VIROLOGY AND GENE THERAPY (VGT) - EMPLOYEE-PROFESSIONAL MASTERS

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There are two pathways to choose from:

The **Regulatory/Translational Pathway** student will gain a broad scope of gene therapy and will learn how to develop a gene based therapeutic from an idea to a validated product. Various gene therapy strategies will be considered in relation to a broad spectrum of human diseases illustrating how genes can be used for gene replacement, tissue engineering, destruction of unwanted tissues, or immune stimulation. Stages in the development of gene-based drugs & biologics will be studied from vector design through preclinical proof of efficacy, clinical protocol development, product manufacture, pharmacology and toxicology testing, analysis of clinical trial outcomes, regulatory affairs, patenting and partnering with industry. The Regulatory/Translation pathway is designed for those learners who desire to conduct or participate in research that will identify therapies/devices that will move into manufacturing facilities.

The **Research Pathway** student will learn from and work alongside faculty members who have primary interests in virology, viral vectors and gene therapy and will develop research skills in conducting or participate in vaccine and gene therapy discovery. These areas overlap with the fields of biochemistry, cell and molecular biology, genetics, and immunology and regulatory science. The Research pathway is designed for learners who desire to be an informed member of a research team conducting or participating in Virology and Gene Therapy research.

Application

Candidates must complete an Employee Master's Degree Application form. This form is available on the MCGSBS Master's Programs intranet site. Supporting documents include transcripts from previous colleges and three letters of recommendation - one preferred from your direct supervisor/manager.

Eligibility

Applicants must have a current Mayo Clinic appointment. Although more common for allied health staff, it is open to all employees. Enrollment is restricted to permanent Mayo employees and is available at all three sites: Arizona, Florida, and Rochester. Temporary roles are not eligible if you were hired with an appointment end date, e.g. visiting clinicians and research trainees are not eligible.

Applicants must have received a bachelor's degree from an accredited college or university, must have taken appropriate undergraduate science courses to adequately prepare for the Master's program, must have a minimum undergraduate grade point average that demonstrates a record of academic excellence. The employee's supervisor must endorse in writing the application of the employee and commit to allowing time to attend scheduled coursework.

Time Requirement

Time to completion can vary by student, but all requirements for the Master's degree must be completed within five years. The five-year period begins on the start date of the term the student is appointed to. Permanent Mayo employees whose Mayo employment terminates are required to notify MCGSBS; their MCGSBS appointments will also end.

Registration Requirement

At least 75% of the coursework for the Master's degree must be completed in MCGSBS.

Minimum Credit Requirements

Students must complete a minimum of 45 credits, including MGS 6000 Responsible Conduct of Research. Six of the credits in the track must be didactic credits. The selection of the courses to be used to meet these requirements will be determined by the student and the track program director.

Transfer Credits

A total of 9 didactic credits may be transferred into the Employee Master's Program. For more details, see the Credit Transfer Policy on the MCGSBS Policies and Procedures intranet site.

Course Requirements

A total of 45 credits to be completed over two to four years with maintenance of at least a 3.0 GPA are required for graduation.

Code	Title	Hours
MGS Courses		**14**
BMB 5100	Chemical Principles of Biopolymer Systems	
VGT 5700	Virology and Gene Therapy	
MGS 6000	Responsible Conduct of Research	
MGS 5050	Critical Thinking and Scientific Writing	
MGS 6400	Master's Scholarly Review Article (Final Project)	
Journal Club		**2**
VGT 6740	Viruses and Vectors Journal Club (1 cr./yr.)	
VGT 6745	Current Topics in Virology and Gene Therapy (1 cr./yr.)	
Track Requirements		
Select 7 or 5 credits based on chosen pathway		5-7
Regulatory/Translation Pathway (details below)		
Research Pathway (details below)		
Advanced Coursework		
Select 24 or 22 credits based on chosen pathway [1]		24-22
Total Hours		**45**

[1] Any courses approved for graduate credit; select in consultation with your mentor.

Track Requirements

Regulatory/Translation Pathway

Code	Title	Hours
CTSC 5020	Regulatory Issues in Clinical Research	1
CTSC 5025	Introduction to Regulatory Science	1

CTSC 5300	Foundations of Epidemiology	1
CTSC 5600	Introduction to Statistics in Clinical and Translational Research	3
CTSC 5040	Intro to the Principles of Current Good Manufacturing Practices (cGMP)	1
Total Hours		**7**

Research Pathway

Code	Title	Hours
IMM 5100	Basic Graduate Immunology	3
VGT 6888	Molecular Therapy Tutorial	2
Total Hours		**5**

Program milestones are included in the Academic Progress and Graduation Requirements for Masters Programs Policy. See below for VGT-specific program highlights and instruction.

Written Qualifying Examination

The VGT written qualifying examination is a three-hour exam that tests the ability to integrate the knowledge in Virology and Gene Therapy acquired since matriculation. The written qualifying examination must be passed before the Master's final project review may be scheduled.

Employee Master's Advisory Committee

The composition of the Master's Advisory Committee is determined collaboratively between student and student's mentor and requires approval of the program director and the school. All members must have graduate faculty privileges and the chair must have a minimum of Master's graduate faculty privileges.

Master's Project Review

At the completion of the Master's scholarly review article (final project), students must review their document with the Employee Master's Advisory Committee. MCGSBS must be informed of the date at least three weeks in advance so that the Master's Final Project Review Report Form can be sent to the Employee Master's Advisory Committee chair. Members of the Employee Master's Advisory Committee should receive copies of the scholarly review article (final project) at least three weeks prior to the final review.

Scholarly Review Article (Final Project)

Master's degree tracks will specify the requirements for a scholarly review article (final project) to be completed as a required component of the degree program. This scholarly review article (final project) needs to be under the supervision of a faculty member with graduate faculty privileges. The scholarly review article (final project) needs to be approved by the track Program Director.

Final Project Corrections

After the student has completed the final project presentation the student has no more than 30 days from the presentation date to complete all graduation requirements, including any requested corrections to the final project.

This is a suggested sequence based on a summer term start. Individual course plans may vary depending on true start date, program, employment/ personal commitments, and research interests. Be sure to confirm you have met your requirements using your degree planning tool. Course offerings may vary slightly. Current course offerings are posted in the course catalog.

Research Pathway

Code	Title	Hours
First Year - Summer Term		
MGS 5050	Critical Thinking and Scientific Writing	2
MGS 6000	Responsible Conduct of Research	1

Code	Title	Hours
First Year - Fall Term		
BMB 5100	Chemical Principles of Biopolymer Systems	2
IMM 5100	Basic Graduate Immunology	3

Code	Title	Hours
First Year - Winter Term		
VGT 5700	Virology and Gene Therapy	3
Electives		

Code	Title	Hours
First Year - Spring Term [1, 2]		
VGT 6888	Molecular Therapy Tutorial (Even years)	2
Electives		

Code	Title	Hours
Second Year - Summer Term [3]		
Electives		

Code	Title	Hours
Second Year - Fall Term		
VGT 6740	Viruses and Vectors Journal Club	1
VGT 6745	Current Topics in Virology and Gene Therapy	1
Electives		

Code	Title	Hours
Second Year - Winter Term		
Electives		

Code	Title	Hours
Second Year - Spring Term		
Electives		

Code	Title	Hours
Third Year - Summer Term		
Electives		

Code	Title	Hours
Third Year - Fall Term		
Electives		

Code	Title	Hours
Third Year - Winter Term		
Electives		

Code	Title	Hours
Third Year - Spring Term		
Electives		

Code	Title	Hours
Fourth Year - Summer Term		
MGS 6400	Master's Scholarly Review Article (Final Project)	6
Electives		

1 Written Qualifying Examination due by end of term unless you do not take VGT 5700
2 Suggested to take VGT 6886 and 6888 as electives during this term in odd years
3 Mentor Selection Suggested by End of Term

Regulatory/Translational Pathway

Code	Title	Hours
First Year - Summer Term		
MGS 5050	Critical Thinking and Scientific Writing	2
MGS 6000	Responsible Conduct of Research	1

Code	Title	Hours
First Year - Fall Term		
BMB 5100	Chemical Principles of Biopolymer Systems	2
CTSC 5300	Foundations of Epidemiology	1

Code	Title	Hours
First Year - Winter Term		
VGT 5700	Virology and Gene Therapy	3
CTSC 5020	Regulatory Issues in Clinical Research	1

Code	Title	Hours
First Year - Spring Term [1, 2]		
Electives		

Code	Title	Hours
Second Year - Summer Term [3]		
CTSC 5025	Introduction to Regulatory Science	1
CTSC 5040	Intro to the Principles of Current Good Manufacturing Practices (cGMP)	1
Electives		

Code	Title	Hours
Second Year - Fall Term		
VGT 6740	Viruses and Vectors Journal Club	1
VGT 6745	Current Topics in Virology and Gene Therapy	1
Electives		

Code	Title	Hours
Second Year - Winter Term		
CTSC 5600	Introduction to Statistics in Clinical and Translational Research	3

Code	Title	Hours
Second Year - Spring Term		
Electives		

Code	Title	Hours
Third Year - Summer Term		
Electives		

Code	Title	Hours
Third Year - Fall Term		
Electives		

Code	Title	Hours
Third Year - Winter Term		
Electives		

Code	Title	Hours
Third Year - Spring Term		
Electives		

Code	Title	Hours
Fourth Year - Summer Term		
MGS 6400	Master's Scholarly Review Article (Final Project)	6
Electives		

1 Written Qualifying Examination due by end of term unless you do not take VGT 5700
2 Suggested to take VGT 6884 (even), 6886 (odd) and 6888 (odd) as electives during this term
3 Mentor Selection Suggested by End of Term