ASU College of Health Solutions

Arizona State University

GRADUATE HANDBOOK

Master of Advanced Study (MAS) in Health Informatics

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Health Informatics Student Handbook

This handbook is a guide for prospective and current graduate students in Health Informatics. 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 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](#). Additionally, Health Informatics has several additional requirements which are identified in this handbook.

Health Informatics

The Master of Advanced Studies (MAS) in Health Informatics is designed to offer professionals working in the field of health care an opportunity to earn a master level degree on the effective use of information technology, data science, and knowledge representation to impact health and health care. Professionals in non-health fields can also enhance their skills to transition to careers in this rapidly expanding field. Core courses provide a background in clinical informatics, while electives allow one to focus in the areas of clinical workflows and modern health information technology, as well as skills with data analysis. The degree prepares graduates to enhance their skills for careers in a wide range of health care settings.

Clinical informaticians work to develop novel information technology, computer science and knowledge management methodologies for disease prevention, treatment, more efficient and safer patient care delivery and decision support. This field requires close collaboration among clinicians, biomedical and computational scientists, knowledge management professionals, educators and health care consumers.

The MAS program is formatted to meet the needs of working professionals. It is offered entirely online and can be taken full-time or part-time. Courses are offered in condensed 7.5 week sessions. The degree plan is 30 credits including: 12 credits of Core Coursework, 15 credits of Electives, and 3 credits of Applied Project for the final culminating event.

Admissions

For a complete Health Informatics MAS application, students will be required to submit the following items:

- graduate admission application and application fee
- official transcripts
- current resume or curriculum vitae
- two letters of recommendation
- statement of purpose
- proof of English proficiency (for international students) taken within 2 years

The Health Informatics program processes admission twice each year (Fall/Spring). Application Deadlines are posted [here](#). [NOTE: The final application deadlines are in place to ensure students will be processed in time for the application term. We do not have a summer admit term.]

Application Review Process: The 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 My ASU, official

admission decisions will be e-mailed to the student.

Funding Resources
The College of Health Solutions does not provide funding to masters level students. However, students should 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

Student Responsibility
It is our expectation that all students enrolled in Health 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, Health 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;
- 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 Health 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.

Campus and Location
Arizona State University is "one university in many places" — with many campuses throughout metropolitan Phoenix (and ONLINE) that create a federation of unique colleges and schools. The College of Health Solutions is located in downtown Phoenix. Additionally, we also collaborate with ASU ONLINE.

- **ONLINE:** Classes are offered 100% ONLINE. Students will access course content through Canvas. Students can access their courses in My ASU.
- **ASU Downtown:** The College of Health Solutions is located at the ASU Downtown Phoenix campus, 500 North 3rd Street, Phoenix AZ 85004.

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

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

Health Informatics Faculty
Health Informatics faculty can be found 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 – ASU Online

10 Best Practices in Graduate Student Wellbeing
ASU Clubs
ASU Online Student FAQ
ASU Academic Integrity
Career and Professional Development Services
Bookstore
College of Health Solutions Graduate Student Site
Counseling and Consultation
Disability Resource Center (DRC)
Graduate Admissions Office
Graduate College - Current Student Academic Resources
Graduate and Professional Student Association
Graduate Wellness Resources
Graduation Office (Registrar)
International Student and Scholars Office
Library
MyApps
Online Support
Online Tutoring
Records (Academic)
Register For Your Classes
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
Top Tips on How to Succeed Online

Health Informatics Degree Requirements

Listed below are the ASU Graduate College and Health Informatics policies for obtaining a MAS degree in Health Informatics from ASU. Additionally, Graduate College requirements define the basic policies for obtaining a degree from ASU. Students can access the policy manual here: Graduate Policies and Procedures.

Advising

To ensure that academic programs run as smoothly as possible, students should consult with their graduate support coordinator, if there are additional questions regarding the policies outlined in this handbook, or the ASU Graduate College requirements. Students can schedule an advising phone appointment, or meet in-person (if the student is local or in the area). Additionally, ASU Online has success coaches that discuss success strategies and help connect students with online resources. Any academic questions or concerns regarding grades, plan of study, academic probation, graduation, etc. should be addressed through your graduate support 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), see "Time Limit" sections.
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.

Note: Per Graduate College guidelines, graduate students must maintain a minimum 3.00 grade point average (GPA) to maintain satisfactory academic progress and to graduate. Students whose cumulative GPA falls below 3.00 are placed on academic probation, receive an advising hold on their account, and are required to complete an academic performance improvement plan.   If students are unable to raise the GPA to a 3.00 within nine credit hours or one year (whichever comes first), the program standards committee may recommend the student for dismissal from the program.

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
Graduate students planning to discontinue registration for a semester or more must submit a Leave of Absence request via their Interactive Plan of Student (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. Having an approved Leave of Absence by the Graduate College will enable students to reenter their program without re-applying to the university.

Students who do not register for a fall or spring semester without an approved Leave of Absence 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.

Students with a Graduate College approved Leave of Absence are not required to pay tuition and/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.

Pre-Admission Credits
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 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 or certificate program to be accepted.

Alternative Elective Courses
Elective courses other than those listed on the Health Informatics pre-approved elective list cannot be used on an iPOS unless pre-approved. The following procedure should be followed for students who wish to take outside electives:
- ➢ The student should prepare a written request to the graduate support coordinator which includes: A course syllabus, the semester the students plans to take the course, how the course enhances the students plan of study.
- ➢ The graduate support coordinator will work with the Program Director and Academic Programs Committee (APC) to consider the elective coursework, and notify the student if approved.

Grading and Grade Policies
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	Grade	Graduate Definition	Value
A+		4.33	W	Withdrawal**	--
A	Excellent	4.00	I	Incomplete	--
A−		3.67	X	Audit	--
B+		3.33	Y	Satisfactory	--
B	Good	3.00	Z	Course in progress***	--
B−		2.67	XE	Academic Dishonesty	0.00*
C+		2.33	NR	No Report	--
C	Passing	2.00	EN	Failing Never Participated	0.00*
D	No Graduate Credit	1.00*			
E	Failure	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.

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
The College of Health Solutions will consider an incomplete grade request 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.

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

Academic Integrity Required Module
All new Health Informatics students are required to complete the Academic Integrity Module, which is available for students in My ASU, listed under the priority tasks list. Students must register for this course in My ASU, review the presentation, and

complete the Quiz by **September 1st** (for Fall starts) or **February 1st** (for Spring starts) with a passing score of 80% or higher. The Health Informatics graduate support coordinator will be reviewing the course records to ensure all graduate students have completed the academic integrity modules successfully.

Plan of Study

The Interactive 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 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 My ASU with the Graduate College. It includes all courses to be taken, and a Faculty Advisor/Chair. For steps on how to submit your Plan of Study, please visit this website.

 ➤ **Faculty Advisor/Chair:** In the iPOS system, students are required to submit a faculty advisor/chair. This person is automatically assigned for all Health Informatics students, please use the Program Director as the Advisor/Chair in the iPOS system.

 ➤ **Change of Coursework**: If a student needs to change the coursework listed on the Plan of Study, the student will need to update the courses listed in the iPOS system and re-submit the iPOS for review. This process is required if you projected a course you did not take, or if you need to change courses listed. The iPOS will be routed electronically to the graduate support coordinator for review and approval, then subsequent routing for auditing by the Graduate College.

An approved Plan of Study must be on file before a student can register for their final culminating experience (BMI 593 Applied Project). Students should review the iPOS at the end of each semester, to ensure the courses listed on the iPOS match the student's transcript and that the courses meet the Health Informatics plan of study course requirements.

Course and Graduation Requirements

The Health Informatics Plan of Study is provided below for both fall and spring starts. 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.*

Additionally, course offerings may change for upcoming years, therefore the BMI program cannot guarantee the courses will be offered the same term/session. Students should review the ASU class schedule for the course schedule of class offerings.

Health Informatics Plan of Study (Sample – Fall Start)

Course	Term	Credits	Name	Type
BMI 601	Fall (A)	3	Fundamentals of Health Informatics	Core Course – Must Take 1st Semester
*	Fall (A)	3	Elective	*Elective Options Listed Below
BMI 603	Fall (B)	3	Health Informatics Database Modeling and Applications	Core Course
*	Fall (B)	3	Elective	*Elective Options Listed Below
BMI 616	Spring (A)	3	Clinical Decision Support and Evidence-Based Medicine	Core Course
*	Spring (A)	3	Elective	*Elective Options Listed Below
*	Spring (B)	3	Elective	*Elective Options Listed Below
*	Spring (B)	3	Elective	*Elective Options Listed Below
BMI 614	Summer (C)	3	Current Perspectives in Health Informatics	Core Course
BMI 593	Summer (C)	3	Applied Project	Culminating Experience
		30	Total Credits for MAS in Health Informatics	

*Electives: Please choose 5 of the elective courses below				
Course	Term	Credits	Name	Type
BMI 598	Fall (A)	3	Telemedicine	Elective
BMI 517	Fall (A)	3	Adv Biostats Biomed Research	Elective (Must Have Taken BMI 515)
HCD 575	Fall (A)	3	Leadership/Professionalism	Elective
BMI 608	Fall (B)	3	Project Management for Interdisciplinary Teams	Elective
BMI 613	Fall (B)	3	Workflow Analysis and Redesign in Health Systems Engineering	Elective
BMD 502	Fall (B)	3	Foundations of Biomedical Informatics Methods I	Elective
HCD 511	Fall (B)	3	Health Econ Policy Payment Mdl	Elective
BMI 515	Spring (A)	3	Applied Biostatistics in Medicine and Informatics	Elective
BMI 615	Spring (B)	3	Human Factors Engineering for Biomedical Applications	Elective
BMI 598	Spring (B)	3	Knowledge Management and Engineering	Elective
BMI 598	Spring (B)	3	Population Health Management and Analytics	Elective (Must Have Taken BMI 515)

Health Informatics Plan of Study (Sample – Spring Start)

Course	Term	Credits	Name	Type
BMI 601	Spring (A)	3	Fundamentals of Health Informatics	Core Course – Must Take 1st Semester
BMI 616	Spring (A)	3	Clinical Decision Support and Evidence-Based Medicine	Core Course
*	Spring (B)	3	Elective	*Elective Options Listed Below
*	Fall (A)	3	Elective	*Elective Options Listed Below
*	Fall (A)	3	Elective	*Elective Options Listed Below
BMI 603	Fall (B)	3	Health Informatics Database Modeling and Applications	Core Course
*	Spring (A)	3	Elective	*Elective Options Listed Below
*	Spring (B)	3	Elective	*Elective Options Listed Below
BMI 614	Summer (C)	3	Current Perspectives in Health Informatics	Core Course
BMI 593	Summer (C)	3	Applied Project	Culminating Experience
		30	Total Credits for MAS in Health Informatics	

*Electives: Please choose 5 of the elective courses below				
Course	Term	Credits	Name	Type
BMI 598	Fall (A)	3	Telemedicine	Elective
BMI 517	Fall (A)	3	Adv Biostats Biomed Research	Elective (Must Have Taken BMI 515)
HCD 575	Fall (A)	3	Leadership/Professionalism	Elective
BMI 608	Fall (B)	3	Project Management for Interdisciplinary Teams	Elective
BMI 613	Fall (B)	3	Workflow Analysis and Redesign in Health Systems Engineering	Elective
BMD 502	Fall (B)	3	Foundations of Biomedical Informatics Methods I	Elective
HCD 511	Fall (B)	3	Health Econ Policy Payment Mdl	Elective
BMI 515	Spring (A)	3	Applied Biostatistics in Medicine and Informatics	Elective
BMI 615	Spring (B)	3	Human Factors Engineering for Biomedical Applications	Elective
BMI 598	Spring (B)	3	Knowledge Management and Engineering	Elective
BMI 598	Spring (B)	3	Population Health Management and Analytics	Elective (Must Have Taken BMI 515)

Applied Project

To complete the MAS in Health Informatics, all students must complete a final culminating experience (BMI 593 Applied Project).

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 and returned to the Applied Project Coordinator.

The applied project coordinator will serve as instructor for the BMI 593 Applied Project course. If you choose to complete your project external of ASU, you will require a Preceptor (site mentor) and approval of the applied project coordinator. If you decide to work with a program faculty, he/she will be your advisor (mentor).

Different deliverables will be required, including an interest statement, a project plan, progress reports and project updates. Throughout the course of the Applied Project, you will be expected to submit 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 data analytics to the clinical setting (e.g. clinical workflow, surveys for clinicians or patients). The important part is that the project is in the field of health 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 healthcare organization and the work you do there may qualify 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 report should be approximately 15-20 pages (actual text pages excluding cover page and references). A longer report (paper) does not mean a better report (paper); it is often harder to be concise and to the point. The final report (paper) should follow a similar format to a business report or a journal article's sections depending on your specific project. Students must receive a B or better in the BMI 593 course to be eligible for graduation.

Advising Steps – MAS Health Informatics

In addition to the required coursework, the steps to achieve a MAS in Health Informatics are listed below. The program is designed to be completed in 1 year. For spring admission, the program will take 1 ½ years to complete, at the earliest.

1st Semester
Complete Academic Integrity Module
Submit Interactive Plan of Study (iPOS)

⇓

2nd Semester
Review iPOS Each Semester
Contact Applied Project Coordinator to prepare for the Applied Project
(Students will develop an interest statement and project plan,
prior to registering for the applied project course)

⇓
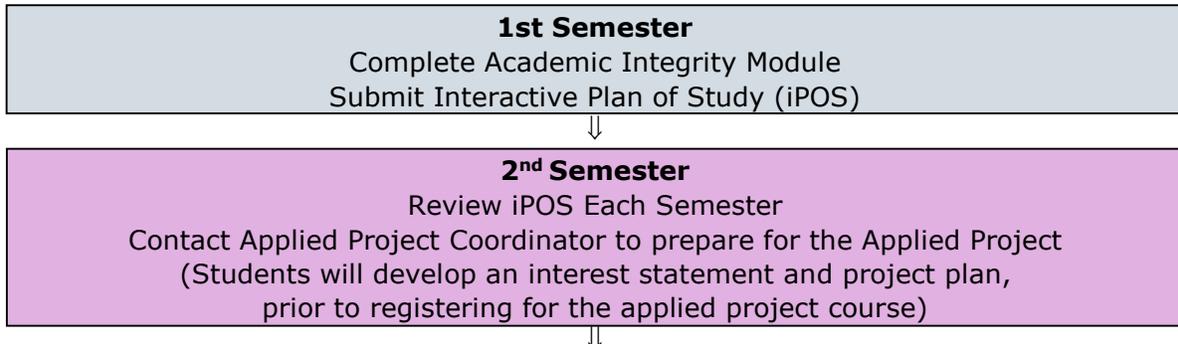
Final Semester
Review iPOS: Make sure you have an approved iPOS on file, with no errors Apply for graduation in My ASU before the deadline Complete the Applied Project and receive a "B" or better

⇓

Graduation
RSVP for Graduation Ceremony Most Students Attend the Fall Graduation Ceremonies (Optional)

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. Students can apply for graduation online through My ASU.

Apply: All students must apply and be processed for graduation to receive their diploma. Students must check to make sure you have an approved iPOS on file and there are no course change requests needed. Any questions or concerns should be directed to the graduate support coordinator.

Graduation Ceremony: Students that graduate in the summer session have the option to participate and walk in the fall ASU graduation ceremonies. There are no graduation ceremonies held during the summer sessions. Information on Graduation Ceremonies can be found here.

- o **Convocation** is held for students graduating from the College of Health Solutions, details provided here.
- o **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 My ASU.

Appendix I
MAS Course Descriptions

Core courses (12 credits):

BMI 601 Fundamentals of Health Informatics (3 credits)
Offers an overview of the field of health informatics. Combines perspectives from medicine and computer science for use of computers and information in health care and the health sciences. Includes an overview of health information literacy and data standards. Covers specific applications and general methodology in health informatics using current topics in the field. Discusses evaluations of health systems.

BMI 603 Health Informatics Database Modeling and Applications (3 credits)
Thorough coverage of the foundations of database systems and their specific use and modeling in healthcare and biomedical environments. Students learn through hands-on experience with the modeling and implementation of health-related databases using the relational approach. Topics include an overview of database models and architecture, database design, SQL, XML, and data warehousing as they are applied in clinical domains. Students are encouraged to explore database-related topics of their own, choosing ones that are relevant to a bioinformatics or clinical domain.

BMI 614 Current Perspectives in Health Informatics (3 credits)
Seminar course using external speakers to discuss and review the current state of the health informatics field.

BMI 616 Clinical Decision Support (3 credits)
Focuses on the major problems of human decision making in health care including causes of errors, decreased quality and increased costs. Explores the role of information technology, primarily through computer-based clinical decision support (CDS), to address these problems. Explores key methods used to provide CDS, the capabilities and limitations of current approaches, and the challenges for managing and updating the knowledge needed to deliver CDS in an enterprise setting. Origins of evidence-based decision making and policy formulation; how to use the tools and approaches that have been developed to support evidence-based decision making and policy formulation; and the history and evolution of systematic review and meta-analysis as a tool to inform decisions and policies based on evidence. Students gain hands-on experience by conducting a systematic review and a meta-analysis and using the results to draw conclusions and formulate health policy.

Electives (15 credits):

BMD 502 Foundations of Biomedical Informatics Methods I (3 credits)
First semester of a two-semester course surveying the methods and theories underlying the field of biomedical informatics.

BMI 515 Applied Biostatistics in Medicine and Informatics (3 credits)
Comprehensive treatment of the statistical methods used most often to analyze quantitative data collected in medical and biomedical informatics studies, including clinical trials, epidemiologic studies, studies of the accuracy and performance of screening and diagnostic tests, and studies to develop predictive models. Students learn to use SAS statistical software to analyze biomedical data.

BMI 517 Biostatistics with Computational Applications (3 credits)
This course will cover the use of computation as a tool for biostatistical data analysis,

especially for research in the field of biomedical informatics. Major topics will include linear and non-linear regression, dimension reduction techniques and multiple comparisons. Time permitting, we will cover the basics of DNA and RNA sequencing and data analysis. Students will use the R statistical programming language to display and analyze data, and to evaluate statistical procedures and algorithms.

BMI 598 Knowledge Management and Engineering (3 credits)
This course introduces the fundamentals of knowledge engineering, applied to biomedical informatics. The topics will include knowledge acquisition, representation, management, delivery, reasoning and revision, with an emphasis on current and best practices in healthcare.

BMI 598 Population Health Management and Analysis (3 credits)
Offers a review of the Population Health landscape as well as many of the different types of Population Health programs, both in the private and public sectors. Special emphasis will be placed on: 1) Identifying unique populations for interventions, 2) Creating programs to target those populations, and 3) Developing a practical approach to analyzing the resulting financial and clinical outcomes.

BMI 598 Telemedicine Fundamentals (3 credits)
This course gives the bioinformatics student a thorough foundational knowledge of telemedicine. It explores telemedicine's basic definitions and concepts, discusses the reasons why it is gaining in use and popularity, delves into its most significant uses, and addresses the operational aspects of building telemedicine programs. The course offers an overview of the clinical, operational, legal, financial, clinical, and technology considerations associated with implementing a telemedicine program.

BMI 608 Project Management for Interdisciplinary Teams (3 credits)
Introduces students to the health care team and explores tools and techniques for establishing effective interdisciplinary teams in a health care setting, emphasizing collaborative clinical decision-making and patient management. By working in small teams, the course puts into practice these techniques, allowing students to collaborate with other health professionals to solve specific problems, provide services, or develop new understandings. Also covers the concepts, skills, tools, and techniques involved in the management of information system projects, providing an introduction to the established discipline of project management, with a specific focus on how they apply to managing information systems for a biomedical setting.

BMI 613 Workflow Analysis and Redesign in Health Systems Engineering (3 credits)

Provides an overview of workflow analysis and process redesign and their use in quality improvement activities, including specification. Uses case examples to highlight key concepts and measurement concepts and covers techniques. Includes the links of systems engineering to fundamentals of decision theory, statistics and optimization. Includes discussion of current successful techniques for systems engineering. System engineering seeks to enable the successful design, implementation, deployment and maintenance of successful systems. Emphasizes gathering and analysis of customer needs for the specification and documentation of required functionality early in the system's lifecycle.

BMI 615 Human Factors Engineering for Biomedical Applications (3 credits)
Fundamental principles of human-computer interaction and human factors and how to apply them to real-world problems through class projects, homework, and real-

world design. Focuses on learning why user-friendly interfaces can greatly improve work productivity and enhance the quality of healthcare without radically changing the underlying technology.

HCD 511 Health Econ Policy Payment Modell (3 credits)
Economics provides a framework to understand and predict human decision making under scarcity, uncertainty and imperfect information. Examines concepts central to health care economics and their application to important decisions made by patients, families, practitioners, administrators and policy makers. Uses an individual family's scenario through a progressive case study to evaluate how incentives and information affect the health and health care of each family member. Each meeting integrates basic economic principles, existing facts and knowledge from economic research, and individual perspectives and experience regarding how these concepts apply to health care policy.

HCD 575 Leadership/Professionalism (3 credits)
Integrates principles of leadership theory, innovation leadership, change leadership and systems thinking through didactic and experiential learning. Identifies characteristics of successful leaders in health and health care, develops competence and confidence in creativity and innovation, and identifies ways to implement meaningful change in the dynamic health care environment. Applies theories to case studies in health and health systems to promote critical analysis, discussion and reflection on topics that provide the framework for future coursework.

Culminating Event (3 credits):
BMI 593 Applied Project (3)
Preparation of a supervised applied project that is a graduation requirement in some professional majors.