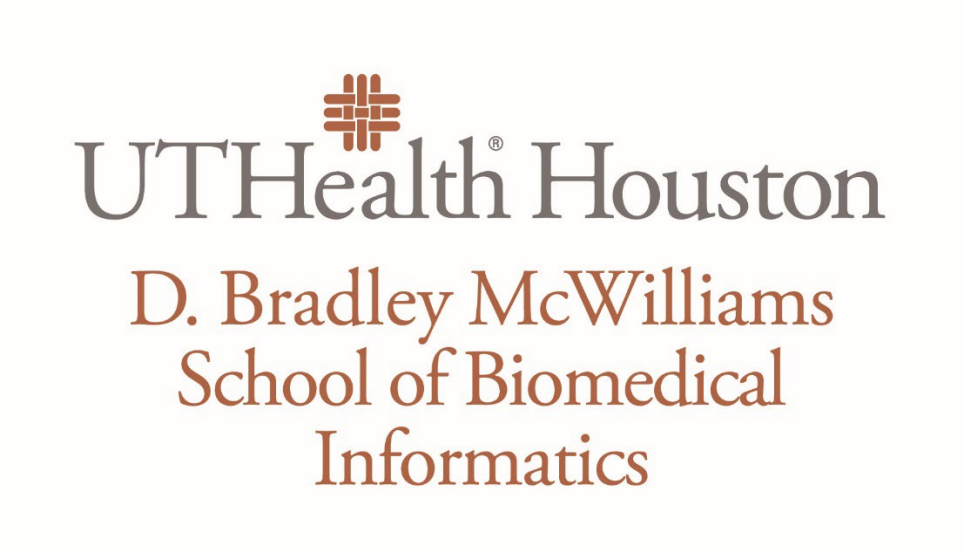

The University of Texas
Health Science Center at Houston
McWilliams School of Biomedical Informatics

2025-2026 Academic Catalog*

*2025-2026 catalog is online and can be found at https://catalog.uth.edu.

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About Us

About McWilliams School of Biomedical Informatics at UTHealth Houston

McWilliams School of Biomedical Informatics (https://sbmi.uth.edu/), formerly UTHealth Houston School of Biomedical Informatics (SBMI), is one of the seven schools of UTHealth Houston (https://www.uth.edu/) which, is a component of the 14 institutions of The University of Texas System (https://www.utsystem.edu/).

McWilliams School of Biomedical Informatics is the only academic biomedical informatics program in Texas, the only free-standing school among 70 related programs in the nation, and one of the largest programs of its kind in the world.

Program Overview

Biomedical Informatics is the study of how health data is collected, stored, and communicated. The field also explores how the data is processed into health information suitable for scientific, administrative and clinical decision making and how computers and telecommunications technology can be applied to support these processes. Biomedical informaticians are in great demand and may work in various clinical, research and educational environments.

Essential Skills for Biomedical Informaticians

Biomedical Informatics is a collaborative discipline that builds on several other fields such as information sciences, biomedicine, computer science, and mathematics. However, the field is also interdisciplinary and collaborative. For students who may need help gaining competencies in these foundation areas, courses are available to help. Solid background knowledge in these support areas is consistent with student success in the study of Biomedical Informatics.

To successfully perform the duties of a health informatician, an individual must be able to think critically and analytically, must demonstrate motivation, and must have a technical understanding of the computing environment that is the basis for informatics work. Students must be able to address problems in a clear and innovative manner. Other requirements include the ability to communicate in English both verbally and in writing at the graduate level and to work in interdisciplinary teams. Depending on their application area, students must have demonstrable proficiency with certain programming languages, college algebra, computer literacy skills, anatomy, physiology, health language, clinical care, and operational characteristics of healthcare.

Program Philosophy

The ultimate goal of the program is to use informatics to improve the health of the people of Texas. McWilliams School of Biomedical Informatics strongly believes that healthcare will increasingly require a cooperative interaction among the health disciplines. The result will be practitioners who understand the technology, data, information, knowledge, assumptions and decision making of others as they attempt to design, provide and evaluate healthcare in the 21st century.

To that end, the Biomedical Informatics program stresses the development of interdisciplinary teams to evaluate and address the complex informatics issues that will face healthcare in the next century. Students will enter the Biomedical Informatics program with a strong base from their previous undergraduate or graduate studies, and will study how to communicate knowledge across traditional, professional, and organizational barriers. As they progress, students will acquire the principles and knowledge needed to organize, store, display, communicate, and evaluate that knowledge across a variety of systems – electronic, social, and political.

The Biomedical Informatics program will start from a strong scientific base and move to the application of informatics in a variety of areas related to the interests of students and faculty. These areas of interest may include, but are not limited to computational knowledge, electronic health records, health data science, health information visualization or bioinformatics.

Biomedical Informatics is always undergoing rapid change. New technologies, conceptual understandings, and computational processes ensure that the future will bring increasing rates of change and development. Students will have the knowledge and skills to address present issues and the adaptability to address future ones. The Biomedical Informatics program continuously aims to meet the needs of students, develop new research to advance the frontiers of the science, and be an active participant in the development and application of informatics initiatives in the community.

Program Description

The Program in Biomedical Informatics is designed to be transdisciplinary in its focus. The program is the first in the nation that does not reside in a discipline#specific professional school. Students come from a variety of disciplines, and work in interdisciplinary teams to better understand the knowledge unique to each discipline and how that knowledge must be translated for use by other disciplines.

The certificate, masters and doctoral degree programs incorporate an interdisciplinary and integrative design that is unique to the field of biomedical informatics. Many existing informatics master and doctoral programs are organized around a specific discipline in which applications of informatics within that discipline are emphasized, e.g., medical informatics, nursing informatics, and dental informatics. The Biomedical Informatics program, on the other hand, is designed to be inherently transdisciplinary and integrative. This means that the fundamental informatics concepts that transcend and apply to all traditional healthcare disciplines are emphasized. Moreover, these programs will identify and teach the major informatics concepts that integrate and link diverse health disciplines, creating focus on patient healthcare.

Message from the Dean

Why Biomedical Informatics?

We are in the throes of a fundamental economic and societal transformation.

The Agricultural Revolution that took place around 10,000 BC liberated people from food insecurity via farming; the Industrial Revolution that commenced 200 years ago began to free people from grueling physical labor through machines; and the Artificial Intelligence (AI) Revolution occurring now is liberating people from cognitive labor through powerful computing, universal connectivity, and massive data. While AI has been disrupting and transforming many industries, including information access, communication, retail, manufacturing, agriculture, entertainment, travel, finance, and education, its seismic tremor is just beginning to impact the largest industry in the U.S., which accounts for nearly one-fifth of its GDP. Healthcare.

As a global academic leader in the areas of artificial intelligence, data science, and informatics for medicine and healthcare, McWillams School of Biomedical Informatics at UTHealth Houston is helping the world reshape the future of medicine and healthcare through active engagement in the AI Revolution.

At McWilliams School of Biomedical Informatics, we collect, process, and convert data—ranging from molecules to populations—into actionable information, knowledge, and intelligence; we educate current and future leaders, innovators, and problem solvers across Texas, the nation, and the world; and we disrupt, transform, and innovate to elicit biomedical discoveries, improve healthcare delivery, and aid in disease prevention by conducting outstanding basic and applied research and developing impactful information technology products and solutions.

Our expertise comprehends three broad areas of education and research:

1. Data Science and Artificial Intelligence
2. Clinical and Health Informatics
3. Bioinformatics and Systems Medicine

Moreover, the school's education programs are designed to cover the broadest student needs, including several Graduate Certificate programs (fully online), two MS programs (research and applied; both online and in-person), two doctoral degrees (PhD - emphasizing research and Doctorate of Health Informatics [DHI] - emphasizing application and executive training), and a growing number of dual-degree programs (e.g., MD/MS, PhD/MPH, PharmD/MS and MS/MPH, etc.).

Our faculty and students represent a wide array of health professions (e.g., medicine, nursing, pharmacy, public health, etc.), as well as the fields of computer science and engineering, mathematics and statistics, clinical informatics and bioinformatics, biomedical engineering, the biomedical sciences, healthcare management, cognitive science, and the law. The diverse background of our faculty and students, coupled with the transdisciplinary nature of the school's education and research programs, creates a uniquely rich and rewarding collaborative environment that lays the groundwork for innovation and seminal discoveries.

The following list is representative of the research and applied projects undertaken by our faculty and students:

- Formulating new ways to integrate and harmonize biomedical data and transform them into actionable information, knowledge, and intelligence
- Building a Clinical Data Warehouse to optimize patient care and quality improvement and support clinical and translational research
- Employing deep learning to predict hospital readmissions, as well as heart failure, sepsis onset, Sudden Unexpected Death in Epilepsy (SUDEP), stroke onset and outcomes, and many other conditions and issues that are central to improving healthcare
- Using statistical methods to elucidate the genomic basis of cancer and other medical conditions
- Discovering new functions of existing FDA-approved drugs
- Monitoring and detecting adverse events related to drug interactions through the analysis of EHRs using machine learning and Natural Language Processing (NLP)
- Writing advanced cryptography algorithms to ensure the security of patient data
- Utilizing deep learning to detect computational biomarkers for Parkinson's disease and psychiatric disorders
- Deploying advanced data analytics methodologies to ensure healthcare quality and patient safety
- Developing and evaluating clinical decision support systems
- Applying deep learning to CT images of stroke patients to determine eligibility for endovascular thrombectomy
- Creating tools and guidelines to optimize EHR usability and workflow
- Inventing mobile platforms that deliver health information to patients
- Pioneering futuristic functions and modules for EHRs

McWilliams School of Biomedical Informatics is the only academic program of biomedical informatics in Texas, the only free-standing school among 70 such programs in the nation, and one of the largest programs of its kind internationally. If a diverse and challenging world-class learning environment is what you are seeking, then join us to be among the informatics leaders of today and tomorrow.

Computer scientist Alan Kay famously said, "The best way to predict the future is to invent it." In that spirit, I would invite you to lend your unique vision and abilities to our bold enterprise, as together we create an impactful future for healthcare delivery, disease prevention, and biomedical discovery.

At McWilliams School of Biomedical Informatics, we are ***Transforming Data to Power Human Health™***.

Jiajie Zhang, PhD
Dean and The Glassell Family Foundation Distinguished Chair in Informatics Excellence

Mission Statement

Vision

McWilliams School of Biomedical Informatics at UTHealth Houston is *Transforming Data to Power Human Health™*.

Mission

The mission of the McWilliams School of Biomedical Informatics is to collect, process, and convert data—ranging from molecules to populations—into actionable information, knowledge, and intelligence; to educate current and future leaders, innovators, and problem solvers across Texas, the nation, and the world; to disrupt, transform, and innovate to elicit biomedical discoveries, improve healthcare delivery, and aid in disease prevention by conducting outstanding basic and applied research and developing impactful information technology products and solutions.

Accreditation

University Accreditation

The University of Texas Health Science Center at Houston is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to award baccalaureate, masters, doctoral, and professional degrees. Degree-granting institutions also may offer credentials such as certificates and diplomas at approved degree levels. Questions about the accreditation of The University of Texas Health Science Center at Houston may be directed in writing to the Southern Association of Colleges and Schools Commission on Colleges at 1866 Southern Lane, Decatur, GA 30033-4097, by calling (404) 679-4500, or by using information available on SACSCOC's website (http://www.sacscoc.org).

Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM)

The MS in Biomedical Informatics program is accredited by the Commission on Accreditation of Health Informatics and Information Management Education (CAHIIM). For information on this accreditation, visit the CAHIIM website (https://www.cahiim.org (https://www.cahiim.org/)). For more information about this program, see the MS in Biomedical Informatics curriculum (p. 13).

School Administration and Faculty

Administration

Jiajie Zhang, PhD
Dean and Professor
The Glassell Family Foundation Distinguished Chair in Informatics Excellence

Ryan Bien, MHA
Associate Dean for Management

Susan H. Fenton, PhD, RHIA, FAHIMA
Vice Dean for Education
Dr. Doris L. Ross Professor

Amy Franklin, PhD
Associate Professor and Associate Dean for Student, Faculty, and Community Affairs

Faculty

A list of current faculty members can be found here (https://sbmi.uth.edu/faculty-and-staff/).

Student Governance

The Student Governance Organization (SGO) consists of all registered McWilliams School of Biomedical Informatics students in good academic standing. Any full-time student enrolled in a program at the school is eligible to become an elected representative of his or her program and will serve for one year.

The purpose of the Student Governance Organization is:

- to provide students of the school an organized feedback and advisory mechanism to the administration and faculty
- to provide students a mechanism by which they may have an impact on the decision-making processes
- to provide social, cultural and recreational activities for students of the school
- to provide representation to the UTHealth Houston Student InterCouncil

Additional information about the organization, its current officers and events can be found on the McWilliams School of Biomedical Informatics website (https://sbmi.uth.edu/current-students/sgo.htm).

Tuition and Fees

Financial Information

Optional and Mandatory Fees

Certain mandatory and optional fees should be anticipated for enrollment at McWilliams School of Biomedical Informatics. Mandatory fees are required of all UTHealth Houston students. Optional fees are not required, but the student may elect to subscribe to any of the services listed under optional fees. Tuition and fees are subject to change and become effective on the date enacted. The Texas Legislature does not set the specific amount for any particular student fee. Student fees are authorized by state statute; the specific fee amounts and the determination to increase fees are made by the university administration and The University of Texas System Board of Regents.

Mandatory Fees

Any prospective student submitting an application through GradCAS for McWilliams School of Biomedical Informatics admissions consideration will be required to submit a non-refundable $38 application fee as part of the GradCAS application process.

All UTHealth Houston required fees can be found on the Bursar's Office website under Required Fees (https://www.uth.edu/bursars/student-resources/tuition-fees/required-fees-all-schools/). MSBMI-specific required fees are listed here (https://www.uth.edu/bursars/student-resources/tuition-fees/mcwilliams-school-of-biomedical-informatics/).

Tuition

All tuition and fees charged are authorized by statute and by regent approval. For the current listing of tuition and fee schedules please refer

to UTHealth Houston Bursar's Office (https://www.uth.edu/bursars/student-resources/tuition-fees/mcwilliams-school-of-biomedical-informatics/).

A resident doctoral student who has a total of 100 or more semester credit hours of doctoral work at an institution of higher education is required to pay nonresident doctoral tuition rates. For more information contact the Office of the Registrar (https://www.uth.edu/registrar/current-students/registration/sch-limit.htm).

Graduation Fee

A graduation fee of $150, payable during the student's final academic term, is required of all degree-seeking students. This fee covers expenses associated with graduation but does not cover fees associates with renting or purchasing the ceremony regalia. This fee is charged whether or not the student participates in the formal commencement/graduation ceremony. Certificate students do not pay the graduation fee.

Course and Lab Fees

Course fees offset the cost of additional requirements needed for the efficient operation of certain courses. These fees cover the cost of items like test materials for professional exam preparation or licensing fees for other resources provided within the course curriculum. Laboratory fees are assessed in an amount to cover the costs of technology and resources used by the student. Laboratory fees are only assessed to a select number of McWilliams School of Biomedical Informatics courses. To review which courses and labs are subject to fees, see here (https://www.uth.edu/bursars/student-resources/course-and-lab-fees/school-of-biomedical-informatics/).

Professional Liability Insurance

Every student enrolled in McWilliams School of Biomedical Informatics must have professional liability insurance coverage throughout each semester enrolled for the minimum policy amount of $100,000 per claim. The professional liability insurance must include coverage for breach of confidentiality of protected health information in electronic or other patient records. Advance written notice or posting may change the minimum amount required by the Office of the Dean. The premium for this insurance is due at the time of initial registration and each fall and spring semester. The annual premium is prorated based on the student's date of entry. The annual premium is approximately $14.50 per year.

Student Services Fee

The Student Services Fee is a mandatory fee assessed per semester credit hour to all students. The fee provides funding support towards student governance, Student Health, Shuttle Service and the Recreation Center. For a full breakdown of these fees, visit here (https://www.uth.edu/bursars/student-resources/student-service-fees/).

Technology Fee

The Technology Fee is collected for the purpose of funding technology costs within McWilliams School of Biomedical Informatics. The Technology Fee will be assessed to all students at $275 every semester to cover the expenses associated with the software, hardware, programming, maintenance fees and technical support used by students. The fee will support the school's goal to be the best publicly supported biomedical informatics school in the US by conducting the highest quality programs in education, biomedical informatics applications and research. The fee will also enable McWilliams School of Biomedical Informatics to use the most current technology to train students and help attract the best and brightest students to our quality graduate programs.

Student Records Fee

The Student Records Fee provides students with unlimited transcripts and enrollment verification documents. The charge is $15.00 per academic year ($5 per semester).

Optional Expenses

- Transportation Expenses: Students are required to provide their own transportation to practicum sites.
- Academic Regalia Rental/Purchase: The charge for rental or purchase of the cap and gown varies, depending on the degree earned and the vendor utilized for the services. Information on ordering academic regalia is sent to students several months before annual commencement exercises.

Competitive Academic Scholarship Awards

Competitive Academic Scholarship awards are designed to facilitate the scholastic development of students who are in high academic standing. The benefits of this award are two#fold: (1) a direct financial award, and (2) if the recipient is not a resident of Texas, the change in status to resident tuition for the semester the award was earned and the two subsequent semesters. The residency waiver is applied for the aforementioned semesters regardless of the student's enrollment in those semesters. All McWilliams School of Biomedical Informatics students are eligible to compete for these scholarships. The number of Competitive Academic Scholarships awarded each year is dependent on the availability of funds. Students are notified via email when scholarship applications are being accepted. Students must submit all applications and required application materials to be considered.

The criteria for selection are:

- McWilliams SBMI coursework Grade Point Average (GPA)
- Pattern of academic achievements, such as scientific papers, posters and/or presentations or any relevant honor, recognition or awards earned
- Relevant Biomedical Informatics community or volunteer experience including any Student Governance Organization (SGO) or Student InterCouncil (SIC) involvement
- Success in overcoming adversity
- Personal Statements

The McWilliams School of Biomedical Informatics Scholarship and Awards Committee considers all submissions. The Scholarship and Awards Committee is composed of McWilliams School of Biomedical Informatics faculty and a representative from McWilliams School of Biomedical Informatics Office of Academic Affairs. The recommendations of the Scholarship and Awards Committee are submitted through the Associate Dean for Student, Faculty, and Community Affairs for submission to the Dean. Notification of awards will be made by email.

Contact Us

Office of Academic Affairs
D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
7000 Fannin, Suite 650
Houston, Texas 77030
Phone: 713-500-3591
Fax: 713-500-0360
E-mail: SBMIAcademics@uth.tmc.edu

Admissions

Application Information

All applications to McWilliams School of Biomedical Informatics at UTHealth Houston are submitted and processed by the centralized application service, Graduate Enrollment Management Centralized Application Services (GradCAS) (https://gradcas.liaisoncas.org/apply/).

Additional information is available by contacting the school's Office of Academic Affairs at:

The University of Texas Health Science Center at Houston (UTHealth Houston)
D. Bradley McWilliams School of Biomedical Informatics Office of Academic Affairs
7000 Fannin, Suite 600
Houston, TX 77030
Telephone: (713) 500-3591
Email Address: SBMIAdmissions@uth.tmc.edu

Specific requirements for admission to the certificate and degree programs are provided in the program section of this catalog. The school is obligated to ensure academic quality and comparability for all applicants applying to our programs. As such, our school will only consider credits earned for degrees awarded from regionally-accredited institutions in our admissions process. For international applicants, coursework reviewed as part of the Course-by-Course Evaluation Report from WES or ECE must show the U.S. equivalency to coursework completed at a regionally-accredited institution.

Non-Degree/Certificate Admission Process

Completed applications are reviewed by the Certificate Program Coordinator(s). Recommendations for or against admission are made to the Associate Dean for Student, Faculty, and Community Affairs. The Certificate Program Coordinator(s) advise all certificate students.

General Admission Process for Degree Programs

The school's Admission, Progression and Graduation Committee reviews completed applications to the master's and doctoral programs.

The admission criteria include, but are not limited to:

- Prior academic preparation (depth, breadth, and performance): application, college transcripts, and letters of reference;
- Relevant work experience (particularly practice in the field of study): application, goal statement, curriculum vitae (CV) or resume, and letters of reference;
- Career goals: application, goal statement, and letters of reference;
- Motivation: goal statement, letters of reference, and college transcripts;
- Integrity: goal statement, and letters of reference;
- Standardized tests: GRE scores and TOEFL/IELTS (if required);
- Thesis, publications and other scholarly works: supplemental documents provided by applicant; and
- Success in overcoming social, economic or educational disadvantages.

Qualified applicants to the doctoral programs will be invited to interview with faculty members at the discretion of the committee. The Office of Academic Affairs will schedule personal interviews. In addition to the listed criteria, the applicant's communication skills and understanding of the program may be evaluated based on the personal interview. Admissions decisions will be made after interviews are completed.

Additional Requirements for International Applicants or Applicants with International Coursework

An international student is a student who is not a citizen or a permanent resident of the U.S. All international students must contact and must be cleared by the UTHealth Houston Office of International Affairs prior to registration. Here is additional information regarding the international applicant admission process. (Students with transcripts from an international institution may also be subject to one or more of the below criteria):

- The Test of English as a Foreign Language (TOEFL) (https://www.ets.org/toefl.html) or the International English Testing System (IELTS) (https://ielts.org/ielts-usa/). For admissions consideration a minimum acceptable score of 94 on the internet-based TOEFL is required or a minimum acceptable overall score of 7.0 on the IELTS is required. Test scores are valid for two years from the test date. The official scores must be submitted directly to GradCAS from the applicable test center. Submit official TOEFL scores by using the reporting code B886; no department code is required. Submit official IELTS scores by sending them to GradCAS; no code is needed. Testing is at the applicant's expense.
- Applicants that have completed coursework outside of the United States and who have received a diploma from a university at which English is the language of instruction are not required to submit an English Language exam. If this school is outside of an English-speaking country, evidence that indicates the language of instruction will need to be provided with your application such as a letter from the University on official letterhead.
- Applicants that have completed coursework outside of the United States must submit official transcripts and a course#by# course education evaluation of all transcripts from all universities attended outside the United States. The application forms for such an evaluation may be obtained online from the service providers, Educational Credential Evaluators, Inc. (ECE) (https://www.ece.org) and World Education Services (WES) (https://www.wes.org). Only evaluations from ECE or WES will be accepted. The results of the evaluation must be submitted directly to GradCAS by the agency. The evaluation report is at the applicant's expense.
- F-1 sponsorship is available for students in the Research Master's, and PhD programs. F-1 sponsorship is not available for the Certificate, Applied Master's, Dual degree or DHI programs. International applicants are still eligible to apply for SBMI programs and can be enrolled at a distance.
- The I#20 form, required by the Department of Homeland Security (DHS) and the United States Citizenship and Immigration Services (USCIS), is prepared by UTHealth Houston and issued to qualified non-immigrant applicants who have been admitted and who have demonstrated financial ability to support their education. Upon acceptance, the non-immigrant student will be asked to provide financial and visa information so that the I#20 form may be completed. The student must submit the completed form to the American Embassy in his/her country of origin in order to receive a

student visa or must otherwise be eligible for F#1 status in the U.S. Please contact the UTHealth Houston Office of International Affairs for information (713-500-3176, utoiahouston@uth.tmc.edu).

- Official transcripts provided directly to GradCAS will be shared with the Office of the Registrar. If the applicant is an actively enrolled student at the college/university at the time of applying, a final official transcripts at the end of the last semester of enrollment with degree conferral must be sent directly to the Office of the Registrar prior to the first day of classes of their starting term. Failure to submit final official documents by the first enrolled term will result in a hold placed on the students account preventing them from future course registration.

Admissions Application Deadlines

Certificates in Biomedical Informatics Application Deadlines
Fall admissions: July 1
Spring admissions: November 1
Summer admissions: March 1

Master of Science in Biomedical Informatics Application Deadlines
Fall admissions: July 1
Spring admissions: November 1
Summer admissions: March 1

Doctor of Philosophy in Biomedical Informatics Application Deadlines
Fall admissions: December 1
Spring admissions: July 1

Doctorate in Health Informatics Application Deadline
Fall admissions: March 1

Address application inquiries to:

Office of Academic Affairs
D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
7000 Fannin, Suite 600
Houston, TX 77030 713-500#3591
SBMIAdmissions@uth.tmc.edu

Waiver or alteration of admission requirements, other than those mandated by statute, for admission to McWilliams School of Biomedical Informatics or of courses offered by the school, must be based upon a review of the circumstances, a justification and review by the faculty, and final written approval by the Dean. Requirements mandated by statute will not be waived or altered.

In order to register, a student must have on file in the Office of the Registrar official transcripts and documents of all previous academic work and meet all admission requirements. A student who knowingly falsifies or is a party to the falsification of any official University record (including transcripts and/or application for admission) will be subject to the offer of admission being withdrawn, or disciplinary action, which may include dismissal from the University.

Academic Standards, Policies, and Procedures

In order for students to maintain good standing and receive appropriate grades and credits for their work, they must adhere to the School's academic policies, procedures and standards.

The School requires a high level of academic achievement from our students, and the School has defined criteria for a student in good standing and a student in academic jeopardy. A letter grading system is used to assess the student's level of achievement.

Grading System

"A" indicates excellent; "B" indicates good; "C" indicates unsatisfactory and may require students to repeat the course; and "F" indicates failing; "P" indicates passing; "W" indicates that the student has withdrawn; "I" indicates an incomplete grade, meaning that course requirements have not been satisfied. All letter grades are reported without modification of plus (+) or minus (-). Grades recorded for courses dropped after the withdrawal deadline will be recorded as "F." After a student accumulates their fourth (4) "W" grade, they will be subject to academic action, including dismissal from the program.

Grade point averages (GPA) are computed at the end of each semester using the following academic standard:

A = 4 points
B = 3 points
C = 2 points
I = not counted
P = not counted
W = not counted
F = 0 points

Graduate level courses in which a grade of "B" or better has been earned may not be repeated for credit. Any student receiving a grade of less than a "B" in a required course must retake the course and receive a grade of "B" or higher to continue on in their academic program.

Grade Reports

Students may access their official term grade reports online through myUTH (https://my.uth.tmc.edu).

Grades of "C"

A grade of "C" is not considered a satisfactory grade. Therefore, all grades of "C" require retake. For a course to count towards any degree plan, a "B" or better must be earned. All grades of "C" are applied to the academic transcript but will not count towards degree progression.

When students earn a grade of "C" in a Required Course, the student must retake the course. Students may only earn two grades of "C" in any two required courses. A third grade of "C" will result in dismissal.*

When students earn a grade of "C" in an Elective Course, the student must retake the course. Students may take another appropriate elective to fulfill the elective requirement for which the "C" grade was earned.

*Students are not permitted to earn more than two grades of "C". A graduate student of this school will be dismissed if a third grade of "C" is earned in any course, including concurrent or inter-institutional courses.

Grades of "I"

An incomplete or "I" grade may be given when course requirements have not been satisfied. A student must have completed at least 50% of the course curriculum requirements for a grade of "I" to be issued. A student must submit an Incomplete Grade Form to receive an incomplete or "I" grade. Students must remove a grade of "I" the academic semester following receipt of the "I" grade, or the incomplete grade will be converted to a grade of "F." During the semester in which the "I" grade coursework is being completed, the student is not permitted to overenroll

(e.g. enroll in more than a fulltime course load). Grades of "I" will not be used in calculating the grade point average. All "I" grades must be removed from a student's record (course requirements satisfied) before the student is eligible for graduation. A student must be actively enrolled at UTHealth Houston in the semester they expect to graduate. Note that students are not permitted to request an "I" grade in consecutive semesters.

Grades of "F"

Students are not permitted to earn a grade of "F". A grade of "F" will result in automatic dismissal from the school.

Grades of "W"

Students who elect a grade of Withdrawal ("W") for a required course, must retake the course and earn a grade of "B" or higher to continue on in their academic program. When retaking a course after electing for a grade of "W", a grade of "W," "C," or lower in the subsequent course is grounds for academic action, including dismissal from the program.

Only two grades of "W" will be allowed for a single elective course. After the second "W" grade is earned, the student is no longer eligible to register for that elective course.

The original grade of "W" will remain on the student transcript. Students are not permitted to earn more than four grades of "W" during their academic program. All enrollments in courses, including repeated courses, will be reflected on the student's transcript.

Grades of "Pass/Fail"

The courses that are graded on a pass/fail basis are described in the course description section of the catalog. In these instances, a symbol of "P" is used to designate "pass" and an "F" to designate "fail." Hours for courses taken pass/fail that are passed are not entered in the grade point calculation; however, hours for courses taken pass/fail and failed are included in the grade point calculation. Students are not permitted to earn a grade of "F". A grade of "F" will result in automatic dismissal from the school.

Each program establishes the maximum number of semester credits a student can take on a Pass/Fail basis during his or her study in that program. A maximum of three credit hours of Directed Study can be applied toward the Certificate program. A maximum of six credit hours of Directed Study can be applied toward the master's and doctoral programs.

GPA Calculation

Grade point average is calculated using grades and credit hours for courses except for those courses in which a grade of "I," "W" or "P" is recorded. The grade achieved in a repeated course is included in the calculation. Those courses taken through concurrent enrollment are not used in calculating the grade point average. Courses obtained by Petition for Equivalency Credit (PEC), which are graduate courses transferred from other institutions, are not used in the calculation of the grade point average.

Enrollment Status

Students who matriculate in McWilliams School of Biomedical Informatics fall into one of the following categories.

Any degree or certificate seeking student enrolled at UTHealth Houston who is not admitted to a degree program or certificate program in McWilliams School of Biomedical Informatics can complete a maximum of 12 semester credit hours and must maintain a 3.0/4.0 grade point average.

Full-Time Student

Full-Time Student: A graduate student enrolled in a program for at least nine semester credit hours (SCH) each during the fall and spring semester, or six semester credit hours in the 12#week summer session. Only those credit hours in UTHealth Houston courses taken for credit are counted in the calculation of credits designating a full#time student.

Part-Time Student

Part-Time Student: A graduate student enrolled in a program for fewer than nine semester credit hours (SCH) each during the fall and/or spring semester, or fewer than six semester credit hours in the 12#week summer session.

Certificate Student

Certificate Student: A student admitted to a certificate program seeking a certificate of completion of 15 semester credit hours. Enrollment in a certificate program does not entitle a student to admission to a degree-seeking program.

Non-Degree Student

Non-Degree Student: A student who is admitted to McWilliams School of Biomedical Informatics for one or more courses but not admitted to a degree or certificate program. Enrollment as a non#degree student does not entitle a student to admission to a program. A non#degree student is not eligible to receive a degree. Non-degree students will not be allowed to register for practicum/doctoral courses. Non#degree students can complete a maximum of 9 semester credit hours and must maintain a 3.0/4.0 grade point average.

Accelerated Masters Student

Accelerated Masters Student: A student who is presently enrolled in a bachelors-level academic program at another accredited institution that has a signed Program Agreement with McWilliams School of Biomedical Informatics and has been admitted to McWilliams School of Biomedical Informatics to complete a graduate certificate at the same time as completing an undergraduate degree.

Concurrent/Inter#institutional Student

Concurrent/Inter#institutional Student: Concurrent and inter#institutional students can complete a maximum of 12 semester credit hours and must maintain a 3.0/4.0 grade point average.

Student Enrollment

Students enroll each semester by using myUTH (https://my.uth.tmc.edu.). There is no on#site enrollment. Enrollment dates are announced in the online Registration Schedule found on the Office of Registrar (http://www.uth.edu/registrar/current-students/registration/registration-schedule.htm) website.

Student in Good Standing

To be considered in "good standing" and making "satisfactory academic progress" at McWilliams School of Biomedical Informatics, a student admitted to a graduate degree program must be following the degree plan; must maintain a cumulative grade point average of 3.0 or above; and must not be on academic probation or suspension as determined by the Associate Dean for Academic and Curricular Affairs. To remain in good standing a graduate student may earn no grade less than a "B" during their program.

Each student will develop a degree plan with written approval of their academic advisor. The student must file a signed degree plan (https://sbmi.uth.edu/current-students/curriculum/) each academic year that includes the required and/or elective courses as specified for their certificate or degree program.

Academic Probation

Probation is an official warning status for a defined period of time that informs the student of unsatisfactory academic and/or professional performance, and provides the student an opportunity to improve. Any student who does not adhere to the academic and professional standards of McWilliams School of Biomedical Informatics is subject to probation or dismissal by the Associate Dean for Academic and Curricular Affairs.

Criteria upon which grades are based are given at the beginning of each course in the course syllabus. Professional standards include appropriate dress, attendance, conduct, and any particular standards required by the program. If a student has questions regarding academic and professional requirements or if assistance is needed in meeting the standards, the student should consult with the course instructor or advisor.

Following the completion of the semester in which any of the following occur, the Associate Dean for Academic and Curricular Affairs will place a graduate student on academic probation if the student

1. receives a grade of less than "B" ("C") in a course while at McWilliams School of Biomedical Informatics or enrolled in a concurrent or inter-institutional course;
2. earns a calculated cumulative grade point average (GPA) of less than 3.0 or
3. fails to make satisfactory academic progress toward the degree.

The graduate student is removed from academic probation at the end of the following registration period when no grade below "B" is assigned in a graduate course, a cumulative grade point average of 3.0 is achieved, and any other cause for probation is removed or remedied.

A McWilliams School of Biomedical Informatics graduate student will be dismissed if a third grade of "C" is earned in any course, including concurrent or inter-institutional courses.

Any student on academic probation is not eligible to receive McWilliams School of Biomedical Informatics scholarships and awards. Any student on academic probation is not eligible for student employment at UTHealth Houston (including Pre-Doctoral Fellowship, Graduate Research Assistant, Graduate Assistant, and Teaching Assistant positions).

Student Conduct and Discipline

All students are responsible for knowledge of and compliance with UTHealth Houston policies regarding student conduct. Students are referred to the UTHealth Houston Handbook of Operating Procedures (HOOP) Policy 186, Student Conduct and Discipline (https://www.uth.edu/hoop/policy.htm?id=1448220).

Course Attendance Policy

Attendance is required for any student registered for an on-campus course. Any student in an on-campus course missing more than three class meetings may be dropped at the discretion of the instructor.

Leave of Absence

The purpose of a leave of absence is to provide students time away from campus for personal reasons. The authority to grant a leave of absence and permission to return from a leave of absence resides with the Associate Dean for Student, Faculty, and Community Affairs. Each leave is individualized based on the needs of the student and handled on a case-by-case basis. A leave of absence may not exceed a period one year. If a student is absent for more than one year, the student must apply for readmission to the program. For additional information, please contact the school's Office of Academic Affairs.

Reasonable Accommodation

Individuals seeking reasonable accommodations related to disability, pregnancy and parenting, or religion must initiate the accommodation process by contacting their school's designated Section 504 Coordinator (https://www.uth.edu/hoop/section-504-coordinators.htm) and completing a request form found on the University Relations & Equal Opportunity (UREO) webpage (https://www.uth.edu/hr/service-areas/university-relations-equal-opportunity/).

Accommodations are not retroactive, and require advance notice to implement. To allow adequate time to evaluate the request, engage in the interactive process, and make arrangements for any accommodation to be provided, requestors are strongly urged to contact UREO as soon as possible.

For more information, visit HOOP Policy 101, Disability and Pregnancy Accommodations (https://www.uth.edu/hoop/policy.htm?id=1448050), HOOP Policy 232, Pregnant and Parenting Students (https://www.uth.edu/hoop/policy.htm?id=32d838cb-8f11-40f7-b8e5-f42719d41202), and HOOP Policy 112, Religious Accommodations (https://www.uth.edu/hoop/policy.htm?id=1448072).

Academic Grade Grievance Procedure

In attempting to resolve any student grievance regarding grades or evaluations, it is the obligation of the student first to make a serious effort to resolve the matter with the faculty member with whom the grievance originated. Individual faculty members retain primary responsibility for assigning grades and evaluations. The faculty member's judgment is final unless compelling evidence suggests differential treatment or mistake. If the evidence warrants appeal, the student must submit a request in writing within 30 days of the date of the evaluation in question and, in the case of a final grade for a course, within 30 days of the date the Registrar recorded the grade of the course in question. The request for the appeal with supporting evidence must be submitted to the Associate Dean for Student, Faculty, and Community Affairs, and the appeal must be resolved by no later than the end of the semester after the semester in which the grade was earned. Upon receipt of the request, the Associate Dean for Student, Faculty, and Community Affairs will review the case and submit a copy of the appeal to the appropriate Standing Committee of the Faculty Governance Organization for review and recommendation. The Standing Committee of the Faculty Governance Organization will review the request and

render its recommendation in writing to the Associate Dean for Student, Faculty, and Community Affairs within 15 business days. The Associate Dean for Student, Faculty, and Community Affairs will submit a written recommendation to the Dean. The student will be notified in writing of the Dean's decision within seven business days of the Associate Dean for Student, Faculty, and Community Affairs' recommendation. The determination of the Dean is final.

Academic Dismissal and Appeal

A student who is on academic probation for one semester and who does not achieve the minimum cumulative 3.0 GPA and the individual course grades necessary to be removed from probation, or remove the cause of probationary status, will be notified of dismissal from the program by the Associate Dean for Academic and Curricular Affairs and will not be allowed to continue in the program.

The student may request a reconsideration of the dismissal by submitting a written request to the Dean within five business days of receipt (electronic or hard copy) of the dismissal letter. The student must also send a copy to the Chair of the Admissions, Progression and Graduation Committee of the Faculty Governance Organization. The student must provide evidence in support of the request for reconsideration of the dismissal. The Admissions, Progression and Graduation Committee will review the request and render its recommendation in writing to the Dean within 15 business days. The student will be notified in writing of the Dean's decision within seven business days of the Committee's recommendation. The determination of the Dean is final.

Reapplication Following Dismissal

Should a student reapply and be readmitted to the program from which he or she was dismissed, the student will be placed on academic probation for one semester. If the student fails to raise his or her cumulative GPA within that semester to 3.0, or if the student makes a course grade below that required to be removed from probation, or otherwise fails to meet standards to be off probation, the student will be dismissed from the School and may not be readmitted.

Five-Year Rule

In order to keep its programs and coursework relevant and current, McWilliams School of Biomedical Informatics allows students to apply completed course credits to a certificate, master's, or doctoral program for no more than five (5) years after the course was successfully completed, with a grade of "B" or better.

These successfully completed courses may be applied at a later date toward the certificate/degree requirements for other academic programs at the school if the course is part of the program's current curriculum. If the grade earned and recorded on the student's transcript (by semester and year) exceeds the Five-Year rule, the course credits will expire and the course must be repeated to meet the program requirements, where applicable.

If the expired course no longer exists in the school Catalog of Courses during the semester a new or returning student enters the program, the student must take a new course to complete the program requirements.

Note - This Five-Year Rule is not applicable to credits earned during a period of continuous enrollment while studying at McWilliams School of Biomedical Informatics. Our students who maintain satisfactory program enrollment over a period of more than five (5) years, can apply all courses taken during their program tenure at the School, so long as the earned grade is a B or better and the student has not exceeded the stated time limit to complete the program in which they are enrolled.

Transfer Credit

Transfer credit for equivalent graduate courses taken elsewhere may be awarded and used to meet degree requirements if their equivalency to a McWilliams School of Biomedical Informatics degree program course is approved through a Petition for Equivalency Credit (PEC). The maximum number of transferable semester credit hours is 3 for the certificate program, 12 for the master's program, 36 for the PhD program, and 21 for the Doctor of Health Informatics ("DHI") program. Contact the Office of Academic Affairs for information.

Courses that are being accepted at McWilliams School of Biomedical Informatics, including courses through a dual- or joint-degree program, can only be transferred in if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer. Transfer credits are subject to the Five-Year Rule based on the semester and year the original credits were posted to a student's official transcript.

Applicants who are presenting course work from universities or colleges outside the United States to meet admission or graduation requirements are referred to the section on International Applicants in this catalog for additional requirements.

Petitioning for Course Equivalency

A student who wishes to receive credit for a graduate course which he or she has taken at another institution and which is similar in content to any course offered at McWilliams School of Biomedical Informatics is to submit required documentation for a Petition for Equivalency Credit (PEC) to the McWilliams School of Biomedical Informatics Office of Academic Affairs during their first academic year.

Credit is only given to courses that match the current school Course Catalog. Courses for which grades of less than "B" were earned will not be accepted for equivalency. Courses must have been completed within the last five years to qualify. The submitted syllabus from the course taken must be from the semester and year the student completed the course. Syllabi from any other semester or year will not be accepted and the PEC will be denied. Course equivalency credits are subject to the Five-Year Rule based on the semester and year the original credits were posted to a student's official transcript.

Any exceptions to the policy must be approved by the Associate Dean for Academic and Curricular Affairs. For additional information, please contact the school Office of Academic Affairs.

Transfer between Academic Programs

A student who is enrolled in a minimum of one (1) credit hour is eligible to transfer from one Academic Program to another. A change in Academic Program can only occur once during the course of academic study. The Academic Program must be at the same level or a lower level program.

A Change of Academic Plan Request Form must be submitted to the Office of Academic Affairs with a new goal statement outlining the student's goals in the new program. Students are not permitted to change their academic plan in their final semester of any degree program. Changes to academic plans cannot be made retroactively.

If approved, the student is expected to complete their Academic Program for the newly requested plan. At the time of program completion, re-

application to McWilliams School of Biomedical Informatics is required for any subsequent program of study.

Reentry after Non#Attendance

A student who has not enrolled in two consecutive registration periods (including the summer session) will have an academic hold placed on their myUTH account by the McWilliams School of Biomedical Informatics Office of Academic Affairs. Students with an academic hold will need to meet to discuss academic degree plan with their academic advisor to have the hold removed and be allowed to enroll in future courses. A student who has not enrolled for three or more consecutive registration periods will be dismissed and must reapply for admission to the program and the School.

Deferment for Newly Admitted Students

A newly admitted student is allowed up to one year for deferment for certain programs. McWilliams School of Biomedical Informatics Office of Academic Affairs must be notified of all deferments in writing before the start of the semester. A student who defers admission will be governed under the catalog in effect during his or her first semester of enrollment at the school. Any newly admitted student who does not enroll for three consecutive registration periods shall no longer be considered an admitted student. This means the student must reapply for future admission to any program or degree offered at McWilliams School of Biomedical Informatics.

Deferment is not available in the Doctorate in Health Informatics (DHI) program. If a DHI student wants to defer admission, that student will need to reapply for a future semester.

Resignation from the University

A student who withdraws from all courses enrolled at McWilliams School of Biomedical Informatics at the end of, or prior to, completing a scheduled semester, should notify his or her advisor and the Office of Academic Affairs in writing by submitting the UTHealth Houston Resignation Form, which can be found on the Registrar's website.

Clearance for Resignation, Graduation, or Dismissal

Any student who submits for resignation or is dismissed from, or completes a program in McWilliams School of Biomedical Informatics must complete the official student clearance process. Such clearance is necessary to ensure that the student has met all obligations to specified offices in McWilliams School of Biomedical Informatics, UTHealth Houston, and the Texas Medical Center. A student clearance form and instructions for completing the clearance process may be obtained from the school's Office of Academic Affairs.

Registering/Adding a Course

Prior to course registration, students are encouraged to work with their academic advisor or advising committee to determine the appropriate courses and course load for the upcoming semester. If a permission code is required for course registration, the student must request instructor approval via email and forward the instructor's approval to the Office of Academic Affairs at SBMIAcademics@uth.tmc.edu. Following this, the student must use myUTH (https://my.uth.tmc.edu) to add the course to their schedule. Refer to the Office of the Registrar's, School of Biomedical Informatics Academic Calendar for deadline dates for adding a course for any semester or session. A student will be unable to add a course after the official reporting date.

Dropping or Withdrawing from a Course

To drop a course during the add/drop period the student must go to myUTH (https://my.uth.tmc.edu). Courses which are dropped during the add/drop period are not reflected on the student's transcript. Please refer to the Refund Policy on the Registrar's Office (https://www.uth.edu/registrar/current-students/registration/refund-policy.htm) website to determine what percentage, if any, students will receive as a refund for tuition paid prior to dropping the course.

To withdraw from a course after the 12th class day and before the last day to withdraw (listed on the Office of the Registrar's, School of Biomedical Informatics Academic Calendar for the semester) the student must submit a signed Add-Drop/Withdrawal Form to the Registrar's Office. Students must obtain signatures of the course instructor(s) and the Associate Dean for Academic and Curricular Affairs in order to drop the course(s). The student must return the completed form to the Office of the Registrar before the deadline for dropping a course. The grade recorded on the transcript will be a "W" - withdrawal. The "W" will not be calculated as part of the GPA.

If a student does not officially withdraw from the course, a grade of "F" will be assigned. A grade of "F" is recorded if a course is dropped after the deadline stated in the academic calendar for that semester or session.

A student, who withdraws from all courses enrolled at McWilliams School of Biomedical Informatics at the end of, or prior to, completing a scheduled semester, should notify his or her advisor and the Office of Academic Affairs in writing by submitting the UTHealth Houston Resignation Form, which can be found on the Registrar's website.

Auditing a Course

McWilliams School of Biomedical Informatics does not allow auditing of classes within the school. If a student is interested in auditing a course at another UTHealth Houston School, they must contact that school for more information. There is an audit fee of $25 attached to an approved course for audit.

Concurrent/Inter-Institutional Enrollment

McWilliams School of Biomedical Informatics students may take courses for credit at area state colleges and universities through concurrent/inter-institutional enrollment. Courses taken by concurrent enrollment will not be calculated into the student's GPA. Students from other institutions concurrently enrolled at the school may complete a maximum of 12 semester credit hours at McWilliams School of Biomedical Informatics and must maintain a 3.0/4.0 grade point average in those courses. Information about participating institutions and procedures for concurrent enrollment can be found on the Registrar's Office (https://www.uth.edu/registrar/current-students/student-information/concurr-inter-inst-enr.htm) website.

General Degree Requirements

In order to receive a degree or a certificate from the McWilliams School of Biomedical Informatics, the student is required to fulfill certain academic, in residence, and degree candidacy requirements. An enrolled student must be in good academic standing and must have completed all the curricular requirements of that program before being eligible for a degree or certificate.

In Residence Requirement

The term “in residence” refers to the minimum number of semester credit hours that must be earned at McWilliams School of Biomedical Informatics. A student must fulfill his or her in residence requirement in order to receive any academic degree or a certificate from this school. Refer to each degree section for specific semester credit hour minimum requirements.

Academic Honesty

Academic honesty is the cornerstone of the academic integrity of a university. It is the foundation upon which the student builds personal integrity and establishes a standard of personal behavior. Because honesty and integrity are such important factors, failure to perform within the bounds of these ethical standards is sufficient grounds to receive a grade of "F" in any course and be recommended for disciplinary actions from McWilliams School of Biomedical Informatics.

The following are examples of academic dishonesty:

- Cheating
- Plagiarism
- Unauthorized collaboration
- Collusion
- Falsifying academic records
- Misrepresenting facts (e.g. providing false information to postpone an exam, obtain an extended deadline for an assignment, or even gain an unearned financial benefit)
- Any other acts or attempted acts that violate the basic standard of academic integrity (e.g. multiple submissions – submitting essentially the same written assignment for two courses without authorization to do so.)

Refer to the Student Conduct and Discipline section in the McWilliams School of Biomedical Informatics Student Handbook or to HOOP 186 Student Conduct and Discipline (https://www.uth.edu/hoop/policy.htm?id=1448220) and Appendix A - Unacceptable Student Conduct (https://www.uth.edu/hoop/186-appendix-a.htm) for more information.

Plagiarism/Self-Plagiarism

For grade generating assignment submissions, students must always submit their own work.

Exception: If group work is allowed or required by the assignment or course.

Student should always provide citations to indicate inclusions from others’ work in their papers and assignment submissions.

Students should not reuse in whole or in part their own previously submitted assignments, papers, text, data, etc. without explicitly indicating prior dissemination. This includes all graded/published artifacts of one’s academic career including time at McWilliams School of Biomedical Informatics.

Students must have instructor permission if they plan to reuse a previous assignment submitted in another course for a grade.

Plagiarism may include:

- Words or ideas taken from someone else without acknowledgment
- Giving incorrect information about the source
- Changing the sequence or structure but using ideas without citation
- Not including material in quotes if directly taken from someone else’s material and/or copying any amount of other’s material.

Per the Exam Proctoring Policy found here, (https://sbmi.uth.edu/current-students/student-handbook/exam-proctoring.htm) students’ submitted work may be subject to evaluation from Turnitin for plagiarism prevention, and graded exams and quizzes will require the use of Proctorio, an online proctoring software.

Refer to the Student Conduct and Discipline section in the Student Handbook or to HOOP 186 Student Conduct and Discipline (https://www.uth.edu/hoop/policy.htm?id=1448220) and Appendix A - Unacceptable Student Conduct (https://www.uth.edu/hoop/186-appendix-a.htm) for more information.

Programs of Study

Degrees

Accelerated Master's

Dual or Pathway Programs

Graduate Certificates

Non-Degree Students

Biomedical Informatics (MS)

Program Description and Goals

The formal study of informatics at the master’s level is designed as a multi#disciplinary approach to accomplish these important goals:

1. Understand the scope of the discipline of Biomedical Informatics;
2. Demonstrate knowledge of the literature of Biomedical Informatics;
3. Develop informatics solutions to biomedical problems based on current research; and,
4. Utilize Electronic Health Records or other health information technologies effectively

Master of Science in Biomedical Informatics Admission Process

The applicant should present a completed application and official documentation of the following:

1. A baccalaureate degree or higher
2. Official transcripts from all colleges and universities attended
3. Goal Statement – follow template instructions on our website (https://sbmi.uth.edu/prospective-students/admission-requirements.htm)
4. A resume or curriculum vitae (as appropriate)
5. Three letters of reference from educators and/or employers
6. Students with international college transcripts must submit a course-by-course evaluation report by either World Education Services or Educational Credential Evaluators.
7. For International Applicants: A minimum TOEFL score of 94 is acceptable on the internet-based test. A minimum acceptable score for the IELTS is a 7.

Applicant materials will be reviewed by the McWilliams School of Biomedical Informatics Admissions, Progression and Graduation (APG) Committee. The committee will consider such areas as:

- Health, MIS, Computer, or Engineering related degree
- Healthcare work experience
- Database work experience
- Informatics work experience
- Demonstrated expertise in programming
- GPA in previous degree
- Success in overcoming social, economic or educational disadvantages, race and ethnicity

Requirements for International Applicants

- The Test of English as a Foreign Language (TOEFL) (https://www.ets.org/toefl.html) or the International English Testing System (IELTS) (https://ielts.org/ielts-usa/). For admissions consideration a minimum acceptable score of 94 on the internet-based TOEFL is required or a minimum acceptable overall score of 7.0 on the IELTS is required. Test scores are valid for two years from the test date. The official scores must be submitted directly to GradCAS from the applicable test center. Submit official TOEFL scores by using the reporting code B886; no department code is required. Submit official IELTS scores by sending them to GradCAS; no code is needed. Testing is at the applicant's expense.
- International applicants who have received a diploma from a university at which English is the language of instruction are not required to submit an English Language exam. If this school is outside of an English-speaking country, evidence that indicates the language of instruction will need to be provided with your application such as a letter from the University on official letterhead.
- International applicants must submit official transcripts and a course#by-course education evaluation of all transcripts from all universities attended outside the United States. The application forms for such an evaluation may be obtained online from the service providers; Educational Credential Evaluators, Inc. (ECE) (https://www.ece.org) and World Education Services (WES) (https://www.wes.org). Only evaluations from ECE or WES will be accepted. The results of the evaluation must be submitted directly to GradCAS by the agency. The evaluation report is at the applicant's expense.
- F-1 sponsorship is available for students in the Master of Science Biomedical Informatics, Research Track program. Students on a F-1 student visa are not eligible to enroll in the Master of Science in Biomedical Informatics, Applied Track program.
- The I#20 form, required by the Department of Homeland Security (DHS) and the United States Citizenship and Immigration Services (USCIS), is prepared by UTHealth Houston and issued to qualified non-immigrant applicants who have been admitted and who have demonstrated financial ability to support their education. Upon acceptance, the non-immigrant student will be asked to provide financial and visa information so that the I#20 form may be completed. The student must submit the completed form to the American Embassy in his/her country of origin in order to receive a student visa or must otherwise be eligible for F#1 status in the U.S. Please contact the UTHealth Houston Office of International Affairs for information (713-500-3176, utoiahouston@uth.tmc.edu).
- International applicants seeking F-1 sponsorship are not eligible for summer admission to the Master of Science in Biomedical Informatics.

Master of Science in Biomedical Informatics application deadlines:

- Fall admission: July 1
- Spring admission: November 1
- Summer admission[1]: March 1

[1] International applicants seeking F-1 sponsorship are not eligible for summer admission to the Master of Science in Biomedical Informatics.

Academic Requirements

Each student will develop a degree plan with written approval of their academic advisor. A signed degree plan (https://sbmi.uth.edu/current-students/curriculum/) will be filed each academic year that includes the required and/or elective courses as specified for the student's MS program. A total of 39 semester credit hours for all courses in the degree plan must be completed prior to graduation. There are two tracks The University of Texas Health Science Center at Houston within the Master's Program. Students should work with the McWilliams School of Biomedical Informatics Office of Academic Affairs and their advisor to assure they are taking courses in their desired focus area.

A student in the MS Program in Biomedical Informatics has up to eight years (24 semesters) from the time of entry to complete the required course work. A student who has not enrolled in two consecutive registration periods (including the summer session) will have an academic hold placed on their myUTH account by the McWilliams School of Biomedical Informatics Office of Academic Affairs. Students with an academic hold will need to discuss their academic degree plan with their academic advisor to have the hold removed and be allowed to enroll in future courses. A student who has not enrolled for three or more consecutive registration periods will be dismissed and must reapply for admission to the program and the School.

Each course with a BMI prefix in the Biomedical Informatics degree plan is a graduate-level course and should be passed with a grade of "B" or better. Students who earn a grade of "C" must retake the course, whether a required or elective course, and earn a grade of "B" or higher to continue

on in their academic program. The course must be retaken the next semester the course is offered. The original grade of "C" will remain on the student transcript. All students who earn a grade of "C" will be placed on Academic Probation. Students are not permitted to earn more than two grades of "C". The third grade of "C" will result in dismissal from the school. The minimum grade point average (GPA) required for graduation is 3.0 on all courses.

A maximum of six credit hours of Directed Study can be applied toward the master's program.

Transfer Credit

Transfer credit for equivalent graduate courses taken elsewhere may be awarded and used to meet degree requirements if their equivalency to a McWilliams School of Biomedical Informatics degree program course is approved through a Petition for Equivalency Credit (PEC). The maximum number of transferable semester credit hours is 12 for the master's program. Contact the McWilliams School of Biomedical Informatics Office of Academic Affairs for information.

Courses that are accepted at McWilliams School of Biomedical Informatics, through a dual or joint degree program, can only be transferred in if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer. Courses must have been completed within the last five years to qualify. See "Five-Year Rule (p. 7)."

Applicants who are presenting course work from universities or colleges outside the United States to meet admission or graduation requirements are referred to the section on International Applicants in this catalog for a listing of additional requirements.

Computer Requirement

Every student is required to have reliable access to a computer that meets the minimum technical requirements. Students are encouraged to purchase a laptop that meets the minimum school requirements.

Computer requirements are listed on the website here (https://sbmi.uth.edu/current-students/student-handbook/computer-requirements.htm) and are subject to change.

Curriculum for the Master of Science in Biomedical Informatics

Research Track

The curriculum of the research track for the Master of Science degree in Biomedical Informatics includes required didactic courses and a practicum. Didactic courses (lecture/discussion, demonstration and student laboratories) are presented to provide facts, concepts, and theories related to the techniques and procedures of Biomedical Informatics. The courses include instruction in basic informatics, research, advanced informatics and elective courses. The practicum is designed to give the students the opportunity to apply theory and techniques in the hospital, research, or private laboratory setting.

Each student will develop a degree plan with written approval of their academic advisor. A degree plan will be filed each academic year that includes the core and required courses as specified below:

Code	Title	Hours
Required Courses		
BMI 5300	Introduction to Biomedical Informatics	3
BMI 5310	Foundations of Biomedical Information Sciences I	3
BMI 5311	Foundations of Biomedical Information Sciences II	3
BMI 5352	Statistical Methods in Biomedical Infomatics	3
BMI 6313	Scientific Writing in Healthcare	3
BMI 6000	Practicum in Biomedical Informatics	3
Elective Courses (seven courses)		
Totaling 21 hours [1]		21
Total Hours		**39**

[1] See school website for suggested concentration curriculum

Changes to the degree plan must be approved in advance by the faculty advisor and the signed degree plan must be on file with the Office of Academic Affairs prior to course registration.

Applied Track

The curriculum of the applied track for the Master of Science degree in Biomedical Informatics includes required didactic courses, a choice of elective and a practicum. Didactic courses (lecture/discussion, demonstration and student laboratories) are presented to provide facts, concepts, and theories related to the techniques and procedures of Biomedical Informatics. The courses include instruction in basic and applied informatics. The practicum is designed to give the students the opportunity to apply theory and techniques in the hospital, research, or private laboratory setting.

Each student will develop a degree plan with written approval from their academic advisor. A signed degree plan will be filed each academic year that includes the core and required courses as specified below:

Code	Title	Hours
Required Courses		
BMI 5300	Introduction to Biomedical Informatics	3
BMI 5301	The US Healthcare System	3
BMI 5305W	Legal and Ethical Aspects of Health Informatics	3
BMI 5313	Foundations of Electronic Health Records and Clinical Information Systems [1]	3
BMI 5315W	Quality & Outcome Improvement in Healthcare	3
BMI 5317	Applied Data Management	3
BMI 5328W	System Analysis and Project Management [2]	3
BMI 5329	Workflow Process Modeling	3
BMI 5371	Business and Technical Communication	3
BMI 6316	Change Management for Health Informatics	3
BMI 6340	Health Information Visualization and Visual Analytics	3
BMI 6000	Practicum in Biomedical Informatics	3
Elective		3
Total Hours		**39**

[1] $100 Course Fee
[2] $50 course fee

Changes to the degree plan must be approved in advance by the faculty advisor and the signed degree plan must be on file with the Office of Academic Affairs prior to course registration.

Practicum in Biomedical Informatics

Students in the Master of Science in Biomedical Informatics program must select an area of interest in which to apply the knowledge and skill gained during the didactic courses while participating in the required practicum course. Students must complete at least 24 credit hours in their master's program before participating in the practicum requirement. Students should work with the Practicum Coordinator for any necessary affiliation or program agreements with the practicum site, if agreements are not already in place. A practicum proposal must be submitted to the Practicum Coordinator by week three of the semester of enrollment in the practicum course, and it must be approved, in writing, by the student's Faculty Practicum Advisor.

Students can complete all required practicum credit hours during one semester or the course can be repeated for a maximum of 3 semester credit hours (for BMI 6000 Practicum in Biomedical Informatics) to meet degree requirements. During the course of the semester(s), student must create weekly logs to chronicle their hours, tasks, and reflections on how the duties of the practicum relate to Biomedical Informatics courses taken. Once the student has logged all 135 contact hours and concluded all practicum projects, she or he must create an 18-page APA format, double-spaced capstone report that details the major project they completed during their practicum. This report, along with other deliverables, will be submitted in completion of the practicum. If the student receives an incomplete for practicum, the student will have the following semester to complete it or receive an "F". If students have any questions regarding the practicum, they can contact the Practicum Coordinator or the McWilliams School of Biomedical Informatics Office of Academic Affairs.

Additional information regarding the Practicum in Biomedical Informatics can be found here (https://sbmi.uth.edu/current-students/practicum.htm).

For further curriculum information, please contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, Texas 77030
Telephone: (713) 500#3591
Email: SBMIAcademics@uth.tmc.edu

Biomedical Informatics (PhD)

Program Description and Goals

This program is designed to be a research-based multi#disciplinary program involving students with a variety of backgrounds. Students will work together in teams to research real clinical and biomedical health problems. They will gain both the scientific background for research and skills needed to address problems. The program is designed to meet the unique needs of each student by using a matrix curriculum plan with an advising committee to guide each student from admission through graduation. Each student must have a faculty academic advisor to guide each student through participation in research projects.

The PhD program in Biomedical Informatics is conceptualized and designed to be inherently multidisciplinary and integrative. This means that the fundamental informatics concepts that transcend and apply to all traditional healthcare disciplines will be emphasized in the PhD program. This program will identify and teach the major informatics concepts that integrate and link diverse health disciplines.

The PhD program in Biomedical Informatics is constructed as a post# baccalaureate degree that not only addresses the knowledge and skills that the student brings at admission, but allows the student to build on previous knowledge and skills in order to attain the research focus needed for the completion of the PhD program in Biomedical Informatics.

Students admitted to the master's program can apply to the PhD program by meeting the same admission requirements as those who apply directly to the PhD program.

Formal study of informatics at the PhD level at McWilliams School of Biomedical Informatics at UTHealth Houston is designed to accomplish these major goals:

- Expand the scope of the discipline of Biomedical Informatics
- Demonstrate familiarity with the Biomedical Informatics research literature, including in-depth knowledge of a selected Biomedical Informatics research area.
- Research and evaluate new regions or domains in Biomedical Informatics
- Lead interdisciplinary teams in the search for solutions to Biomedical Informatics problems
- Effectively communicate research findings to peers and to practitioners who can use the research findings.

The PhD program is a 93#semester credit hour full#time program developed as a post baccalaureate program. Part-time enrollment requires written approval of the advisor and advising committee.

Doctor of Philosophy in Biomedical Informatics Admission Process

The applicant should present a completed application and official documentation of the following:

1. A baccalaureate degree or higher
2. Official transcripts from all colleges and universities attended
3. A resume or curriculum vitae (as appropriate)
4. Three letters of reference from educators and/or employers.
5. A Graduate Record Exam (GRE) score. GRE waivers may be considered on a case-by-case basis, exemption criteria can be reviewed on the admissions requirement website (https://sbmi.uth.edu/prospective-students/admission-requirements.htm). Official GRE test scores must be no more than five (5) years old.
6. Goal Statement – follow template instructions on the school's website (https://sbmi.uth.edu/prospective-students/admission-requirements.htm)
7. Students with international college transcripts must submit a course-by-course evaluation report by either World Education Services or Educational Credential Evaluators.
8. For International Applicants: A minimum TOEFL score of 94 is acceptable on the internet-based test. A minimum acceptable score for the IELTS is a 7.

9. Interview with the McWilliams School of Biomedical Informatics Admissions, Progression and Graduation (APG) Committee by invitation only. Applicants will also complete a writing assessment as part of the interview process.

Requirements for International Applicants

- The Test of English as a Foreign Language (https://www.ets.org/toefl.html) (TOEFL) or the International English Testing System (https://ielts.org/ielts-usa/) (IELTS). For admissions consideration a minimum acceptable score of 94 on the internet-based TOEFL is required or a minimum acceptable overall score of 7.0 on the IELTS is required. Test scores are valid for two years from the test date. The official scores must be submitted directly to GradCAS from the applicable test center. Submit official TOEFL scores by using the reporting code B886; no department code is required. Submit official IELTS scores by sending them to GradCAS; no code is needed. Testing is at the applicant's expense.
- International applicants who have received a diploma from a university at which English is the language of instruction are not required to submit an English Language exam. If this school is outside of an English-speaking country, evidence that indicates the language of instruction will need to be provided with your application such as a letter from the University on official letterhead.
- International applicants must submit official transcripts and a course#by#course education evaluation of all transcripts from all universities attended outside the United States. The application forms for such an evaluation may be obtained online from the service providers; Educational Credential Evaluators, Inc. (ECE) (https://www.ece.org) and World Education Services (WES) (https://www.wes.org). Only evaluations from ECE or WES will be accepted. The results of the evaluation must be submitted directly to GradCAS by the agency. The evaluation report is at the applicant's expense.
- F-1 sponsorship is available for students in the PhD program.
- The I#20 form, required by the Department of Homeland Security (DHS) and the United States Citizenship and Immigration Services (USCIS), is prepared by UTHealth Houston and issued to qualified non-immigrant applicants who have been admitted and who have demonstrated financial ability to support their education. Upon acceptance, the non-immigrant student will be asked to provide financial and visa information so that the I#20 form may be completed. The student must submit the completed form to the American Embassy in his/her country of origin in order to receive a student visa or must otherwise be eligible for F#1 status in the U.S. Please contact the UTHealth Houston Office of International Affairs for information (713-500-3176, utoiahouston@uth.tmc.edu).

Doctor of Philosophy in Biomedical Informatics Application Deadlines

- Fall admission: December 1
- Spring admission: July 1

PhD Application Review and Admission Process

Review by the Admissions, Progression, and Graduation (APG) Committee

Applicant materials will be reviewed by the admissions committee. The admissions committee will review the materials and recommend whether applicants will be offered an interview - the next step in the PhD admissions process. Applicants who are recommended for an interview will be contacted by Office of Academic Affairs for scheduling.

Interview

Applicants who proceed to the next level of the admission process will be interviewed by McWilliams School of Biomedical Informatics faculty members. The interview will focus on the applicant's research goals and how they will be achieved in the PhD program. Applicants will also complete a writing assessment as part of the interview process.

Academic Advising

The PhD Coordinator serves as the primary advisor until an Advising Committee and Committee Chair has been identified.

As a student progresses, he or she must identify an academic advisor. This person will serve as the Committee Chair. The Committee Chair (also known as mentor, PI, dissertation director, advisor) is a fulltime member of the School of Biomedical Informatics faculty who works with the student to develop a research topic, helps formulate ideas and guides the progress of the dissertation. In some cases, although rare, there is a Committee Co#Chair (principal research, co#advisor) who also advises the student. The Committee Chair should be identified during the first year or initial semester of the second year. The Change of Advisor Form (available on the Current Students section of the website) for changing the PhD Coordinator to the named advisor must be completed following identification of a Committee Chair.

The student, in consultation with his/her Committee Chair, will identify the other members of the Advising Committee. Committee members are those who have expertise in and inform the student's area of research, serve as a reader of the proposal and dissertation, and vote on the outcome of the qualifying exam, proposal defense and outcome of final dissertation. A minimum of three individuals must serve on the final Advising Committee. At least two members of this committee, including the Chair, must be fulltime members of McWilliams School of Biomedical Informatics faculty.

Students are responsible for scheduling and planning meetings with their committee and meeting milestones defined by this catalog. Student course selection must be approved by the Committee Chair and appropriately documented on the PhD Degree Plan form (available on the McWilliams School of Biomedical Informatics Current Students section of the website). Students are encouraged to meet with their Advising committee during the course of each semester to discuss ongoing progress and formulate plans for acceptable academic progress.

Transfer Credit

Transfer credit for equivalent graduate courses taken elsewhere may be awarded and used to meet degree requirements if their equivalency to a McWilliams School of Biomedical Informatics degree program course is approved through a Petition for Equivalency Credit (PEC). The maximum number of transferable semester credit hours is 36 for the PhD program. Contact the Office of Academic Affairs for information.

Courses that are being accepted at McWilliams School of Biomedical Informatics, through a dual or joint degree program, can only be transferred in if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer. Courses must have been completed within the last five years to qualify. See "Five(5)-Year Rule (p. 7)".

Students who are presenting course work from universities or colleges outside the United States to meet admission or graduation requirements are referred to the section on International Applicants in this catalog for a listing of additional requirements.

Financial Assistance

McWilliams School of Biomedical Informatics offers scholarships for PhD students that include full tuition support during the first year of academic study. Competitive full-ride scholarship opportunities are also available. These competitive scholarships are limited and offered to the most qualified PhD program applicants. Graduate Research Assistantships and Student Teaching Assistantships are available on a case-by-case basis. Students must submit an application to be considered for these opportunities.

PhD Academic Requirements

A total of 93 semester credit hours must be completed prior to graduation. Both full#time and part-time students in the PhD Program in Biomedical Informatics have up to eight years from the time of entry to complete the required coursework. Continuous enrollment is required unless approval from the advising committee is obtained. Each student will develop a degree plan with written approval of their academic advisor. A signed degree plan, found here (https://sbmi.uth.edu/current-students/curriculum/), will be filed each academic year that includes the required and/or elective courses as specified for the student's PhD program.

A maximum of six credit hours of Directed Study can be applied toward the PhD program.

Other Requirements

In Residence Requirement: The term "in residence" refers to the requirement that a student completes 57 semester credit hours over the course of the program at UTHealth Houston. A student must fulfill his or her in residence requirement in order to receive a PhD degree from the School.

Curriculum for the Doctor of Philosophy in Biomedical Informatics Program

The curriculum of the PhD degree in Biomedical Informatics includes required didactic courses and elective courses. Didactic courses (lecture/discussion, demonstration and student laboratories) are presented to provide facts, concepts, and theories related to the techniques, and procedures of Biomedical Informatics. They include instruction in basic informatics, research, advanced informatics and support courses. The elective courses are designed to give students the opportunity to apply theory and techniques in the hospital, research, or private laboratory setting.

Required Courses from School Catalog

The PhD Program requires a minimum of 93 semester credit hours of study. The following courses are required for the PhD degree plan.

Code	Title	Hours
BMI 5300	Introduction to Biomedical Informatics [1]	3
BMI 5007	Methods in Health Data Science [1]	3
BMI 5310	Foundations of Biomedical Information Sciences I [1]	3
BMI 5311	Foundations of Biomedical Information Sciences II [1]	3
BMI 5352	Statistical Methods in Biomedical Infomatics [1]	3-4
or PHM 1690L	Introduction to Biostatistics in Public Health	
BMI 6319	Data Analysis for Scientific Research in Biomedical Informatics [1]	3
BMI 7302	Theories & Frameworks for BMI [1]	3
BMI 7303	Critical Review of Biomedical Informatics Literature Seminar [1]	3
BMI 7304	Advanced Research Design for Biomedical Informatics [1]	3
Elective Courses (seven courses)		
Advanced Level Statistics Course [2]		3
Six Additional Courses (totaling 18 hours)		18
Other Requirements		
BMI 7000	Advanced Preceptorship	9
BMI 7050	Research in Biomedical Informatics [3]	21
BMI 7150	Research Seminar [4]	3
or BMI 7151	Seminar in Precision Medicine	
BMI 7301	Grant Writing	3
BMI 9999	Dissertation in Biomedical Informatics	9
Total Hours		**93**

1. Course must be completed prior to the qualifying exam. Requirements for these courses can be met through concurrent enrollment at other institutions and/or by consent of the student's Academic Advisor.
2. Not offered at McWilliams School of Biomedical Informatics – See Advisor for concurrent enrollment options.
3. BMI 7050 must be repeated for maximum of 21 semester credit hours to meet the PhD degree requirements.
4. BMI 7150 OR BMI 7151 must be repeated for a maximum of 3 semester credit hours to meet the PhD degree requirements.

Progression

Each year, students will be reviewed by the faculty to determine if adequate progress in the program has been made. This review is facilitated by the completion of annual Individualized Development Plans (IDP). It is the student's responsibility to maintain and update this plan in cooperation with their advisor. IDPs are filed annually with the Office of Academic Affairs. Failure to make adequate progress will result in action by the Admission, Progression and Graduation Committee. Action may include, but is not limited to additional review and monitoring of progress, changes in student standing (at risk, on probation, etc.) or dismissal from the program.

Qualifying Exam

The goals of the PhD qualifying exam are:

1. To motivate students to review and synthesize course work and reported research
2. To determine the student's ability to understand and apply fundamental concepts
3. To develop and test the student's ability to communicate orally and to respond to questions and comments
4. To evaluate the student's potential to pursue doctoral research

5. To identify areas needing strengthening for the student to be successful as a PhD student and independent scholar
6. To provide a mechanism for faculty to come to know the student's capabilities

Students should prepare for a comprehensive qualifying exam within the semester following their sixth completed full-time semester or after completion of their 48th semester credit hour. The plan for the qualifying exam will be developed in conjunction with the academic advisor. The qualifying exam consists of demonstration of competency within two areas:

Domain Specific Knowledge
Demonstration knowledge, understanding, and proficiency in domain specific content and methodology. One of the purposes is to challenge students to discover relevant literature and deepen their knowledge of interests within this track.
Breadth of Knowledge across the discipline
Demonstrate breadth of knowledge across health sciences disciplines through questions that require synthesis of knowledge from core areas.

Submission deadlines related to materials related for the qualifying exam (e.g. reading list, abstract/proposal to committee) will follow a set timeline following the student's declaration of intent. All components of the qualifying exam must be attempted within 30 days. The qualifying exam is composed of a total of seven graded sections: three domain specific questions, three general informatics questions and an oral presentation. A student must be ultimately successful on each question/section of the qualifying exam to progress in the PhD Program.

General Structure of the Exam

1. Topics for the exam will include materials covered in the Core Courses (indicated by *) and materials selected within a specific domain. The domain specific reading list will be developed in conjunction with the Committee Chair/Advising Committee.
2. Students will complete a written exam including both domain general and domain specific questions.
3. In addition to the exam, students will prepare a proposal abstract (1-2 pages) and deliver a public presentation of this abstract.
4. Following the written exam and public presentation, the student, Advising Committee, and PhD Qualifying Exam Committee will take part in a closed question and answer session (1-2 hours) over the written exam and public presentation.

The qualifying exam dossier will contain the following items:

a) Research project abstract
b) Preliminary dissertation proposal (one to two pages, demonstrating knowledge and work of the student and others, synthesized to present a rationale for the proposed dissertation topic (e.g., theory to be developed, hypotheses to be tested) as well as proposed methodology to fulfill the dissertation objective.)
c) List of references (30-50 articles) and syllabi for relevant classes for three domain areas related to their proposed research. Students should discuss these areas with their advisor in the process of planning their graduate program and prior to preparation of their qualifying exam materials.
d) Current CV
e) All previously completed Individualized Development Plans

Grading for the Written Qualifying Exam Component:

a) Pass unconditionally (score between 28-35)
b) Pass conditionally (21-27)
c) Fail with option to retake (16-20)
d) Fail without option to retake (Less than 16)

Grading for the Oral Qualifying Exam Component:

a) Pass unconditionally (score between 3 and 4)
b) Pass conditionally (2.5-2.99)
c) Fail with option to retake (2.0-2.49)
d) Fail without option to retake (Less than 2)

Remediation Procedures

Should a student score either pass conditionally or fail with the option to retake, the original assigned graders will determine the final score for each question following remediation. Remediation may include addressing the shortcomings of the written questions during the oral presentation section of the exam, rewriting a question response, drafting a paper to address problems with a written question, presenting an improved oral presentation, or remediation through additional coursework. The student's PhD Advising Committee will determine the form of remediation and evaluation for the domain-specific questions. The PhD Qualifying Exam Committee will determine remediation on the general knowledge questions. The two committees will work together to determine the requirements for the student should remediation be needed on the oral presentation. Remediation responses will be graded on a pass/fail basis. Efforts to retake or remediate must be completed within 12 weeks. Failure to successfully pass all components will result in dismissal from the program. Students with scores between 16-20 for four or more graded sections of the written qualifying exam will fail the exam without the opportunity for remediation. A single score below 16 on any section will result in dismissal.

Advanced Preceptorship

Advanced Preceptorship is required for all PhD students. During Advanced Preceptorship, the student will develop and prepare his or her Advance to Candidacy Proposal including: defining the proposed research agenda; a review of the literature; research design, procedure and data analysis; collecting preliminary data; and scientific contribution to the discipline. The student's primary advisor and advising committee must approve the focus of the research. Students must successfully pass their Qualifying Exam prior to registering for Advanced Preceptorship hours.

Advancement to Candidacy

Admission to the PhD program does not constitute or guarantee a student's admission to candidacy for the PhD degree. Within two full-time semesters or completion of 18 semester credit hours after completion of the qualifying exam, each student must submit an advance to candidacy proposal and give an oral presentation of their completed and proposed work to their Advising Committee. Successful advance to candidacy proposal defense includes approval of both the written proposal and its oral presentation. The oral presentation is open to the public and the candidacy proposal is only disseminated to the student's advising committee. Approval of the advance to candidacy proposal is required for continued progress towards the degree and designation as a doctoral candidate.

A student passes their advance to candidacy proposal defense if the majority of their Advising Committee votes to pass and the student's primary advisor votes to pass. In the event of a tie, the Associate Dean for

Academic and Curricular Affairs will break the tie. If the Associate Dean for Academic and Curricular Affairs is on the committee, the Committee Chair will break the tie. If the Associate Dean for Academic and Curricular Affairs is the Committee Chair, the Dean will break the tie. If the student passes, he or she is admitted to candidacy. If the student does not pass, the Advising Committee can recommend failure without another attempt or failure with the opportunity to re#defend within 30 days. If the student again does not pass the defense, he or she will be given the option of completing a Master of Science in Biomedical Informatics degree but will otherwise be dismissed from the doctoral program.

Dissertation

The faculty believes that communication and dissemination is a critical aspect of the research process. The student will have two options available for the dissertation. The first option will consist of three articles that are accepted for publication. Publication must be in journals or proceedings, which are both peer-reviewed and indexed for academic retrieval. The three papers are combined with an introduction and summary and bound as a dissertation. The second option requires the student to write a monograph or dissertation. The monograph will review the literature, research approaches and options, the data design and gathering processes. The findings and data will be discussed in the context of the published literature. The monograph will be bound.

The dissertation must be presented at an oral defense that is open to the public. All research papers, theses, and dissertations authored by degree candidates are available to interested members of the general public upon request. After the presentation, the student's Advising Committee votes to award the degree, allow for re-defense of the dissertation within 30 calendar days of the failed attempt, or dismiss the student from the program without a degree.

Petitioning for Extension

Students who have exceeded their time to degree deadline or a milestone deadline for the qualifying exam or prospectus may petition APG for an extension. The Petition to Extend Time Boundary for Qualifying Exam, Advance to Candidacy or Dissertation Defense form can be found under the Current Student section of the school website (https://sbmi.uth.edu/current-students/).

For further curriculum information, contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, Texas 77030
Telephone: (713) 500#3591
Email: SBMIAcademics@uth.tmc.edu

Doctorate in Health Informatics (DHI)

Program Description and Goals

The program is the nation's first advanced practice degree in health informatics. The DHI includes unique curriculum built for professionals seeking a terminal degree in the field of health informatics.

The degree is geared towards professionals with documented executive or management-level healthcare experience. This practice doctorate program provides informatics leaders with the advanced education required to translate evidence from original research, evaluate current practices, and utilize critical thinking to accelerate the adoption of best practices in clinical and healthcare organizations.

Instruction for the program is in a hybrid environment with more than 50% of the coursework taught online. After completing necessary didactic courses, DHI students must complete a large-scale translational project at a healthcare organization. Students work under advisor guidance while completing the project, so students have the opportunity to translate evidence from original research and accelerate the adoption of best health informatics practices.

The program goals are to help students:

- Assume leadership positions throughout the healthcare industry having integrated health informatics with organizational leadership and ethics.
- Design, implement and evaluate health information technology quality improvement projects in health care systems.
- Implement evidence-based practice to improve human health.
- Employ effective communication and collaboration skills to identify and implement best practices in health care delivery.

Doctorate in Health Informatics Admission Process

The applicant should present a completed application and official documentation of the following:

1. A completed online GradCAS application with a $38 application fee
2. Official transcripts from all colleges and universities attended
3. A baccalaureate or higher degree (master's degree preferred)
4. No minimum GPA requirement. Majority of successful applicants have a GPA of 3.0 or greater
5. A resume or curriculum vitae (as appropriate)
6. Goal Statement – follow template instructions on our website (https://sbmi.uth.edu/prospective-students/admission-requirements.htm)
7. Proposed area of interest for translational practice project
8. A Letter of Support from the healthcare organization willing to facilitate the translational practice project. The Letter of Support must be on the healthcare organization's official letterhead. The Letter of Support should not be from the same person as a Letter of Reference. The Letter of The University of Texas Health Science Center at Houston Support should include background on the healthcare organization (including the indication of size and the type of activities), the area the institution expects the student to perform the project in, and whether or not the organization will provide any type of support (monetary or technical) for the applicant's project.
9. Three letters of reference from supervisors or colleagues. At least two letters should be from supervisors.
10. Interview with the McWilliams School of Biomedical Informatics Admissions, Progression and Graduation (APG) Committee by invitation only. Applicants will also complete a writing assessment as part of the interview process.

Requirements for Applicants with International Coursework

- The Test of English as a Foreign Language (TOEFL) (https://www.ets.org/toefl.html) or the International English Testing System (IELTS) (https://ielts.org/ielts-usa/). For admissions consideration a minimum acceptable score of 94 on the internet-based TOEFL is required or a minimum acceptable overall score of 7.0 on the IELTS is required. Test scores are valid for two years from the test date. The official scores must be submitted directly to GradCAS from the applicable test center. Submit official TOEFL scores by using the reporting code B886; no department code is required. Submit official IELTS scores by sending them to GradCAS; no code is needed. Testing is at the applicant's expense.
- Applicants that have completed coursework outside of the United States and who have received a diploma from a university at which English is the language of instruction are not required to submit an English Language exam. If this school is outside of an English-speaking country, evidence that indicates the language of instruction will need to be provided with your application such as a letter from the University on official letterhead.
- Applicants that have completed coursework outside of the United States must submit official transcripts and a course-by-course education evaluation of all transcripts from all universities attended outside the United States. The application forms for such an evaluation may be obtained online from the service providers; Educational Credential Evaluators, Inc. (ECE) (https://www.ece.org/) and World Education Services (WES) (https://www.wes.org/). Only evaluations from ECE or WES will be accepted. The results of the evaluation must be submitted directly to GradCAS by the agency. The evaluation report is at the applicant's expense.
- International applicants seeking F-1 student sponsorship are not eligible for the DHI Program.

Doctorate in Health Informatics Application Deadline

- Fall admission: March 1

Transfer Credit

Transfer credit for equivalent graduate courses taken elsewhere may be awarded and used to meet degree requirements if their equivalency to a McWilliams School of Biomedical Informatics degree program course is approved through a Petition for Equivalency Credit (PEC). The maximum number of transferable semester credit hours is 21 for the DHI program. Contact the Office of Academic Affairs for information.

Courses that are accepted at McWilliams School of Biomedical Informatics, through a dual or join degree program, can only be transferred in if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer. Courses must have been completed within the last five years to qualify. See "Five-Year Rule (p. 7)."

Students who are presenting coursework from universities or colleges outside the United States to meet admission or graduation requirements are referred to the section on Applicants with International Coursework in this catalog for a listing of additional requirements.

Academic Requirements

Students without a master's degree in health informatics, or a related field, must complete 33 semester credit hours of didactic coursework before starting the DHI curriculum. Students who hold a master's degree in informatics can immediately start the 63-semester credit hour program. A part#time student has up to ten years (30 semesters) from the time of entry to complete the required course work. Continuous enrollment is required unless approval is obtained. Each course with a BMI prefix in the Biomedical Informatics degree plan is a graduate level, professional course and must be passed with a grade of "B" or better. Students must earn a grade of "B" or higher in all dual degree program courses, unless the course is graded on a Pass or Fail basis in which a grade of "Pass" must be earned. If a dual degree student earns less than a "B" in any required course, it must be retaken to continue in the program. A grade of "B" or higher must be earned on the second attempt to prevent dismissal from the program. The minimum grade point average (GPA) required for graduation is 3.0 on all BMI courses.

Each student will develop a degree plan with written approval of their academic advisor. A signed degree plan (https://sbmi.uth.edu/current-students/curriculum/) will be filed each academic year that includes the required and/or elective courses as specified for the student's DHI program.

Computer Requirement

Every student is required to have reliable access to a computer that meets the minimum technical requirements. Students are encouraged to purchase a laptop that meets the minimum school requirements.

Computer requirements are listed on the website (https://sbmi.uth.edu/current-students/student-handbook/computer-requirements.htm) and are subject to change.

Curriculum for the Doctorate in Health Informatics

The DHI program requires a minimum of 63 semester credit hours to earn the degree, for applicants with a master's degree. This includes 30 semester credit hours of required courses, and 33 semester credit hours of coursework focused on translational project advisement, implementation, and evaluation.

Code	Title	Hours
Required Courses		
BMI 5300	Introduction to Biomedical Informatics	3
BMI 6311	Leadership and Decision Making	3
BMI 6316	Change Management for Health Informatics	3
BMI 6324	Health Information Technology Policy	3
BMI 6325	Assessment, Implementation, and Evaluation of Artificial Intelligence in Healthcare	3
BMI 6328	Value in the Health Data Eco-system	3
BMI 6340	Health Information Visualization and Visual Analytics	3
BMI 7350W	Scholarly Foundations of Advanced Health Informatics Practice	3
BMI 7351	Evidence-based Health Informatics Practice	3
BMI 7362: Advanced Project & Vendor Management in Healthcare Informatics [1]		3
Translational Project Courses		

BMI 7170	Project Advisement [2]	3
BMI 7070	Fellowship in Health Informatics [3]	21
BMI 9950	Project Evaluation and Writing [4]	9
Total Hours		**63**

1. New course being added in Summer 2027.
2. BMI 7170 must be repeated for a maximum of 3 semester credit hours to meet the DHI degree requirements.
3. BMI 7070 must be repeated for a maximum of 21 semester credit hours to meet the DHI degree requirements.
4. BMI 9950 must be repeated for a maximum of 9 semester credit hours to meet the DHI degree requirements.

For those entering the program with only a bachelor's degree, the program requires the completion of 93 semester credit hours of McWilliams School of Biomedical Informatics coursework. This includes 60 semester credit hours of required courses and 33 semester credit hours of coursework focused on translational project advisement, implementation, and evaluation.

Code	Title	Hours
Required Courses		
BMI 5300	Introduction to Biomedical Informatics	3
BMI 5301	The US Healthcare System	3
BMI 5305	Legal Ethical Aspects of Health Informat	3
BMI 5313	Foundations of Electronic Health Records and Clinical Information Systems [1]	3
BMI 5315W	Quality & Outcome Improvement in Healthcare	3
BMI 5317	Applied Data Management	3
BMI 5328W	System Analysis and Project Management [2]	3
BMI 5329	Workflow Process Modeling	3
BMI 5371	Business and Technical Communication	3
BMI 6316	Change Management for Health Informatics	3
BMI 6340	Health Information Visualization and Visual Analytics	3
Additional Elective Course		3
BMI 6311	Leadership and Decision Making	3
BMI 6316W	Change Management for Health Informatics	3
BMI 6324	Health Information Technology Policy	3
BMI 6325	Assessment, Implementation, and Evaluation of Artificial Intelligence in Healthcare	3
BMI 6328	Value in the Health Data Eco-system	3
BMI 7350W	Scholarly Foundations of Advanced Health Informatics Practice	3
BMI 7351	Evidence-based Health Informatics Practice	3
BMI 7362: Advanced Project & Vendor Management in Healthcare Informatics [3]		3
Translational Project Courses		
BMI 7170	Project Advisement [4]	3
BMI 7070	Fellowship in Health Informatics [5]	21
BMI 9950	Project Evaluation and Writing [6]	9
Total Hours		**93**

1. $100 Course Fee; $30 Lab Fee
2. $50 Course Fee
3. New course being added in Summer 2027.
4. BMI 7170 must be repeated for a maximum of 3 semester credit hours to meet the DHI degree requirements.
5. BMI 7070 must be repeated for a maximum of 21 semester credit hours to meet the DHI degree requirements.
6. BMI 9950 must be repeated for a maximum of 9 semester credit hours to meet the DHI degree requirements.

Progression Gates and Milestones

The DHI Progression Gates or Milestones are required tasks and assignments that must be completed in a satisfactory manner during each specified semester. The Progression Gates are outlined in the DHI Progression Gates Canvas course. One of these Milestones includes required attendance at all DHI Residency Seminars that take place in Houston (on-campus) or virtually.

Failure to complete any Progression Gate or Milestone can result in a student being referred to McWilliams School of Biomedical Informatics Admissions, Progression & Graduate Committee for student review and potential disciplinary action. Students must resolve all outstanding milestones by the end of the next semester, or submit a timeline outlined by the DHI Program Director or they will be unable to enroll going forward.

Core Progression Gates and Milestones

DHI students are expected to meet the following requirements each semester:

- Attend all DHI Residency Seminars (held in Houston or virtually)
- Complete all Canvas-based Progression Gate Assessments
- Meet course requirements and maintain satisfactory academic standing
- Complete all prerequisite courses prior to advancement
- Have a clearly defined Translational Project with organizational approval
- Complete all requirements mandated by the UTHealth Houston Committee For the Protection of Human Subjects

Academic Advising

DHI students must work closely with their Academic Advisor regarding any issues related to the completion of Progression Gates and Milestones.

Translational Project Requirement

To remain in good standing, DHI students must maintain a defined Translational Project throughout their time in the program. Should a DHI student be without a project, the following protocols will take place:

- Failure to have a defined project for **two consecutive semesters** may result in **dismissal** from the program.
- Students who do not have an **approved and clearly defined project prior to the qualifying exam** will have their exam **postponed to the following academic year**.

Qualifying Exam

The goals of the DHI qualifying exam are:

1. To motivate students to review and synthesize course work and reported evidence-based practice

2. To determine the student's ability to understand and apply fundamental concepts
3. To develop and test the student's ability to communicate orally and to respond to questions and comments
4. To evaluate the student's potential to pursue doctoral-level work
5. To identify areas needing strengthening for the student to be successful as a DHI student and informatics leader
6. To provide a mechanism for faculty to come to know the student's capabilities

Students should prepare for a comprehensive qualifying exam upon completion of the second summer semester or after completion of their 33rd semester credit hour. The plan for the qualifying exam will be developed in conjunction with the student's academic advisor.

The qualifying exam consists of demonstration of competency with both:

Domain-Specific Knowledge

Demonstration knowledge, understanding, and proficiency in domain specific content and methodology. One of the purposes is to challenge students to discover relevant literature and deepen their knowledge of interests within this track.

Breadth of Knowledge across the discipline

Demonstrate breadth of knowledge across health sciences disciplines through questions that require synthesis of knowledge from core areas.

General Structure of the Exam

1. Topics for the exam will include materials covered in the Required Courses and materials selected within a specific domain. The domain specific reading list will be developed in conjunction with the student's Committee Chair/Advising Committee.
2. Students will complete a written exam including both domain general and domain specific questions.
3. In addition to the written exam, students will prepare their translational project proposal and deliver a public presentation of the translational project proposal.
4. Following the written exam and public presentation, the student, Advising Committee, and DHI Qualifying Exam Committee will take part in a closed question and answer session (1-2 hours) over the written exam and public defense.

Submission deadlines for materials related to the qualifying exam (e.g., list of references, translational project proposal to committee) will follow a set timeline following the student's declaration of intent.
All components of the qualifying exam must be completed within the published dates associated with your declaration of intent to site for the qualifying exam.

The qualifying exam dossier will contain the following items:

1. Current CV or resume
2. Abstract of DHI Oral Translational Project Proposal Presentation
   a. Students must work with their Chair and Committee to complete this item.
3. Written Draft of DHI Translational Project Paper
4. List of references (30-50 articles) supporting three domain areas related to the student's proposed translational project.
   a. Students should discuss these areas with their advisor in the process of planning their graduate program and prior to preparation of their qualifying exam materials.
5. All previously completed Individualized Development Plans

Grading

The Advising Committee and DHI Qualifying Exam Committee will assign one of the following grades to the overall qualifying exam:

1. Pass unconditionally
2. Pass conditionally (Advising Committee together with the DHI Qualifying Exam Committee to specify the conditions needed to pass, such as remedial coursework needed)
3. Fail with option to retake
4. Fail without option to retake

A student must be successful on each element of the qualifying exam to achieve pass unconditionally. The Advising Committee decision, together with the DHI Qualifying Exam Committee decision, will determine the specific requirements for options of a conditional pass or options to retake (e.g., retake the written and the oral, oral only, remediate with additional coursework.)

If given the option to retake, students will be allowed to retake any specified portion of the exam once. Efforts to retake the progression sequence must be completed within 12 weeks. Failure to progress after this point will result in dismissal from the program.

Upon successful completion of all components of the Qualifying Exam, the DHI student will have advanced to Candidacy for the Doctorate in Health Informatics.

Translational Project

The DHI culminates with a translational project and a project evaluation report. Students in the program will work on didactic courses and translational project work simultaneously. Students identify a project and primary advisor during the first semester of study and invite two additional committee members during the second semester.

The Project Advisement course is taken as the student works with an advisor and committee to prepare the project plan. At the end of the student's first year, a tentative timeline for the completion of the DHI program and translational project must be submitted.

The translational project requires:

- Section 1: Introduction
- Section 2: Evidence-Based Practice Review
- Section 3: Methodology (Setting and Project Design)
- Section 4: Results
- Section 5: Discussion
- Section 6: Study Limitations
- Section 7: Conclusions
- References
- About Appendices (as needed)
- Appendix A: Glossary of Terms
- Appendix B: Project Management Plan
- Appendix C: Return on Investment (ROI)/Cost-Benefit Analysis

After completing the translational project, the student must present the findings. The presentation must be presented at an oral session that is

open to the public. Translational project documents authored by degree candidates are available to interested members of the general public upon request. After the presentation, the translational project committee votes to pass or fail the student. If the student passes and all other degree requirements are met, the translational project committee makes its recommendation for the degree to be awarded.

Petitioning for Extension

Students who have exceeded their time to degree deadline or a milestone deadline for the qualifying exam or project defense may petition APG for an extension. The Petition to Extend Time Boundary for Qualifying Exam form or Translational Practice Project Defense form can be found here (https://sbmi.uth.edu/current-students/forms.htm).

For further curriculum information, please contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, Texas 77030
Telephone: (713) 500#3591
Email: SBMIAcademics@uth.tmc.edu

Biomedical Informatics (Accelerated Master's)

Program Description and Goals

Undergraduate students have the opportunity to earn both a Bachelor of Arts/Science and a Master of Science in Biomedical Informatics over the course of five years through the Accelerated Master's Program. The program is an integrated program that overlaps graduate curriculum into the student's undergraduate work, which provides the opportunity to graduate with the bachelor's at the same time as their Graduate Certificate in Biomedical Informatics. The student's undergraduate degree program must be in an appropriate area, e.g., biomedical science, pre-med, nursing, health sciences, life sciences, management information systems, or computer science to qualify for admission to the Accelerated Master's 4+1 Program.

McWilliams School of Biomedical Informatics has collaboration agreements with the following institutions whose students are eligible to participate in this integrated curriculum:

- Our Lady of the Lake University (OLLU)
- Texas A&M International University (TAMIU)
- Tuskegee University
- University of Texas Rio Grande Valley (UTRGV)

The student will graduate with an undergraduate degree in their selected major course of study, but will also have the opportunity to complete a master's degree in Biomedical Informatics in one additional year instead of the customary two years.

Upon completion of the 15-semester credit hour certificate, students will be awarded a certificate of completion from McWilliams School of Biomedical Informatics at UTHealth Houston. A transcript showing graduate credits may be obtained from the Registrar's Office.

Curriculum for Certificate Programs

The course requirements for earning both the undergraduate degree and graduate certificate from the school will vary by participating institution. Please contact the McWilliams School of Biomedical Informatics Accelerated Master's 4+1 Program Coordinator for additional information.

For further curriculum information, please contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, Texas 77030
Telephone: (713) 500#3591
Email: SBMIAcademics@uth.tmc.edu

Admission to the Accelerated Masters 4 + 1 Program

The admission process for the Accelerated Masters 4 + 1 program requires the submission of both a Pre-Application (https://sbmi.uth.edu/prospective-students/academics/4-plus-1-uam.htm) and a McWilliams School of Biomedical Informatics application. Both applications must include all supplemental documents.

Step 1:

4+1 PRE-APPLICATION

Prospective students are to complete the 4 + 1 Pre-Application where the applicant will upload the following items:

1. Copy of Degree Audit or unofficial transcripts from the student's undergraduate institution
2. One Letter of Reference/Recommendation
3. Essay Question

See the Accelerated Masters 4 + 1 Program admission requirements webpage (https://sbmi.uth.edu/prospective-students/academics/4-plus-1-uam.htm) for additional information.

All documents for the Pre-Application must be submitted by October 1st for the Spring admission deadline, February 1st for the Summer admission deadline, and June 1st for the Fall admission deadline.

Candidates who successfully make it through the pre-application process will be cleared to begin step 2.

Step 2:

INTERVIEW

Upon meeting the requirements in Step 1, If the pre-application is approved, candidates will be contacted to have an interview with the 4+1 admissions committee.

Step 3:

MCWILLIAMS SCHOOL OF BIOMEDICAL INFORMATICS APPLICATION

Upon meeting the requirements in Step 1 and Step 2 (the recommendation of the admissions committee), pre-approved candidates will then submit an application to the Graduate Certificate program.

The applicant should present a completed application and official documentation through GradCAS of the following:

1. $38 application fee
2. Official transcripts from ALL colleges and universities attended in the US.
   - Any dual credit or AP credits must be verified on the transcript from the present college or an official transcript from the awarding college or program.
   - Courses or degrees completed outside of the US must have a WES (https://www.wes.org/evaluations-and-fees/) or ECE (https://www.ece.org/ECE/Credential-Evaluations/) course-by-course transcript evaluation with GPA calculation
   - Grade Point Average (GPA): no minimum GPA requirement. Recommended cumulative GPA of 3.0 or higher.
3. Personal Goal statement
4. One Letter of Reference/Recommendation
5. Resume and/or Curriculum Vitae (as appropriate)

Application deadlines

- Fall admission: July 1
- Spring admission: November 1
- Summer admission: March 1

Any student receiving a grade of less than a "B" in a required or elective course must retake the course and receive a grade of "B" or higher to continue on in their academic program. The original grade of "C" will remain on the student transcript. Students are not permitted to earn more than two grades of "C". The third grade of "C" will result in dismissal from McWilliams School of Biomedical Informatics.

No grade lower than a "B" will be accepted for transfer into the McWilliams School of Biomedical Informatics master's or doctoral program.

Biomedical Informatics (MS/MD)

Program Description and Goals

The MS/MD Dual Degree pathway program is for students aiming to be both physicians and informaticians. Through this unique program, students earning a Doctor of Medicine (MD) also study at McWilliams School of Biomedical Informatics at UTHealth Houston and earn a Master of Science in Biomedical Informatics during their four years of medical school.

Our school collaborates with three different medical schools to offer the dual degree:

- McGovern Medical School at UTHealth Houston
- University of Texas Rio Grande Valley (UTRGV) School of Medicine
- Baylor College of Medicine (BCM) - Temple and Houston Campuses

Dual Degree students will explore the wide range of applications of health and biomedical informatics in the quest to improve patient care. The program examines both electronic health records systems and clinical decision support systems and methods for enhancing those tools. Students learn about data interpretation and knowledge management as they discover how to collect, process, and transform health and biomedical data into health information and knowledge. Dual Degree students will understand core clinical informatics disciplines such as technology assessment, quality and outcome improvement, data analytics and precision medicine.

Students in the dual degree program must satisfy admission requirements and be admitted separately to each program. Students must meet the requirements of each program for its respective degree. Admission to one program does not ensure admission to the other. Students in the dual degree program will receive a diploma from each degree program after meeting the individual requirements of each program. Admission does not have to be done at the same semester for each school but must be done before reaching the maximum hours set by each School.

Master of Science in Biomedical Informatics Admission Process – MS/MD Program

The applicant should present a completed application and official documentation of the following:

1. Copy of Medical School admission letter if you are a new student with no Medical School enrollment. If you are already enrolled in Medical School, a letter of good academic standing that includes the applicant's academic year of medical school.
2. Official Transcripts from all colleges and universities attended
3. Goal Statement – follow template instructions on our website (https://sbmi.uth.edu/prospective-students/admission-requirements.htm)
4. A resume or curriculum vitae (as appropriate)
5. Three letters of reference from educators and/or employers
6. Students with international college transcripts must submit a course-by-course evaluation report by either World Education Services or Educational Credential Evaluators.
7. For International Applicants: A minimum TOELF score of 94 is acceptable on the internet-based test. A minimum acceptable score for the IELTS is a 7.

Applicant materials will be reviewed by the McWilliams School of Biomedical Informatics Admissions, Progression and Graduation (APG) Committee. The committee will consider such areas as:

- Health, MIS, Computer, or Engineering related degree
- Healthcare work experience
- Database work experience
- Informatics work experience
- Demonstrated expertise in programming
- GPA in previous degree
- Success in overcoming social, economic or educational disadvantages, race and ethnicity

Requirements for Applicants with International Coursework

- The Test of English as a Foreign Language (TOEFL) (https://www.ets.org/toefl.html) or the International English Testing System (IELTS) (https://ielts.org/ielts-usa/). For admissions consideration a minimum acceptable score of 94 on the internet-based TOEFL is required or a minimum acceptable overall score of 7.0 on the IELTS is required. Test scores are valid for two years from the test date. The official scores must be submitted directly to GradCAS from

the applicable test center. Submit official TOEFL scores by using the reporting code B886; no department code is required. Submit official IELTS scores by sending them to GradCAS; no code is needed. Testing is at the applicant's expense.

- Applicants that have completed coursework outside of the United States and who have received a diploma from a university at which English is the language of instruction are not required to submit an English Language exam. If this school is outside of an English-speaking country, evidence that indicates the language of instruction will need to be provided with your application such as a letter from the University on official letterhead.
- Applicants must submit official transcripts and a course-by-course education evaluation of all transcripts from all universities attended outside the United States. The application forms for such an evaluation may be obtained online from the service providers; Educational Credential Evaluators, Inc. (ECE) (https://www.ece.org) and World Education Services (WES) (https://www.wes.org). Only evaluations from ECE or WES will be accepted. The results of the evaluation must be submitted directly to GradCAS by the agency. The evaluation report is at the applicant's expense.
- International applicants seeking F-1 student sponsorship are not eligible for this dual degree program.

MS/MD Dual Degree Program Application Deadlines

- Fall admission: July 1
- Spring admission: November 1
- Summer admission[1]: March 1

[1] International applicants seeking F-1 sponsorship are not eligible for summer admission to the Master of Science in Biomedical Informatics.

MS/MD Program Application Process

The application process for the Doctor of Medicine is determined by the McGovern Medical School at UTHealth Houston, the UTRGV School of Medicine, or Baylor College of Medicine, respectively. The application process for the Master of Science in Biomedical Informatics is determined by the McWilliams School of Biomedical Informatics.

Transfer Credit

Transfer credit is not accepted for students enrolled in the dual degree program due to the amount of shared credit hours between McWilliams School of Biomedical Informatics and the participating institution.

Shared Credit Hours

Courses that are being accepted at McWilliams School of Biomedical Informatics, through a dual or joint degree program, can only be transferred into the McWilliams School of Biomedical Informatics degree plan if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer.

MD/MS Program Requirements for the Master of Science in Biomedical Informatics

Academic Requirements

Each student follows a degree plan developed with the guidance of the Office of Academic Affairs at McWilliams School of Biomedical Informatics. A signed degree plan (https://sbmi.uth.edu/current-students/curriculum/) will be filed each academic year that includes the required and/or elective courses as specified for the student's dual degree program. A total of 39 semester credit hours must be completed prior to graduation.

A student in the MD/MS Program in Biomedical Informatics has up to eight years (24 semesters) from the time of entry to complete the required course work. A student who has not enrolled in two consecutive registration periods (including the summer session) will have an academic hold placed on their myUTH account by the McWilliams School of Biomedical Informatics Office of Academic Affairs. Students with an academic hold will need to discuss their academic degree plan with their academic advisor to have the hold removed and be allowed to enroll in future courses. A student who has not enrolled for three or more consecutive registration periods will be dismissed and must reapply for admission to the program and the School.

Each course with a BMI prefix in the Biomedical Informatics degree plan is a graduate level, professional course and must be passed with a grade of "B" or better. Students must earn a grade of "B" or higher in all dual degree program courses, unless the course is graded on a Pass or Fail basis in which a grade of "Pass" must be earned. If a dual degree student earns less than a "B" in any required course, it must be retaken to continue in the program. A grade of "B" or higher must be earned on the second attempt to prevent dismissal from the program. The minimum grade point average (GPA) required for graduation is 3.0 on all BMI courses.

Computer Requirement

Every student is required to have reliable access to a computer that meets the minimum requirements. Students are encouraged to purchase a laptop that meets the minimum UTHealth Houston requirements. Computer requirements are listed on the website (https://sbmi.uth.edu/current-students/student-handbook/computer-requirements.htm) and are subject to change.

Curriculum for the MD/MS Master of Science in Biomedical Informatics Program

The MD/MS program requires a minimum of 39 semester credit hours to earn the MS, including the completion of a practicum experience in the field of biomedical informatics. Students must complete 27 semester credit hours of McWilliams School of Biomedical Informatics coursework and 12 semester credit hours from the student's MD program are accepted. The program curriculum for the MS degree includes:

Code	Title	Hours
Required Courses		
BMI 5300	Introduction to Biomedical Informatics	3
BMI 5310	Foundations of Biomedical Information Sciences I	3

BMI 5311	Foundations of Biomedical Information Sciences II	3
BMI 6313	Scientific Writing in Healthcare	3
BMI 6000	Practicum in Biomedical Informatics	3
Area of Interest Courses		
Select four courses [1]		12
Medical School Modules		
Select three to five modules		12
Total Hours		**39**

[1] Students will work with Office of Academic Affairs staff and McWilliams School of Biomedical Informatics faculty when selecting the courses to ensure that the elective courses meet program requirements.

McGovern Medical School at UTHealth Houston Modules accepted by McWilliams School of Biomedical Informatics for the Dual Degree Pathway Program

Code	Title	Hours
BSCI 1101	Doctoring 1: History and Physical Exam P/F	4
BSCI 1204	Doctoring 2:Longitudinal Clinical Experience	4
BSCI 2102	Doctoring 3: Longitudinal Clinical Experience	4
Total Hours		**12**

UTRGV School of Medicine Modules accepted by McWilliams School of Biomedical Informatics for the Dual Degree Pathway Program

Code	Title	Hours
MEDI 8117: Molecules to Medicine Module (MS Year 1)		3
MEDI 8119: Attack & Defense (Evidence Based Medicine) (MS Year 1)		3
MEDI 8111-01 & 8111-02: Medicine, Behavior & Society (MS Year 1 & 2)		3
MEDI 8511: Mind, Brain and Behavior (MS Year 2)		3
Total Hours		**12**

Baylor College of Medicine Modules accepted by McWilliams School of Biomedical Informatics for the Dual Degree Pathway Program

Code	Title	Hours
MBPP2-Main: Patient, Physician and Society I (MS Year 1)		1
MBPP3-Main: Patient, Physician and Society II (MS Year 1)		3
Clinical Application of Basic Sciences: Evidence Based Medicine (MS Year 2)		2
Clinical Application of Basic Sciences: Business & Leadership in Medicine (MS Year 2)		3
Research and Populations in Medicine (MS Year 1)		3
Total Hours		**12**

Practicum

Students in the Master of Science in Biomedical Informatics must select an area of interest in which to apply the knowledge and skill gained during the didactic courses while participating in the required practicum course. Students in the MD/MS program must complete at least 24 credit hours in their master's program before participating in the practicum requirement. Students should work with the Practicum Coordinator for any necessary affiliation or program agreements with the practicum site, if agreements are not already in place. A practicum proposal must be submitted to the Practicum Coordinator by week three of the semester of enrollment in the practicum course and it must be approved, in writing, by the student's Faculty Practicum Advisor. Students can complete all required practicum credit hours during one semester or the course can be repeated for a maximum of 3 semester credit hours (for BMI 6000 Practicum in Biomedical Informatics) to meet degree requirements. During the course of the semester(s), student must create weekly logs to chronicle their hours, tasks, and reflections on how the duties of the practicum relate to Biomedical Informatics courses taken. Once the student has logged all 135 contact hours and concluded all practicum projects, she or he must create an 18-page, double spaced capstone report that details the major project they completed during their practicum. This report, along with other deliverables, will be submitted in completion of the practicum. If students have any questions regarding the practicum, they can contact the Practicum Coordinator or the Office of Academic Affairs.

For further curriculum information, please contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, Texas 77030
Telephone: (713) 500#3591
Email: SBMIAcademics@uth.tmc.edu

Biomedical Informatics (MS/MPH)

Program Description and Goals

The Master of Science in Biomedical Informatics/Master of Public Health dual degree program combines the MS degree from the McWilliams School of Biomedical Informatics at UTHealth Houston with the MPH from the UTHealth Houston School of Public Health. The training and curriculum in the dual degree program will provide students and future leaders in public health with the necessary skills to be leaders in the field of Public Health Informatics. The dual degree program provides an integrated curriculum that includes a number of shared courses as well as a practicum experience.

Students in the dual degree program must be admitted separately to each UTHealth Houston school. Students must meet the requirements of each UTHealth Houston school for its respective degree. Admission to one program does not ensure admission to the other. Students in the dual degree program will receive a diploma from each degree program after meeting the individual requirements of each UTHealth Houston school. Admission does not have to be done at the same semester for each school, but must be done before reaching the maximum hours set by each school.

Master of Science in Biomedical Informatics Admission Process – MS/MPH Dual Degree Program

The applicant should present a completed application and official documentation of the following:

1. A baccalaureate degree or higher
2. Official transcripts from all colleges and universities attended

3. Goal Statement – follow template instructions on the school's website (https://sbmi.uth.edu/prospective-students/admission-requirements.htm)
4. A resume or curriculum vitae (as appropriate)
5. Three letters of reference from educators and/or employers
6. Students with international college transcripts must submit a course-by-course evaluation report by either World Education Services or Educational Credential Evaluators.
7. For International Applicants: A minimum TOEFL score of 94 is acceptable on the internet-based test. A minimum acceptable score for the IELTS is a 7.

Applicant materials will be reviewed by the McWilliams School of Biomedical Informatics Admissions, Progression and Graduation (APG) Committee. The committee will consider such areas as:

- Health, MIS, Computer, or Engineering related degree
- Healthcare work experience
- Database work experience
- Informatics work experience
- Demonstrated expertise in programming
- GPA in previous degree
- Success in overcoming social, economic or educational disadvantages, race and ethnicity

Requirements for Applicants with International Coursework

- The Test of English as a Foreign Language (TOEFL) (https://www.ets.org/toefl.html) or the International English Testing System (IELTS) (https://ielts.org/ielts-usa/). For admissions consideration a minimum acceptable score of 94 on the internet-based TOEFL is required or a minimum acceptable overall score of 7.0 on the IELTS is required. Test scores are valid for two years from the test date. The official scores must be submitted directly to GradCAS from the applicable test center. Submit official TOEFL scores by using the reporting code B886; no department code is required. Submit official IELTS scores by sending them to GradCAS; no code is needed. Testing is at the applicant's expense.
- Applicants that have completed coursework outside of the United States and who have received a diploma from a university at which English is the language of instruction are not required to submit an English Language exam. If this school is outside of an English-speaking country, evidence that indicates the language of instruction will need to be provided with your application such as a letter from the University on official letterhead.
- Applicants that have completed coursework outside of the United States must submit official transcripts and a course-by-course education evaluation of all transcripts from all universities attended outside the United States. The application forms for such an evaluation may be obtained online from the service providers; Educational Credential Evaluators, Inc. (ECE) (https://www.ece.org) and World Education Services (WES) (https://www.wes.org). Only evaluations from ECE or WES will be accepted. The results of the evaluation must be submitted directly to GradCAS by the agency. The evaluation report is at the applicant's expense.
- International applicants seeking F-1 student sponsorship are not eligible for this dual degree program.

MS/MPH Dual Degree Program - Master of Science in Biomedical Informatics Application Deadlines

- Fall admission: July 1
- Spring admission: November 1
- Summer admission: March 1

Transfer Credit

Transfer credit is not accepted for students enrolled in the dual degree program due to the amount of shared credit hours between McWilliams School of Biomedical Informatics and the School of Public Health (SPH).

Shared Credit Hours

Courses that are accepted at McWilliams School of Biomedical Informatics, through a dual or joint degree program, can only be transferred into the McWilliams School of Biomedical Informatics degree plan if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer.

Academic Requirements

Each student follows a degree plan developed with the Dual Degree Program Coordinator. A signed degree plan, found here (https://sbmi.uth.edu/current-students/curriculum/), will be filed each academic year that includes the required and/or elective courses as specified for the student's Dual Degree program. A total of 40 semester credit hours must be completed prior to graduation.

A student in the dual degree MS/MPH Program in Biomedical Informatics has up to eight years (24 semesters) from the time of entry to complete the required course work. A student who has not enrolled in two consecutive registration periods (including the summer session) will have an academic hold placed on their myUTH account by the McWilliams School of Biomedical Informatics Office of Academic Affairs. Students with an academic hold will need to meet to discuss their academic degree plan with their academic advisor to have the hold removed and be allowed to enroll in future courses. A student who has not enrolled for three or more consecutive registration periods will be dismissed and must reapply for admission to the program and the School.

Each course with a BMI prefix in the Biomedical Informatics degree plan is a graduate-level course and should be passed with a grade of "B" or better. Students who earn a grade of "C" must retake the course, whether a required or elective course, and earn a grade of "B" or higher to continue on in their academic program. The course must be retaken the next semester the course is offered. The original grade of "C" will remain on the student transcript. All students who earn a grade of "C" will be placed on Academic Probation. Students are not permitted to earn more than two grades of "C". The third grade of "C" will result in dismissal from the school. The minimum grade point average (GPA) required for graduation is 3.0 on all courses.

Courses that are being accepted at McWilliams School of Biomedical Informatics, through a dual or joint degree program, can only be transferred in if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer. Courses must have been completed within the last five years to qualify. See "Five(5)-Year Rule (p. 7)".

A maximum of six credit hours of Directed Study can be applied toward the MS in Biomedical Informatics program.

Computer Requirement

Every student is required to have reliable access to a computer that meets the minimum requirements. Students are encouraged to purchase a laptop that meets the minimum UTHealth Houston requirements.

Computer requirements are listed on the school's website (https://sbmi.uth.edu/current-students/student-handbook/computer-requirements.htm) and are subject to change.

Curriculum for MS/MPH Dual Degree

The curriculum for the Master of Science in Biomedical Informatics and the Master of Public Health include required didactic courses and a practicum. Didactic courses (lecture/discussion, demonstration and student laboratories) are presented to provide facts, concepts, and theories related to the techniques and procedures of public health courses, and support courses. The public health informatics practicum is designed to give the students the opportunity to apply theory and techniques in the hospital, research, community health agencies or private laboratory setting.

Each student will develop a degree plan with written approval from their faculty advisor.

Code	Title	Hours
BMI 5300	Introduction to Biomedical Informatics	3
BMI 5310	Foundations of Biomedical Information Sciences I	3
BMI 5311	Foundations of Biomedical Information Sciences II	3
BMI 5380	Principles and Foundations of Public Health Informatics	3
BMI 6313	Scientific Writing in Healthcare	3
BMI 6000	Practicum in Biomedical Informatics	3
PHM 1690L	Introduction to Biostatistics in Public Health	4
PHM 2612L	Introduction to Epidemiology	3
PHM 1110L	Health Promotion and Behavioral Sciences in Public Health	3
PHM 3715L	Management & Policy Concepts in Public Health	3
PHM 2110L	Public Health Ecology & the Human Environment	3
Elective Courses		6
Total Hours		**40**

Changes to the degree plan must be approved in advance by the faculty advisor and the signed degree plan must be on file with the Office of Academic Affairs prior to course registration.

- Master's in Biomedical Informatics (MS): 40 Required Semester Credit Hours
- Master's in Public Health (MPH): 45 Required Semester Credit Hours
- Total Semester Credits: 85
- Shared Courses: -25
- Grand Total for Combined Degrees: 60

Practicum

Students in the McWilliams School of Biomedical Informatics master's program must select an area of interest in which to apply the knowledge and skill gained during the didactic courses while participating in the required practicum course. Students must complete at least 24 credit hours in their master's program before participating in the practicum requirement. Students should work with the McWilliams School of Biomedical Informatics Practicum Coordinator for any necessary affiliation or program agreements with the practicum site, if agreements are not already in place. A practicum proposal must be submitted to the Practicum Coordinator by week three of the semester of enrollment in the practicum course, and it must be approved, in writing, by the student's Faculty Practicum Advisor. Students can complete all required practicum credit hours during one semester or the course can be repeated for a maximum of 3 semester credit hours (for BMI 6000 Practicum in Biomedical Informatics) to meet degree requirements. During the course of the semester(s), student must create weekly logs to chronicle their hours, tasks, and reflections on how the duties of the practicum relate to Biomedical Informatics courses taken. Once the student has logged all 135 contact hours and concluded all practicum projects, she or he must create an 18-page APA format double spaced capstone report that details the major project they completed during their practicum. This report, along with other deliverables, will be submitted in completion of the practicum. If the student receives an incomplete for practicum, the student will have the following semester to complete it or receive an "F". If students have any questions regarding the practicum, they can contact the Practicum Coordinator or the McWilliams School of Biomedical Informatics Office of Academic Affairs.

For further curriculum information, contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, Texas 77030
Telephone: (713) 500#3591
Email: SBMIAcademics@uth.tmc.edu

Biomedical Informatics (MS/PharmD)

Program Description and Goals

The PharmD/MS Dual Degree program is for students aspiring to be both pharmacists and informaticians. Through this unique program, students earning a Doctor of Pharmacy (PharmD) at the University of Texas at Austin (UT Austin) College of Pharmacy also study at McWilliams School of Biomedical Informatics at UTHealth Houston and earn a Master of Science in Biomedical Informatics during their four years of pharmacy school.

Dual Degree students will learn important skills focused on medication-related patient care and improved health outcomes. Students will discover the importance of informatics practices while managing medication-related information in electronic health records, pharmacy information systems, and other automated systems. The program will explore the benefits and limitations to information systems in a pharmacy practice, standards and regulation in the design and use of information systems in pharmacy practice, health information systems and automation technologies and their impact on the medication-use process, and evaluation of patient safety, clinician satisfaction, workflow and outcomes in pharmacy informatics practice.

Students in the dual degree program must satisfy admission requirements and be admitted separately to each program. Students must meet the requirements of each program for its respective degree. Admission to one program does not ensure admission to the other.

Students in the dual degree program will receive a diploma from each degree program after meeting the individual requirements of each program. Admission does not have to be done at the same semester for each school but must be done before reaching the maximum hours set by each School.

Master of Science Biomedical Informatics Admission Process - PharmD/MS Program

The applicant should present a completed application and official documentation of the following:

1. Copy of UT Austin College of Pharmacy admission letter for new students, and for students already enrolled in UT Austin's College of Pharmacy, a letter of good academic standing that includes the applicant's academic year of pharmacy school.
2. A Verification of Enrollment form must be signed and completed by UT Austin College of Pharmacy Advising Coordinator. This form can be located in our website (https://sbmi.uth.edu/prospective-students/admission-requirements.htm) in the admission requirements section.
3. Official Transcripts from all colleges and universities attended
4. Goal Statement – follow template instructions on our website (https://sbmi.uth.edu/prospective-students/admission-requirements.htm)
5. A resume or curriculum vitae (as appropriate)
6. Three letters of reference from educators and/or employers
7. Students with international college transcripts must submit a course-by-course evaluation report by either World Education Services or Educational Credential Evaluators.
8. For International Applicants: A minimum TOELF score of 94 is acceptable on the internet-based test. A minimum acceptable score for the IELTS is a 7.

Applicant materials will be reviewed by the McWilliams School of Biomedical Informatics Admissions, Progression and Graduation (APG) Committee. The committee will consider such areas as:

- Health, MIS, Computer, or Engineering related degree
- Healthcare work experience
- Database work experience
- Informatics work experience
- Demonstrated expertise in programming
- GPA in previous degree
- Success in overcoming social, economic or educational disadvantages, race and ethnicity

Requirements for Applicants with International Coursework

- The Test of English as a Foreign Language (TOEFL) (https://www.ets.org/toefl.html) or the International English Testing System (IELTS) (https://ielts.org/ielts-usa/). For admissions consideration a minimum acceptable score of 94 on the internet-based TOEFL is required or a minimum acceptable overall score of 7.0 on the IELTS is required. Test scores are valid for two years from the test date. The official scores must be submitted directly to GradCAS from the applicable test center. Submit official TOEFL scores by using the reporting code B886; no department code is required. Submit official IELTS scores by sending them to GradCAS; no code is needed. Testing is at the applicant's expense.
- Applicants that have completed coursework outside of the United States and who have received a diploma from a university at which English is the language of instruction are not required to submit an English Language exam. If this school is outside of an English-speaking country, evidence that indicates the language of instruction will need to be provided with your application such as a letter from the University on official letterhead.
- Applicants must submit official transcripts and a course-by-course education evaluation of all transcripts from all universities attended outside the United States. The application forms for such an evaluation may be obtained online from the service providers; Educational Credential Evaluators, Inc. (ECE) (https://www.ece.org) and World Education Services (WES) (https://www.wes.org). Only evaluations from ECE or WES will be accepted. The results of the evaluation must be submitted directly to GradCAS by the agency. The evaluation report is at the applicant's expense.
- International applicants seeking F-1 student sponsorship are not eligible for this dual degree program.

PharmD/MS Dual Degree Program - Master of Science in Biomedical Informatics Application Deadlines

- Fall admission: July 1
- Spring admission: November 1
- Summer admission[1]: March 1

[1] International applicants seeking F-1 sponsorship are not eligible for summer admission to the Master of Science in Biomedical Informatics.

PharmD/MS Program Application Process

The application process for the Doctor of Pharmacy is determined by the University of Texas at Austin College of Pharmacy. The application process for the Master of Science in Biomedical Informatics is determined by McWilliams School of Biomedical Informatics at UTHealth Houston.

Transfer Credit

Transfer credit is not accepted for students enrolled in the dual degree program due to the amount of shared credit hours between McWilliams School of Biomedical Informatics at UTHealth Houston and the participating institution.

Shared Credit Hours

Courses that are being accepted at McWilliams School of Biomedical Informatics, through a dual or joint degree program, can only be transferred into the McWilliams School of Biomedical Informatics degree plan if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer.

Academic Requirements

Each student follows a degree plan developed with the guidance of McWilliams School of Biomedical Informatics Office of Academic Affairs. A signed degree plan (https://sbmi.uth.edu/current-students/curriculum/) will be filed each academic year that includes the required and/or elective courses as specified for the student's dual degree

program. A total of 39 semester credit hours must be completed prior to graduation.

A student in the PharmD/MS Program in Biomedical Informatics has up to eight years (24 semesters) from the time of entry to complete the required course work. A student who has not enrolled in two consecutive registration periods (including the summer session) will have an academic hold placed on their myUTH account by the McWilliams School of Biomedical Informatics Office of Academic Affairs. Students with an academic hold will need to discuss their academic degree plan with their academic advisor to have the hold removed and be allowed to enroll in future courses. A student who has not enrolled for three or more consecutive registration periods will be dismissed and must reapply for admission to the program and the School.

Each course with a BMI prefix in the Biomedical Informatics degree plan is a graduate level, professional course and must be passed with a grade of "B" or better. Students must earn a grade of "B" or higher in all dual degree program courses, unless the course is graded on a Pass or Fail basis in which a grade of "Pass" must be earned. If a dual degree student earns less than a "B" in any required course, it must be retaken to continue in the program. A grade of "B" or higher must be earned on the second attempt to prevent dismissal from the program. The minimum grade point average (GPA) required for graduation is 3.0 on all BMI courses.

Computer Requirement

Every student is required to have reliable access to a computer that meets the minimum requirements. Students are encouraged to purchase a laptop that meets the minimum UTHealth Houston requirements. Computer requirements are listed on the website (https://sbmi.uth.edu/current-students/student-handbook/computer-requirements.htm) and are subject to change.

Curriculum

The PharmD/MS program requires a minimum of 39 semester credit hours to earn the MS, including the completion of a practicum experience in the field of biomedical informatics. Students must complete 27 semester credit hours of McWilliams School of Biomedical Informatics coursework and 12 semester credit hours from the student's PharmD program are accepted by McWilliams School of Biomedical Informatics for the Dual Degree.

The program curriculum for the MS degree includes:

Code	Title	Hours
Informatic Courses		
BMI 5300	Introduction to Biomedical Informatics	3
BMI 5310	Foundations of Biomedical Information Sciences I	3
BMI 5311	Foundations of Biomedical Information Sciences II	3
BMI 6313	Scientific Writing in Healthcare	3
BMI 6000	Practicum in Biomedical Informatics	3
Elective Courses		
BMI 5328W	System Analysis and Project Management [1]	3
BMI 5390	Methods in Pharmacy Informatics	3
BMI 5391	Synthesis Project in Pharmacy Informatics	3
BMI 6316	Change Management for Health Informatics	3
or BMI 6340	Health Information Visualization and Visual Analytics	
UT Austin College of Pharmacy Courses		
PHM 295Q: Drug Information & Evidence-Based Practice		2
PHM 295R: Advanced Evidence-Based Practice		2
PHM 283L: Health Behavior and Health Outcomes		2
PHM 384L: Pharmacy and the U.S. Health Care System		3
PHM 394F: Principles of Pharmacoeconomics and Pharmacy Management		3
Total Hours		**39**

[1] $50 Course Fee

Practicum

Students in the Master of Science in Biomedical Informatics must select an area of interest in which to apply the knowledge and skill gained during the didactic courses while participating in the required practicum course. Students in the PharmD/MS program must complete at least 24 credit hours in their master's program before participating in the practicum requirement. Students should work with the Practicum Coordinator for any necessary affiliation or program agreements with the practicum site, if agreements are not already in place. A practicum proposal must be submitted to the Practicum Coordinator by week three of the semester of enrollment in the practicum course and it must be approved, in writing, by the student's Faculty Practicum Advisor. Students can complete all required practicum credit hours during one semester or the course can be repeated for a maximum of 3 semester credit hours (for BMI 6000 Practicum in Biomedical Informatics) to meet degree requirements. During the course of the semester(s), student must create weekly logs to chronicle their hours, tasks, and reflections on how the duties of the practicum relate to Biomedical Informatics courses taken. Once the student has logged all 135 contact hours and concluded all practicum projects, she or he must create an 18-page, double spaced capstone report that details the major project they completed during their practicum. This report, along with other deliverables, will be submitted in completion of the practicum. If students have any questions regarding the practicum, they can contact the Practicum Coordinator or the Office of Academic Affairs.

For further curriculum information, please contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, Texas 77030
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Biomedical Informatics (PhD/MPH)

Program Description and Goals

The PhD/MPH dual degree pathway program combines the PhD degree from McWilliams School of Biomedical Informatics at UTHealth Houston with the MPH from UTHealth Houston School of Public Health. The training and curriculum in the dual degree program will provide students and future leaders in public health the necessary skills to be leaders in the field of public health informatics. The MPH/PhD program provides an integrated curriculum that includes a number of shared courses as well as a practicum experience and/or the thesis topic in the area of public health informatics. The selection of specific academic programs and scheduling of specific courses, fieldwork, and practica for individual

students is guided by an academic advisor from McWilliams School of Biomedical Informatics and an advising committee, which can include faculty from both UTHealth Houston schools.

The PhD part of the program in Biomedical Informatics is conceptualized and designed to be inherently multi#disciplinary and integrative. This means that the fundamental informatics concepts that transcend and apply to all traditional healthcare disciplines will be emphasized in the PhD program. This program will identify and teach the major informatics concepts that integrate and link diverse health disciplines.

The PhD program in Biomedical Informatics is constructed as a post# baccalaureate degree that not only addresses the knowledge and skills that the student brings at admission, but allows the student to build on previous knowledge and skills in order to attain the research focus needed for the completion of the PhD program in Biomedical Informatics.

Formal study of informatics at the PhD level at UTHealth Houston is designed to accomplish these major goals:

- Expand the scope of the discipline of Biomedical Informatics
- Demonstrate familiarity with the Biomedical Informatics research literature, including in-depth knowledge of a selected Biomedical Informatics research area.
- Research and evaluate new regions or domains in Biomedical Informatics
- Lead interdisciplinary teams in the search for solutions to Biomedical Informatics problems
- Effectively communicate research findings to peers and to practitioners who can use the research findings.

Students in the MPH/PhD program must be admitted separately to each UTHealth Houston school. Students must meet the requirements of each UTHealth Houston school for its respective degree. Admission to one program does not ensure admission to the other. Students in the program will receive a diploma from each degree program after meeting the individual requirements of each UTHealth Houston school. Admission does not have to be done at the same semester for each school, but must be done before reaching the maximum hours set by each school.

PhD in Biomedical Informatics (PhD): 93 required semester credit hours
Master's in Public Health (MPH): 45 required semester credit hours
Total Semester Credits: 138 credit hours
Shared Courses: -24 credit hours
Grand Total for Combined Degrees: 114 required semester credit hours

MPH/PhD Application Process

Students in the MPH/PhD program must be admitted separately to each UTHealth Houston school. The application process for the Master of Public Health is determined by the UTHealth Houston School of Public Health (SPH), so students must contact the SPH Student Affairs Office for details. The application process for the Doctor of Philosophy in Biomedical Informatics is determined by the McWilliams School of Biomedical Informatics at UTHealth Houston. Refer to the standard PhD program application process (p. 15).

Transfer Credit

Transfer credit is not accepted for students enrolled in the dual degree program due to the amount of shared credit hours between McWilliams School of Biomedical Informatics and SPH.

Shared Credit Hours

Courses that are accepted at McWilliams School of Biomedical Informatics, through a dual or joint degree program, can only be transferred into the McWilliams School of Biomedical Informatics degree plan if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer.

Financial Assistance

Financial assistance packages and research assistantships will be available to all students on a competitive basis to facilitate full-time doctoral education.

F-1 Student Sponsorship

International applicants seeking F-1 student sponsorship are not eligible for this dual degree program.

PhD Academic Requirements

A total of 93 semester credit hours must be completed prior to graduation. A full#time student in the PhD Program in Biomedical Informatics has up to eight years from the time of entry to complete the required coursework. Continuous enrollment is required unless approval from the advising committee is obtained. Each student will develop a degree plan with written approval of their academic advisor. A signed degree plan (https://sbmi.uth.edu/current-students/curriculum/) will be filed each academic year that includes the required and/or elective courses as specified for the student's PhD program.

Courses that are being accepted at McWilliams School of Biomedical Informatics, through a dual or joint degree program, can only be transferred in if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer. Courses must have been completed within the last five years to qualify. See "Five(5)-Year Rule (p. 7)".

A maximum of six credit hours of Directed Study can be applied toward the PhD program.

Other Requirements

In Residence Requirement: The term "in residence" refers to the requirement that a student completes 57 semester credit hours over the course of the program at UTHealth Houston. A student must fulfill his or her in residence requirement in order to receive a PhD degree from the School.

Curriculum for the Doctor of Philosophy in Biomedical Informatics Program

The curriculum of the PhD degree in Biomedical Informatics includes required didactic courses and elective courses. Didactic courses (lecture/discussion, demonstration and student laboratories) are presented to provide facts, concepts, and theories related to the techniques, and procedures of Biomedical Informatics. They include instruction in basic informatics, research, advanced informatics and support courses. The elective courses are designed to give students the opportunity to apply theory and techniques in the hospital, research, or private laboratory setting.

Required Courses from School Catalog

The PhD Program requires a minimum of 93 semester hours of study. The following courses are required for the PhD degree plan.

Code	Title	Hours
BMI 5300	Introduction to Biomedical Informatics [1]	3
BMI 5007	Methods in Health Data Science [1]	3
BMI 5310	Foundations of Biomedical Information Sciences I [1]	3
BMI 5311	Foundations of Biomedical Information Sciences II [1]	3
BMI 5352	Statistical Methods in Biomedical Infomatics [1]	3-4
or PHM 1690L	Introduction to Biostatistics in Public Health	
BMI 6319	Data Analysis for Scientific Research in Biomedical Informatics [1]	3
BMI 7302	Theories & Frameworks for BMI [1]	3
BMI 7303	Critical Review of Biomedical Informatics Literature Seminar [1]	3
BMI 7304	Advanced Research Design for Biomedical Informatics [1]	3
Elective Courses (seven courses)		
Advanced Level Statistics Course [2]		3
Six Additional Courses (totaling 18 hours)		18
Other Requirements		
BMI 7000	Advanced Preceptorship	9
BMI 7050W	Research in Biomed Informatics [3]	21
BMI 7150	Research Seminar [4]	3
or BMI 7151	Seminar in Precision Medicine	
BMI 7301	Grant Writing	3
BMI 9999	Dissertation in Biomedical Informatics	9
Total Hours		**93**

1. Courses must be completed prior to the qualifying exam. Requirements for these courses can be met through concurrent enrollment at other institutions and/or by consent of the student's Academic Advisor.
2. Not offered at McWilliams School of Biomedical Informatics – See Advisor for concurrent enrollment options.
3. BMI 7050 must be repeated for maximum of 21 semester credit hours to meet the PhD degree requirements.
4. BMI 7150 OR BMI 7151 must be repeated for a maximum of 3 semester credit hours to meet the PhD degree requirements.

Progression

Each year, students will be reviewed by the faculty to determine if adequate progress in the program has been made. This review is facilitated by the completion of annual Individualized Development Plans (IDP). It is the student's responsibility to maintain and update this plan in cooperation with their advisor. IDPs are filed annually with the Office of Academic Affairs. Failure to make adequate progress will result in action by the Admission, Progression and Graduation Committee. Action may include, but is not limited to additional review and monitoring of progress, changes in student standing (at risk, on probation, etc.) or dismissal from the program.

Qualifying Exam

The goals of the PhD qualifying exam are:

1. To motivate students to review and synthesize course work and reported research
2. To determine the student's ability to understand and apply fundamental concepts
3. To develop and test the student's ability to communicate orally and to respond to questions and comments
4. To evaluate the student's potential to pursue doctoral research
5. To identify areas needing strengthening for the student to be successful as a PhD student and independent scholar
6. To provide a mechanism for faculty to come to know the student's capabilities

Students should prepare for a comprehensive qualifying exam within the semester following their sixth completed full-time semester or after completion of their 48th semester credit hour. The plan for the qualifying exam will be developed in conjunction with the academic advisor. The qualifying exam consists of demonstration of competency with both:

Domain Specific Knowledge

Demonstration knowledge, understanding, and proficiency in domain specific content and methodology. One of the purposes is to challenge students to discover relevant literature and deepen their knowledge of interests within this track.

Breadth of Knowledge across the discipline

Demonstrate breadth of knowledge across health sciences disciplines through questions that require synthesis of knowledge from core areas. Submission deadlines related to materials related for the qualifying exam (e.g. reading list, abstract/proposal to committee) will follow a set timeline following the student's declaration of intent. All components of the qualifying exam must be attempted within 30 days. The qualifying exam is composed of a total of 7 graded sections: 3 domain specific questions, 3 general informatics questions and an oral presentation. A student must be ultimately successful on each question/section of the qualifying exam to progress in the PhD Program.

General Structure of the Exam

1. Topics for the exam will include materials covered in the Core Courses (indicated by *) and materials selected within a specific domain. The domain specific reading list will be developed in conjunction with the Committee Chair/Advising Committee.
2. Students will complete a written exam including both domain general and domain specific questions.
3. In addition to the exam, students will prepare a proposal abstract (1-2 pages) and deliver a public presentation of this abstract.
4. Following the written exam and public presentation, the student, Advising Committee, and PhD Qualifying Exam Committee will take part in a closed question and answer session (1-2 hours) over the written exam and public presentation.

The qualifying exam dossier will contain the following items:

1. Research project abstract
2. Preliminary dissertation proposal (one to two pages, demonstrating knowledge and work of the student and others, synthesized to present a rationale for the proposed dissertation topic (e.g., theory

to be developed, hypotheses to be tested) as well as proposed methodology to fulfill the dissertation objective.)

3. List of references (30-50 articles) and syllabi for relevant classes for three domain areas related to their proposed research. Students should discuss these areas with their advisor in the process of planning their graduate program and prior to preparation of their qualifying exam materials.
4. Current CV
5. All previously completed Individualized Development Plans

Grading for the Written Qualifying Exam Component:

a) Pass unconditionally (score between 28-35)
b) Pass conditionally (21-27)
c) Fail with option to retake (16-20)
d) Fail without option to retake (Less than 16)

Grading for the Oral Qualifying Exam Component:

a) Pass unconditionally (score between 3 and 4)
b) Pass conditionally (2.5-2.99)
c) Fail with option to retake (2.0-2.49)
d) Fail without option to retake (Less than 2)

Remediation Procedures

Should a student score either pass conditionally or fail with the option to retake, the original assigned graders will determine the final score for each question following remediation. Remediation may include addressing the shortcomings of the written questions during the oral presentation section of the exam, rewriting a question response, drafting a paper to address problems with a written question, presenting an improved oral presentation, or remediation through additional coursework. The student's PhD Advising Committee will determine the form of remediation and evaluation for the domain-specific questions. The PhD Qualifying Exam Committee will determine remediation on the general knowledge questions. The two committees will work together to determine the requirements for the student should remediation be needed on the oral presentation. Remediation responses will be graded on a pass/fail basis. Efforts to retake or remediate must be completed within 12 weeks. Failure to successfully pass all components will result in dismissal from the program. Students with scores between 16-20 for 4 or more graded sections of the written qualifying exam will fail the exam without the opportunity for remediation. A single score below 16 on any section will result in dismissal.

Advanced Preceptorship

Advanced Preceptorship is required for all PhD students. During Advanced Preceptorship, the student will develop and prepare his or her Advance to Candidacy Proposal including: defining the proposed research agenda; a review of the literature; research design, procedure and data analysis; collecting preliminary data; and scientific contribution to the discipline. The student's primary advisor and advising committee must approve the focus of the research. Students must successfully pass their Qualifying Exam prior to registering for Advanced Preceptorship hours.

Advancement to Candidacy

Admission to the PhD program does not constitute or guarantee a student's admission to candidacy for the PhD degree. Within two full-time semesters or completion of 18 semester credit hours after completion of the qualifying exam, each student must submit an advance to candidacy proposal and give an oral presentation of their completed and proposed work to their Advising Committee. Successful advance to candidacy proposal defense includes approval of both the written proposal and its oral presentation. The oral presentation is open to the public and the candidacy proposal is only disseminated to the student's advising committee. Approval of the advance to candidacy proposal is required for continued progress towards the degree and designation as a doctoral candidate.

A student passes their advance to candidacy proposal defense if the majority of their Advising Committee votes to pass and the student's primary advisor votes to pass. In the event of a tie, the Associate Dean for Academic and Curricular Affairs will break the tie. If the Associate Dean for Academic and Curricular Affairs is on the committee, the Committee Chair will break the tie. If the Associate Dean for Academic and Curricular Affairs is the Committee Chair, the Dean will break the tie. If the student passes, he or she is admitted to candidacy. If the student does not pass, the Advising Committee can recommend failure without another attempt or failure with the opportunity to re#defend within 30 days. If the student again does not pass the defense, he or she will be given the option of completing a Master of Science in Biomedical Informatics degree but will otherwise be dismissed from the doctoral program.

Dissertation

The faculty believes that communication and dissemination is a critical aspect of the research process. The student will have two options available for the dissertation. The first option will consist of three articles that are accepted for publication. Publication must be in journals or proceedings, which are both peer-reviewed and indexed for academic retrieval. The three papers are combined with an introduction and summary and bound as a dissertation. The second option requires the student to write a monograph or dissertation. The monograph will review the literature, research approaches and options, the data design and gathering processes. The findings and data will be discussed in the context of the published literature. The monograph will be bound.

The dissertation must be presented at an oral defense that is open to the public. All research papers, theses, and dissertations authored by degree candidates are available to interested members of the general public upon request. After the presentation, the student's Advising Committee votes to award the degree, allow for re-defense of the dissertation within 30 calendar days of the failed attempt, or dismiss the student from the program without a degree.

Petitioning for Extension

Students who have exceeded their time to degree deadline or a milestone deadline for the qualifying exam or prospectus may petition APG for an extension. The Petition to Extend Time Boundary for Qualifying Exam, Advance to Candidacy or Dissertation Defense form can be found under the Current Student section of the school website (https://sbmi.uth.edu/current-students/).

For further curriculum information, contact:

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Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, Texas 77030
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Email: SBMIAcademics@uth.tmc.edu

Graduate Certificates

Program Description and Goals

McWilliams School of Biomedical Informatics offers various Graduate Certificates designed for self-motivated professionals working in the health care and information technology fields. A certificate requires the student to complete a minimum of 15 semester credit hours.

The certificates provide professionals with an increased understanding of the opportunities and challenges involved in technology integration into health care. They will be able to participate in designing, planning, implementing and evaluating new software and hardware solutions at their institutions.

The school is experienced in providing education to working professionals. The certificate programs are designed to provide quality education to professionals on their schedule as courses can be completed online.

Upon satisfactory completion of the 15 semester credit hours, students will be awarded a certificate of completion from McWilliams School of Biomedical Informatics at UTHealth Houston.

Please note: F-1 sponsorship is not available for non-degree seeking programs, including certificate programs.

Admission to the Biomedical Informatics Certificate Programs

The admission process to the certificate programs is designed to get the professional working applicant into the program by meeting minimal requirements.

The applicant should present a completed application and official documentation of the following:

1. Official transcripts from all colleges/universities attended with the minimum of a baccalaureate or higher degree awarded.
2. Goal Statement
3. A resume or curriculum vitae (as appropriate)
4. One Letter of Reference from an educator or employer
5. Students with international college transcripts must submit a course-by-course evaluation report by either World Education Services or Educational Credential Evaluators.

Application deadlines

- Fall admission: July 1
- Spring admission: November 1
- Summer admission: March 1

The coursework completed as a Certificate Student is at the graduate level. A transcript showing graduate credits may be obtained from the Registrar's Office.

The semester credit hours earned in the certificate programs may be transferable into the corresponding degree-seeking program. No grade lower than a "B" will be accepted to transfer into master's or doctoral programs. Courses must have been completed within the last five years to qualify. See "Five(5)-Year Rule (p. 7)".

Academic Requirements for Biomedical Informatics Certificate Programs

A student in any McWilliams School of Biomedical Informatics Certificate Program has up to five years (15 semesters) from the time of entry to complete the required course work. A student who has not enrolled in two consecutive registration periods (including the summer session) will have an academic hold placed on their myUTH account by the McWilliams School of Biomedical Informatics Office of Academic Affairs. Students with an academic hold will need to meet to discuss academic degree plan with their academic advisor to have the hold removed and be allowed to enroll in future courses. A student who has not enrolled for three or more consecutive registration periods will be dismissed and must reapply for admission to the program and the School.

Curriculum for Biomedical Informatics Certificate Program

The Biomedical Informatics Certificate Program offers the following curriculum with completion of 15 semester credit hours and includes two different options. Option 1 is a set of five predetermined courses with an emphasis in Clinical Informatics.

Code	Title	Hours
BMI 5300	Introduction to Biomedical Informatics [2]	3
BMI 5310	Foundations of Biomedical Information Sciences I	3
BMI 5313	Foundations of Electronic Health Records and Clinical Information Systems [1]	3
BMI 5360	Clinical Decision Support Systems	3
BMI 6340	Health Information Visualization and Visual Analytics	3
Total Hours		**15**

[1] $100 course fee
[2] Must be taken in the first semester.

BMI 5300 Introduction to Biomedical Informatics must be taken in the first semester. The other four courses can be taken in any order.

Option 2 is BMI 5300 Introduction to Biomedical Informatics and the student's choice (with advice from a certificate program advisor) of four courses selected from the course concentration listing. This option allows professionals to customize their studies to meet their background and needs.

A maximum of three credit hours of Directed Study can be applied toward the Biomedical Informatics Certificate program.

Curriculum for Applied Biomedical Informatics Certificate Program

The Applied Biomedical Informatics Certificate Program offers the following curriculum with completion of 15 semester credit hours and includes two different options. Option 1 is a set of five predetermined courses with an emphasis in Electronic Health Records (EHRs).

Code	Title	Hours
BMI 5300	Introduction to Biomedical Informatics [3]	3
BMI 5301	The US Healthcare System	3

BMI 5305	Legal Ethical Aspects of Health Informat	3
BMI 5313	Foundations of Electronic Health Records and Clinical Information Systems [1]	3
BMI 5328W	System Analysis and Project Management [2]	3
Total Hours		**15**

[1] $100 Course Fee
[2] $50 Course Fee
[3] Must be taken in the first semester.

BMI 5300 Introduction to Biomedical Informatics must be taken in the first semester. The other four courses can be taken in any order.

Option 2 is BMI 5300 Introduction to Biomedical Informatics and the student's choice (with advice from a certificate program advisor) of four courses selected from the Applied Masters course offerings. This option allows professionals to customize their studies to meet their background and needs.

A maximum of three credit hours of Directed Study can be applied toward the Applied Biomedical Informatics Certificate program.

Curriculum for Joint Certificate in Public Health Informatics Program

The Public Health Informatics Certificate Program is offered in conjunction with the UTHealth Houston School of Public Health and offers the following curriculum with completion of 16 semester credit hours:

Code	Title	Hours
BMI 5300	Introduction to Biomedical Informatics	3
BMI 5380	Principles and Foundations of Public Health Informatics	3
PHM 1690L	Introduction to Biostatistics in Public Health	4
PHM 2612L	Introduction to Epidemiology	3
Select one of the following courses:		3
BMI 5313	Foundations of Electronic Health Records and Clinical Information Systems	
BMI 5381	Methods in Public Health Informatics	
BMI 5382W	Synthesis Project in Public Health Informatics	
PHM 1110L	Health Promotion and Behavioral Sciences in Public Health	
PHM 2110L	Public Health Ecology & the Human Environment	
PHM 3715L	Management & Policy Concepts in Public Health	
Total Hours		**16**

PHM 1690L Introduction to Biostatistics in Public Health, PHM 2612L Introduction to Epidemiology or BMI 5300 Introduction to Biomedical Informatics must be taken in the first semester.

Courses that are accepted at McWilliams School of Biomedical Informatics through the joint certificate program can only be transferred in if the grade earned in the course is a "B" or higher. Courses for which grades of less than "B" were earned will not be accepted for transfer.

Each student will develop a degree plan with written approval of their academic advisor. A signed degree plan found here (https://sbmi.uth.edu/current-students/curriculum/), will be filed each academic year that includes the required and/or elective courses as specified for their certificate program.

Curriculum for Health Data Science Certificate Program

The Health Data Science Certificate Program offers the following curriculum with completion of 15 semester credit hours.
BMI 5300 Introduction to Biomedical Informatics must be taken in the first semester. The other four courses can be taken in any order based on individual course requirements.

Code	Title	Hours
BMI 5300	Introduction to Biomedical Informatics	3
BMI 5007	Methods in Health Data Science	3
BMI 6340	Health Information Visualization and Visual Analytics	3
Select two of the following:		6
BMI 5304	Advanced Database Concepts for Biomedical Informatics	
BMI 5353	Biomedical Data Analysis	
BMI 5351	Research Design and Evaluation in Biomedical Informatics	
BMI 6306	Biomedical Ontologies and Knowledge Representation	
BMI 6318	Big Data in Biomedical Informatics	
BMI 6323	Machine Learning in Biomedical Informatics	
BMI 6331	Medical Imaging and Signal Pattern Recognition	
BMI 6334	Deep Learning in Biomedical Informatics	
Total Hours		**15**

Curriculum for Pharmacy Informatics Certificate Program

The Pharmacy Informatics Certificate Program offers the following curriculum with completion of 15 semester credit hours.

BMI 5300 Introduction to Biomedical Informatics must be taken in the first semester. The other four courses can be taken in any order based on individual course requirements.

Code	Title	Hours
BMI 5300	Introduction to Biomedical Informatics [2]	3
BMI 5390	Methods in Pharmacy Informatics	3
BMI 5391	Synthesis Project in Pharmacy Informatics	3
Select two of the following:		6
BMI 6313	Scientific Writing in Healthcare	
BMI 5328W	System Analysis and Project Management [1]	
BMI 6340	Health Information Visualization and Visual Analytics	
Total Hours		**15**

[1] $50 course fee
[2] Must be taken in the first semester.

For Certificate Program Information, contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, TX 77030
(713) 500#3591
SBMIAcademics@uth.tmc.edu

Joint Certificates

Program Description and Goals

McWilliams School of Biomedical Informatics at UTHealth Houston partners with several universities across Texas to offer a variety of graduate level, joint certificate programs. This gives students the opportunity to advance their knowledge of biomedical informatics and its applications in their area of study. These programs provide an avenue for students to concurrently enroll and complete specialized certificates with courses at both institutions.

Our school has collaboration agreements to offer joint certificate in the following areas with these respective institutions whose students are eligible to participate in this integrated curriculum:

- **Our Lady of the Lake University (OLLU)**
    - Non-Profit Informatics
    - Leadership Informatics
- **UTHealth Houston School of Public Health**
    - Public Health Informatics
- **UTHealth Houston School of Dentistry**
    - Dental Informatics
- **University of Texas El Paso (UTEP)**
    - Business Informatics for Healthcare
    - Kinesiology
    - Occupational Therapy Informatics
    - Physical Therapy Informatics
    - Public Health Informatics
    - Rehabilitation Counseling
    - Social Work
    - Speech Language Pathology

For more information on these programs, including admissions requirements, visit our website (https://sbmi.uth.edu/prospective-students/academics/certificate.htm).

For further curriculum information, please contact:

D. Bradley McWilliams School of Biomedical Informatics at UTHealth Houston
Office of Academic Affairs
7000 Fannin Street Suite 600
Houston, TX 77030
(713) 500#3591
SBMIAcademics@uth.tmc.edu

Non-Degree Biomedical Informatics

Program Description and Goals

A student who is admitted to McWilliams School of Biomedical Informatics for one or more courses but not admitted to a degree or certificate program is considered a non-degree student. Enrollment as a non#degree student does not entitle a student to admission to a degree program within the school. A non#degree student is not eligible to receive a certificate or degree. Non-degree students will not be allowed to register for practicum or doctoral courses. Non#degree students can complete a maximum of 9 semester credit hours and must maintain a 3.0/4.0 grade point average.

Employees of institutions within the Texas Medical Center (TMC) may register as a non-degree student for one or more McWilliams School of Biomedical Informatic courses.

Please note: F-1 sponsorship is not available for non-degree seeking programs.

Admission to the Biomedical Informatics Non-Degree Program

The admission process to the certificate programs is designed to get the professional working applicant into a McWilliams School of Biomedical Informatics degree program by meeting minimal requirements.

The applicant should present a completed application and official documentation of the following:

- Official transcripts from all colleges/universities attended with the minimum of a baccalaureate or higher degree awarded.
- Goal Statement
- A resume or curriculum vitae (as appropriate)
- One Letter of Reference from an educator or employer
- Students with international college transcripts must submit a course-by-course evaluation report by either World Education Services or Educational Credential Evaluators.

Application deadlines

- Fall admission: July 1
- Spring admission: November 1
- Summer admission: March 1

The coursework completed as a Non-Degree Seeking Student is at the graduate level. A transcript showing graduate credits may be obtained from the Registrar's Office.

This coursework may be transferred into a degree program at McWilliams School of Biomedical Informatics. No grade lower than a "B" will be accepted to transfer into the certificate, master's or doctoral programs.

Employees of institutions within the Texas Medical Center (TMC) may register as a non-degree student for one or more McWilliams School of Biomedical Informatic courses. For more information on the application process for this application, visit our website (https://sbmi.uth.edu/prospective-students/academics/non-degree.htm).

Course Descriptions

Course descriptions in school catalogs and the Course Search (https://catalog.uth.edu/course-search/) are correct at the time of publication. See myUTH (https://uthidp.uth.edu/nidp/saml2/sso/?id=Campus-Affiliate-LOA2-DUO&sid=0&option=credential&sid=0) for more recent course information and to register for courses.

BMI 5004 Introduction to Clinical Healthcare (3 Credits)
This course will present a survey of modern American clinical health care for students without a health care background who are entering fields that interact with health care such as biomedical informatics, cancer biology, and translational science. It is not a health care system course and is not intended to teach students how to practice medicine. The course is not appropriate for students who have a healthcare background (e.g., international medical graduates). We will focus on how clinical health care is delivered, rather than on health care financing, administration, regulation or governance. Students will attend lectures and "mini rotations" during which they will visit operational health care settings including outpatient clinics (pediatric and adult), emergency departments, intensive care units, clinical research and surgical settings. Major medical specialties including pediatrics, emergency medicine, internal medicine, radiology, etc. are presented. Students will interact with a variety of clinical practitioners. Letter Graded Lab Fee: $30

BMI 5004W Introduction to Clinical Healthcare (3 Credits)
This course will present a survey of modern American clinical health care for students without a health care background who are entering fields that interact with health care such as biomedical informatics, cancer biology, and translational science. It is not a health care system course and is not intended to teach students how to practice medicine. The course is not appropriate for students who have a healthcare background (e.g., international medical graduates). We will focus on how clinical health care is delivered, rather than on health care financing, administration, regulation or governance. Students will attend lectures and 'mini rotations' during which they will visit operational health care settings including outpatient clinics (pediatric and adult), emergency departments, intensive care units, clinical research and surgical settings. Major medical specialties including pediatrics, emergency medicine, internal medicine, radiology, etc. are presented. Students will interact with a variety of clinical practitioners. Letter Graded Lab Fee: $30

BMI 5007 Methods in Health Data Science (3 Credits)
The course introduces methods in health data science - defining the problem, accessing, and loading the data, formatting it into data structures required for analysis. This course covers the basics of computational thinking to define a computational solution, methods to access healthcare data from a variety of sources in different data formats. The students will apply methods for data wrangling and data quality assessments to structure the data for analysis. The students will be introduced to the basics of design and evaluation of algorithms and application of data structures for healthcare data. The course will use Python programming language and basic python libraries for data sciences such as pandas and matplotlib. Students should expect a good amount of programming exercises for each week. This course is not an introduction to programming, and not a course to improve programming skills. Students are expected to have some experience with introductory / beginner-level Python programming. Letter Graded Lab Fee: $30

BMI 5007W Methods in Health Data Science (3 Credits)
The course introduces methods in health data science - defining the problem, accessing, and loading the data, formatting it into data structures required for analysis. This course covers the basics of computational thinking to define a computational solution, methods to access healthcare data from a variety of sources in different data formats. The students will apply methods for data wrangling and data quality assessments to structure the data for analysis. The students will be introduced to the basics of design and evaluation of algorithms and application of data structures for healthcare data. The course will use Python programming language and basic python libraries for data sciences such as pandas and matplotlib. Students should expect a good amount of programming exercises for each week. This course is not an introduction to programming, and not a course to improve programming skills. Students are expected to have some experience with introductory / beginner-level Python programming. Letter Graded Lab Fee: $30

BMI 5300 Introduction to Biomedical Informatics (3 Credits)
This introductory graduate level survey course provides an overview of Biomedical Informatics and Health Information Technology and introduces the student to the major areas of the evolving discipline. The competencies for graduate education in the discipline are presented as well as the definitions of biomedical informatics. A systems framework for understanding informatics is also considered. The course focuses on the application of health information technology for healthcare delivery, education and research as well as the multidisciplinary nature of biomedical informatics. The knowledge and skills presented in this course will help the student progress to other more advanced or specialized courses throughout the curriculum since an understanding of health care, health information technology and recent governmental efforts is necessary in order to function in the biomedical informatics discipline. Letter Graded Lab Fee: $30

BMI 5300W Introduction to Biomedical Informatics (3 Credits)
This introductory graduate level survey course provides an overview of Biomedical Informatics and Health Information Technology and introduces the student to the major areas of the evolving discipline. The competencies for graduate education in the discipline are presented as well as the definitions of biomedical informatics. A systems framework for understanding informatics is also considered. The course focuses on the application of health information technology for healthcare delivery, education and research as well as the multidisciplinary nature of biomedical informatics. The knowledge and skills presented in this course will help the student progress to other more advanced or specialized courses throughout the curriculum since an understanding of health care, health information technology and recent governmental efforts is necessary in order to function in the biomedical informatics discipline. Letter Graded Lab Fee: $30

BMI 5301 The US Healthcare System (3 Credits)
This course will present a survey of the modern American health care system. The course will focus on the major pieces of legislation that serve as the foundation of the current U.S. health care structures. Topics in the course will include Medicare, Medicaid, and HIPAA, their impacts on financing, health care access and professional roles. The course will integrate current legislative actions, public concerns, implications, and discussions surrounding health care reform. Letter Graded

BMI 5301W The US Healthcare System (3 Credits)
This course will present a survey of the modern American health care system. The course will focus on the major pieces of legislation that serve as the foundation of the current U.S. health care structures. Topics in the course will include Medicare, Medicaid, and HIPAA, their impacts on financing, health care access and professional roles. The course will integrate current legislative actions, public concerns, implications, and discussions surrounding health care reform. Letter Graded

BMI 5302 Intro to Human Factors in Healthcare (3 Credits)
The course covers human factors topics with focus on healthcare. The topics include basics of human computer interactions, design and evaluation of healthcare interfaces, and role of usability in patient safety. The students will evaluate design of healthcare systems, including EHR modules, health information display (dashboards, health education material), social networks for health, mobile health (apps, sensors, wearables, and devices) and medical devices. The students will also develop functioning prototypes for healthcare design solutions. Letter Graded Lab Fee: $30

BMI 5302W Intro to Human Factors in Healthcare (3 Credits)
The course covers human factors topics with focus on healthcare. The topics include basics of human computer interactions, design and evaluation of healthcare interfaces, and role of usability in patient safety. The students will evaluate design of healthcare systems, including EHR modules, health information display (dashboards, health education material), social networks for health, mobile health (apps, sensors, wearables, and devices) and medical devices. The students will also develop functioning prototypes for healthcare design solutions. Letter Graded Lab Fee: $30

BMI 5303 Methods in Human Factors Engineering (3 Credits)
This course will introduce students to key methods employed in biomedical informatics and human factors research. Students will have the opportunity to explore and learn about differing techniques, methods and design considerations. Students will conduct different types of data collection, analysis, and interpretation using both quantitative and qualitative methods. Ethnography, task analysis, questionnaires/surveys, log analysis, and gaze behavior are some of the topics covered. Through user experience projects, as well as critical evaluation of existing work, students will gain insight into the strengths and limitations of each approach. Letter Graded BMI 5302 or 5302W

BMI 5303W Methods in Human Factors Engineering (3 Credits)
This course will introduce students to key methods employed in biomedical informatics and human factors research. Students will have the opportunity to explore and learn about differing techniques, methods and design considerations. Students will conduct different types of data collection, analysis, and interpretation using both quantitative and qualitative methods. Ethnography, task analysis, questionnaires/surveys, log analysis, and gaze behavior are some of the topics covered. Through user experience projects, as well as critical evaluation of existing work, students will gain insight into the strengths and limitations of each approach. Letter Graded BMI 5302 or 5302W

BMI 5304 Advanced Database Concepts for Biomedical Informatics (3 Credits)
Database processing is a key area of competency in biomedical informatics. This course introduces the concepts and methods of database processing in the context of healthcare and biomedicine. Topics covered include developing data models, designing, accessing and implementing databases, and database web access. We will cover relational databases (SQL), XML, no-SQL databases, ontologies and introduction to public databases for biomedical information. Letter Graded BMI 5007 or 5007W Lab Fee: $30

BMI 5304W Advanced Database Concepts for Biomedical Informatics (3 Credits)
Database processing is a key area of competency in biomedical informatics. This course introduces the concepts and methods of database processing in the context of healthcare and biomedicine. Topics covered include developing data models, designing, accessing and implementing databases, and database web access. We will cover relational databases (SQL), XML, no-SQL databases, ontologies and introduction to public databases for biomedical information. Letter Graded BMI 5007 or 5007W Lab Fee: $30

BMI 5305 Legal Ethical Aspects of Health Informat (3 Credits)
Biomedical Informatics involves rapidly changing technology, which impacts the way in which legal and ethical considerations are understood in our culture. This course will examine the relationships between law and ethics. Particular considerations will be given to the concepts of privacy, autonomy, responsibility and decision-making. These concepts will be discussed from both legal and ethical perspectives in the policy and regulatory arena. The impact of current and future technology, such as patient portals and social media, will be discussed as it relates to these concepts and the impact on Biomedical Informatics. Letter Graded Lab Fee: $30

BMI 5305W Legal and Ethical Aspects of Health Informatics (3 Credits)
Biomedical Informatics involves rapidly changing technology, which impacts the way in which legal and ethical considerations are understood in our culture. This course will examine the relationships between law and ethics. Particular considerations will be given to the concepts of privacy, autonomy, responsibility and decision-making. These concepts will be discussed from both legal and ethical perspectives in the policy and regulatory arena. The impact of current and future technology, such as patient portals and social media, will be discussed as it relates to these concepts and the impact on Biomedical Informatics. Letter Graded Lab Fee: $30

BMI 5306 Security for Health Information Systems (3 Credits)
This course will address security issues as they impact health information systems. Physical security of the hardware and software including redundancy, back up and restricted access will be discussed. Security and appropriateness of access will be addressed in terms of both hardware and software solutions. Data integrity, audit ability and system integrity will be considered along with the unique problems, such as the hacking of implantable devices, wired, wireless, and cellular networks, as well as the challenges of personally owned devices. Solutions to these concerns will be discussed in terms of industry standards, those that already exist, and those that are still evolving (i.e. Blockchain). Hands on experience with Splunk, a network security monitoring program. Features and functionality of Splunk include search, reporting, and analytics using machine data. Letter Graded

BMI 5306W Security for Health Information Systems (3 Credits)
This course will address security issues as they impact health information systems. Physical security of the hardware and software including redundancy, back up and restricted access will be discussed. Security and appropriateness of access will be addressed in terms of both hardware and software solutions. Data integrity, audit ability and system integrity will be considered along with the unique problems, such as the hacking of implantable devices, wired, wireless, and cellular networks, as well as the challenges of personally owned devices. Solutions to these concerns will be discussed in terms of industry standards, those that already exist, and those that are still evolving (i.e. Blockchain). Hands on experience with Splunk, a network security monitoring program. Features and functionality of Splunk include search, reporting, and analytics using machine data. Letter Graded

BMI 5310 Foundations of Biomedical Information Sciences I (3 Credits)
This course provides an overview of topics, concepts, theories and methods that form the foundations of biomedical information sciences. It gives students the fundamental knowledge and skills to pursue further study in biomedical informatics. Foundations I presents a general framework for computational models including symbolic and statistical approaches for solving problems throughout the range of biomedical science, from genetics to clinical care to public health. It covers concepts, theories and methods that deal with how biomedical information is acquired, discovered, represented, managed, organized, communicated, retrieved, and processed. It also provides an overview of the primary research and application areas in biomedical informatics. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 5310W Foundations of Biomedical Information Sciences I (3 Credits)
This course provides an overview of topics, concepts, theories and methods that form the foundations of biomedical information sciences. It gives students the fundamental knowledge and skills to pursue further study in biomedical informatics. Foundations I presents a general framework for computational models including symbolic and statistical approaches for solving problems throughout the range of biomedical science, from genetics to clinical care to public health. It covers concepts, theories and methods that deal with how biomedical information is acquired, discovered, represented, managed, organized, communicated, retrieved, and processed. It also provides an overview of the primary research and application areas in biomedical informatics. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 5311 Foundations of Biomedical Information Sciences II (3 Credits)
This course provides an overview of theories and methods that are broadly applicable to all health informaticians. Students will be exposed to a variety of theories and frameworks needed to pursue study in biomedical informatics. In-demand skills such as working effectively in interprofessional teams, as well as creating and delivering an effective presentation will be demonstrated. This class will also present various informatics career paths for students. Letter Graded BMI 5310 or 5310W Lab Fee: $30

BMI 5311W Foundations of Biomedical Information Sciences II (3 Credits)
This course provides an overview of theories and methods that are broadly applicable to all health informaticians. Students will be exposed to a variety of theories and frameworks needed to pursue study in biomedical informatics. In-demand skills such as working effectively in interprofessional teams, as well as creating and delivering an effective presentation will be demonstrated. This class will also present various informatics career paths for students. Letter Graded BMI 5310 or 5310W Lab Fee: $30

BMI 5313 Foundations of Electronic Health Records and Clinical Information Systems (3 Credits)
This course is designed to provide informatics students with an overview of the key concepts regarding implementation of a clinically-oriented information system (e.g., an electronic medical record, computer-based provider order entry). The course will examine how health data are collected, how they are used and the impact of electronic records on the health data. The course will review standards, standards development, languages used, usability and issues related to information processing in health care. The course will review the impact of electronic records and patient portals on health and health care including, legal, financial, and clinical design issues. Challenges encountered during training and go-live will be discussed. Students will receive hands-on experience with an electronic health record in the training environment. Letter Graded Course fee: $100 Lab Fee: $30

BMI 5313W Foundations of Electronic Health Records and Clinical Information Systems (3 Credits)
This course is designed to provide informatics students with an overview of the key concepts regarding implementation of a clinically-oriented information system (e.g., an electronic medical record, computer-based provider order entry). The course will examine how health data are collected, how they are used and the impact of electronic records on the health data. The course will review standards, standards development, languages used, usability and issues related to information processing in health care. The course will review the impact of electronic records and patient portals on health and health care including, legal, financial, and clinical design issues. Challenges encountered during training and go-live will be discussed. Students will receive hands-on experience with an electronic health record in the training environment. Letter Graded Course fee: $100 Lab Fee: $30

BMI 5315W Quality & Outcome Improvement in Healthcare (3 Credits)
This introductory course provides an overview to health care quality from the view of information science and the discipline of informatics. It takes a patient-centered approach that covers the complexities of quality and the scientific basis for understanding the measurement and improvement of quality, including exposure to multiple measures from a variety of organizations and measure comparison sites such as Medicare Compare. It provides the learner with a framework for key theories and concepts and models of quality improvement. Students will be introduced to health information technology safety issues, including tools for operationalizing HIT safety. Learners will be introduced to data quality, the challenges of data from devices and e-quality measures, as well as experience the challenge of calculating quality measures with data from the EHR. The merging of quality outcomes with evolving reimbursement paradigms and models will be examined. Letter Graded

BMI 5317 Applied Data Management (3 Credits)
This course provides a broad foundation for health care data management. Students will develop a data model for a relational database, evaluate the quality of a variety of datasets, utilize common tools to produce actionable information from data, and develop and design processes for effective data and information governance. After the introduction of key theories and concepts across these topics, students will complete hands-on projects. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 5317W Applied Data Management (3 Credits)
This course provides an introduction and broad orientation to health care data management. Students are introduced to computer programming languages such as R and Structured Query Language (SQL) and have the opportunity to complete module assignments to demonstrate basic competencies. Selected course assignments help students gain skills and experience using Excel. Real-world or simulated data sets are used for most module assignments to help students gain an appreciation of the complexity of health data and how data are used in a learning health organization. Students have the experience to complete a data governance project. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 5327W Standards in Health Informatics (3 Credits)
Unlike much of the world, American health care standards are frequently developed by private organizations rather than the government. The Standards Development Organizations (SDOs) create an alphabet soup of organizations that are often not well known to people within health care, let alone those just entering the field. This course will explore the history of a variety of SDOs, examining their membership and focus domain. Students will examine the role of the major SDOs and their impact on the structure and function of health care delivery in the United States. The relationship between U.S. and international standards organizations will be reviewed. Letter Graded

BMI 5328W System Analysis and Project Management (3 Credits)
This course is an introduction to both systems analysis and project management. The student will have the opportunity to learn more about the approaches and tools available for systems analysis. Additionally, the student will learn more about the roles, responsibilities, and duties of a project manager. Moreover, the student will learn project management methods and the core activities of a project manager as well as the tools and techniques required to ensure the success of a large health care information technology project such as the implementation of a system or the evaluation of an existing system. Specific emphasis will be on training and support during go-live, total costing of projects, and explicit change management techniques. Letter Graded Course fee: $50

BMI 5329 Workflow Process Modeling (3 Credits)
Students in this course will learn how to identify and assess different aspects of health care systems and health care workflow as well as how to evaluate a health information system. Students will learn the skills needed to assess and help improve workflow and the quality of health care delivery, with a special emphasis on optimization after implementation. Students will also be introduced to different methods of evaluation and how they would apply to health information systems, as well as the use of health information systems themselves. Letter Graded Lab Fee: $30

BMI 5329W Workflow Process Modeling (3 Credits)
Students in this course will learn how to identify and assess different aspects of health care systems and health care workflow as well as how to evaluate a health information system. Students will learn the skills needed to assess and help improve workflow and the quality of health care delivery, with a special emphasis on optimization after implementation. Students will also be introduced to different methods of evaluation and how they would apply to health information systems, as well as the use of health information systems themselves. Letter Graded Lab Fee: $30

BMI 5330 Introduction to Bioinformatics (3 Credits)
The course gives a comprehensive entry-level introduction to bioinformatics. It covers a wide variety of topics in bioinformatics, including but not limited to genome analysis, transcription profiling, protein structure and proteomics. Two major goals are 1) to help students understand the scope, basic concepts and theory of bioinformatics; and 2) to become familiar with tools for bioinformatics-related data analysis. Using software tools will be a major component of the course but advanced programming skills are not required (see minimum programming skills requirements below). A laptop computer is necessary to use the bioinformatics software and tools in class and while performing the research tasks for the course project. Letter Graded

BMI 5330W Introduction to Bioinformatics (3 Credits)
The course gives a comprehensive entry-level introduction to bioinformatics. It covers a wide variety of topics in bioinformatics, including but not limited to genome analysis, transcription profiling, protein structure and proteomics. Two major goals are 1) to help students understand the scope, basic concepts and theory of bioinformatics; and 2) to become familiar with tools for bioinformatics-related data analysis. Using software tools will be a major component of the course but advanced programming skills are not required (see minimum programming skills requirements below). A laptop computer is necessary to use the bioinformatics software and tools in class and while performing the research tasks for the course project. Letter Graded

BMI 5331 Foundations of Pharmacogenomics (3 Credits)
Pharmacogenomics is the study of how human genetic variation impacts drug response. It is one of the major promises of the genome project: that individual genetic information can be used to tailor drugs to patients, maximizing efficacy and minimizing adverse reactions. An understanding of pharmacogenomics requires dual understanding of the basics of genetics and genomics and of pharmacology. This course will provide the background to understand the current state and literature in pharmacogenomics, including the methods used in research and the current issues in discovery and implementation of pharmacogenomics. Letter Graded BMI 5330 or 5330W Lab Fee: $30

BMI 5331W Foundations of Pharmacogenomics (3 Credits)
Pharmacogenomics is the study of how human genetic variation impacts drug response. It is one of the major promises of the genome project: that individual genetic information can be used to tailor drugs to patients, maximizing efficacy and minimizing adverse reactions. An understanding of pharmacogenomics requires dual understanding of the basics of genetics and genomics and of pharmacology. This course will provide the background to understand the current state and literature in pharmacogenomics, including the methods used in research and the current issues in discovery and implementation of pharmacogenomics. Letter Graded BMI 5330 or 5330W Lab Fee: $30

BMI 5332 Statistical Analysis of Genomic Data (3 Credits)
This course provides students practical skills and statistical concepts and methods that underlie the analysis of high-dimensional genomic and Omics big data generated by high throughput technologies. It will also address issues related to the experimental design and implementation of these technologies. Lectures will often be delivered with live demonstrations. Students will engage in practical problem solving sessions. The R language will be used for programming throughout the course. Letter Graded BMI 5330/W and 5352/W Lab Fee: $30

BMI 5332W Statistical Analysis of Genomic Data (3 Credits)
This course provides students practical skills and statistical concepts and methods that underlie the analysis of high-dimensional genomic and Omics big data generated by high throughput technologies. It will also address issues related to the experimental design and implementation of these technologies. Lectures will often be delivered with live demonstrations. Students will engage in practical problem solving sessions. The R language will be used for programming throughout the course. Letter Graded BMI 5330/W and 5352/W Lab Fee: $30

BMI 5333 Systems Medicine: Principles and Practice (3 Credits)
Systems medicine is an interdisciplinary field of study that looks at the systems of the human body as part of an integrated whole, incorporating biochemical, physiological, and environment interactions. Systems medicine draws on systems science, omics, imaging, systems biology, and considers complex interactions within the human body in light of a patient's genomics, behavior and environment, and design the precision medicine at systems level. Students will engage in hands-on projects exploring methods of systems medicine. Letter Graded Lab Fee: $30

BMI 5333W Systems Medicine: Principles and Practice (3 Credits)
Systems medicine is an interdisciplinary field of study that looks at the systems of the human body as part of an integrated whole, incorporating biochemical, physiological, and environment interactions. Systems medicine draws on systems science, omics, imaging, systems biology, and considers complex interactions within the human body in light of a patient's genomics, behavior and environment, and design the precision medicine at systems level. Students will engage in hands-on projects exploring methods of systems medicine. Letter Graded Lab Fee: $30

BMI 5334 Biomedical Data Privacy (3 Credits)
The massive increase in the number of biomedical and health related datasets offer great opportunities for optimizing healthcare and understanding the molecular basis of diseases. These also bring novel challenges centered around protecting the privacy of consumers, patients, and their family members. Students will explore privacy preserving data analysis methods aimed at maximizing data utility while respecting the privacy of individuals. Foundational statistical methods that protect the privacy of individuals will be applied during hands-on exercises. Letter Graded

BMI 5334W Biomedical Data Privacy (3 Credits)
The massive increase in the number of biomedical and health related datasets offer great opportunities for optimizing healthcare and understanding the molecular basis of diseases. These also bring novel challenges centered around protecting the privacy of consumers, patients, and their family members. Students will explore privacy preserving data analysis methods aimed at maximizing data utility while respecting the privacy of individuals. Foundational statistical methods that protect the privacy of individuals will be applied during hands-on exercises. Letter Graded

BMI 5351 Research Design and Evaluation in Biomedical Informatics (3 Credits)
This course provides the student the opportunity to develop more advanced competencies in the design, analysis, interpretation and critical evaluation of experimental, quasi-experimental, pre-experimental and qualitative biomedical informatics research and evaluation studies. The student will identify flaws or weaknesses in research and evaluation designs, choose which of several designs most appropriately tests a stated hypothesis or controls variables potentially jeopardizing validity, and analyze and interpret research and evaluation results. Through exposure to the basic "building block" designs, students will have the opportunity to develop the competence to appropriately choose and use the most important and frequently used design procedures for single or multifactor research or evaluation studies. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 5351W Research Design and Evaluation in Biomedical Informatics (3 Credits)
This course provides the student the opportunity to develop more advanced competencies in the design, analysis, interpretation and critical evaluation of experimental, quasi-experimental, pre-experimental and qualitative biomedical informatics research and evaluation studies. The student will identify flaws or weaknesses in research and evaluation designs, choose which of several designs most appropriately tests a stated hypothesis or controls variables potentially jeopardizing validity, and analyze and interpret research and evaluation results. Through exposure to the basic "building block" designs, students will have the opportunity to develop the competence to appropriately choose and use the most important and frequently used design procedures for single or multifactor research or evaluation studies. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 5352 Statistical Methods in Biomedical Infomatics (3 Credits)
This course provides the student the opportunity to develop essential competencies in the measurement, design, analysis, interpretation and critical evaluation of health, information, and behavioral science research and evaluation studies. Students will have the opportunity to learn and apply the most important and most frequently used statistical measures and methods, as well as critically evaluate their appropriate use. Topics include the study of frequency distributions, measures of central tendency, variance, hypothesis testing, correlation and both parametric and non-parametric inferential methods including t-tests, analysis of variance, chi-square, Kruskal-Wallis, Mann-Whitney, and Wilcoxon tests of significance, as well as tests of measures of association. Letter Graded Lab Fee: $30

BMI 5352W Statistical Methods in Biomedical Infomatics (3 Credits)
This course provides the student the opportunity to develop essential competencies in the measurement, design, analysis, interpretation and critical evaluation of health, information, and behavioral science research and evaluation studies. Students will have the opportunity to learn and apply the most important and most frequently used statistical measures and methods, as well as critically evaluate their appropriate use. Topics include the study of frequency distributions, measures of central tendency, variance, hypothesis testing, correlation and both parametric and non-parametric inferential methods including t-tests, analysis of variance, chi-square, Kruskal-Wallis, Mann-Whitney, and Wilcoxon tests of significance, as well as tests of measures of association. Letter Graded Lab Fee: $30

BMI 5353 Biomedical Data Analysis (3 Credits)
This course provides an overview of the data analysis process, with particular attention paid to the data quality issues encountered with biomedical data. The course will cover the entire data analysis pipeline from needs analysis to presentation of final results. The course is primarily project-based. The projects will cover a wide variety of biomedical data, including bioinformatics, clinical, public health, and literature datasets. Students will implement their analysis in Python and present their work in a variety of presentation formats. Letter Graded BMI 5007 or 5007W Lab Fee: $30

BMI 5353W Biomedical Data Analysis (3 Credits)
This course provides an overview of the data analysis process, with particular attention paid to the data quality issues encountered with biomedical data. The course will cover the entire data analysis pipeline from needs analysis to presentation of final results. The course is primarily project-based. The projects will cover a wide variety of biomedical data, including bioinformatics, clinical, public health, and literature datasets. Students will implement their analysis in Python and present their work in a variety of presentation formats. Letter Graded BMI 5007 or 5007W Lab Fee: $30

BMI 5354 Cognitive Engineering in Biomedical Informatics I (3 Credits)
This course focuses on cognitive engineering techniques for designing user-centered health information systems. Such systems provide appropriate functionality to the user, are easy to use and learn, reduce the chance of user error, and increase user efficiency. The course emphasizes how human cognitive abilities and limitations impose requirements on the design of effective interfaces. It covers the theory and practical application of several cognitive engineering techniques, including cognitive task analysis, verbal protocol analysis, propositional analysis and cognitive walkthroughs. Letter Graded BMI 5302 or 5302W Lab Fee: $30

BMI 5354W Cognitive Engineering in Biomedical Informatics I (3 Credits)
This course focuses on cognitive engineering techniques for designing user-centered health information systems. Such systems provide appropriate functionality to the user, are easy to use and learn, reduce the chance of user error, and increase user efficiency. The course emphasizes how human cognitive abilities and limitations impose requirements on the design of effective interfaces. It covers the theory and practical application of several cognitive engineering techniques, including cognitive task analysis, verbal protocol analysis, propositional analysis and cognitive walkthroughs. Letter Graded BMI 5302 or 5302W Lab Fee: $30

BMI 5360 Clinical Decision Support Systems (3 Credits)
This course is designed to provide an overview of decision support systems in health care, with a particular emphasis on design, evaluation and application of clinical decision support systems (CDSS) across all health care settings - in-patient, ambulatory care, long-term care, pharmacy, etc. The course explores the background and features of CDSS. Students will understand the mathematical foundations of knowledge-based systems, learn to identify areas which might benefit from a decision support system, evaluate the challenges surrounding development and implementation and consider issues of CDSS appropriateness and usability. The course also includes a detailed discussion of issues in clinical vocabularies and other important issues in the development and use of CDSS, and provides guidance on the use of decision support tools for patients. Students will have hands-on experience with EHR CDSS modification. Letter Graded

BMI 5360W Clinical Decision Support Systems (3 Credits)
This course will train the next generation of clinical researchers in the basics of clinical information systems (CIS). Students will be introduced to the skills needed to both use the data that is derived from these systems as well as understand the issues surrounding the design, development, implementation, and evaluation of CIS-based interventions. Letter Graded

BMI 5361W Informatics for Clinical Researchers (2 Credits)
This course will train the next generation of clinical researchers in the basics of clinical information systems (CIS). Students will be introduced to the skills needed to both use the data that is derived from these systems as well as understand the issues surrounding the design, development, implementation, and evaluation of CIS-based interventions. Pass/Fail

BMI 5371 Business and Technical Communication (3 Credits)
This course provides the advanced skills necessary to write a full range of business documents, including letters, memos, emails, technical and non-technical user guides, training documentation, system documentation, and application tip sheets. The reason for and appropriate uses of each of these types of documents will be examined. There will also be an introduction to scientific writing, which will be compared and contrasted with business and technical writing. The course presents techniques for producing high-quality business or technical writing. Students will apply these techniques by examining selected documents and published papers, producing their own writing, and critiquing the writing of others in class. Letter Graded

BMI 5371W Business and Technical Communication (3 Credits)
This course provides the advanced skills necessary to write a full range of business documents, including letters, memos, emails, technical and non-technical user guides, training documentation, system documentation, and application tip sheets. The reason for and appropriate uses of each of these types of documents will be examined. There will also be an introduction to scientific writing, which will be compared and contrasted with business and technical writing. The course presents techniques for producing high-quality business or technical writing. Students will apply these techniques by examining selected documents and published papers, producing their own writing, and critiquing the writing of others in class. Letter Graded

BMI 5380 Principles and Foundations of Public Health Informatics (3 Credits)
This course provides foundational knowledge relevant to Public Health Informatics (PHI), and exposes students to emerging research and application areas in this field. Topics covered include: public health registries and databases, surveillance systems, data exchange and standards, interoperability issues, the role of informatics in health promotion, use of web 2.0 informatics tools to understand behavior change, public health communication and dissemination, public health policy, and project management. Letter Graded Lab Fee: $30

BMI 5380W Principles/Foundations in PH Informatics (3 Credits)
This course provides foundational knowledge relevant to Public Health Informatics (PHI), and exposes students to emerging research and application areas in this field. Topics covered include: public health registries and databases, surveillance systems, data exchange and standards, interoperability issues, the role of informatics in health promotion, use of web 2.0 informatics tools to understand behavior change, public health communication and dissemination, public health policy, and project management. Letter Graded Lab Fee: $30

BMI 5381 Methods in Public Health Informatics (3 Credits)
This course introduces practical methods and techniques used in PHI. The course will focus on methods for evaluation of the effectiveness and efficiency of public health protection and delivery. The course modules are organized into four sub-domains of PHI methods: 1) theoretical frameworks, evaluation methods, and technological insights of digital behavior change support systems, 2) Legal and policy framework of PHI; 3) GIS and spatial analysis; and 4) Social network methods. The course is designed to familiarize students with methods for addressing the core concepts and issues confronting public health practitioners and researchers in planning, implementation and evaluation of information systems. Published articles will be used as reading assignments to complement class discussions and will provide with the background knowledge and practical context to understand and apply the concepts and the experiences from the class. Letter Graded Lab Fee: $30

BMI 5381W Methods in Public Health Informatics (3 Credits)
This course introduces practical methods and techniques used in PHI. The course will focus on methods for evaluation of the effectiveness and efficiency of public health protection and delivery. The course modules are organized into four sub-domains of PHI methods: 1) theoretical frameworks, evaluation methods, and technological insights of digital behavior change support systems, 2) Legal and policy framework of PHI; 3) GIS and spatial analysis; and 4) Social network methods. The course is designed to familiarize students with methods for addressing the core concepts and issues confronting public health practitioners and researchers in planning, implementation and evaluation of information systems. Published articles will be used as reading assignments to complement class discussions and will provide with the background knowledge and practical context to understand and apply the concepts and the experiences from the class. Letter Graded Lab Fee: $30

BMI 5382W Synthesis Project in Public Health Informatics (3 Credits)
This course provides an opportunity for students to gain practical, hands-on cumulating knowledge and experience in PHI. This project should reflect a substantial effort and competency of synthesis in informatics developed through the course training that address core competencies of the PHI system by working through a problem of the student's choice. The selected problem should be discussed and approved by a faculty mentor. This should be tied to research/practice of a student's interest that includes one or more didactic modules covered in the prior courses. The synthesis project should be based upon the combined efforts of (online) library database search, fieldwork, and mentored research approved by the mentor(s). Expectations of the class include the presentation of the conclusions from the project in a written manner for academic dissemination as a conference abstract/poster. Letter Graded Lab Fee: $30

BMI 5390 Methods in Pharmacy Informatics (3 Credits)
Methods for pharmacy informatics focuses on the opportunities and challenges in integrating information technology into contemporary pharmacy practice in acute and ambulatory settings. It is designed to introduce students to basic and practical informatics problems and solutions in pharmacy practice. Letter Graded

BMI 5390W Methods in Pharmacy Informatics (3 Credits)
Methods for pharmacy informatics focuses on the opportunities and challenges in integrating information technology into contemporary pharmacy practice in acute and ambulatory settings. It is designed to introduce students to basic and practical informatics problems and solutions in pharmacy practice. Letter Graded

BMI 5391 Synthesis Project in Pharmacy Informatics (3 Credits)
This course provides an opportunity for students to gain practical, hands-on cumulating knowledge and experience in Pharmacy Informatics. This project should reflect a substantial effort and competency of synthesis in informatics developed through the course training that address core competencies of the pharmacy informatics system by working through a problem of the student's choice. The selected problem should be discussed and approved by a faculty mentor. This should be tied to research/practice of a student's interest that includes one or more didactic modules covered in the prior courses. The synthesis project should be based upon the combined efforts of (online) library database search, fieldwork, and mentored research approved by the mentor(s). Expectations of the class include the presentation of the conclusions from the project in a written manner for academic dissemination as a conference abstract/poster. Letter Graded BMI 5300/W and 5390/W

BMI 5391W Synthesis Project in Pharmacy Informatics (3 Credits)
This course provides an opportunity for students to gain practical, hands-on cumulating knowledge and experience in Pharmacy Informatics. This project should reflect a substantial effort and competency of synthesis in informatics developed through the course training that address core competencies of the pharmacy informatics system by working through a problem of the student's choice. The selected problem should be discussed and approved by a faculty mentor. This should be tied to research/practice of a student's interest that includes one or more didactic modules covered in the prior courses. The synthesis project should be based upon the combined efforts of (online) library database search, fieldwork, and mentored research approved by the mentor(s). Expectations of the class include the presentation of the conclusions from the project in a written manner for academic dissemination as a conference abstract/poster. Letter Graded BMI 5300/W and 5390/W

BMI 6000 Practicum in Biomedical Informatics (1-3 Credits)
During the practicum, each student will select an area of interest in which to apply the knowledge and skills gained during the didactic courses. Students will become active participants in the work of developing informatics-based applications. Each student will develop a specific set of goals, to be approved by the student's advising committee and practicum supervisor, to be accomplished. These goals will reflect the student's area of interest and the needs of the organization. This course is graded on a pass/fail basis and is repeated for a maximum of six semester credit hours to meet degree requirements. Pass/Fail Course fee: $1650

BMI 6000W Practicum in Biomedical Informatics (1-3 Credits)
During the practicum, each student will select an area of interest in which to apply the knowledge and skills gained during the didactic courses. Students will become active participants in the work of developing informatics-based applications. Each student will develop a specific set of goals, to be approved by the student's advising committee and practicum supervisor, to be accomplished. These goals will reflect the student's area of interest and the needs of the organization. This course is graded on a pass/fail basis and is repeated for a maximum of six semester credit hours to meet degree requirements. Pass/Fail Course fee: $1650

BMI 6002 Directed Study: Biomedical Informatics (1-6 Credits)
This course provides a mechanism for students to explore issues of personal interest in the field of biomedical informatics. The varying content may include topics such as display of large-scale nursing data, mapping issues for dentistry or linking public health knowledge to clinical medicine. This course may be graded on a letter grade or pass/fail basis, and may be repeated as topics vary. Maximum allowed hours of BMI 6002: 3 hours maximum certificate students and 6 hours for master's and doctoral students. Letter Graded

BMI 6002W Directed Study: Biomedical Informatics (1-6 Credits)
This course provides a mechanism for students to explore issues of personal interest in the field of biomedical informatics. The varying content may include topics such as display of large-scale nursing data, mapping issues for dentistry or linking public health knowledge to clinical medicine. This course may be graded on a letter grade or pass/fail basis, and may be repeated as topics vary. Maximum allowed hours of BMI 6002: 3 hours maximum certificate students and 6 hours for master's and doctoral students. Letter Graded

BMI 6301 Health Data Display (3 Credits)
This course will examine the evaluation and design of information displays for health care. The course will focus on three areas: (1) Theories and methodologies for the evaluation of information displays; (2) Techniques and tools for generating effective information displays through visualization; and (3) How the formats of information displays affect decision making in health care. Letter Graded

BMI 6301W Health Data Display (3 Credits)
This course will examine the evaluation and design of information displays for health care. The course will focus on three areas: (1) Theories and methodologies for the evaluation of information displays; (2) Techniques and tools for generating effective information displays through visualization; and (3) How the formats of information displays affect decision making in health care. Letter Graded

BMI 6303 Introduction to Telehealth (3 Credits)
The course will provide an overview of telehealth in the context of the general health care system. It will survey the application of telehealth in various medical specialties and different settings, e.g., rural, military/aerospace and corrections. The course will identify key issues in implementing and operating a telehealth program, including technology, economics, law/ethics, training, protocol development, and evaluation. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 6303W Introduction to Telehealth (3 Credits)
The course will provide an overview of telehealth in the context of the general health care system. It will survey the application of telehealth in various medical specialties and different settings, e.g., rural, military/aerospace and corrections. The course will identify key issues in implementing and operating a telehealth program, including technology, economics, law/ethics, training, protocol development, and evaluation. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 6305 Social Dynamics & Health Information (3 Credits)
The implementation of information systems will not only greatly enhance the quality of health care but also radically change the nature of health care. This course will look at health care as a distributed system composed of groups of people interacting with each other and with information technology. Two major areas will be covered in the course. The first area is computer-supported cooperative work (CSCW), which is defined as computer assisted coordinated activity such as reasoning, problem solving, decision-making, routine tasks and communication carried out by a group of collaborating individuals who interact with complex information technology. Most health information systems (such as EMR) are large group-wares that support large numbers of synchronous and asynchronous users with diverse backgrounds in the executions of many different types of tasks. The second area is the social impact of information technology. This area will focus on the impact of the Internet on health care, such as the functions and impacts of virtual communities, online health groups, and telehealth care through the web. Letter Graded BMI 5300/W or BMI 5310/W

BMI 6305W Social Dynamics & Health Information (3 Credits)
The implementation of information systems will not only greatly enhance the quality of health care but also radically change the nature of health care. This course will look at health care as a distributed system composed of groups of people interacting with each other and with information technology. Two major areas will be covered in the course. The first area is computer-supported cooperative work (CSCW), which is defined as computer assisted coordinated activity such as reasoning, problem solving, decision-making, routine tasks and communication carried out by a group of collaborating individuals who interact with complex information technology. Most health information systems (such as EMR) are large group-wares that support large numbers of synchronous and asynchronous users with diverse backgrounds in the executions of many different types of tasks. The second area is the social impact of information technology. This area will focus on the impact of the Internet on health care, such as the functions and impacts of virtual communities, online health groups, and telehealth care through the web. Letter Graded BMI 5300/W or BMI 5310/W

BMI 6306 Biomedical Ontologies and Knowledge Representation (3 Credits)
The purpose of this course is to examine the role of information representation, controlled vocabularies and knowledge engineering constructs such as ontologies in conceptualization, design and implementation of modern health information systems. The course will introduce approaches for representing information and knowledge in a distributed network of health information systems. Moving beyond a general understanding of taxonomies, students will gain an understanding of the conceptual foundations of ontologies, including the limitations of the modern systems. Knowledge modeling and engineering principals will be introduced through lectures, hands-on practice and the class project. This will include the design, construction and use of ontologies in health care applications. Through hands-on experience, students will gain insight into the strengths and limitations of the existing resources, approaches and systems as well as point to directions where future work needs to be done. Letter Graded BMI 5304 or 5304W Lab Fee: $30

BMI 6306W Biomedical Ontologies and Knowledge Representation (3 Credits)
The purpose of this course is to examine the role of information representation, controlled vocabularies and knowledge engineering constructs such as ontologies in conceptualization, design and implementation of modern health information systems. The course will introduce approaches for representing information and knowledge in a distributed network of health information systems. Moving beyond a general understanding of taxonomies, students will gain an understanding of the conceptual foundations of ontologies, including the limitations of the modern systems. Knowledge modeling and engineering principals will be introduced through lectures, hands-on practice and the class project. This will include the design, construction and use of ontologies in health care applications. Through hands-on experience, students will gain insight into the strengths and limitations of the existing resources, approaches and systems as well as point to directions where future work needs to be done. Letter Graded BMI 5304 or 5304W Lab Fee: $30

BMI 6308 Digital Technologies and Analytics for Personalized Health (3 Credits)
Digital technologies have been gaining popularity in personal health and wellness. A plethora of mobile and connected platforms, patient centered solutions are poised to transform the role of public, care providers, and health systems. The key driving forces of this digital era are personalized health data and advanced analytics. In this course, students will explore these key facets of digital health and learn to (a) apply text analytics and machine learning models to describe user needs in digital settings, (b) synthesize best practices and tools for optimizing and measuring user experiences in digital solutions, and (c) discuss the emerging trends in the field that have the potential to transform health care. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 6308W Digital Technologies and Analytics for Personalized Health (3 Credits)
Digital technologies have been gaining popularity in personal health and wellness. A plethora of mobile and connected platforms, patient centered solutions are poised to transform the role of public, care providers, and health systems. The key driving forces of this digital era are personalized health data and advanced analytics. In this course, students will explore these key facets of digital health and learn to (a) apply text analytics and machine learning models to describe user needs in digital settings, (b) synthesize best practices and tools for optimizing and measuring user experiences in digital solutions, and (c) discuss the emerging trends in the field that have the potential to transform health care. Letter Graded BMI 5300 or 5300W Lab Fee: $30

BMI 6309 Healthcare Interface Design (3 Credits)
This course is a project-based course, and covers topics of user interface design for healthcare related systems (such as EHR, clinical decision support system, dashboards). Students will apply the fundamental principles of human-computer interaction and human factors to real world problems through class projects, and will develop formal documentations of user-centered design process for interface design. The focus is executing a design project to develop user-friendly interfaces, and interfaces that are compliant with industry and government standards (e.g., FDA, CMS, NIST) for healthcare. Letter Graded BMI 5302/W or BMI 5303/W Lab Fee: $30

BMI 6309W Healthcare Interface Design (3 Credits)
This course is a project-based course, and covers topics of user interface design for healthcare related systems (such as EHR, clinical decision support system, dashboards). Students will apply the fundamental principles of human-computer interaction and human factors to real world problems through class projects, and will develop formal documentations of user-centered design process for interface design. The focus is executing a design project to develop user-friendly interfaces, and interfaces that are compliant with industry and government standards (e.g., FDA, CMS, NIST) for healthcare. Letter Graded BMI 5302/W or BMI 5303/W Lab Fee: $30

BMI 6311 Leadership and Decision Making (3 Credits)
Healthcare is challenging with a high degree of uncertainty, making decision making more complex. Leadership is fundamentally about getting things done through people, while decision making is the process behind choosing. In this course we will focus on how to lead, choose between alternatives, measure productivity, streamline process flows, and implement project plans in health/clinical informatics. We will incorporate theories behind uncertainty and decision modeling, and spend time assessing examples of both superior and inferior leadership in healthcare and health informatics. Letter Graded Lab Fee: $30

BMI 6311W Leadership and Decision Making (3 Credits)
Healthcare is challenging with a high degree of uncertainty, making decision making more complex. Leadership is fundamentally about getting things done through people, while decision making is the process behind choosing. In this course we will focus on how to lead, choose between alternatives, measure productivity, streamline process flows, and implement project plans in health/clinical informatics. We will incorporate theories behind uncertainty and decision modeling, and spend time assessing examples of both superior and inferior leadership in healthcare and health informatics. Letter Graded Lab Fee: $30

BMI 6313 Scientific Writing in Healthcare (3 Credits)
This course provides the advanced skills necessary to write a full range of scientific manuscripts in Biomedical Informatics. The course begins with the philosophy of science, types of scientific research, and types of scientific manuscripts (including review, applied, and research articles). The course then examines each component of a scientific manuscript in detail, including the title, abstract, introduction, literature review, method, discussion, conclusion and appendices. The course covers the purpose of each of these components, discusses properties that distinguish good components from bad, and presents techniques for producing high-quality scientific writing. Students will apply these techniques by examining selected published papers, producing their own scientific writing, and critiquing the writing of others in the class. Students are expected to enter the class with a draft scientific paper that they have written and a high degree of general writing skills. Letter Graded Lab Fee: $30

BMI 6313W Scientific Writing in Healthcare (3 Credits)
This course provides the advanced skills necessary to write a full range of scientific manuscripts in Biomedical Informatics. The course begins with the philosophy of science, types of scientific research, and types of scientific manuscripts (including review, applied, and research articles). The course then examines each component of a scientific manuscript in detail, including the title, abstract, introduction, literature review, method, discussion, conclusion and appendices. The course covers the purpose of each of these components, discusses properties that distinguish good components from bad, and presents techniques for producing high-quality scientific writing. Students will apply these techniques by examining selected published papers, producing their own scientific writing, and critiquing the writing of others in the class. Students are expected to enter the class with a draft scientific paper that they have written and a high degree of general writing skills. Letter Graded Lab Fee: $30

BMI 6315 Advanced Electronic Health Records (3 Credits)
This course is designed to provide informatics students with an in-depth overview of the key concepts regarding implementation of a clinically-oriented information system (e.g., an electronic medical record, computer-based provider order entry, nursing). The course will strive to present best practices in cases which there is evidence to support such assertions. The course will rely heavily upon the published literature as well as the experience of the instructors. Letter Graded BMI 5313 or 5313W Lab Fee: $30

BMI 6316 Change Management for Health Informatics (3 Credits)
The ability to manage change - people, process, and technology - may be the most important factor in successful implementation and in producing sustained outcomes from applied health informatics projects. This course will cover the theory and principles of change management, with a particular emphasis on healthcare and information technology innovation at both the individual and organizational level. Tools and techniques for developing comprehensive change management plans will be presented. Case studies of successful and failed change efforts will demonstrate applications of these principles and techniques. Letter Graded BMI 5300/W or concurrent enrollment with 5300/W

BMI 6316W Change Management for Health Informatics (3 Credits)
The ability to manage change - people, process, and technology - may be the most important factor in successful implementation and in producing sustained outcomes from applied health informatics projects. This course will cover the theory and principles of change management, with a particular emphasis on healthcare and information technology innovation at both the individual and organizational level. Tools and techniques for developing comprehensive change management plans will be presented. Case studies of successful and failed change efforts will demonstrate applications of these principles and techniques. Letter Graded

BMI 6318 Big Data in Biomedical Informatics (3 Credits)
This course will expose students to the technologies used to solve 'Big Data' problems in biomedicine and healthcare. Through hands-on exercises, we will learn how to distill actionable information from small and large data leveraging multiple machines. We will cover the Health Data Science toolboxes for processing data sets with distributed algorithms, how to apply machine learning models in this context and finally, evaluate and report on the analysis. Students will be required to complete hands-on exercises and working knowledge of Python and SQL is required. Letter Graded BMI 5007 or 5007W Lab Fee: $30

BMI 6318W Big Data in Biomedical Informatics (3 Credits)
This course will expose students to the technologies used to solve 'Big Data' problems in biomedicine and healthcare. Through hands-on exercises, we will learn how to distill actionable information from small and large data leveraging multiple machines. We will cover the Health Data Science toolboxes for processing data sets with distributed algorithms, how to apply machine learning models in this context and finally, evaluate and report on the analysis. Students will be required to complete hands-on exercises and working knowledge of Python and SQL is required. Letter Graded BMI 5007 or 5007W Lab Fee: $30

BMI 6319 Data Analysis for Scientific Research in Biomedical Informatics (3 Credits)
This is a PhD level course which will expose students to the best practices in Health Data Science in biomedicine and healthcare. The students will devise a plan for a reproducible data analysis pipeline which will be developed throughout the course. The course will involve class discussions and sharing of ideas on methodologies and Health Data Science tools, with particular emphasis on reproducibility. The data analysis plan, including choice of dataset, will be student driven but it will require approval from the students' PhD supervisor and the course instructor. Pass/Fail BMI 5007 or 5007W Lab Fee: $30

BMI 6319W Data Analysis for Scientific Research in Biomedical Informatics (3 Credits)
This is a PhD level course which will expose students to the best practices in Health Data Science in biomedicine and healthcare. The students will devise a plan for a reproducible data analysis pipeline which will be developed throughout the course. The course will involve class discussions and sharing of ideas on methodologies and Health Data Science tools, with particular emphasis on reproducibility. The data analysis plan, including choice of dataset, will be student driven but it will require approval from the students' PhD supervisor and the course instructor. Pass/Fail BMI 5007 or 5007W Lab Fee: $30

BMI 6322 Distributional Semantics in BMI (3 Credits)
This course concerns computational methods that learn about the meaning of words and concepts from their distribution in natural language, and consequently are able to perform cognitive tasks in a human-like manner. For example, with the appropriate learning materials, these methods have shown performances comparable with English as a second language speakers on the Test of English as a Foreign Language synonym test. Applications in the biomedical domain include information retrieval, automated indexing of the biomedical literature, literature-based knowledge discovery and the analysis of biological sequences. This course will explore the underlying theories and various methodological approaches used to measure semantic relatedness (the extent to which the meaning of two terms is related), as well as their application in biomedical and other domains. The course will provide hands-on instruction so that students will emerge with the ability to apply the methods taught in the class in their own research. Letter Graded Lab Fee: $30

BMI 6323 Machine Learning in Biomedical Informatics (3 Credits)
The increased digitization of biomedical data has dramatically increased interest in methods to analyze large quantities of data. Data mining is the process of transforming this raw data into actionable knowledge, which has led to many spectacular advances in biomedicine. This course provides an introduction to data mining methods from a biomedical perspective. The primary focus will be on practical and commonly used machine learning techniques for data mining (e.g., decision trees, support vector machines, clustering) and how these techniques transform data into knowledge. Students will engage in hands-on projects that expose them to data mining methods. Further, students will be able to critically evaluate the appropriateness of data mining methods on different tasks. Letter Graded Lab Fee: $30

BMI 6323W Machine Learning in Biomedical Informatics (3 Credits)
The increased digitization of biomedical data has dramatically increased interest in methods to analyze large quantities of data. Data mining is the process of transforming this raw data into actionable knowledge, which has led to many spectacular advances in biomedicine. This course provides an introduction to data mining methods from a biomedical perspective. The primary focus will be on practical and commonly used machine learning techniques for data mining (e.g., decision trees, support vector machines, clustering) and how these techniques transform data into knowledge. Students will engage in hands-on projects that expose them to data mining methods. Further, students will be able to critically evaluate the appropriateness of data mining methods on different tasks. Letter Graded Lab Fee: $30

BMI 6324 Health Information Technology Policy (3 Credits)
This course will examine policy issues related to the use of information technologies in health care. It will examine key policies and policy issues in three areas: clinical informatics, consumer informatics and population health informatics. The primary focus will be on the United States, but international approaches will also be discussed. Letter Graded

BMI 6324W Health Information Technology Policy (3 Credits)
This course will examine policy issues related to the use of information technologies in health care. It will examine key policies and policy issues in three areas: clinical informatics, consumer informatics and population health informatics. The primary focus will be on the United States, but international approaches will also be discussed. Letter Graded

BMI 6325 Assessment, Implementation, and Evaluation of Artificial Intelligence in Healthcare (3 Credits)
This course is focused on the governance, assessment, implementation, and evaluation of artificial/augmented intelligence in healthcare to address healthcare problems. It will include the applicable regulations from federal and state agencies, as well as guidance from recognized non-governmental and international organizations. Particular emphasis will be given to patient safety, privacy, consent, workflow and return on investment. Upon successfully completing this course, students will: Assess Artificial Intelligence applications as possible solutions to addressing healthcare problems Develop an Artificial Intelligence implementation plan Design an evaluation and monitoring plan for healthcare Artificial Intelligence Identify Artificial Intelligence governance requirements congruent with applicable regulations Please let me know if you have any questions or need any additional information. Letter Graded BMI 5300 or 5300W

BMI 6325W Assessment, Implementation, and Evaluation of Artificial Intelligence in Healthcare (3 Credits)
This course is focused on the governance, assessment, implementation, and evaluation of artificial/augmented intelligence in healthcare to address healthcare problems. It will include the applicable regulations from federal and state agencies, as well as guidance from recognized non-governmental and international organizations. Particular emphasis will be given to patient safety, privacy, consent, workflow and return on investment. Upon successfully completing this course, students will: Assess Artificial Intelligence applications as possible solutions to addressing healthcare problems Develop an Artificial Intelligence implementation plan Design an evaluation and monitoring plan for healthcare Artificial Intelligence Identify Artificial Intelligence governance requirements congruent with applicable regulations Letter Graded BMI 5300 or 5300W

BMI 6328 Value in the Health Data Eco-system (3 Credits)
This course will expose doctoral students to an interdisciplinary research area that aims to explore the challenges of improving health care delivery, and reducing costs in a health information technology-enabled environment. Data and information are assets and a strategic resource for an organization that can add value or cause major disruptions. An understanding of the relationships and use of data and its interdependencies are essential to manage an organization. Improving healthcare requires knowledge of the intersections between data systems and relationships, data governance, data definitions, representative metrics, evidence-based interventions and outcomes. Letter Graded BMI 5300 or 5300W

BMI 6328W Value in the Health Data Eco-system (3 Credits)
This course will expose doctoral students to an interdisciplinary research area that aims to explore the challenges of improving health care delivery, and reducing costs in a health information technology-enabled environment. Data and information are assets and a strategic resource for an organization that can add value or cause major disruptions. An understanding of the relationships and use of data and its interdependencies are essential to manage an organization. Improving healthcare requires knowledge of the intersections between data systems and relationships, data governance, data definitions, representative metrics, evidence-based interventions and outcomes. Letter Graded BMI 5300 or 5300W

BMI 6330 Biomedical Natural Language Processing (3 Credits)
This course focuses on current natural language processing (NLP) methods and their applications in the biomedical domain. It is a project-based student-driven course while also providing a systematic introduction to basic NLP concepts and methods, especially with a biomedical focus. Students will gain knowledge and skills in various NLP tasks such as named entity recognition, information extraction, and information retrieval. Prior to enrollment in the course, students are required to select and prepare a research project. This includes both having direct access to the raw text data as well as high-level goals for the NLP task. Please contact the instructor with questions and pointers to potential data sources. Students will be expected to manually annotate this data, create an automatic machine learning-based NLP system, and write a paper describing their results. Letter Graded

BMI 6330W Biomedical Natural Language Processing (3 Credits)
This course focuses on current natural language processing (NLP) methods and their applications in the biomedical domain. It is a project-based student-driven course while also providing a systematic introduction to basic NLP concepts and methods, especially with a biomedical focus. Students will gain knowledge and skills in various NLP tasks such as named entity recognition, information extraction, and information retrieval. Prior to enrollment in the course, students are required to select and prepare a research project. This includes both having direct access to the raw text data as well as high-level goals for the NLP task. Please contact the instructor with questions and pointers to potential data sources. Students will be expected to manually annotate this data, create an automatic machine learning-based NLP system, and write a paper describing their results. Letter Graded

BMI 6331 Medical Imaging and Signal Pattern Recognition (3 Credits)
Biomedical data in the form of images, videos or other unstructured signals are continuously collected by clinicians, such as radiologists, dermatologists or ophthalmologists, life science researchers and increasingly by ourselves with our personal devices. Tools able to distill quantitative actionable information from these data are essential to generate phenotypes, aid diagnosis, screening, treatment and automate repetitive tasks. In the era of personalized medicine and big data, they have become an urgent medical need. In this course, you will be introduced to the essential pattern recognitions techniques to build and evaluate such tools. We will be covering the basics of image/signal processing, computer vision and applied machine learning with hands on examples relevant to biomedical applications. Letter Graded BMI 5007 or 5007W Lab Fee: $30

BMI 6331W Medical Imaging and Signal Pattern Recognition (3 Credits)
Biomedical data in the form of images, videos or other unstructured signals are continuously collected by clinicians, such as radiologists, dermatologists or ophthalmologists, life science researchers and increasingly by ourselves with our personal devices. Tools able to distill quantitative actionable information from these data are essential to generate phenotypes, aid diagnosis, screening, treatment and automate repetitive tasks. In the era of personalized medicine and big data, they have become an urgent medical need. In this course, you will be introduced to the essential pattern recognitions techniques to build and evaluate such tools. We will be covering the basics of image/signal processing, computer vision and applied machine learning with hands on examples relevant to biomedical applications. Letter Graded BMI 5007 or 5007W Lab Fee: $30

BMI 6332 Genomics and Precision Medicine (3 Credits)
This course will provide the foundations of precision medicine and its relations with genomics by exposing trainees to the use and interpretation of genetic studies of human populations in the context of phenotypes and diseases. The course will cover principles of genetics underlying associations between genetic variants and disease susceptibility and drug response. Letter Graded BMI 5330 or 5330W Lab Fee: $30

BMI 6332W Genomics and Precision Medicine (3 Credits)
This course will provide the foundations of precision medicine and its relations with genomics by exposing trainees to the use and interpretation of genetic studies of human populations in the context of phenotypes and diseases. The course will cover principles of genetics underlying associations between genetic variants and disease susceptibility and drug response. Letter Graded BMI 5330 or 5330W Lab Fee: $30

BMI 6333 Current Topics in Genomics (3 Credits)
Bioinformatics play significant roles in modern genetics and genomics studies. Nearly every large-scale biology projects require a significant component of bioinformatics and computational approaches. This course provides an introduction to advanced technologies and resources in genetics, epigenetics, transcriptomics, and phenotype studies, organized as "topics". Students will be provided with knowledge and skills to apply canonical algorithms in bioinformatics tasks, to identify potential challenges, and to develop their own analysis pipelines. Letter Graded BMI 5330 or 5330W

BMI 6333W Current Topics in Genomics (3 Credits)
Bioinformatics play significant roles in modern genetics and genomics studies. Nearly every large-scale biology projects require a significant component of bioinformatics and computational approaches. This course provides an introduction to advanced technologies and resources in genetics, epigenetics, transcriptomics, and phenotype studies, organized as "topics". Students will be provided with knowledge and skills to apply canonical algorithms in bioinformatics tasks, to identify potential challenges, and to develop their own analysis pipelines. Letter Graded BMI 5330 or 5330W

BMI 6334 Deep Learning in Biomedical Informatics (3 Credits)
Deep learning and artificial intelligence have disrupted multiple industries including healthcare. This class offers students exposure to basic concepts of and practical skills for deep learning and its applications in selected problems in biomedical informatics. Students will study the foundations of deep learning, understand how to build neural networks, and conduct successful machine learning analyses. Deep learning architectures such as convolutional neural networks, recurrent neural networks, and autoencoders will be explored, along with concepts such as embeddings, dropout, and batch normalization. Case studies from biomedical informatics, including biomedical and clinical natural language processing, medical imaging, electronic health records, and genomics data will be utilized. Students will use the Python language and the state-of-the-art deep learning frameworks to implement deep learning models to solve real world problems. Experience with Python programming and basic knowledge of linear algebra is required. Letter Graded BMI 5007/W and 5353/W Lab Fee: $30

BMI 6334W Deep Learning in Biomedical Informatics (3 Credits)
Deep learning and artificial intelligence have disrupted multiple industries including healthcare. This class offers students exposure to basic concepts of and practical skills for deep learning and its applications in selected problems in biomedical informatics. Students will study the foundations of deep learning, understand how to build neural networks, and conduct successful machine learning analyses. Deep learning architectures such as convolutional neural networks, recurrent neural networks, and autoencoders will be explored, along with concepts such as embeddings, dropout, and batch normalization. Case studies from biomedical informatics, including biomedical and clinical natural language processing, medical imaging, electronic health records, and genomics data will be utilized. Students will use the Python language and the state-of-the-art deep learning frameworks to implement deep learning models to solve real world problems. Experience with Python programming and basic knowledge of linear algebra is required. Letter Graded BMI 5007/W and 5353/W Lab Fee: $30

BMI 6335 Technical Foundations of Generative Artificial Intelligence (3 Credits)
Generative Artificial Intelligence (AI) holds immense potential to revolutionize the field of biomedicine by enhancing accuracy, efficiency, and personalization in healthcare, ultimately leading to better patient outcomes and a more robust healthcare system. It is crucial in improving diagnostic capabilities, personalized medicine, drug discovery, clinical decision support, and patient engagement and support. This course provides fundamental and technical skills in generative AI, offering hands-on experience with Large Language Models (LLMs), Stable Diffusion Models, and Generative Adversarial Networks (GANs). Students will engage in using generative AI to solve real-world biomedical problems and will be critically evaluated on their methodology and results. Upon successfully completing this course, students will: Select an appropriate generative AI model for a specific data science task. Modify, adapt, and deploy generative AI models for specific biomedical problems. Train, evaluate, and compare the outputs of generative AI. Identify the ethical and real-world implementation implications of generative AI models Letter Graded BMI 5007 or 5007W

BMI 6335W Technical Foundations of Generative Artificial Intelligence (3 Credits)
Generative Artificial Intelligence (AI) holds immense potential to revolutionize the field of biomedicine by enhancing accuracy, efficiency, and personalization in healthcare, ultimately leading to better patient outcomes and a more robust healthcare system. It is crucial in improving diagnostic capabilities, personalized medicine, drug discovery, clinical decision support, and patient engagement and support. This course provides fundamental and technical skills in generative AI, offering hands-on experience with Large Language Models (LLMs), Stable Diffusion Models, and Generative Adversarial Networks (GANs). Students will engage in using generative AI to solve real-world biomedical problems and will be critically evaluated on their methodology and results. Upon successfully completing this course, students will: Select an appropriate generative AI model for a specific data science task. Modify, adapt, and deploy generative AI models for specific biomedical problems. Train, evaluate, and compare the outputs of generative AI. Identify the ethical and real-world implementation implications of generative AI models Letter Graded BMI 5007 or 5007W

BMI 6340 Health Information Visualization and Visual Analytics (3 Credits)
This course introduces the basics of information visualization, which is the use of interactive visual representations of data to amplify human cognition. Properly constructed visualizations allow us to analyze data by exploring it from different perspectives and using the power of our visual system to quickly reveal patterns and relationships. This course uses practical, hands-on examples and exercises to teach the theory and application of information visualization for health data. The class emphasizes visual analysis of time-series data, ranking and part-to-whole relations, deviations, distributions, correlations, multivariate, and geographic data. You will also learn how to combine multiple visualizations into interactive dashboards and how to use Tableau, a state-of-the-art information visualization tool to produce and deliver visualizations and dashboards quickly and easily. Letter Graded Lab Fee: $30

BMI 6340W Health Information Visualization and Visual Analytics (3 Credits)
This course introduces the basics of information visualization, which is the use of interactive visual representations of data to amplify human cognition. Properly constructed visualizations allow us to analyze data by exploring it from different perspectives and using the power of our visual system to quickly reveal patterns and relationships. This course uses practical, hands-on examples and exercises to teach the theory and application of information visualization for health data. The class emphasizes visual analysis of time-series data, ranking and part-to-whole relations, deviations, distributions, correlations, multivariate, and geographic data. You will also learn how to combine multiple visualizations into interactive dashboards and how to use Tableau, a state-of-the-art information visualization tool to produce and deliver visualizations and dashboards quickly and easily. Letter Graded Lab Fee: $30

BMI 6370 Advanced Standards and Terminologies in Nursing and Health Informatics (3 Credits)
This course will explore the history of healthcare SDOs, examining their membership and focus domain. Students will examine the role of the major SDOs and their impact on the structure and function of global healthcare delivery. The relationship between US and International Standards Organizations will be reviewed. Furthermore, the course will explore emerging standards. Additionally, students will have the opportunity to compare and contrast nursing terminologies and classification systems relevant to the Electronic Health Record (EHR). Students will create a nursing standard for implementation in an electronic health record (EHR) and propose a method to evaluate the standard post implementation. Letter Graded

BMI 6370W Advanced Standards and Terminologies in Nursing and Health Informatics (3 Credits)
This course will explore the history of healthcare SDOs, examining their membership and focus domain. Students will examine the role of the major SDOs and their impact on the structure and function of global healthcare delivery. The relationship between US and International Standards Organizations will be reviewed. Furthermore, the course will explore emerging standards. Additionally, students will have the opportunity to compare and contrast nursing terminologies and classification systems relevant to the Electronic Health Record (EHR). Students will create a nursing standard for implementation in an electronic health record (EHR) and propose a method to evaluate the standard post implementation. Letter Graded

BMI 7000 Advanced Preceptorship (1-9 Credits)
The student will use this course to develop a research proposal that will be used as a basis for their doctoral dissertation. The student must complete nine semester credit hours with the supervision of the mentor or primary advisor. The result will be used to prepare for the advance to candidacy exam. Pass/Fail

BMI 7000W Advanced Preceptorship (1-9 Credits)
The student will use this course to develop a research proposal that will be used as a basis for their doctoral dissertation. The student must complete nine semester credit hours with the supervision of the mentor or primary advisor. The result will be used to prepare for the advance to candidacy exam. Pass/Fail

BMI 7050 Research in Biomedical Informatics (1-9 Credits)
The doctoral candidate must complete 21 hours of research in Biomedical Informatics. The mentor or primary advisor will supervise the advancement of the candidates progress. Pass/Fail

BMI 7050W Research in Biomed Informatics (1-9 Credits)
The doctoral candidate must complete 21 hours of research in Biomedical Informatics. The mentor or primary advisor will supervise the advancement of the candidates progress. Pass/Fail

BMI 7070 Fellowship in Health Informatics (1-9 Credits)
DHI students will use this course to implement their translational practice project under the supervision of their primary advisor and in collaboration with their additional committee members. The translational practice project requirements will consist of background and review of relevant literature/evidence, project overview, theoretical framework/logic model, purpose statement/significance of project, evaluation design (including return on investment), implementation/gather evidence, recommendations and finally, future implications. This course must be repeated as students must earn a total of 21 semester credit hours to meet the degree requirement. Pass/Fail

BMI 7150 Research Seminar (1 Credit)
This course involves the weekly research seminars in which both invited speakers and students present their work to an audience of SBMI affiliates. Students participating in the course for credit are required to both give a seminar presentation, attend at least 80% of the weekly seminars, and fill out evaluation forms (available online). Each student seminar must be supervised by a faculty member (not necessarily the student's advisor). The faculty member will work with students to ensure that the seminars are both appropriate and interesting for the audience. Pass/Fail

BMI 7151 Seminar in Precision Medicine (1 Credit)
Seminar in Precision Medicine will introduce and discuss recent advances, frontier technologies, case studies, and future direction in precision medicine. The topics cover precision medicine, bioinformatics, systems biology, pharmacogenomics, genetics, genomic medicine, study design, methodologies and computational tools. Students enrolled in the course for credit are required to give a seminar presentation, attend at least 80% of the weekly seminars, and fill out evaluation forms. Each student seminar must be supervised by a faculty member (not necessarily the student's advisor). The faculty member will work with students to ensure that the seminars are both appropriate and interesting for the audience. Pass/Fail

BMI 7170 Project Advisement (1 Credit)
DHI students will use this course to develop a proposal/plan to be used as a basis for their translational practice project. Students must complete three semester credit hours with the supervision of their primary advisor and additional committee members. The proposal/plan will be used to prepare for the project execution as students develop a timeline for completion of the translational practice project during this course. Pass/Fail

BMI 7301 Grant Writing (3 Credits)
Students will develop skills in the planning and execution of grant development. The focus will be on NIH and NSF grants forms, but students will also be exposed to grant applications from private organizations. The goal of the course is to enable students to develop a draft that can be used for the funding of dissertation work or to develop a grant that would allow students to continue their dissertation work in a post-dissertation award. Students will learn how to write the narrative, project time lines, include appropriate evaluation and draft budgets. Letter Graded

BMI 7301W Grant Writing (3 Credits)
Students will develop skills in the planning and execution of grant development. The focus will be on NIH and NSF grants forms, but students will also be exposed to grant applications from private organizations. The goal of the course is to enable students to develop a draft that can be used for the funding of dissertation work or to develop a grant that would allow students to continue their dissertation work in a post-dissertation award. Students will learn how to write the narrative, project time lines, include appropriate evaluation and draft budgets. Letter Graded

BMI 7302 Theories & Frameworks for BMI (3 Credits)
This course introduces a variety of significant theories, frameworks and models that are relevant to biomedical informatics knowledge and research. Students will explore these through exploration of methods and application papers. By the end of the semester students will be able to identify theories, frameworks and models that are applicable to their doctoral research. Letter Graded BMI 5300/W, 5310/W, and 5311/W

BMI 7302W Theories and Frameworks for Biomedical Informatics Research (3 Credits)
This course introduces a variety of significant theories, frameworks and models that are relevant to biomedical informatics knowledge and research. Students will explore these through exploration of methods and application papers. By the end of the semester students will be able to identify theories, frameworks and models that are applicable to their doctoral research. Letter Graded BMI 5300/W, 5310/W, and 5311/W

BMI 7303 Critical Review of Biomedical Informatics Literature Seminar (3 Credits)
The purpose of the critical literature review seminar is to apply and deepen knowledge from an area of biomedical informatics study and demonstrate proficiency in reviewing, synthesizing, and critically analyzing the research literature in a topic area that relates directly to the student's chosen dissertation topic. By the end of the semester each student will have completed a draft literature review of their chosen subject. Letter Graded BMI 5300/W, 5352/W, 5310/W, and 5311/W

BMI 7303W Critical Review of Biomedical Informatics Literature Seminar (3 Credits)
The purpose of the critical literature review seminar is to apply and deepen knowledge from an area of biomedical informatics study and demonstrate proficiency in reviewing, synthesizing, and critically analyzing the research literature in a topic area that relates directly to the student's chosen dissertation topic. By the end of the semester each student will have completed a draft literature review of their chosen subject. Letter Graded BMI 5300/W, 5352/W, 5310/W, and 5311/W

BMI 7304 Advanced Research Design for Biomedical Informatics (3 Credits)
This course will provide an in-depth examination of advanced research design and methods for establishing causal statements about the efficacy, effectiveness and generalizability of biomedical informatics research to improve human health. Standards for stating/claiming than an intervention is evidence-based will also be addressed. By the end of the semester students will be able to provide a plausible research design given a scenario and hypothesis. Letter Graded BMI 5300/W, 5352/W, 5310/W, and 5311/W

BMI 7304W Advanced Research Design for Biomedical Informatics (3 Credits)
This course will provide an in-depth examination of advanced research design and methods for establishing causal statements about the efficacy, effectiveness and generalizability of biomedical informatics research to improve human health. Standards for stating/claiming than an intervention is evidence-based will also be addressed. By the end of the semester students will be able to provide a plausible research design given a scenario and hypothesis. Letter Graded BMI 5300/W, 5352/W, 5310/W, and 5311/W

BMI 7320 Topics for Artificial Intelligence in Cancer Discovery (3 Credits)
This course introduces a few common deep learning architectures (e.g., convolution neural network, graph neural network, recurrent neural network and autoencoder) to the students who are new to AI. The primary aim of this course is to flatten the learning curve in AI and to provide students with a basis for further implementation of more complex models using enormous real-world data, especially in cancer research. This course will have a combination of lectures and demos to guarantee the students will have adequate first-hand experience with course concepts and with the opportunity to explore AI methods implemented in cancer research. We also include one tutorial of basic programming skills with Python and its machine learning libraries. Pass/Fail, F not in GPA

BMI 7320W Topics for Artificial Intelligence in Cancer Discovery (3 Credits)
This course introduces a few common deep learning architectures (e.g., convolution neural network, graph neural network, recurrent neural network and autoencoder) to the students who are new to AI. The primary aim of this course is to flatten the learning curve in AI and to provide students with a basis for further implementation of more complex models using enormous real-world data, especially in cancer research. This course will have a combination of lectures and demos to guarantee the students will have adequate first-hand experience with course concepts and with the opportunity to explore AI methods implemented in cancer research. We also include one tutorial of basic programming skills with Python and its machine learning libraries. Pass/Fail, F not in GPA

BMI 7350W Scholarly Foundations of Advanced Health Informatics Practice (3 Credits)
This foundational course focuses on analyzing health informatics competencies, role, and scholarship as the foundation for scholarly practice at the doctoral level. The foundations of science and scientific inquiry are explored including the epistemological and ontological bases for scientific methods, theory, and knowledge. Sources of evidence, theory, and knowledge for health informatics practice are analyzed. Evidence based practice, leadership, innovation/change, inter-professional collaboration/teams, and quality and safety, are introduced as fundamental components of health informatics practice. Implementation science is investigated as a means of guiding science-based practice. Letter Graded BMI 5300 or 5300W

BMI 7351 Evidence-based Health Informatics Practice (3 Credits)
In this course the doctoral student will learn the importance of evidence for the advancement of Informatics practice, improvement of varied outcomes, and advancement of the information technology to support a learning health system. The student will apply skills to focus on the current urgency of evidence application to practice, and have a hands on illustration of how to appraise, summarize and translate evidence to support recommendations for quality improvement and sustainment in a learning health system. In addition, this course is intended to update and enhance evidence-based practice knowledge and process for conducting a search, critiquing, and evaluating research publications. Students will learn to perform an electronic literature search from electronic databases and assess, investigate and recommend informatics practice using an evidence-based practice methodology. Letter Graded BMI 5300 or 5300W

BMI 7351W Evidence-based Health Informatics Practice (3 Credits)
In this course the doctoral student will learn the importance of evidence for the advancement of Informatics practice, improvement of varied outcomes, and advancement of the information technology to support a learning health system. The student will apply skills to focus on the current urgency of evidence application to practice, and have a hands on illustration of how to appraise, summarize and translate evidence to support recommendations for quality improvement and sustainment in a learning health system. In addition, this course is intended to update and enhance evidence-based practice knowledge and process for conducting a search, critiquing, and evaluating research publications. Students will learn to perform an electronic literature search from electronic databases and assess, investigate and recommend informatics practice using an evidence-based practice methodology. Letter Graded BMI 5300 or 5300W

BMI 7360 Advanced Project Management (3 Credits)
This course is an advanced project management for doctoral students. The student will develop a management plan for a health care information technology project identifying a specific set of operations designed to accomplish a singular goal, to deliver on-time, on-budget, evaluating performance and project integration supporting the strategic goals of the organizations. Moreover, the student will learn to apply evidence-based practice and project management methods and core activities of a project manager that incorporate the five project management processes as well as the tools and techniques essential to the ten project management knowledge areas as defined by the Project Management Institute, Inc. Letter Graded BMI 5328W Course fee: $50 Lab Fee: $30

BMI 7360W Advanced Project Management (3 Credits)
This course is an advanced project management for doctoral students. The student will develop a management plan for a health care information technology project identifying a specific set of operations designed to accomplish a singular goal, to deliver on-time, on-budget, evaluating performance and project integration supporting the strategic goals of the organizations. Moreover, the student will learn to apply evidence-based practice and project management methods and core activities of a project manager that incorporate the five project management processes as well as the tools and techniques essential to the ten project management knowledge areas as defined by the Project Management Institute, Inc. Letter Graded BMI 5328W Course fee: $50 Lab Fee: $30

BMI 7361 Business, Contract, and Vendor Management (3 Credits)
In this course the doctoral student will learn the skills needed to effectively manage vendors, as well as negotiate and manage contracts. Through hands-on exercises, students will learn the role of governance to oversee contractual, financial, and service delivery performance that can improve outcomes within projects, programs, and the overall organization portfolio. This governance can be built into the relationship from the onset of the engagement to improve the overall health of the relationship and maximize value for current and future engagements. Students will develop an integrated understanding of how vendors are chosen, motivated and managed, as well as strong contract negotiation skills. Letter Graded BMI 5300 or 5300W

BMI 7361W Business, Contract, and Vendor Management (3 Credits)
In this course the doctoral student will learn the skills needed to effectively manage vendors, as well as negotiate and manage contracts. Through hands-on exercises, students will learn the role of governance to oversee contractual, financial, and service delivery performance that can improve outcomes within projects, programs, and the overall organization portfolio. This governance can be built into the relationship from the onset of the engagement to improve the overall health of the relationship and maximize value for current and future engagements. Students will develop an integrated understanding of how vendors are chosen, motivated and managed, as well as strong contract negotiation skills. Letter Graded BMI 5300 or 5300W

BMI 9950 Project Evaluation and Writing (1-9 Credits)
Doctoral students will use this course to develop a project evaluation report to be written upon completion of the translational practice project. Students must present the translational project findings at an oral session that is open to the public. This course may be repeated for at least 9 semester credit hours to meet the degree requirement. Pass/Fail

BMI 9999 Dissertation in Biomedical Informatics (1-9 Credits)
The post-candidacy doctoral student will use this course to write their doctoral dissertation under the supervision of their primary mentor, and in collaboration with their advisory committee. This course may be repeated for at least 9 hours to meet the degree requirement. Pass/Fail

BMI 9999W Dissertation in Biomedical Informatics (1-9 Credits)
The post-candidacy doctoral student will use this course to write their doctoral dissertation under the supervision of their primary mentor, and in collaboration with their advisory committee. This course may be repeated for at least 9 hours to meet the degree requirement. Pass/Fail

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