

# PERSONALIZED MOLECULAR MEDICINE

The Master's program in Personalized Molecular Medicine (PMM) will uniquely position new graduates to join the work force with the skills necessary to participate fully in the next generation of patient-powered research and treatment. The PMM program will train students in current personalized medicine approaches as well as teach students the knowledge and skills required to explore molecular medicine pathways that will be targeted in the future to expand and refine personalized treatment strategies. Personalized or precision medicine will be the norm for medicine in the future, and the PMM program will ensure that graduates fully engage as active participants in the evolution of this approach to medicine. Students will gain foundational training in biological systems, molecular mechanisms, and cutting-edge translational technologies. Training will include next generation molecular technology to devise and implement personalized strategies to prevent and treat human diseases based on individual susceptibilities through the study of complex and integrated biological systems. Students will receive first-hand experience in the use of the latest technologies in next generation sequencing, single cell analysis, computational biology, epigenomics, proteomics, drug design, animal models of human diseases, systems approaches, as well as instruction in "mining" the multitude of human disease databases such as The Cancer Genome Atlas (TCGA). Programmatic faculty members participate actively in systems biology research focused on understanding a range of human disorders including cancer, developmental defects, hormone dysregulation, and metabolic disorders. Students will participate in didactic classroom instruction, team-based learning, and hands-on laboratory training with a choice between a Thesis/Research or Course-Based plan of study.

## Admissions Requirements

All of the required application information, including official transcripts from all institutions attended, must be submitted in order for an applicant to be considered by the PMM program Admissions Committee. In general, students should have a sufficient educational background in the biological or biochemical sciences prior to admission to the program. The following minimal requirements will be applied:

1. A baccalaureate degree from an accredited institution in the United States or proof of an equivalent degree and training at a foreign institution.
2. Required prior coursework: 2 years of biological science majors with labs; organic and inorganic chemistry with labs; 1 semester of calculus (exceptions will be considered on a case-by-case basis). Highly recommended: 1 year of physics; analytical chemistry with lab; biochemistry; molecular biology; genetics.
3. Minimal grade point average (GPA): No lower than B (3.0 on a 4.0 scale).
4. GRE, MCAT, DAT: The GRE, MCAT, or DAT is recommended but not required. Scores on tests taken more than five years prior to the date of application are not acceptable.
5. International applicants from countries where English is not the native language must earn a minimum score of 84 on the Test of English as a Foreign Language (TOEFL), a score of 7.0 on the Academic version of the International English Language Testing System (IELTS) or a score of 115 on the Duolingo English Test.

6. Letters of recommendation (three) attesting to the applicant's readiness for graduate level studies. These letters should be submitted with the online application to the GSBS.
7. Research experience is not required, but will be considered.

International applicants who have completed or will complete their degree prior to matriculation at an accredited U.S. Institution may be exempted from the TOEFL/IELTS requirement.

Application deadlines (<https://www.uthscsa.edu/academics/biomedical-sciences/programs/personalized-molecular-medicine-ms/admission/>) can be found on the program's admission page.

## Degree Requirements

A minimum of 36 SCH and a minimum overall GPA of 3.0 is required for the M.S. degree. In addition, students must successfully complete all the course requirements. Students choosing the course based plan must pass the final oral examination. Students choosing the Thesis/Research Plan must register for MMED 6098, Thesis, for at least one semester prior to graduation and successfully defend a thesis. All students must be recommended by their program Committee on Graduate Studies (COGS) for approval of their degree to the Dean of the Graduate School of Biomedical Sciences.

## First Year

First-year students shall take the required PMM courses (Core Curriculum) and choose a degree plan (Course-Based or Thesis/Research Plan). All students will register for Seminars in Molecular Medicine (MMED 6091). Students must enroll for nine semester credit hours per semester.

**Course-Based Plan:** Students will complete required courses, research practicum, and practicum reports.

**Thesis/Research Plan:** In addition to completing the required courses, students will complete two laboratory rotations and must select a research area of interest and a Thesis/Research Advisor.

## Second Year

**Course-Based Plan:** Students will complete additional course requirements as well as the Research Practicum and Practicum Reports. Students may complete additional elective courses as needed to meet final credit hours required for graduation. Students will complete their final oral examination based on course and practicum material.

**Thesis/Research Plan:** Student will choose a Thesis/Research Committee and gain approval of their research proposal to advance to candidacy. Student will complete their research, write their thesis, and defend their thesis in a final presentation and oral examination.

## Master of Science in Personalized Molecular Medicine - Thesis/Research Plan

### First Year

Fall		Credit Hours
MMED 6016	Advanced Molecular, Cellular, and Synthetic Biology	4
MMED 5019	Graduate Colloquium In Molecular Medicine	1.5

MMED 6091	Seminars in Molecular Medicine	1.5
TSCI 5070	Responsible Conduct of Research	2
Two Laboratory Rotations		
Identification of Research Mentor		

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**Total Credit Hours: 9.0**

**First Year**

**Spring**

MMED 6091	Seminars in Molecular Medicine	1.5
CSAT 5095	Experimental Design And Data Analysis	3
MMED 5001	Advances in Personalized Medicine	2
MMED 6018	Journal Club and Research Presentation in Molecular Medicine	1
MMED 6097	Research	1.5
Approval of Research Mentor		
Start Thesis Work		

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**Total Credit Hours: 9.0**

**Second Year**

**Fall**

MMED 6091	Seminars in Molecular Medicine	1.5
MMED 5015	Modern Methods in Molecular Analysis	2
MMED 6018	Journal Club and Research Presentation in Molecular Medicine	1
MMED 6097	Research	4.5
Form Thesis Committee		
Approval of Research Proposal		
Advancement to Candidacy		

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**Total Credit Hours: 9.0**

**Second Year**

**Spring**

MMED 6091	Seminars in Molecular Medicine	1.5
MMED 6018	Journal Club and Research Presentation in Molecular Medicine	1
MMED 6097	Research	3.5
MMED 6098	Thesis	1
PMM Elective (Any graduate level course)		2
Complete Research		
Meet with Committee		
Write and Defend Thesis		

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**Total Credit Hours: 9.0**

For all semesters, students must enroll for a minimum of 9 semester credit hours (SCH).

## Master of Science in Personalized Molecular Medicine - Course Based Plan

**First Year**

**Fall**

MMED 6016	Advanced Molecular, Cellular, and Synthetic Biology	4
MMED 5019	Graduate Colloquium In Molecular Medicine	1.5
MMED 6091	Seminars in Molecular Medicine	1.5
TSCI 5070	Responsible Conduct of Research	2

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**Total Credit Hours: 9.0**

**First Year**

**Spring**

MMED 6091	Seminars in Molecular Medicine	1.5
CSAT 5095	Experimental Design And Data Analysis	3
MMED 5001	Advances in Personalized Medicine	2
MMED 6018	Journal Club and Research Presentation in Molecular Medicine	1
MMED 5020	Research Practicum	1.5

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**Total Credit Hours: 9.0**

**Second Year**

**Fall**

MMED 6091	Seminars in Molecular Medicine	1.5
MMED 5015	Modern Methods in Molecular Analysis	2
MMED 6018	Journal Club and Research Presentation in Molecular Medicine	1
MMED 5020	Research Practicum	4.5
Practicum Report		

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**Total Credit Hours: 9.0**

**Second Year**

**Spring**

MMED 6091	Seminars in Molecular Medicine	1.5
MMED 6018	Journal Club and Research Presentation in Molecular Medicine	1
MMED 5020	Research Practicum	4.5
PMM Elective (Any graduate level course)		2
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Practicum Report		
Final Oral Examination		

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**Total Credit Hours: 9.0**

For all semesters, students must enroll for a minimum of nine semester credit hours (SCH).

Students in the Masters program in Personalized Molecular Medicine (PMM) will:

- Show proficiency in fundamental biological principles in personalized molecular medicine.
- Show proficiency in reviewing and interpreting the scientific literature.
- Communicate effectively through scientific writing and verbal presentations.
- Show proficiency in the techniques performed in personalized molecular medicine.
- Show proficiency in conducting independent research (Thesis/ Research Plan).