

CLINICAL SCIENCE (MS)

Overview

This program provides learning in new fields and acquisition of skills in clinical research to prepare clinicians for careers in clinical and translational sciences. Didactic course work and a mentored research project aimed to provide a strong foundation in:

- computational and statistical tools
- clinical epidemiology
- clinical research study design
- health services and outcomes research
- biomedical ethics

Admission Requirements

Qualified clinicians who have already earned either a professional doctoral degree (e.g., MD, DO, DDS, PharmD) or a clinically-related bachelor's or master's degree (e.g., nursing, pharmacy, physical therapy) are eligible to apply to this program.

Application Deadlines

- **February 1st** to be considered for admission in following summer or fall semesters
- **May 1st** for following fall semester
- **October 1st** for following spring semester

Minimum Criteria for Admission

- An undergraduate GPA of at least 3.0 (on a 4.0 scale).
- An acceptable and verifiable GRE, MCAT or PCAT score or earned MS/MPH or PhD from an accredited US School
- Clinically related bachelor's, master's or professional doctoral degree. Individuals without a clinically related degree but with an exceptional background and relevant experience in the health care field are encouraged to contact one of the Executive Leadership team members to discuss their interest further.

International Applicant Additional Admission Criteria

In addition to the general admission requirements listed above, international applicants must meet additional requirements dictated by the University.

Please note that the Clinical Science Program does not provide stipends to assist with tuition and/or room and board expenses. In addition we currently do not have any research or teaching assistantships to support the educational costs of international students.

Applying

The application package for the MSCS program is available electronically one month prior to the admission cycle deadline.

The application package **must** include the following:

- **Upload A:** Education and training, awards, publications, presentations, grants and research experience and other scholarly activity. (Please upload your CV)
- **Upload B** (optional): Non-academic and professional experiences.

- **Upload C:** Identify the topic of your proposed research project, and if known, research mentor. In addition, include a description of how this program will enhance your career.
- **Three recommendation letters** (Once you submit your application on-line, your references will receive an e-mail explaining how to upload their letters to the on-line application system)
- **Official transcripts** from **all** higher education institutions (even if no degree was awarded). Students are not permitted to personally issue, send or deliver transcripts to program staff: All transcripts must be officially issued/sealed by and sent from the originating college/university institution. Therefore, when requesting an official transcript from your school, **please instruct the school to send your transcript directly from their office to:**

- Clinical Science Program
ATTN: Amanda Whiting
University of Colorado Denver
12401 East 17th Avenue, Campus Box B141
Leprino Bldg, Rm 351
Aurora, CO 80045
- **Official electronic transcripts are encouraged** and should be e-mailed to amanda.g.whiting@cuanschutz.edu (Amanda.G.Whiting@cuanschutz.edu)

Special Request: Due to the situation with the Coronavirus, we are unable to review transcripts that are mailed to the campus. Please make sure to request electronic transcripts and if those are not available, provide the program with documentation of your efforts.

Degree Requirements

- a minimum of 30 credit hours, of which no less than 4 and no more than 6 must be thesis/research hours
- defense/final exam of a thesis or publishable paper
- students have 8-11 elective credit hours to allow for tailoring of coursework

Code	Title	Hours
BIOS 6601	Applied Biostatistics I	3
BIOS 6602	Applied Biostatistics II	3
<i>Choose 1 of the following:</i>		
BIOS 6648	Design and Conduct of Clinical Research	
EPID 6626	Research Methods in Epidemiology	
BIOS 6623	Advanced Data Analysis	
EPID 6631	Analytical Epidemiology	
CLSC 6210	Research Seminars in Clinical Science	1
CLSC 6270	Critical Appraisal Seminars in Clinical Science	1
CLSC 7101	Grant Writing I	1
CLSC 7150	Ethics and Responsible Conduct of Research	1
EPID 6630	Epidemiology	3
CLSC 6699	Masters Research Project: Publishable Paper	1-6
or CLSC 6950	Masters Research Project: Thesis	

- Core course credits: 15-16
- Thesis/Research credits: 4-6
- Elective course credits: 8-11
- **Total required credit hours for degree = 30**

Learning Objectives

- Perform human research adhering to legal, ethical and regulatory principles and and guidelines
- Critically appraise existing literature and sources of information
- Apply evidence based practice principals
- Accurately select, use and interpret commonly used statistics
- Apply and use appropriate study designs and methods to address research questions/hypotheses
- Identify and measure clinically relevant and meaningful outcomes
- Design and conduct research studies
- Publish research-based manuscripts to peer-reviewed journals
- Prepare and submit grant proposals
- Provide constructive reviews and feedback to colleagues
- Demonstrate effective communication and leadership skills
- Participate in interdisciplinary collaboration

Courses

BIOS 6601 - Applied Biostatistics I (3 Credits)

Applied biostatistical methods including descriptive and statistical inference; odds ratio and relative risk, probability theory, parameter estimation, tests for comparing statistics of two or more groups, correlation and linear regression and overviews of: multiple and logistic regression and survival analysis.

Grading Basis: Letter Grade

A-PUBH1 Graduate students and public health certificate students only. Typically Offered: Fall, Spring, Summer.

BIOS 6602 - Applied Biostatistics II (3 Credits)

A continuation of BIOS 6601 extending the basic principles of descriptive and inferential statistics to modeling more complex relationships using linear regression, logistic regression, and Cox regression. The statistical package SAS is used extensively. Multiple optional lab sessions offered. Prerequisite: BIOS 6601

Grading Basis: Letter Grade

A-PUBH1 Graduate students and public health certificate students only. Typically Offered: Spring.

BIOS 6623 - Advanced Data Analysis (3 Credits)

This course teaches the students how to be effective collaborators. Students will learn to modify project hypotheses to be statistical hypotheses. The students will identify and perform the appropriate data analyses and communicate their analyses both verbally and in writing. prerequisite: BIOS 6601 and BIOS 6602 or BIOS 6611 and BIOS 6612 or permission of instructor.

Grading Basis: Letter Grade

A-PUBH1 Graduate students and public health certificate students only. Typically Offered: Fall.

BIOS 6648 - Design and Conduct of Clinical Research (2 Credits)

Design and conduct of clinical research studies. Intended for non-biostatistics students. Topics include: specifying the research question, study endpoints, study populations, study interventions, sample size evaluation, and choice of comparison groups. Common study designs and methods for study conduct are described. Prerequisite: BIOS 6601 or BIOS 6611 or consent of instructor. Offered in odd years.

Grading Basis: Letter Grade

A-PUBH1 Graduate students and public health certificate students only. Typically Offered: Fall.

CLSC 6210 - Research Seminars in Clinical Science (1 Credit)

This course provides an overview of the types of clinical translational studies being conducted by senior CLSC doctoral students. The interactive seminar series structure allows for interdisciplinary scientific dialogue among students at various stages of training, mentors and faculty.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 6270 - Critical Appraisal Seminars in Clinical Science (1 Credit)

This course provides an overview of the approaches for critically appraising common study designs published in the clinical and translational sciences literature, as well as other sources of information.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

CLSC 6950 - Masters Research Project: Thesis (1-6 Credits)

During this course students plan, execute, and write the Final Research Project in the form of a Masters thesis. In addition, students will prepare for the Final Research Project Examination. This is a capstone course. Prerequisites: Consent of program, BIOS 6601, BIOS 6602, CLSC 7150, EPID 6630.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 6.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

CLSC 6699 - Masters Research Project: Publishable Paper (1-6 Credits)

During course students working with his/her research mentor and research project committee to plan, execute, write Final Research Project in form of a publishable paper. In addition, students prepare for Final Research Project Examination. This is a capstone course. Prerequisite: Consent of program. BIOS 6601 and BIOS 6602 or BIOS 6611 and BIOS 6612, CLSC 7150, EPID 6630.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 6.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

CLSC 7101 - Grant Writing I (1 Credit)

The purpose of this course is to develop and improve your skills in writing successful grant applications and participating in the critique and review process of grants. Prerequisites: BIOS 6601 and EPID 6630. Course Restrictions: CLSC students, unless written approval of Course Director.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

CLSC 7150 - Ethics and Responsible Conduct of Research (1 Credit)

Course provides overview of the field of ethics in clinical research. Topics include historical background, current regulations, IRB requirements on human subjects protection issues. Students will learn how to develop approaches to conduct ethical human subjects research in an optimal manner.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

EPID 6626 - Research Methods in Epidemiology (3 Credits)

Principles, concepts and methods for conducting ethical, valid and scientifically correct observational studies in epidemiological research are the focus of this class. Lectures and practical experience reinforce hypothesis formulation, study design, data collection and management, analysis and publication strategies. Prereq: BIOS 6601, BIOS 6680, EPID 6630.

Grading Basis: Letter Grade

A-PUBH1 Graduate students and public health certificate students only.

Typically Offered: Spring.

EPID 6630 - Epidemiology (3 Credits)

This course provides an introduction to descriptive and analytic methods in epidemiology and their application to research, preventive medicine and public health practice.

Grading Basis: Letter Grade

A-PUBH1 Graduate students and public health certificate students only.

Typically Offered: Fall, Spring.

EPID 6631 - Analytical Epidemiology (3 Credits)

Fundamental analytical skills for assessing and reporting disease status, determinants of disease and their impact on public health including determining rates of disease occurrence, measures of associations between exposures and disease, and techniques for identifying and correcting for misclassifications, effect modifiers and confounder.

Prerequisites: EPID 6630 and BIOS 6601 or BIOS 6611

Grading Basis: Letter Grade

A-PUBH1 Graduate students and public health certificate students only.

Typically Offered: Fall.

Please refer to the Graduate School Policies page (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/#policiestext>).

Contact Us

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