutions, TAships are limited to the first two years of students' enrollment in the program. All students must have the expertise, experience, and willingness to be a TA and teach courses or laboratories in the BMI curriculum or be an RA as funding allows. International students must demonstrate English proficiency before they can begin a TA appointment (note that the proficiency standards required for being a TA are higher than for admittance into a graduate program). An ASU Graduate Assistantship (TA/RA) handbook and policy Manual is available from the Graduate College (TA/RA handbook) to provide an overview of ASU policies and support services pertinent to teaching and research assistants and associates.

- Eligibility: In order to be eligible to receive an appointment as a TA/RA, a student must be regularly admitted to and enrolled in the graduate degree program. During the fall and spring semester, a TA/RA must be enrolled for a minimum of six hours. During the summer session(s) a TA/RA must be enrolled for a minimum of 1 hour, if on a TA/RA appointment over the summer. Students on GSA appointments over the summer do not need to enroll in 1 credit. Audited courses or undergraduate courses may not be used to fulfill this requirement.
- Training for TAs: All ***new*** **TAs** are required to complete Pre-Service Training prior to your first semester as a TA.
- Reappointment: TA/RA appointments are, by definition, term appointments. TAs/RAs should not assume that they will be reappointed merely because no notification or termination at the end of the appointment period has been received. Reappointments are subject to and contingent upon the continuing availability of funds and the TA's/RA's satisfactory performance. TAships are based upon the availability of funds and are not guaranteed. In considering reappointments, the

hiring unit or project director must consider the TA's/RA's contribution to the objectives of the unit or project along with the associate's academic progress.

- Evaluations. TAs/RAs will be reviewed periodically to inform students as to their progress and outline areas for improvement if necessary. These reviews will include an evaluation of the student's abilities and behaviors concerning completion of assigned tasks; ability to work independently once tasks are explained; ability to analyze problems and find solutions; cooperation with supervisors and other TAs/RAs; and professional behavior.
- Termination: In the rare instance that a TA/RA is to be terminated prior to the end of the appointment period, then the TA's/RA's supervising faculty member or head of the academic unit should write to the student describing the reasons for the action. The dean of the academic college (when applicable) and the dean of Graduate College should receive copies of the letter. Within 10 days of the receipt of the notice of termination, the TA/RA may appeal the decision at the unit and college level. If a TA/RA is unable to continue an appointment, he or she must inform the supervising faculty member and the program director in writing of the reasons for the action, with the understanding that the student will lose financial support.

Summer funding: TAships are NOT available over the summer. RAships are dependent upon funding.

Curriculum and graduation requirements

Master program requirements

The Biomedical Informatics, MS is comprised of 32 credits, including an applied project. The master's degree 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.

Required Core (17 credits)

- BMI 502 Foundations of Biomedical Informatics Methods I (3)
- BMI 505 Foundations of Biomedical Informatics Methods II (3)
- BMI 515 Applied Biostatistics in Medicine and Informatics (3)
- BMI 540 Problem Solving in Biomedical Informatics (3)
- BMI 570 BMI Symposium (2)
- BMI 601 Fundamentals of Health Informatics (3)

Other Requirements (3 credits)

- BMI 404 Clinical Environments (3) or
- BMI 504 Introduction to Clinical Environments (3)

Electives (9 credits)

Culminating Experience (3 credits)

- BMI 593 Applied Project (3)

Note: A grade of B or better is required in all coursework, except courses applying to the electives area.

> *A maximum of 6 credit hours of 400-level coursework can be included on an iPOS with program approval.*

Faculty advisor

After admission to the Master's program, new students will use the program director as the initial faculty advisor. Students should ultimately select a faculty advisor who 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
- Oversee the student's applied project, working in conjunction with the applied project coordinator

Electives

Students admitted to the MS program must complete a minimum of 9 credits of elective coursework to include at least 6 credits of coursework in BMI. Electives should be chosen in consultation with the student's faculty advisor. See Appendix B for a list of pre-approved courses.

Courses that are not pre-approved may be considered. The following procedure should be followed by students who wish to take outside electives:

1. The student prepares a written request which includes:
    - A description of the course;
    - The objectives of the course;
    - How the course enhances the ability of the student to conduct research.
2. The request is reviewed by the student's faculty advisor
3. If approved by the faculty advisor, the request should be forwarded by email to the graduate support coordinator no later than two weeks before the start of the semester, to be reviewed by the program director
4. If the program director approves the elective, the approval will be forwarded to the graduate support coordinator who will notify the student.

Applied project

To complete the Master of Science in biomedical informatics, all students must complete an applied project. BMI 593 Applied Project must be completed after the first year of study. Students must receive a B or better in the BMI 593 course to be eligible for graduation.

The faculty advisor will serve as instructor for the BMI 593 Applied Project course. Students who choose to complete a project external to BMI will need to choose the applied project coordinator as the instructor upon registration for BMI 593. The external project mentor will be the site preceptor. Prior to registration, students must complete an interest statement that lists the faculty mentors and contains an abstract of the proposed project. This statement must be signed by the student's faculty 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 the faculty advisor. It will include project information such as title, research location, objectives, resources required, and a project timeline. Throughout the course, students will be expected to submit progress reports and project updates to the applied project coordinator, with the approval of their faculty advisor. Should any issues arise that may jeopardize timely completion of the project, it is important that students communicate immediately to both their faculty 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. Students should start thinking about interests, future project ideas, and potential faculty advisors as they go through classes in the first year. Many students obtain an internship in a biomedical informatics organization and the work completed there may quality for a project as well. Students should contact the applied project coordinator at least three months before the semester in which they plan to take BMI 593.

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 the 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.

Doctoral program requirements

The Biomedical Informatics, PhD comprised of 84 credits, including a written comprehensive exam, an oral comprehensive exam, a prospectus, and a dissertation. The doctoral degree program prepares graduates to undertake advanced informatics research and development and to assume leadership roles in the field of biomedical informatics.

Required Core (22 credits)

- BMI 502 Foundations of Biomedical Informatics Methods I (3)
- BMI 504 Introduction to Clinical Environments (3)
- BMI 505 Foundations of Biomedical Informatics Methods II (3)
- BMI 515 Applied Biostatistics in Medicine and Informatics (3)
- BMI 540 Problem Solving in Biomedical Informatics (3)
- BMI 560 Teaching in Biomedical Informatics (2)
- BMI 570 BMI Symposium (2)
- BMI 601 Fundamentals of Health Informatics (3)

Electives (32 credits)

Research (18 credits)

- BMI 792 Research (18)

Culminating Experience (12 credits)

- BMI 799 Dissertation (12)

Note: A grade of B or better is required in all coursework, except courses applying to the electives area.

> *Students entering the doctoral program with a master's degree in a related discipline may count up to 30 credit hours from the master's degree toward the total credit hours, with program approval.*
>
> *A maximum of 6 credit hours of 400-level coursework can be included on an iPOS with program approval.*

Faculty advisor and committees

Faculty advisor: Upon admission to the doctoral 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 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.

Supervisory committee: Once a faculty advisor has been identified, students consult with the faculty advisor to form a supervisory committee. Graduate College policy requires the 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 supervisory committee. To formalize the committee, the student contacts potential members 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 committee chair/ faculty advisor. Students will also need to submit a Supervisory Committee Change Form to the graduate support coordinator. The supervisory committee members should be selected during 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 off-site. In this situation, the BMI core faculty member will serve as co-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 support 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 graduate support coordinator.

Electives

Students admitted to the PhD program must complete a minimum of 32 credits of elective coursework. Electives should be chosen in consultation with the student's faculty advisor. A minimum of 15 credits must be completed through BMI coursework. See Appendix B for a list of pre-approved courses that may be used for up to 17 credits of the Electives area.

No more than 9 credit hours of reading and conference (independent study) courses (BMI 790) can be applied toward the iPOS, to be included in the Electives area.

Courses that are not pre-approved may be considered. The following procedure should be followed by students who wish to take outside electives:

1. The student prepares a written request which includes:
    - A description of the course;
    - The objectives of the course;
    - How the course enhances the ability of the student to conduct research.
2. The request is reviewed by the student's faculty advisor.

3. If approved by the faculty advisor, the request should be forwarded by email to the graduate support coordinator no later than two weeks before the start of the semester, to be reviewed by the program director
4. If the program director approves the elective, the approval will be forwarded to the graduate support coordinator who will notify the student.

Comprehensive examinations

Doctoral students will take comprehensive examinations, generally in their fourth semester of studies in the program. When students have completed the required core and approved elective courses, have chosen an area of research, and have an approved iPOS, they may take the comprehensive examinations. The comprehensive examinations are administered by the program director and an examination committee, consisting of 3 BMI faculty. Students should consult the program director by the beginning of their fourth term regarding the formation of their examination committee. There is a written comprehensive examination and an oral comprehensive examination.

Students will take the written examination utilizing a one-day format with a morning session and an afternoon session. Written examination questions will focus on required core and elective courses that students have taken as part of their doctoral studies. The written comprehensive exam is a closed book examination. The 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 comprehensive examination within 5-10 business days after passing the written exam.

The oral comprehensive examination consists 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. Note that general questions from other areas of discussion within BMI may be included; however, the focal point will be content from the written exam.

Once completed, examination results will be recorded by the oral examination committee and submitted to the graduate support coordinator to be entered officially on the iPOS. Failure in the comprehensive examination is considered final unless the supervisory committee and the program director recommend and the dean of the Graduate College approves 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 program director, must be approved by the dean 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. The Graduate College may withdraw a student from the 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.

Teaching requirement

Doctoral students are required to act as a limited Teaching Assistant (TA) in two different BMI courses in two different semesters in order to gain skills in teaching. Students earn one academic credit per limited TA experience through BMI 560 Teaching in Biomedical Informatics for a total of 2 credits to apply to the

doctoral program. 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.

Students serving in the role as limited TA are encouraged, but not required, to take the TA Development Training offered by the 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 a course and limited TA credit for the same course.

Students whose first language is not English are *encouraged*, but not required, to meet English Proficiency for Teaching Assistants prior to enrolling in BMI 560. Information on this and supplemental training can be found on the Grad College website.

Duties provided as a limited TA include the following:

- Canvas
  - Assist instructor with initial set up and organization
  - Post items to Canvas
  - Troubleshoot student access to Canvas
- Assist students
  - Communicate concerning assignments and other materials
  - Locate online tutorials and other assistance for students who need help
- Prepare and grade assignments
  - Locate and post files for course readings
  - Design homework exercise or other assignment
  - Grade assignment
- Prepare and present lecture(s)
- Attend selected classes
- Support instructor in classroom set-up (i.e. AV equipment)

Research

After completing the comprehensive examinations, students register for BMI 792 Research to conduct research leading to their dissertation. A maximum of 18 credit hours of BMI 792 can be applied to iPOS.

All students who conduct any research using human subjects are required to submit their research proposal to the Institutional Review Board for approval prior to conducting their study. This procedure is necessary even for students who are doing secondary data analysis. Students at ASU are not eligible to submit their own IRB protocols. Students will have to work with their faculty mentor to submit the IRB protocols.

Note: On a case-by-case basis, up to 6 credits of BMI 792 may be taken prior to the comprehensive examinations in order to prepare the prospectus. To be considered for this, 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.

Dissertation and prospectus

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.

Per Graduate College policies, students cannot begin their dissertation until they have passed their dissertation proposal defense. The dissertation proposal defense may not be scheduled until the student has passed the comprehensive exams. Per ASU Graduate College policy, no more than 12 credits of dissertation (BMI 799) can be used to satisfy the program credit hour requirement.

Prospectus:

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

- a statement of the proposed research and why it is important.
- an overview of bibliography of the relevant literature.
- a description of the student's competence in conducting the research.
- 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).
- a projected time-table and outline of the dissertation.

Note: ASU uses an online formatting tool that follows the Format Manual to generate a template into which you can insert your document text. The student cannot begin data collection until all approvals of the proposal have been completed and after all IRB (or IACUC) approvals are done.

The required oral defense of the dissertation prospectus administered by the supervisory committee, is generally taken six months after a student passes the comprehensive examination. The seminar component to present the prospectus will be public but the defense component will be only for the committee and the candidate.

The student coordinate with the supervisory committee to determine a day and time for the prospectus defense. Assistance with booking a room is available by emailing chsreception@asu.edu. 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; and, the student's preparation for carrying out the proposed research. No later than 10 business days before the proposal defense, the student must send the proposal abstract, date of the proposal, room location and zoom link to chsgrad@asu.edu to enable an announcement of the event.

Proposal/prospectus grading: 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 defense 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 graduate support coordinator to be entered officially on the iPOS

Failure of the doctoral dissertation prospectus defense is considered final unless the supervisory committee and the program director recommend and the dean for Graduate College approves a second proposal defense. If a petition is approved, the student must submit the new prospectus by the end of six months from the date that the first prospectus defense was held. If the program faculty do not grant the student permission to retake the proposal defense, or if the student fails to pass the retake of the proposal defense, the Graduate College may withdraw the student from the degree program.

Advancement to candidacy: The Graduate College will send a letter indicating that the student has been advanced to candidacy once the comprehensive exams are passed and the dissertation proposal defense forms are approved and submitted. **Students should not enroll in dissertation hours (BMI 799) until after being advanced to candidacy**. Doctoral students who have been advanced to candidacy are required to maintain continuous enrollment (at least 1 credit hour each semester) until all degree requirements have been completed and graduated.

Dissertation: Doctoral Plans 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, advancement to candidacy, and completion of the BMI 792 Research requirement. Before enrolling in 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 it orally.

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

Scheduling the defense: The student's supervisory committee will conduct the oral examination in defense of the dissertation. Dissertation defenses are public. Oral defenses are to be held on an ASU campus during regular business hours to facilitate student, faculty, and public accessibility. Members of the student's supervisory committee must be present; therefore, students are encouraged to defend the dissertation during a Fall or Spring term when faculty are likely to be available. If a committee member cannot be physically present, connect with the graduate support coordinator and refer to established Graduate College defense procedures.

Once the student's committee has approved scheduling of the dissertation defense, the student will:

- Ensure they have a finalize iPOS on file (with no errors)
- Apply for graduation through MyASU
- Work with chsreception@asu.edu to book a room for their defense. Students must know the location of their defense before they can schedule their defense through the Graduate College.
- Student enters their defense date for approval by the Graduate College through the iPOS. The oral defense must be scheduled at least 10 business days before the anticipated defense date. Please see the available resources to help prepare for your defense, which includes the 10-Working Day Calendar.

- Once the request has been submitted, the request must be approved by the BMI program. Note: the defense is not officially scheduled until approved by the BMI program and the Graduate College.
- Email chsgrad@asu.edu the dissertation title page, abstract page, list of committee members, and the date, time, and location of the defense. The graduate support coordinator will post the announcement and send an email notice to students and faculty prior to 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 a 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.

Dissertation submission: 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.

Once the defense has been scheduled, the student must upload their complete, defense-ready document for format review to the Graduate College 10 calendar days prior to the defense.

1. Students must submit documents through their iPOS by clicking on the Format tab and uploading a Word or PDF document as an attachment. If you are attaching multiple files, the documents must be submitted as a compressed zip file.
2. Documents should only be submitted after consultation with the student's committee/chair and must be a complete, defense-ready document (i.e. meets standards set by the ASU Graduate College Format Manual, complete content).
3. The Graduate Format team will not review incomplete documents or those that have not been formatted according to the format manual. If a partial or incomplete document is submitted, the document will be returned without evaluation and revisions will be requested before further review.
4. Students must be enrolled in at least (1) credit hour during the semester they plan to defend their thesis/dissertation and while working on format revisions.

Degree completion/ final revisions:

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 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.

Once any final corrections to the dissertation as recommended by the committee are complete and approved, the final version of the document is evaluated by a format reviewer in the Graduate College and submitted to UMI/ProQuest for printing.

Keep in contact with the format advisors (gradformat@asu.edu) as well to complete all format changes. To avoid jeopardizing your graduation, be sure to submit your final revisions by the posted semester deadline. If the deadline is not met, the student will be required to register (and pay) for one (1) graduate-level credit hour the following semester to be able to graduate.

Revision process: After making the required corrections outlined in the email and reviewed the entire document, upload the document to the Graduate College via your iPOS. (Note: A format advisor checks your work against the Format Manual requirements. They also spot-check for misspellings, inconsistencies, typographical errors, and grammatical problems, but a thorough review of the entire document for these errors is the responsibility of the student and his/her chair.). Turnaround time for review fluctuates depending upon the volume of documents, and increases as the semester deadlines approach, students should expect a response within 3-5 business days. This process will continue until your document is ready for electronic submission through UMI/ProQuest.

Final submission: Student will receive an email from the format advisor notifying you that your document is ready for electronic submission through UMI/ProQuest. Read the email carefully as you may receive instructions before final submission to UMI/ProQuest. You must have received format approval from the Graduate College and ensure your defense results have been reported to the Graduate College through iPOS in order to be eligible to complete the final step of submitting to ProQuest.

Master in passing

Doctoral students who complete the requirements of the approved MIP may be awarded the related master's degree. Students with an existing master's degree with the same major are not eligible.

Students who include any blanket hours from a previously awarded master's degree on their doctoral interactive Plan of Study (iPOS) are not eligible for a Master's in Passing. All coursework included in an MIP iPOS must have been completed after the semester and year of admission to the doctoral program.

Application to graduate

Students should apply for graduation during the semester of planned graduation and must apply no later than the dates specified on the University Registrar Services website. Students can apply for graduation online through MyASU or in-person through the ASU Graduation Office, located in the university registrar services locations. Students must have an approved iPOS on file before applying for graduation.

Plan of study

To graduate in a timely manner, students should follow a plan of study. See below for sample plans. Deviation from a plan of study should be discussed with the graduate support coordinator and program director. Failure to follow a plan of study may result in delayed graduation.

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

MS Sample Plan of Study, Fall Start

Term/ Session	Course	Credits
Year 1 - Fall	BMI 502 Foundations of Biomedical Informatics Methods I	3
	BMI 515 Applied Biostatistics in Medicine and Informatics	3
	BMI 570 BMI Symposium	1
	BMI 601 Fundamentals of Health Informatics	3
Year 1 - Spring	BMI 504 Introduction to Clinical Environments	3
	BMI 505 Foundations of Biomedical Informatics Methods II	3
	BMI 570 BMI Symposium	1
	Elective	3
Year 2 - Fall	BMI 540 Problem Solving in Biomedical Informatics	3

	Elective	3
	Elective	3
Year 2 - Spring	BMI 593 Applied Project	3

Note: BMI 502 and BMI 601 are required in the first term. BMI 505 is required in the second term.

In addition to the required coursework, the steps to achieve a Master of Science in biomedical informatics are listed below.

Year 1 - Fall
Complete Academic Integrity Module
Determine permanent faculty advisor
Submit Interactive Plan of Study (iPOS)

Year 1 - Spring
Discuss applied project and coursework options with faculty advisor
Review iPOS
Summer internship (optional)

Year 2 - Fall
Finalize applied project topic with faculty advisor
Review iPOS

Year 2 - Spring
Review iPOS: Make sure you have an approved iPOS on file, with no errors
Apply for graduation in MyASU before the deadline
Complete the Applied Project with a grade of B or better

Graduation
RSVP for and attend graduation ceremony (optional)

PhD Sample Plan of Study, Fall Start

Term/ Session	Course	Credits
Year 1 - Fall	BMI 502 Foundations of Biomedical Informatics Methods I	3
	BMI 515 Applied Biostatistics in Medicine and Informatics	3
	BMI 570 BMI Symposium	1
	BMI 601 Fundamentals of Health Informatics	3
Year 1 - Spring	BMI 504 Introduction to Clinical Environments	3
	BMI 505 Foundations of Biomedical Informatics Methods II	3
	BMI 570 BMI Symposium	1
	Elective	3
Year 2 - Fall	BMI 540 Problem Solving in Biomedical Informatics	3
	Elective	3
	Elective	3

Year 2 - Spring	Elective	3
	Elective	3
	Elective	3
	Comprehensive Examinations	0
Year 2 - Summer	BMI 792 Research	3
Year 3 - Fall	BMI 560 Teaching in Biomedical Informatics	1
	BMI 792 Research	3
	Elective	3
	Elective	3
	Prospectus Defense	0
Year 3 - Spring	BMI 560 Teaching in Biomedical Informatics	1
	BMI 792 Research	6
	Elective	2
Year 3 - Summer	BMI 792 Research	1
Year 4 - Fall	BMI 792 Research	5
	Elective	3
	Elective	3
Year 4 - Spring	BMI 799 Dissertation	12
	Dissertation Defense	0

Note: BMI 502 and BMI 601 are required in the first term. BMI 505 is required in the second term. Students who enter with an approved master's degree may apply up to 30 credits toward the elective area and should create an individualized plan with their faculty advisor and the graduate support coordinator.

In addition to the required coursework, the steps to achieve a doctorate in biomedical informatics are listed below.

Year 1 - Fall
Complete Academic Integrity Module
Meet with initial faculty advisor
Investigate and apply for grant, fellowship, and funding opportunities outsite of ASU

Year 1 - Spring
Meet with initial faculty advisor; identify facutly advisor/chair and supervisory committee
Develop research interests & Plan of Study with supervisory committee
Submit Interactive Plan of Study (iPOS)
Summer internship (optional)

Year 2 - Fall
Meet with faculty advisor and supervisory committee
Prepare for the comprehensive examinations
Investigate and apply for grant, fellowship, and funding opportunities outsite of ASU

Year 2 - Spring
Meet with faculty advisor and supervisory committee
Schedule and pass the comprehensive examinations
Defend dissertation prospectus (can be defended in Summer)
Summer internship (optional)

Year 3 - Fall
Meet with faculty advisor and supervisory committee; Work on research
Investigate and apply for grant, fellowship, and funding opportunities outsite of ASU

Year 3 - Spring
Meet with faculty advisor and supervisory committee; Work on research
Review and update iPOS
Summer internship (optional)

Year 4 - Fall
Complete research and prepare for dissertation work

Year 4 - Spring
Review iPOS: Make sure you have an approved iPOS on file, with no errors
Apply for graduation in MyASU before the deadline
Work on dissertation; Prepare for, schedule, and pass dissertation defense

Graduation
RSVP for and attend graduation ceremony (optional)

Interactive plan of study (iPOS)

The Interactive Plan of Study, or iPOS, is an agreement between the student, the academic unit, and the Graduate College. The iPOS must be submitted by the time the student has enrolled in 50 percent of the minimum credit hours required for the degree program, and before completing comprehensive exams, thesis/dissertation. Students are encouraged to submit their iPOS by the end of their first semester (masters) or second semester (doctoral). More information on iPOS can be found here.

Faculty advisor/chair: program director (masters) or faculty advisor and committee (doctoral)

Change of coursework: If a change of coursework is needed, the student must update the courses listed in the iPOS and submit a course change for review. This process is required if you projected a course you did not complete, or if you need to change courses listed. The iPOS will be routed electronically to the graduate support coordinator for review and approval, and then for auditing by the Graduate College.

Specializations and certifications

The College of Health Solutions prepares graduates for excellence upon entering the workplace. Since certification and licensure requirements vary by profession and from state-to-state, we recommend that you visit the ASU licensure website to determine if your program meets the requirements of individual state licensures or national certifications, as applicable. If you have specific questions, please contact your program director or degree coordinator.

Satisfactory academic progress

All graduate students are expected to make systematic progress toward completion of their graduate program. This progress includes satisfying the conditions listed below, and achieving the benchmarks and requirements set by the individual graduate programs as well as the Graduate College. If a student fails to satisfy the requirements of their 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 at which time the dean of the Graduate College makes the final determination.

Satisfactory academic progress includes:

1. Maintain a minimum 3.00 for all GPAs.
2. Satisfy all requirements of the graduate program.
3. Satisfy the maximum time limit for graduation for the student's graduate program (six years for masters and certificates, ten years for doctoral)
4. Successfully pass comprehensive exams, qualifying exams, foreign language exams, and the oral defense of the proposal/prospectus for the thesis or dissertation.
5. Successfully complete the culminating experience.
6. Graduate students must remain continuously enrolled in their graduate program. Failing to do so without a Graduate College approved Leave of Absence is considered to be lack of academic progress and may result in the Graduate College withdrawing the student from their program.

In addition to the items above, the Biomedical Informatics, PhD program requires students to:

1. Make regular progress in the program as evaluated bi-annually by the BMI Academic Programs Committee
2. Complete the degree program within 5 years of passing the comprehensive examinations

GPA and grades

Graduate students must maintain a minimum 3.00 (scale is 4.00 = "A") 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):

1. The iPOS GPA is calculated on all courses that appear on the student's approved iPOS
2. Cumulative GPA represents all courses completed at ASU during the graduate career.
3. The Overall Graduate GPA is based on all courses numbered 500 or higher that appear on the transcript after admission to a graduate program or graduate non-degree. This includes shared coursework if in an approved accelerated bachelor's/master's program.

Transfer credits and some courses taken in the Sandra Day O'Connor College of Law are not calculated on in the iPOS GPA or the Graduate GPA. Courses lower than a "C" cannot appear on the iPOS but will be included when calculating the Graduate GPA. Courses with an "I" grade (incomplete) or "X" grade (audit) cannot appear on the iPOS.

University grade definitions and policies can be found here.

The Biomedical Informatics, MS and PhD programs require a grade of B or better in all required coursework (excluding coursework applied to the electives area). If a lesser grade is earned in a required course, the course must be retaken. Note that if a student retakes a course to meet the minimum grade requirement of B or better, the grade will NOT be replaced. 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.

Incomplete grade requests

An incomplete grade request may be considered when the following factors are present:

- The student has been completing acceptable work (grade of "C" or better) and has completed 80% of the course.
- The student is unable to complete the course due to illness or conditions beyond the student's control.
- The student can complete the unfinished work with the same instructor.

Students have up to one calendar year to finish incomplete work. If a student does not complete the missing coursework by the date that is agreed upon on the incomplete request form, the instructor may change the grade to what was earned based on the work completed in the class. If the coursework is not completed after a calendar year, the incomplete becomes permanent. Repeating a class in which an incomplete is awarded will not replace the "I" on the student's transcript. Students must complete the incomplete request form and submit it to their instructor for review and processing.

Academic probation and dismissal

Failure to maintain a minimum 3.0 GPA or failure to satisfactorily progress in the program as referenced in this handbook will result in the student being placed on academic probation. Students will be notified of probationary status and expectations for improvement by the program director or graduate support coordinator. Time limits for probationary status may vary. Typically, students have 9 credit hours or one year, whichever comes first, to raise their GPA.

Students who fail to meet requirements or timeline needed to demonstrate satisfactory improvement will be recommended for dismissal from the program. Notice will be provided by the program director and will include procedures for appeal.

Time to completion limit

All work toward a master's degree must be completed within six consecutive years. Graduate courses taken prior to admission that are included on the Interactive Plan of Study must have been completed within three years of the semester and year of admission to the program. The six-year period begins with the term of admission to the program OR the earliest term of applied pre-admission credit.

Doctoral students must complete all program requirements within a ten-year period. Graduate courses taken prior to admission that are included on the iPOS must have been completed within three years of the semester and year of admission to the program (previously awarded master's degrees used on the Interactive Plan of Study are exempt). The ten-year period begins with the term of admission to the doctoral program OR the earliest term of applied pre-admission credit.

Any exception to the time limit policy must be approved by the program director, the College of Health Solutions, the dean of the Graduate College. The Graduate College may withdraw students who are unable to complete all degree requirements and graduate within the allowed maximum time limits.

Appeal and grievance processes

Grade appeal

The final grade appeal process may only be initiated by a student once the course has concluded and a final course grade has been posted to the student's transcript. Per university policy, grade appeals must be processed in the regular semester immediately following the issuance of the final grade in dispute (by commencement for fall or spring) regardless of whether the student is enrolled at the university.

The process begins with a discussion about the matter between the student and the course instructor. If the matter is unresolved, the student should submit a Grade Appeal Form for further review. If this review does not adequately settle the matter, the student should begin the formal procedure of appealing to the College of Health Solutions Academic Standards and Grievance Committee. More information on all steps of this process can be found here.

Student grievance

Students who wish to file a grievance about a non-grade-related matter may use the established procedure (more information can be found here). Non-grade-related grievances may include dissatisfaction with an instructor, problems with a classmate or other unresolved situations.

Appealing recommendation for dismissal

1. Students may appeal a decision for dismissal from the program by submitting a letter to the program director.
    a. The appeal letter must be received within 10 business days of the date of the letter of dismissal. The letter should state the reasons justifying a reversal of the original decision and provide substantive evidence in support of the request.
    b. Letters received after the 10 business-day interval will not be reviewed and the dismissal will be final.

   c. The program committee will review all letters of appeal that are received within the 10 business-day time frame. The committee will submit their decision to the program director within 10 business days of receipt of the student's letter.

2. The program director will then notify the Student Success Hub of the decision. The Student Success Hub will inform the student of the decision.
3. If the appeal is denied, the student may appeal to the CHS Academic Standards and Grievances Committee within 10 business days of receiving the denial of the appeal. The CHS Academic Standards and Grievances Committee will review the dismissal and appeal materials and make a recommendation to the dean of the College of Health Solutions. The dean will have 20 calendar days to make a final decision.
4. If at any stage, a timely appeal is not submitted by the student, the program director will recommend dismissal to the Graduate College via the Student Success Hub. The Graduate College will then inform the student of the dismissal by letter.

Student code of conduct and academic integrity

ASU expects and requires its students to act with honesty, integrity, and respect. Required behavior standards are listed in the ASU Student Code of Conduct and Student Disciplinary Procedures, the ABOR Code of Conduct, the Computer, Internet, and Electronic Communications Policy, the ASU Student Academic Integrity Policy, and outlined by the Office of Student Rights & Responsibilities. Violations of a Graduate College, College of Health Solutions, or Arizona State University policy will result in academic review and may consequently result in student disciplinary procedures.

Academic integrity

The ASU Student Academic Integrity Policy lists violations in detail. These violations fall into five broad areas that include, but are not limited to:

1. Cheating on an academic evaluation or assignment.
2. Plagiarizing.
3. Academic deceit, such as fabricating data or information.
4. Aiding academic integrity policy violations and inappropriately collaborating.
5. Falsifying academic records.

Information on the Academic Integrity procedure within the College of Health Solutions can be found at https://catalog.asu.edu/policies/chs.

Newly admitted graduate students will receive a "priority task" on their MyASU directing them to complete a canvas module on academic integrity. The module consists of a PowerPoint that outlines academic integrity and students must take a quiz and pass with an 80% or higher.

Student code of conduct

Violations of the ASU Student Code of Conduct, other than the provision concerning academic dishonesty, are more generally considered inappropriate behavior. The Office of Student Rights and Responsibilities reviews and sanctions these matters. If a student violates both the academic integrity provision and additional provisions of the Student Code of Conduct, both the college and the Office of Student Rights and Responsibilities will review the matter. Each independently makes determinations concerning violations and appropriate sanctions.

Professional conduct

ASU is a community and a professional work environment. Graduate students are expected to treat their peers, teachers, students, staff, and members of the ASU community with respect and work with them in a professional manner. Graduate students are representatives of their program, the College of Health Solutions, and ASU. Students must demonstrate the requisite qualifications for successful professional performance, including interpersonal skills, basic communication skills, appropriate professional conduct, and satisfactory performance in field experiences.

Graduate students who demonstrate behaviors or characteristics which make success in their related fields questionable will be reviewed by the program committee. The committee's review may result in a recommendation for dismissal from the program or implementation of probational conditions for continued participation. Students may appeal a recommendation for dismissal by following established procedures.

College and university procedures and policies

All policies and procedures outlined in this handbook are in accordance with policy set by the Graduate College and Office of the University Provost. In some cases, program policies may be more restrictive than those set by Graduate College and Provost.

Continuous enrollment policy

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 using 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. More information on this policy can be found here.

Requesting a leave of absence

Graduate students planning to discontinue registration for a semester or more must submit a leave of absence request via their Interactive Plan of Study (iPOS). This request must be submitted and approved **before** the anticipated semester of non-registration. Students may request a maximum of two semesters of leave during their entire program. Students with a Graduate College-approved leave of absence are not required to pay tuition or fees, but in turn are not permitted to place any demands on university faculty or use any university resources. These resources include university libraries, laboratories, recreation facilities or faculty and staff time. More information on this policy can be found here.

Registration policies

Students are strongly encouraged to enroll in courses well in advance of the start of the term. Enrollment must be complete by the Add/Drop deadline for the session in which the class is offered. Courses that are dropped by the Add/Drop deadline will not appear on a student's transcript. If a course is removed from a student's schedule after this deadline, it will be considered a withdrawal and a grade of "W" will be recorded. Term dates and deadlines, including the Add/Drop, Tuition Refund, Course Withdrawal, and Session Withdrawal deadlines, can be found on the Academic Calendar.

Discrimination, harassment, and retaliation

Title IX of the Education Amendments of 1972 is a federal law which 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 ACD 401 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. For information on resources, visit the sexual violence awareness, prevention, and response website.

Student support resources

Academic program support

Graduate students in the College Health Solutions have access to the Graduate Student website, which houses college resources and advising information.

University resources

- Graduate College
- Office of the University Provost

Academic and career support

- ASU Libraries
- Graduate Writing Center
- Career and Professional Development Services
- Handshake
- Graduate and Professional Student Association
- Student Clubs and Organizations

Business and finance services

- Financial Aid and Scholarship Services (financial aid)
- Student Business Services (tuition, fees, and payments)
- Parking and Transit Services (permits, shuttles, public transit)
- Sun Devil Card Services (ID cards)
- University Technology Office (technology assistance)
- Sun Devil Dining (meal plans, M&G, hours)

Counseling services

ASU Counseling Services provides confidential, time-limited counseling and crisis services for students experiencing emotional concerns or other factors that affect their ability to achieve their goals. Support is available 24/7.

In-person counseling: Monday-Friday 8 a.m. – 5 p.m.

ASU Counseling Services, Student Services Building 234 Tempe, AZ 85287

480-965-6146

After-hours/weekends

Call EMPACT's 24-hour ASU-dedicated crisis hotline:

480-921-1006

For life threatening emergencies

Call 911

Disability accommodations

Reasonable accommodations are determined on a case-by-case, course-by-course basis to mitigate barriers experienced due to a disability (SSM 701-02). Students with disabilities who require accommodations must register with the Student Accessibility and Inclusive Learning Services and submit appropriate documentation. It is recommended students complete this process at the beginning of the term and communicate as appropriate with their instructor.

- Email: Student.Accessibility@asu.edu
- Phone: (480) 965-1234
- FAX: (480) 965-0441

Pregnancy: Students requesting services due to pregnancy (SSM 701-10) should be prepared to submit documentation regarding the pregnancy, any complications and clearance to return to school related activities. Student Accessibility can work with students to foster continued participation in a program, whether that be with academic accommodations such as absences or assistance requesting a leave, or through other requested accommodations.

Health and fitness

All ASU students enrolled in in-person programs have access to Sun Devil Fitness facilities on all campuses. For more information about facilities, membership and group fitness classes, please visit: https://fitness.asu.edu

For information about health insurance and appointments with care providers, please see the ASU Health Services website: https://eoss.asu.edu/health

International students

ASU's International Student and Scholars Center can provide support and answers to questions about visas, employment, scholarships and travel. To find more information or schedule an appointment with an ISSC adviser, visit the website: https://issc.asu.edu/

Veterans and military

The Pat Tillman Veterans Center provides guidance and support for students who are veterans, active-duty military or military dependents. For more information, please call the office at 602 496-0152 or visit: https://veterans.asu.edu/

Appendix

A: Program faculty

Marcela Aliste, PhD, MS, ACUE (profile) – molecular dynamics simulations, drug-receptor interactions, data privacy

Mara Aspinall, MBA (profile) – dynamics of COVID-19 testing, personalized medicine, genomic medicine, policy, advocacy, corporate leadership

Pierre Cassigneul, MBA (profile) – corporate leadership, commercialization and innovation

Yunro Chung, PhD (profile) – biomarker discovery for personalized diagnosis, clinical trials, machine learning

Valentin Dinu, PhD (profile) – use of biological domain knowledge to supplement statistical analysis and data mining methods to identify genes and pathways associated with disease; exploration of database modeling approaches for managing large and heterogeneous data sets from clinical and biosciences domains

Bradley Doebbeling, MD (profile) – health care and systems redesign, population and health informatics, clinical workflow, information technology development and innovation

Michael Donovan, PhD, JD (profile) – intellectual property, biotech/diagnostics, infectious diseases, regulation of diagnostics

Adela Grando, PhD (profile) – clinical decision support systems, information technology for patient empowerment in healthcare, building mobile technology to support patient decision processes

Andrea Kamenca, MBA (profile) – telehealth, telemedicine, digital innovation, remote patient monitoring, AI, VR, AR

Chong Lee, PhD (profile) – cardiovascular disease and chronic disease epidemiology and health informatics, detection and prediction algorithms of chronic disease morbidity and mortality across various age and race groups

Jianming Liang, PhD (profile) – computer-aided diagnosis and prognosis of pulmonary embolism, personalized cardiovascular disease risk stratification, ensuring high-quality colonoscopy, personalized proton therapy for lung cancer

Li Liu, MD (profile) – advance precision medicine, incorporating evolutionary and functional information in model construction, translating bioinformatics discoveries into improvements in patient care

Anita Murko, MD, MACP, FAMIA (profile) – patient-centered medical home, health information exchange, clinical decision support

Chinedum Ojinnaka, PhD (profile) – identifying associations between individual and population-level social determinants of health, food insecurity, health and healthcare disparities, health outcomes, cancer-related disparities, health policy, applied research methods

Matthew Scotch, PhD (profile) – genomic epidemiology of RNA viruses (influenza), phylodynamics, molecular epidemiology, bioinformatics, DNA sequence databases and metadata enrichment, natural language processing (NLP)

Kyle Singleton, PhD (profile) – predictive disease modeling, medical data integration, machine learning, and external validation

Davide Sottara, PhD (profile) – clinical informatics, knowledge representation, knowledge-driven model software systems, service-oriented event-driven software architectures, knowledge management and delivery, knowledge elicitation

Dongwen Wang, PhD (profile) – modeling and representation of biomedical knowledge in computer-interpretable format, management of biomedical data in specific context of workflow and team collaboration, development and dissemination of online resources, and delivery of technology-mediated behavioral interventions to facilitate knowledge translation, healthcare processes, and patient outcomes

Hassan Zadeh, PhD (profile) – mobile health, machine learning, algorithms

B: 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 I
APM 534 Mathematical Population Biology II
APM 535 Mathematical Models in Medicine
BIO 517 Uncertainty & Decision Making
BIO 545 Populations: Evolution Genetics
BIO 546 Principles of Human Genetics
BIO 552 Developmental Genetics
BIO 564 Cellular Physiology & Signaling
BIO 591 Seminar: Sociogenomics
BIO 591 Seminar: Grant Writing
BIO 591 Seminar: Readings in Evolutionary Medicine
BIO 598 Topic: Non-coding RNA
BIO 598 Topic: Functional Biogeography
BIO 598 Topic: Genomic Analysis
BIO 598 The RNA World
BIO 691 Seminar: Genetics and the Law
BMD 511 Health Economics, Policy and Payment Models
CHS 791: Seminar: F31 Grant Writing
CSE 510 Database Management System Implementation
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 Verification/Validation/Test
CSE 566 Software Project/Process/Qual Mgt
CSE 569 Fundamentals of Statistical Learning & Pattern Recognition
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 Seminar: Data Visualization
CSE 598 Topic: Database Management
*CSE 598 Topic: Information Retrieval, Mining, and Integration
*CSE 691 Seminar: Logical & Distributional Semantics of Natural Lang
*CSE 691 Seminar: Advanced Topics on Social Media Analysis
DCI 691 Seminar: Seminar on Writing Research
DCI 707 Scholarly Practices Seminar: Proposal Writing
DCI 791 Seminar: Scholarly Writing
EVO 598 Topic: Software Carpentry
GIS 598 Topic: Location and analysis modeling
GIS 598 Topic: GIS Methods for Non-Majors
GIS 603 Spatial Statistics and Modeling
HCR 561 Responsible Conduct of Clinical Research
IEE 505 Information Systems Engr
IEE 520 Statistical Learning for Data Mining
IEE 547 Human Factors Engineering
IEE 572 Design Engineering Experiments
LIN 514 Syntax
STP 505 Bayesian Statistics
STP 530 Applied Regression analysis
STP 533 Applied Multivariate Analysis
STP 540 Computational Statistics
STP 598 Topic: Mixed Models
TWC 514 Visualizing Data & Information
TWC 544 User Experience

*Requires program director review and approval in order to apply to iPOS.

Note: Some courses may require permission to enroll.