

# MASTER OF SCIENCE IN BIOMEDICAL SCIENCES PROGRAM:THESIS TRACK

The Master of Science Biomedical Sciences program offers training for students interested in research careers at academic, government or private institutions. We will provide individuals aspiring for a health science career an opportunity to become prepared for professional studies in the areas of medicine and research.

The track with thesis requires the completion of a research-based thesis. The thesis project is expected to provide significant contribution to the knowledge of the specific discipline and is evaluated by a Thesis Advisory Committee. The Thesis Advisory Committee is responsible for approving the student's thesis and confirming that the student passed their thesis defense.

The track with thesis is designed to be completed in 24 months but can take up to five years to be completed on a part-time basis. The curriculum includes first-year medical school classes, courses specifically designed for the biomedical science program and an intensive 18 months of research.

Students currently enrolled in the Doctor of Osteopathic Medicine (DO) program or Doctor of Podiatric Medicine (DPM) program can apply to the Biomedical Sciences program and select the track with thesis. Curriculum for dual degree students on the thesis track is designed to be completed within five years. The emphasis for dual degree students is on training clinician researchers to teach research methods and conduct methodologically rigorous and scientifically sound studies.

## Mission

To educate diverse groups of highly competent and collaborative biomedical scientists prepared to address problems of human health through basic and clinical research.

## Vision

A cultivator of exceptional student researchers who discover and disseminate new knowledge that contributes to the advancement of the treatment, cure, and prevention of human disease.

## Program Requirements

To be considered for admission, applicants must have a bachelor's degree from a regionally accredited college or university from within the United States prior to the start of orientation, or meet the requirements of a specific articulation agreement.

Applicants have the option to supply results of an entrance exam (e.g. MCAT, GRE, DAT) with their application. Required courses must be complete before registration. The minimum grades recommended for application are a 2.8 cumulative GPA and a 2.8 science GPA on a 4.0 scale, and at least a "C" in each of the following prerequisite areas:

Subject	Required Course(s) or Term Hours
Biology/Zoology	8 semester hours, with lab
General Chemistry	8 semester hours, with lab
Organic Chemistry	4 semester hours, with lab
Biochemistry	3 semester hours

Physics	8 semester hours, with lab (may substitute 3 semester hours of Statistics)
English: Comp/Literature/Speech	6 semester hours

Other recommended coursework includes cell biology, microbiology, immunology, physiology, and anatomy.

Additional information can be found on the M.S.B.S. Program Admissions Requirements [website](#).

## Program Application Process

Application to the Master of Science in Biomedical Sciences program is accepted through The Centralized Application Service for Postbaccalaureate Programs ([PostBacCAS](#)).

Detailed information regarding the process can be found on the MSBS program admissions [website](#).

A student may request transfer credit for previous graduate work completed at other regionally accredited educational institutions from within the United States. The request should be submitted in writing to the Program Director who will forward it to the Biomedical Sciences Coordinating Committee. Approved transfer credits will be entered on the student's permanent record by the Registrar's Office. No more than 10.0 credit hours of approved graduate work will be applied toward the 46.5 credit hours required for the degree.

## Curriculum Overview and Outline

The Master of Science in Biomedical Sciences is a two-year program that offers diverse opportunities in the specialties' biochemistry, microbiology, pharmacology, physiology, and pathology. Dual degree students (DO or DPM) on the thesis track can complete the requirements for the MS degree with one additional year added to their clinical program. Students are required to complete a total of 46.5 credit hours (21.5 credit hours in the classroom, 16 credit hours of bench research and 9 credit hours of thesis).

Students select a laboratory in their first year while completing the majority of their course work. The second year focuses primarily on research and thesis. Throughout the program students enjoy beneficial learning and working relationships with each other and with faculty dedicated to their success.

## Program Learning Outcomes

1. Carry out and interpret biomedical research that generates new knowledge and advances the field.
2. Apply mastery of core concepts in biomedical science to course work and research projects.
3. Effectively communicate scientific information in written and oral format
4. Adhere to the appropriate standards of professionalism and ethics related to biomedical research.
5. Collaborate effectively with colleagues, advisors, and the larger research community to promote cooperative learning.

## Continuous Quality Improvement

The COM is committed to delivering high-quality academic programming to ensure the academic and professional success of its students. Assessment and evaluation are crucial steps in the educational

process that are carefully aligned with student learning objectives and instructional activities. Formative and summative assessment methods vary in format – i.e., written tests, performance assessments (research and thesis), focused assignments (case reports, projects, self-reflection) and portfolios, among others. Student assessment results are incorporated into the COM planning process on a regular basis to support continual improvement in programs and services to students.

## TECHNICAL STANDARDS FOR ADMISSION, ACADEMIC PROMOTION AND GRADUATION

The purpose of this document is to specify the technical standards the University deems necessary for a student to matriculate, remain in good standing and ultimately achieve all the competencies necessary for graduation within their program. The University, therefore, requires candidates to confirm their ability to comply with these standards, with or without accommodation, as a condition of admission and on an annual basis thereafter.

Fulfillment of the technical standards for graduation does not guarantee that a graduate will be able to fulfill the technical requirements of any specific residency program or employment setting.

A candidate seeking a MSBS degree at Des Moines University must be capable of completing core educational requirements and achieving the competencies in the basic and applied sciences. DMU seeks to develop candidates who have a deep and robust medical knowledge base, with the ability to appropriately apply it, effectively interpret information, and contribute to decisions across a broad spectrum of laboratory situations in all settings. The critical skills required to be successful are outlined below, and include the ability to observe, communicate, perform motor functions, as well as to understand, integrate core knowledge and skills, and to behave appropriately in varied educational and professional situations.

Reasonable accommodations may be required by otherwise qualified individual candidates to meet the technical standards specified below. Requests for University-provided accommodations will be granted if the requests are reasonable, do not cause a fundamental alteration of the medical education program, do not cause an undue hardship, are consistent with the standards of the profession, and are recommended by the Accommodations and Educational Support Specialist.

1. **Observation:** Candidates and students must be able to acquire required information and timely interpret demonstrations, experiments, and laboratory exercises in the basic sciences.
2. **Communication:** Candidates and students must be able to demonstrate proficiency in the English language such that they can communicate effectively in oral and written form with all members of the classroom and laboratory team. Candidates and students must be able to communicate with peers and advisors in order to elicit and share information. They must have the capacity for comfortable verbal and non-verbal communication and interpersonal skills to enable effective collaboration within a multidisciplinary team. In any case where a candidate's ability to communicate is compromised, the candidate must demonstrate alternative means and/or abilities to communicate with teams.
3. **Motor and Sensory:** Candidates and students must have sufficient motor and tactile function to execute movements reasonably required to perform basic laboratory tests. Such actions may require coordination of both gross and fine muscular movements,

equilibrium, and functional use of the senses of touch. In any case where a candidate's ability to complete and interpret laboratory findings using motor skills is compromised, the candidate must demonstrate alternative means and/or abilities to retrieve these physical findings.

4. **Strength and Mobility:** Candidates and students must demonstrate strength, including lower extremity and body strength, and mobility to complete laboratory dissections or experiments.
5. **Intellectual, Conceptual, Integrative, and Quantitative Abilities:** Candidates and students must have the ability to accurately measure, calculate, reason, analyze, synthesize, problem solve, and think critically. They must also have the ability to participate and learn through a variety of modalities including, but not limited to, classroom instruction, small groups, team and collaborative activities. In addition, candidates and students should be able to comprehend three-dimensional relationships and understand the spatial relationships of structures. Candidates and students must be able to concentrate, timely analyze and interpret data and make decisions within areas in which there is a reasonable amount of visual and auditory distraction.
6. **Behavioral Attributes, Social Skills, and Professional Expectation:** Candidates and students must be able to effectively utilize their intellectual abilities, exercise good judgment, timely complete all responsibilities attendant to the diagnosis and care of patients, and develop mature, sensitive, and effective relationships with patients and colleagues. Candidates and students must be able to professionally manage heavy workloads, prioritize conflicting demands, and function effectively under stress. They must be able to adapt to changing environments; to display flexibility, to learn to function in the face of their own possible biases and uncertainties inherent in the process of research, and to not engage in substance abuse. Candidates and students must be able to understand and determine the impact of the social determinants of health and other systemic issues which impact the care for all individuals in a respectful and effective manner regardless of race, color, national origin, ethnicity, creed, religion, age, disability, sex, gender, gender identity, sexual orientation, or any other protected status. Professionalism, compassion, integrity, concern for others, interpersonal skills, interest and motivation are all qualities that are required throughout the educational process.

## REASONABLE ACCOMMODATIONS

Des Moines University welcomes qualified candidates and students with disabilities who meet the technical standards of the program, with or without reasonable accommodations. Students with a disability who may need accommodations during their educational career at DMU will be asked to reaffirm their need for accommodations when acknowledging the ability to meet technical standards annually. The student is responsible for requesting accommodations through the Accommodations and Educational Support Specialist in Academic Support within the Center for Educational Enhancement. Please reach out in person, by email ([accommodations@dmu.edu](mailto:accommodations@dmu.edu)), or by calling Academic Support at 515-271-1516. The Accommodations and Educational Support Specialist reviews all requests for accommodations through an individualized, interactive process.

The use of an intermediary may be a reasonable accommodation while performing some non-essential physical maneuvers or non-technical data gathering. However, an intermediary cannot substitute for the candidates' or student's interpretation and judgement. Intermediaries

may not perform essential skills on behalf of the candidate or student, nor can they replace technical skills related to selection and observation.

## PROCESS FOR ASSESSING COMPLIANCE WITH THE TECHNICAL STANDARDS

Candidates are required to attest at the time they accept an offer to matriculate that they meet the applicable technical standards, with or without reasonable accommodation, and annually confirm they continue to meet these standards. These standards are not intended to deter any candidate or student who might be able to complete the requirements of the curriculum with reasonable accommodations.

The University will provide reasonable accommodations as may be required by the Americans with Disabilities Act or the Iowa Civil Rights Act

A student whose behavior or performance raises questions concerning his or her ability to fulfill these technical standards may be required to obtain evaluation or testing by a health care provider designated by the University, and to provide the results to the Center for Educational Enhancement to be considered as part of the interactive process to determine possible reasonable accommodations.

Technological compensation can be made with respect to certain technical standards, but candidates and students should be able to perform these standards in a reasonably independent manner.

## PHYSICAL HEALTH

In addition to the technical standards set forth, candidates and students must possess the general physical health necessary for performing the duties of a student in the health sciences and a health professional in training without endangering the lives of patients and/or colleagues with whom they might have contact.

## Required Core

Code	Title	Credit Hours
BIOC 1112	Biochemistry/Molecular Genetics	4.5
MBS 1B02	Introduction to Research	2
MBS 1B14	Research Compliance & Laboratory Safety	0.5
MBS 1B03	Responsible Conduct Biomedical Research	1
MBS 1B06	Intro to Biostatistics and Data Analysis	2
MBS 1B12	Frontiers in Biomedical Research	2.5
MBS 2B04	Presentation of Scientific Information	1
MBS 2B05	Scientific Communications	1.5
MBS 2B10	Research	16
MBS 2B12	Thesis	8.5
<b>Total Hours (Required Core &amp; Emphasis Block Courses)</b>		<b>46.5</b>

## Emphasis Blocks

Code	Title	Credit Hours
MBS 1B07	Microbiology and Immunology <sup>1</sup>	5.5
MBS 1B11	Special Topics Microbiology & Immunology <sup>1</sup>	1.5
<b>Total Credit Hours</b>		<b>7</b>

Code	Title	Credit Hours
PHYPM 1116	Medical Physiology <sup>1</sup>	6
MBS 1B05	Special Topics in Physiology & Pharm <sup>1</sup>	1
<b>Total Credit Hours</b>		<b>7</b>

Code	Title	Credit Hours
MBS 1B08	Major Organ Physiology <sup>1</sup>	3
MICR 1104	Immunology	1.5
MICR 1109	General Pathology	2.5
<b>Total Credit Hours</b>		<b>7</b>

<sup>1</sup> 7.0 hours of emphasis courses are required.

In addition to course work, students in the program must successfully write and defend a thesis to receive their master's degree from Des Moines University.

## Elective Courses

There are no required elective hours in the MSBS program; a complete list of University electives may be found on the [Elective Courses](#) page. Prior to the start of each term, students are provided a list of electives for which MSBS students are eligible. Elective courses not required for the MSBS degree are not eligible for financial aid.

## Graduation Requirements

The University awards the degree of Master of Science in Biomedical Sciences (MSBS) upon recommendation of the faculty. The Academic Progress Committee reports annually to the college faculty the names of students that have met requirements for the master's degree. To graduate, a student must:

- Exhibit high standards of professional behavior and receive the graduate faculty's recommendation for graduation.
- Successfully complete all required courses and attain a final cumulative GPA of 3.0 or higher.
- Successfully complete and defend their thesis.
- Make continual research project progress commensurate with successful thesis completion.
- Satisfactorily discharge all financial obligations to the University.
- Complete all graduation requirements, including the graduation clearance process and a Petition to Graduate form. The [Petition to Graduate form](#) can be found on the website.