

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

The admission requirements for the Personalized Molecular Medicine (PMM) degree program align with the general requirements of the UTHSCSA Graduate School of Biomedical Sciences. 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 for science majors with labs; Organic and inorganic chemistry with labs; 1 year physics; 1 semester calculus. Recommended but not required: Analytical chemistry with lab; biochemistry; molecular biology/genetics.
3. Minimal grade point average (GPA): No lower than B (e.g., 3.0 in a 4.0 system).
4. Minimal GRE scores: A satisfactory score for the Graduate Record Examination (GRE), as recommended by the Graduate School of Biomedical Sciences (GSBS), is a minimum of the 50th percentile for the verbal and quantitative portions of the GRE. Scores on GRE tests taken more than five years prior to the date of application are not acceptable. MCAT scores can be substituted for GRE scores.
5. Minimal TOEFL scores: For applicants from countries where English is not the native language, a minimum score on the Test of English as a Foreign Language (TOEFL) is 560 (paper test), 220 (computer test), or 68 (internet test) is expected.
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.

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 9 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	
Total Credit Hours:	9.0

First Year

Spring	Credit Hours
MMED 6091 Seminars in Molecular Medicine	1.5
CSAT 5095 Experimental Design And Data Analysis	3
MMED 5001 Advances in Personalized Medicine	2
MMED 6097 Research	2.5
Approval of Research Mentor	
Start Thesis Work	
Total Credit Hours:	9.0

Second Year

Fall	Credit Hours
MMED 6091 Seminars in Molecular Medicine	1.5
MMED 5015 Modern Methods in Molecular Analysis	2
MMED 6097 Research	5.5
Form Thesis Committee	
Approval of Research Proposal	
Advancement to Candidacy	
Total Credit Hours:	9.0

Second Year

Spring	Credit Hours
MMED 6091 Seminars in Molecular Medicine	1.5
CSAT 6095 Analysis and Visualization of Genomic Data	2
MMED 6097 Research	4.5
MMED 6098 Thesis	1
Complete Research	
Meet with Comittee	
Write and Defend Thesis	
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	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
Total Credit Hours:	9.0

First Year

Spring	Credit Hours
MMED 6091 Seminars in Molecular Medicine	1.5
CSAT 5095 Experimental Design And Data Analysis	3
MMED 5001 Advances in Personalized Medicine	2
MMED 5020 Research Practicum	2.5
Practicum Report	
Total Credit Hours:	9.0

Second Year

Spring	Credit Hours
MMED 6091 Seminars in Molecular Medicine	1.5
MMED 5015 Modern Methods in Molecular Analysis	2
MMED 5020 Research Practicum	5.5
Practicum Report	
Total Credit Hours:	9.0

Second Year

Spring	Credit Hours
MMED 6091 Seminars in Molecular Medicine	1.5
CSAT 6095 Analysis and Visualization of Genomic Data	2
MMED 5020 Research Practicum	5.5
Practicum Report	
Final Oral Examination	
Total Credit Hours:	9.0

For all semesters, students must enroll for a minimum of 9 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).