College of Health Solutions
Arizona State University

Biomedical Diagnostics, MS

Student Handbook

2024-2025 Catalog

Last revised June 20, 2024

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.

Inclusive Excellence at the College of Health Solutions

The College of Health Solutions has a mission to improve the mental and physical health of our larger and immediate communities by better understanding the challenges that individuals and populations face, while striving to be part of the solution. The college is committed to the idea that every member of our society should have the opportunity for good health and wellness throughout their lifespans. In an effort to actualize this ideal, we embrace and support inclusive excellence in everything we do, including teaching, research, service, and clinical practice.

Commitments to Inclusive Excellence

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 discriminatory or harmful actions.

Contents

Introduction **5**
Welcome 5
Program overview 5
Vision and mission 5
Program contacts 6
Admission **7**
Graduate admission requirements 7
Academic program requirements 7
Provisional acceptance guidelines 7
Pre-admission credit policy 8
Tuition and assistance **9**
Tuition and fees 9
Financial assistance 9
Travel assistance 9
Curriculum and graduation requirements **10**
Program requirements 10
Application to graduate 11
Plan of study 11
Interactive plan of study (iPOS) 13
Specializations and certifications 13
Satisfactory academic progress 14
GPA and grades 14
Incomplete grade requests 14
Academic probation and dismissal 15
Time to completion limit 15
Appeal and grievance processes 15
Grade appeal 15
Student grievance 15
Appealing recommendation for dismissal 16
Student code of conduct and academic integrity **17**
Academic integrity 17
Student code of conduct 17
Professional conduct 17

College and university procedures and policies 18
Continuous enrollment policy 18
Requesting a leave of absence 18
Registration policies 18
Discrimination, harassment, and retaliation 18
Student support resources 20
Appendix 22
A: Program faculty 22
B: Course information 23

Introduction

Welcome

Welcome from the Biomedical Diagnostics faculty at ASU! This handbook is a guide for prospective and current graduate students in the Biomedical Diagnostics, MS program. 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. Additionally, the Biomedical Diagnostics, MS has several requirements which are identified in this handbook.

Program overview

Diagnostics is at the center of health care innovation and is critical to personalized medicine. More than 60 percent of clinical decision-making uses biomedical diagnostics, and the industry employs more than 4 million people worldwide.

The Masters of Science in Biomedical Diagnostics has five core curricular areas that provide the foundation for the degree program:

- Technology of Diagnostics: will explore instrument and assay development, biomedical engineering and diagnostic product development
- Science of Diagnostics: will focus on underlying bioinformatics and biostatistical analysis, clinical trial design, regulatory systems and the technology behind imaging, pathology, molecular and immunological testing platforms
- Business of Diagnostics: will encompass public and private health care finance and reimbursement, along with personalized health care, and include the companion diagnostics
- Application of Diagnostics: will be taught through case studies on critical diagnostics-related issues including bioethics, clinical utility, intellectual property, smart systems, as well as modality integration and systems analysis
- Policy of Diagnostics: surveys the role of public policy in addressing public health needs through the advancement of diagnostics.

Students will:

- Benefit from innovative, cross-disciplinary curriculum taught by expert faculty who are leaders in the fields of engineering, technology, medicine, law, and business
- Develop a comprehensive approach to health care
- Garner experience through involvement in research or industry immersion programs
- Gain a competitive advantage in the job market

Vision and mission

The Master of Science in Biomedical Diagnostics provides educational opportunities to a diverse and multidisciplinary group of students. Diagnostics influences every facet of health care including clinical outcomes, pharmaceutical and technology development, patient management, health care finance, clinical research, and health care policy. Our program delivers fundamental and practical learning experiences through a blended, global classroom setting, with an emphasis on the technology, science,

business/legal, and application of diagnostics. Graduates from this program are better equipped to transform health care through a deeper understanding of biomedical diagnostics. The design of the MS Biomedical Diagnostics program aligns with and supports the ASU charter through the advancement of innovative biomedical research intended to improve public health, as well as the promotion of academic excellence and student engagement in interdisciplinary research.

Program contacts

Program director: Michael Donovan, michael.j.donovan@asu.edu

Graduate support coordinator: Jill Atwood, chsgrad@asu.edu

Program faculty: see Appendix A

Admission

Admission to the Biomedical Diagnostics, MS is available for Fall and Spring terms. Deadlines to apply can be found here. The deadlines are in place to ensure applications will be processed in time for the starting term. 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: Online
- Start terms: Fall, Spring
- Time to completion: 1 to 1.5 years

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. For more information, visit the admissions website.

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 college or university in one of the following fields, or a closely related field: biomedical informatics, biology, life sciences, chemistry, biochemistry, engineering, biomedical engineering, business, computer science, supply chain management, health sciences or medical studies

Statement of purpose – 1-2 pages; how was the program selected; what are the applicant expects to learn from the program; how will this will enable attainment of career professional goals; and, a short description of applicant's background in the sciences

References – Contact information for two references is required. References will be contacted via email to submit a letter of recommendation and respond to a series of questions about the applicant.

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

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. Certain types of graduate credits cannot be transferred to ASU (see the Graduate College Policy Manual). Official transcripts must be sent to Graduate Admission Services from the records office of the institution where the credits were earned.

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 Diagnostics, MS has a program fee of $222 per credit (max $2,000 per semester).

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).

For more information and assistance, visit the Financial Aid website.

Travel assistance

Financial assistance for travel related to conferences, workshops, or training related to a student's graduate program is available through several resources.

- Graduate College travel awards
- Graduate and Professional Student Association travel grants
- College of Health Solutions student conference support

Curriculum and graduation requirements

Program requirements

The Biomedical Diagnostics, MS is comprised of 31 credits, including an applied project.

Required core (19 credits)

- BMD 502 Foundations of Biomedical Informatics Methods I (3)
- BMD 510 Current Perspectives in Biomedical Diagnostics (3)
- BMD 513 Principles of Diagnostic Technology: Immunoassays (4)
- BMD 514 Principles of Diagnostic Technology: Molecular Diagnostics (3)
- BMD 667 Regulation of Medical Diagnostics (3)
- HCD 511 Health Economics and Policy (3)

Electives (6 credits)

- BMD 550 Translational Bioinformatics (3)
- BMD 562 Bioethical Issues in Applied Biomedicine (3)
- BMD 598 Topic: Biomedical Device Design: Hands-on Work (3)
- BMI 598 Topic: Biomedical Commercialization (3)
- BMI 598 Topic: Imaging Informatics & Diagnostics (3)

Research (3 credits)

- BMD 592 Research (3)

Culminating experience (3 credits)

- BMD 593 Applied Project (3)

Note: A grade of B or better is required in BMD 593.

No 400-level coursework may be used toward the requirements of this program.

Electives – Elective courses other than those on the elective list cannot be used on an iPOS unless pre-approved by the program director. The following procedure should be followed for students who wish to take outside electives:

- The student must prepare a written request to the graduate support coordinator which includes: a course syllabus, the semester the students plans to take the course, and how the course enhances the students plan of study
- The graduate support coordinator will work with the program director, and program committee as needed, to consider the elective coursework, and notify the student of the decision

Applied project – The Applied Project is a combination of two courses – BMD 592 and BMD 593. It is expected that students take BMD 592 and BMD 593 consecutively within the same term as Session A and Session B, if taken in a Fall term. Students who start in BMD 592 in Spring Session B are expected to take BMD 593 in Summer Session C.

The Project begins in BMD 592 with a research question posed by a real-world company or organization involved in biomedical diagnostics (a “sponsor”) to a small team of students. Students then learn relevant

project management techniques to organize, plan, and carry-out their Applied Project. The remainder of BMD 592 and the entirety of BMD 593 is spent answering the sponsor's research question by conducting relevant research, meeting with the sponsor's leadership and the instructor, preparing a research report, and finally presenting the team's findings to the sponsor and course stakeholders. The Applied Project is grades on a letter grade basis and a grade of B or better is required in BMD 593 Applied Project. Applied Projects can be directed to any relevant diagnostics questions, including competitive intelligence, market analysis, health-technology assessments, regulatory/ reimbursement strategies, and medical data privacy policies. More information is available in Appendix B.

Application to graduate

Students should apply for graduation during the semester of planned graduation and must apply no later than the deadline specified for that term. 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 recommended plan of study. 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. Students should review the ASU Class Search for the course offerings each semester.

Plan of Study, Fall Start with Summer project

Term/ Session	Course	Credits
Term 1 - Fall	BMD 502 Foundations of Biomedical Informatics Methods I	3
	BMD 513 Principles of Diagnostic Technology: Immunoassays	4
	BMD 667 Regulation of Medical Diagnostics	3
	Elective	3
Term 2 - Spring	HCD 511 Health Economics and Policy	3
	BMD 514 Principles of Diagnostic Technology: Molecular Diagnostics	3
	BMD 592 Research *Note: Must be taken prior to BMD 593*	3
	Elective	3
Term 3 - Summer	BMD 510 Current Perspectives in Biomedical Diagnostics	3
	BMD 593 Applied Project	3

Plan of Study, Fall Start with Fall project

Term/ Session	Course	Credits
Term 1 - Fall	BMD 502 Foundations of Biomedical Informatics Methods I	3
	BMD 513 Principles of Diagnostic Technology: Immunoassays	4
	BMD 667 Regulation of Medical Diagnostics	3
Term 2 - Spring	HCD 511 Health Economics and Policy	3

	BMD 514 Principles of Diagnostic Technology: Molecular Diagnostics	3
	Elective	3
Term 3 - Summer	Elective [BMD 562 Bioethical Issues in Applied Biomedicine]	3
Term 4 - Fall	BMD 510 Current Perspectives in Biomedical Diagnostics	3
	BMD 592 Research *Note: Must be taken prior to BMD 593*	3
	BMD 593 Applied Project	3

Plan of Study, Spring Start

Term/ Session	Course	Credits
Term 1 – Spring	HCD 511 Health Economics and Policy	3
	BMD 513 Principles of Diagnostic Technology: Immunoassays	4
	BMD 514 Principles of Diagnostic Technology: Molecular Diagnostics	3
	Elective	3
Term 2 - Summer	BMD 502 Foundations of Biomedical Informatics Methods I	3
	Elective [BMD 562 Bioethical Issues in Applied Biomedicine]	3
Term 3 - Fall	BMD 510 Current Perspectives in Biomedical Diagnostics	3
	BMD 592 Research *Note: Must be taken prior to BMD 593*	3
	BMD 593 Applied Project	3
	BMD 667 Regulation of Medical Diagnostics	3

Elective offering schedule

Course	Term offered
BMD 550 Translational Bioinformatics (3)	Spring
BMD 562 Bioethical Issues in Applied Biomedicine (3)	Fall, Summer
BMD 598 Topic: Biomedical Device Design: Hands-on Work (3)	Spring
BMI 598 Topic: Biomedical Commercialization (3)	Spring
BMI 598 Topic: Imaging Informatics & Diagnostics (3)	Fall

Note: Subject to change, always check posted schedule for available courses.

In addition to the required coursework, the steps to achieve a Master of Science in biomedical diagnostics are listed below. The program is designed to be completed in 1 year at the earliest.

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

Second Semester
Review iPOS each semester until graduation

Final Semester
Review iPOS: Make sure you have an approved iPOS on file, with no errors
Apply for graduation in MyASU before the deadline
Complete the Research and Applied Project courses

Graduation
RSVP for graduation ceremony
Attend graduation ceremonies (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 student must submit their iPOS in the first semester of the program. Students are encouraged to 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 plan of study course requirements. More information on iPOS can be found here.

Faculty advisor/chair: program director

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
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.
    a. Students in the Biomedical Diagnostics, MS program must be enrolled in at least one class that applies to the program each term (excluding Summer), unless given prior approval from the program director

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 GPAs (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 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 Diagnostics, MS program requires a grade of B or higher in BMD 593.

Incomplete grade requests

An incomplete grade request may be considered by an instructor when a student, who is doing otherwise acceptable work, is unable to complete a course (e.g., final exam or term paper) because of illness or other conditions beyond the student's control. Unfinished work must be completed with the same instructor except under extenuating circumstances. The completion date is determined by the instructor

but may not exceed one calendar year from the date the mark of "I" is recorded. Once the work is completed, faculty must request a change on the grade roster to post the grade. 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 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.

Any exception to the time limit policy must be approved by the program director, the College of Health Solutions, and 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

For grade disputes during a class, students must first contact the instructor of the course. Concerns that are not able to be resolved with the instructor should be brought to the program director.

The process to appeal a final course grade 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, 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.

Note: Students in the Biomedical Diagnostics, MS program must be enrolled in at least one class that applies to the program/is included on iPOS each term (excluding Summer), unless given prior approval from the program director

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

Students are encouraged to thoroughly read the course syllabi for availability of additional supports such as dedicated Slack channels and virtual office hours. At new student orientation, students will be encouraged to make an appointment with the program director and the graduate support coordinator to discuss student expectations and support systems within the Biomedical Diagnostics, MS program. Additionally, the program has an online Canvas site that houses programmatic resources.

Graduate students in the College of Health solutions may access the CHS website for information on college policies and 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
- Graduate and Professional Student Association
- Student Clubs and Organizations

Business and finance services

- Financial Aid and Scholarship Services (financial aid)
- Billing and Student Finances (tuition, fees, and payments)
- Parking and Transit Services (permits, shuttles, public transit)
- Sun Devil Card Services (ID cards)
- Enterprise Technology (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

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

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

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

Travis Schlappi, PhD (profile) – engineering; microfluidics; developing point-of-care medical diagnostics LMIC settings; urinary tract infections; and antibiotic susceptibility testing

Alisa Tubbs, MBA (profile) – diagnostics business leader that both teaches within the Biomedical Diagnostics MS program and is eligible to lead applied projects teams.

B: Course information

Required Courses

BMD 502 Foundations of Biomedical Informatics Methods I (3 credits) Survey the methods and theories underlying the field of biomedical informatics. The course explores techniques in mathematics, logic, decision science, computer science, engineering, cognitive science, management science and epidemiology, and demonstrates the application to healthcare and biomedicine.

BMD 510 Current Perspectives in Biomedical Diagnostics (3 credits) This course provides an overview of the Biomedical Diagnostics Industry covering research, policy and legal aspects of the field. Visiting speakers from ASU, Biomedical Diagnostics companies, and regulatory agencies will provide an overview of their specialty based on personal experience and case studies.

BMD 513 Principles of Diagnostic Technology: Immunoassays (4 credits) The purpose of this module is to provide a detailed understanding of the theory and applications of advanced diagnostic assay systems and devices. In this module students will gain knowledge in immunoassay design and validation with particular attention to the manipulation of the immune system for disease recognition. This module assumes no former knowledge of immunology, but some knowledge would be advantageous.

BMD 514 Principles of Diagnostic Technology: Molecular Diagnostics (3 credits) Primer on nucleic acid structure, genome types, RNA, mutations, molecular diagnostics platforms, applications such as infectious disease, cancer, pharmacogenomics, risk management, current technologies such as DNA amplification, probes, DNA sequencing, mRNA expression levels, sample preparation, methods on the horizon.

BMD 592 Research (3 credits) This is the first of two contiguous courses (with BMD 593) which constitutes the overall Applied Project that is the culminating activity for the Biomedical Diagnostics master's degree. Small teams of students work on projects addressing real needs for a company or organization engaged in biomedical diagnostics who designate a mentor from their institution to provide subject matter expertise and guidance. The students will learn how to prepare a functional project plan and subsequently initiate the research described within the plan.

BMD 593 Applied Project (3 credits) Students will continue the research initiated in BMD 592 and prepare the final deliverables of the Applied Project. The deliverables are a detailed research report and typically an oral presentation to the leadership of the partnering company or organization for the project. The Applied Project typically brings to bear most, if not all, of the major concepts learned throughout the master's program.

BMD 667 Regulation of Medical Diagnostics (3 credits) This course explores the regulatory environment for the development, marketing, access and interpretation of modern biomedical diagnostics. Students will explore the business environment of diagnostic firms, interactions with state and federal regulatory authorities, and how new types of diagnostics and business models challenge established approaches for safeguarding the validity and safety of new products and service.

HCD 511 Health Economics and Policy (3 credits) Each class will explore basic economic principles, existing facts and knowledge from economic theory and research, characteristics of the current US healthcare market, and individual perspectives and experiences in health care to demonstrate a core set of economic concepts and logics that can help students critically analyze health care policies offered across the political spectrum.

Elective Courses

BMD 550 Translational Bioinformatics (3 credits) Introduces bioinformatics methods and applications used in the field of translational medical research. Topics include bioinformatics data acquisition and management, analysis methodologies, and applications.

BMD 562 Bioethical Issues in Applied Biomedicine (3 credits) Examines bioethical challenges in real-world health care settings, including emerging health advancements, technological innovations, an ever-changing social and cultural landscape, and increased attention to deeply challenging and personal decisions. Analyzes contextual history of bioethics and applies theory to modern-day ethical dilemmas.

BMD 598 Biomedical Device Design (3 credits) Medical Device Design uses a mixture of lectures, demonstrations, and lab experiments to convey the breadth of medical devices in the medical diagnostic device industry. Classification of devices and function are explained and covered. Students will learn to reverse engineer and build simple devices as well as learn about the FDA, market, business and design side of these products.

BMI 598 Biomedical Commercialization (3 credits) This course is designed to provide students with a real-world perspective of the challenges faced by those trying to commercialize new diagnostics technologies. The course will focus on the current environment. Students will also have an opportunity to interact with recognized experts in the field of clinical laboratory, business, legal, reimbursement, regulatory, professional society and wearable device communities during guest lectures.

BMI 598 Imaging Informatics & Diagnostics (3 credits) This course introduces imaging informatics, covering imaging modalities (CT, MRI, Ultrasound, PET, etc.), PACS (picture archiving and communication systems), RIS (radiology information systems), and the basic of image analysis and computer-aided diagnosis in medical imaging.