

CLINICAL AND TRANSLATIONAL SCIENCE (CTS) – POSTDOCTORAL MASTERS

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For Mayo Clinic physicians, scientists and other staff who have already earned doctoral degrees, the Center for Clinical and Translational Science (CCaTS) and Mayo Clinic Graduate School of Biomedical Sciences collaborate to offer a master's degree in clinical and translational science.

The program includes coursework and a mentored research experience and culminates in a published thesis. Upon graduation from the program, scholars will be prepared to:

- Lead their own research teams.
- Form hypotheses.
- Design studies.
- Analyze and interpret data.
- Conduct a clinical research protocol.
- Communicate research findings.

Application

Candidates must complete a Postdoctoral Master's Degree Application form. This form is available on the MCGSBS Master's Programs intranet site. Supporting documents include a program fee agreement form, transcripts from previous colleges and two letters of recommendation - one preferred from your direct supervisor/manager.

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: 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 (except for CTS). Visiting research fellows are eligible. However, 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.

Minimum Credit Requirements

Students must complete a minimum of 45 credits, which includes a maximum of 16 Research credits. (See Requirements tab within each track for specific course requirements.)

Transfer Credits

A total of 9 didactic credits may be transferred into the program. For more details, see the Credit Conversion, Transfer, Waiver, and Substitution Policy on the MCGSBS intranet site.

Course Work

The curriculum for the Master's degree consists of **45 credits**. The student must complete all of the required courses listed below:

Code	Title	Hours
Track Requirements		
MGS 6000	Responsible Conduct of Research	1
CTSC 5010	Clinical Research Proposal Development	2
CTSC 5020	Regulatory Issues in Clinical Research	1
CTSC 5100	Academic Publishing	1
CTSC 5370	Introduction to Epidemiology	2
CTSC 5390	Advanced Applied Epidemiological Methods	2
CTSC 5600	Introduction to Statistics in Clinical and Translational Research	3
CTSC 5610	Statistics in CTR: Linear Regression Concepts, Interpretation, and Statistical Software	3
Select one of the following:		
CTSC 5602	Introduction to Utilizing Statistical Software in Clinical and Translational Research	1
CTSC 5603	Introduction to R Programming in Clinical and Translational Research	1
Select one of the following:		
CTSC 5110	Grant Writing in the Sciences	1
CTSC 5115	Elevating Grant Writing in the Sciences: Strategies for Competitive Proposals	2
Select one of the following:		
CTSC 5710	Practical Data Collection	1
CTSC 5810	Qualitative Research Design, Methods, and Analysis	1
CTSC 5820	Introduction to Survey Research	1
Advanced Coursework		
Students can choose to focus their elective credits into one of the concentration areas listed below or select their elective credits based on recommendations from their mentor or based on their professional goals. ¹		8
Research Requirements ²		
MGS 6100	Master's Thesis Proposal	3
MGS 6840	Master's Research (4 cr/qtr - 4 qtrs required)	16
Total Hours		50

- ¹ Students who have selected a concentration need two or three additional electives depending on the concentration they have declared. Students not completing a concentration need eight additional electives. Students are encouraged to fulfil their electives with Clinical and Translational Science (CTSC) courses. Most CTSC courses will count as electives in the program. However, there are some exceptions (ex. CTSC 5300, CTSC 5611, etc.). Other Mayo Clinic Graduate School of Biomedical Science courses may be allowable with/without pre-approval. Consult with your CCaTS Education Coordinator for further information before enrolling in elective credits.
- ² It is expected that a minimum of one year will be devoted to research.

Concentration Requirements

Biomedical Ethics (BET)

Code	Title	Hours
CTSC 5261	Theoretical and Historical Foundations of Biomedical Ethics	2
CTSC 5262	Health Policy and Biomedical Ethics	1
Select 2 credits of the following:		2
CTSC 5210	Ethical Issues in Regenerative Medicine	
CTSC 5263	Ethical Issues in Population Health	
CTSC 5340	Ethical Issues in Individualized Medicine	
CTSC 5350	Ethical Issues in Artificial Intelligence and Information Technologies	
Total Hours		5

Clinical Trials (CLTR)

Code	Title	Hours
CTSC 5025	Introduction to Regulatory Science	1
CTSC 5650	Advanced Statistics in CTS Research: Survival Analysis with Statistical Software	1
CTSC 5720	Clinical Trials Design and Conduct	1
Select 2 credits of the following:		2
CTSC 5640	Statistics in Clinical and Translational Research: Logistic Regression with Statistical Software	
CTSC 5761	Evidence-Based Medicine for Clinical Researchers	
CTSC 5770	Diagnostic Testing Strategies	
CTSC 5820	Introduction to Survey Research (excluded if taken as a foundational cr.)	
Total Hours		5

Individualized Medicine (IDVM)

Code	Title	Hours
CTSC 5340	Ethical Issues in Individualized Medicine	1
CTSC 5400	Introduction to Bioinformatics Concepts and Core Technologies for Individualized Medicine Approaches	1
CTSC 6160	Genomic Analysis and Data Interpretation for Rare and Undiagnosed Diseases	2
CTSC 5410	Molecular Variant Evaluation	2
Total Hours		6

Mixed Methods Research (MIXM)

Code	Title	Hours
CTSC 5810	Qualitative Research Design, Methods, and Analysis (excluded if taken as a foundational credit)	1
CTSC 5815	Qualitative and Mixed Methods Research for Translational Science	2
CTSC 5820	Introduction to Survey Research (excluded if taken as a foundational credit)	1
CTSC 5900	Introduction to Health Services Research	1
Total Hours		5

Quantitative Research Methods (QUAN)

Code	Title	Hours
CTSC 5640	Statistics in Clinical and Translational Research: Logistic Regression with Statistical Software	1
CTSC 5650	Advanced Statistics in CTS Research: Survival Analysis with Statistical Software	1
Select 3 credits of the following:		3
CTSC 5500	Genomic Analysis of Complex Traits	
CTSC 5641	Observational Studies & Causal Inference	
CTSC 5710	Practical Data Collection (excluded if taken as a foundational credit)	
CTSC 5715	Publication Quality Tables and Figures	
CTSC 5740	Systematic Reviews and Meta-Analysis	
CTSC 5815	Qualitative and Mixed Methods Research for Translational Science	
CTSC 5820	Introduction to Survey Research (excluded if taken as a foundational credit)	
CTSC 5940	Secondary Data Analysis	
Total Hours		5

Research Proposal

Students develop their research proposals in CTSC 5010 Clinical Research Proposal Development and submit their proposal to the CCaTS Masters and Certificate Programs Executive Committee following completion of the course. Proposals are due on February 1 or August 1 following course completion. Details on Research Proposal found here (<https://www.mayo.edu/research/centers-programs/center-clinical-translational-science/education/postdoctoral-masters-degree-program/for-current-scholars/research-proposal/>).

Thesis Advisory Committee

When developing your TAC, consider the following:

- Your mentor serves as committee chair.
- Identify three additional faculty members from at least two different clinical research disciplines.
- Identify one member with expertise in statistics, epidemiology or study design.
- It is desirable to have a member with basic science or translational laboratory expertise related to your project.

Additional guidelines specific to CTS scholars are defined here (<https://www.mayo.edu/research/centers-programs/center-clinical-translational-science/education/postdoctoral-masters-degree-program/for-current-scholars/thesis-advisory-committee/>).

Progress Meetings

CTS scholars must submit progress reports to the CCaTS Masters and Certificate Executive Committee as requested.

Written Qualifying Exam (WQE)

The WQE is designed to demonstrate a student's ability to integrate and synthesize the core competencies of the program. Students must pass the WQE to complete the degree requirements. The one-day exam is held the third Tuesday of January, April and September. Students can take the WQE once they have their research proposal approved by the CCaTS Masters and Certificate Programs Executive Committee and have earned a minimum GPA of 3.0 in the following courses:

Code	Title	Hours
CTSC 5010	Clinical Research Proposal Development	2
CTSC 5370	Introduction to Epidemiology	2
CTSC 5390	Advanced Applied Epidemiological Methods	2
CTSC 5600	Introduction to Statistics in Clinical and Translational Research	3
CTSC 5602	Introduction to Utilizing Statistical Software in Clinical and Translational Research	1
CTSC 5610	Statistics in CTR: Linear Regression Concepts, Interpretation, and Statistical Software	3

Thesis Defense (Final Oral Examination)

The final oral examination cannot be completed until the following criteria have been met:

- The Written Qualifying Examination has been passed,
- All coursework has been completed with a GPA of 3.0 or higher,
- All program milestones have been met, and
- CCaTS Masters and Certificate Programs Committee has received the thesis, scholar summary letter and mentor summary letter.

Publication Requirement

Master's thesis research must make a substantial contribution to the biomedical literature, and preparing work for publication is an important part of research training. A minimum of one first or last author journal ready or published paper will be required before being approved to defend thesis. A co-first author paper may be approved if a supplemental statement from your mentor is received that indicates you served as a significant contributor. The paper(s) should be derived from your thesis and must be linked to your master's thesis topic. In other words, papers not related to the thesis topic do not meet the publication requirement.

Suggested Sequence

Below is an example of a suggested sequence based on a Summer term start.

Individual course plans will vary depending on the quarter you enter the program and/or if you are pursuing an optional concentration, etc. Progress on the course plan should be documented on your degree planning tool. Contact the track Education Coordinator for additional information.

Code	Title	Hours
First Year - Summer Term		
MGS 6000	Responsible Conduct of Research	1
CTSC 5020	Regulatory Issues in Clinical Research	1
CTSC 5100	Academic Publishing	1

CTSC 5370	Introduction to Epidemiology	2
CTSC 5600	Introduction to Statistics in Clinical and Translational Research	3
CTSC 5602	Introduction to Utilizing Statistical Software in Clinical and Translational Research	1

Code	Title	Hours
First Year - Fall Term		
CTSC 5010	Clinical Research Proposal Development	2
CTSC 5110	Grant Writing in the Sciences	1
CTSC 5390	Advanced Applied Epidemiological Methods	2
CTSC 5610	Statistics in CTR: Linear Regression Concepts, Interpretation, and Statistical Software	3
Electives		1

Code	Title	Hours
First Year - Winter Term		
Electives		1-8

Code	Title	Hours
First Year - Spring Term		
MGS 6840	Master's Research	4
Electives		1-8

Code	Title	Hours
Second Year - Summer Term		
MGS 6100	Master's Thesis Proposal	3
MGS 6840	Master's Research	4
Electives		1-8

Code	Title	Hours
Second Year - Fall Term		
MGS 6840	Master's Research	4
Electives		1-8

Code	Title	Hours
Second Year - Winter Term		
MGS 6840	Master's Research	4
Electives		1-8

Code	Title	Hours
Second Year - Spring Term		
No coursework should be taken this quarter if you are planning to defend your thesis this quarter.		