# VIROLOGY AND GENE THERAPY (VGT) - POSTDOCTORAL MASTER'S DEGREE


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## Application

Candidates must complete a formal application. More details are available on the MCGSBS Master's Programs web page. Additional details specific to the CTS Master's Program can be found here (https://www.mayo.edu/research/centers-programs/center-clinical-translational-science/education/postdoctoral-masters-degree-program/application-process.html). Applicants must be approved by the track program director and admission endorsed by MCGSBS.

## Eligibility

Applicants must be employed at Mayo Clinic. The employment appointment, as documented at the time of application, must be greater in length than the time required for completion of all requirements of the program. Eligible roles include: Any Mayo Clinic physician, scientist, fellow or resident with a doctoral degree in a discipline applicable to clinical research or medical student who plans to have a research career. Visiting clinicians, research trainees and research collaborators are not eligible.

## Time Requirement

Applicants must have adequate protected time to complete course and research requirements within designated program length. Applications with inadequate protected time to complete the program will**not**be accepted. Time to completion can vary by program and Mayo Clinic role from two to five years. All scholars must be in their program a minimum of 1 year in order to meet the MCGSBS residency requirement. Scholars must complete all program requirements within 5 years.

Students must have dedicated time for their program commitments and abide by course attendance requirements as defined in course syllabi. Students must be appropriately engaged in their program and demonstrate continued progress towards graduation.

Registration Requirement

At least 75% of the coursework for the Master's degree must be completed in MCGSBS. It is expected that a minimum of one year will be devoted to research. Students must be enrolled in a minimum of one course per term. If students are not registered for courses, they will be considered inactive to some reporting agencies and subject to any implications of the inactive status, e.g. eligibility for student loan deferral if applicable.

## Minimum Credit Requirements

Students must complete a minimum of 45 credits, which can include a maximum of 16 Research credits. (See individual specialty track descriptions for specific course requirements.)

## Transfer Credits

A total of 6 didactic credits may be transferred into the program. For more details, see the Credit Transfer Policy on the MCGSBS Policies and Procedures intranet site.

The Postdoctoral Master's degree track in Virology and Gene Therapy has 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 and participating 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.*

## Coursework

Scholars in the Postdoctoral Master's Degree Program in virology and gene therapy are expected to gain competencies through carefully selected didactic coursework and a mentored research project.

| Code | Title | Hours |
|---|---|---|
| **MGS** | | |
| MGS 6000 | Responsible Conduct of Research | 1 |
| MGS 5050 | Critical Thinking and Scientific Writing | 2 |
| BMB 5100 | Chemical Principles of Biopolymer Systems | 2 |
| VGT 5700 | Virology and Gene Therapy | 3 |
| **Journal Club** | | |
| VGT 6740 | Viruses and Vectors Journal Club (1 cr./yr.) | 1 |
| VGT 6745 | Current Topics in Virology and Gene Therapy (1 cr./yr.) | 1 |
| **Track Requirements** | | |
| Select 5 or 7 credits depending on chosen pathway | | 5-7 |
| **Advanced Coursework** | | |
| Select 9 or 11 credits based on chosen pathway [1] | | 9-11 |
| **Research** | | |
| MGS 6100 | Master's Thesis Proposal | 3 |
| MGS 6840 | Master's Research (4 cr/qtr - 4 qtrs required) | 16 |
| **Total Hours** | | **43-47** |

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

## Track Required Courses

### Regulatory/Translation Pathway

| Code | Title | Hours |
|---|---|---|
| CTSC 5020 | Regulatory Issues in Clinical Research | 1 |
| CTSC 5025 | Introduction to Regulatory Science | 1 |
| CTSC 5040 | Intro to the Principles of Current Good Manufacturing Practices (cGMP) | 1 |
| CTSC 5300 | Foundations of Epidemiology | 1 |
| CTSC 5600 | Introduction to Statistics in Clinical and Translational Research | 3 |
| **Total Hours** | | **7** |

### Research Pathway

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

# Graduation Requirements

The degree requirements include:

- A minimum of 45 credits (includes 19 research credits)
- Successfully pass VGT Written Qualifying Exam
- Preparation and successful oral defense of a thesis

*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 |
| **First Year - Fall Term** | | |
| BMB 5100 | Chemical Principles of Biopolymer Systems | 2 |
| IMM 5100 | Basic Graduate Immunology | 3 |
| **First Year - Winter Term** | | |
| VGT 5700 | Virology and Gene Therapy | 3 |
| Electives | | |
| **First Year - Spring Term** [1] | | |
| VGT 6888 | Molecular Therapy Tutorial (Even years) | 2 |
| Electives | | |
| **Second Year - Summer Term** | | **3** |
| Electives | | |
| **Second Year - Fall Term** | | |
| VGT 6740 | Viruses and Vectors Journal Club | 1 |
| VGT 6745 | Current Topics in Virology and Gene Therapy | 1 |
| Electives | | |
| **Second Year - Winter Term** | | |
| Electives | | |
| **Second Year - Spring Term** | | |
| Electives | | |
| **Third Year - Summer Term** | | |
| Electives | | |
| **Third Year - Fall Term** | | |
| Electives | | |
| **Third Year - Winter Term** | | |
| Electives | | |
| **Third Year - Spring Term** | | |
| Electives | | |
| **Fourth Year - Summer Term** | | |
| MGS 6400 | Master's Scholarly Review Article (Final Project) | 6 |
| Electives | | |

## 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 |
| **First Year - Fall Term** | | |
| BMB 5100 | Chemical Principles of Biopolymer Systems | 2 |
| CTSC 5300 | Foundations of Epidemiology | 1 |
| **First Year - Winter Term** | | |
| VGT 5700 | Virology and Gene Therapy | 3 |
| CTSC 5020 | Regulatory Issues in Clinical Research | 1 |
| **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