



University of Colorado
Denver | Anschutz Medical Campus

CLINICAL SCIENCE GRADUATE PROGRAM FACULTY HANDBOOK

303-724-1214 (p)

<https://cctsi.cuanschutz.edu/training/clsc>

TABLE OF CONTENTS

WELCOME!..... 4

PURPOSE OF HANDBOOK 4

CLSC PROGRAM INFORMATION..... 5

 GENERAL INFORMATION 5

Mission 5

Vision 5

Core Competencies 5

Clinical Science Graduate Program Core Faculty and Staff 6

Main Office Address: 6

 PROGRAM DESCRIPTIONS 7

Master of Science in Clinical Science (MSCS) Degree Program 7

Clinical Science PhD Degree Program 7

 TRACKS WITHIN THE CLSC PROGRAM 7

Clinical Investigation (CI) 7

Health Information Technology track (HIT) 8

Health Services Research track (HSR), Collaborative Program with CSPH 8

The Clinical Science Program MSCS curriculum for students admitted during or after Fall 2021 9

Clinical Investigation Curriculum (students admitted during or after Fall 2024) 10

Health Information Technology Curriculum (students admitted during or after Fall 2024) 11

TEACHING 12

 CLSC FACULTY APPOINTMENTS 12

Graduate Faculty 12

Program Faculty 13

 COURSE INFORMATION 13

Course Proposals/Inventories 13

Course Syllabi 13

Course Scheduling 13

Course Syllabus (Template) 14

 REGISTRATION 17

 GRADING WITHIN THE CLSC PROGRAM 17

Incomplete Grades 18

Submission of Grades 18

 ONLINE COURSE MANAGEMENT 18

 COURSE EVALUATIONS 19

 ADDITIONAL INFORMATION 19

I.D. Badge and Parking Information 19

The Strauss Health Sciences Library at Anschutz Medical Campus 20

Scholarship Information and Financial Aid 20

 CLSC 6650/7650 GUIDED RESEARCH TUTORIAL 21

Sample Course Plan for CLSC 6650 22

SERVING ON A STUDENT COMMITTEE 23

 EXPECTATIONS OF THE STUDENT 23

 EXPECTATIONS OF THE RESEARCH MENTOR 24

 EXPECTATIONS OF MEMBERS 24

 EXPECTATIONS OF THE CHAIR 25

ACKNOWLEDGMENT OF NIH FUNDING ON CCTSI PUBLICATIONS AND PROJECTS 26

MSCS FINAL PROJECT AND EXAMINATION 26

 STEPS FOR STUDENT COMPLETION OF THE MSCS FINAL PROJECT AND EXAMINATION 27

 FINAL EXAM SCHEDULE APPROVAL FORM 31

 CLINICAL SCIENCE GRADUATE PROGRAM: MSCS FINAL PROJECT EXAMINATION REPORT 34

PHD COMPREHENSIVE EXAM, THESIS PROCESS AND THESIS DEFENSE	35
COMPREHENSIVE EXAMINATION AND THESIS COMMITTEE.....	35
<i>Committee Composition</i>	36
COMPREHENSIVE EXAMINATION PLANNING PROCESS.....	36
<i>Admission to Candidacy</i>	36
<i>Requirements Prior to Scheduling the Comprehensive Examination</i>	36
<i>Scheduling</i>	37
COMPREHENSIVE EXAMINATION PROCEDURE/CONTENT	38
<i>Thesis Proposal</i>	38
<i>Evaluation Criteria for the Paper/Written Element</i>	38
<i>Comprehensive Exam Structure</i>	38
<i>Examination Grading</i>	39
APPROVAL OF THESIS PROPOSAL	41
CLSC PHD PROGRAM: COMPREHENSIVE EXAMINATION CHECKLIST	42
CLSC PHD PROGRAM: COMPREHENSIVE EXAMINATION REPORT	44
POST COMPREHENSIVE EXAM REQUIREMENTS.....	46
<i>Registration</i>	46
<i>Committee Meetings</i>	46
THESIS COMMITTEE REPORT.....	47
THESIS PROCESS.....	49
<i>Thesis Chapter Content Requirements</i>	49
THESIS DEFENSE.....	50
<i>Guidelines for Doctoral Dissertations</i>	52
<i>Doctoral Dissertation Checklist</i>	57
<i>CLSC PhD Program Checklist for Thesis Defense</i>	58
PERMISSION TO PROCEED TO DEFENSE	60
CLSC PHD DISSERTATION\THESIS DEFENSE REPORT.....	61
ACADEMIC ADVISEMENT	62
ADVISOR RESPONSIBILITIES & PROGRAM PLANS.....	62
THE PHD PRELIMINARY EXAMINATION	63
COURSE REQUIREMENTS FOR TAKING THE PRELIMINARY EXAM	63
<i>Exam Format</i>	63
<i>Honor Code and Grading Policy</i>	63
<i>Criteria Used for Grading</i>	64
<i>Transfer of Credits</i>	65
GENERAL GRADUATE SCHOOL RELATED INFORMATION.....	67
I.D. BADGE AND PARKING INFORMATION	67
GUIDELINES FOR STUDYING	67
THE STRAUSS HEALTH SCIENCES LIBRARY AT ANSCHUTZ MEDICAL CAMPUS	67
SCHOLARSHIP INFORMATION AND FINANCIAL AID	67
HONOR CODE	67
CLINICAL SCIENCE PROGRAM FREQUENTLY ASKED QUESTIONS	68

Welcome!

The overall goal of the University of Colorado Denver (UCD) Graduate Program in Clinical Science (CLSC) is to train nationally competitive clinician/clinical translational scientists by providing a formal, structured, and rigorous educational program in the clinical and translational sciences. The Clinical Science Graduate Program was designed in response to the demand for well-qualified clinical researchers in academia and industry. The critical need for individuals capable of conducting rigorous, credible and relevant patient-based research within stringent ethical and regulatory guidelines, and translating the evidence for community application, is expected to continue to grow.

For doctoral students, there is a selected emphasis of study in one of the following three tracks: Clinical Investigation (CI), Health Information Technology (HIT), or Health Services Research (HSR). These three specialized tracks of clinical science are important areas of study for translational research activities in the evolving health care environment. In our program, training occurs across many disciplines to achieve proficiency in the areas of clinical science, clinical investigation and translation, and includes biostatistics, clinical epidemiology, clinical studies design, ethics, and grant writing. An important compliment to the rigorous training in the CLSC program is the formal mentoring with interdisciplinary faculty working in the clinical sciences. Graduates of our program are highly qualified and well-trained clinician/clinical scientists who will be nationally competitive for grant funding and career advancement in the health sciences.

Your feedback and perspectives of the CLSC program are important. We strive to provide the best academically rigorous program while simultaneously meeting the individual needs of students and seizing opportunities to enrich the educational experience. Please feel free to contact any of the Core CLSC Faculty or CLSC Program Administrator at any time. Our contact information is below. We have an open door policy and want to hear your thoughts both good and bad. Please feel free to contact Dr. Lisa Cicutto, CLSC Director, at any time by email (Lisa.Cicutto@cuanschutz.edu) or by phone at 303-398-1538.

Purpose of Handbook

- The intent of the Faculty Handbook is to provide key information and required documents to support faculty in their roles as instructor, student committee member and advisor. This Handbook is to be used in conjunction with the University of Colorado Denver Graduate School Policies and Procedures, and the Graduate School Course Book. There are additional documents to support the activities of the CLSC Graduate Program that can be found on the [CLSC website](#). Students are expected to be familiar with and knowledgeable of these documents. To access the Graduate School Policies and Procedures, please go to <https://graduateschool.cuanschutz.edu/forms-resources/resources>

As a general rule, the policies in effect at the time of admission govern a student's progression. The curriculum, course schedules, and offerings are subject to change. Courses are offered pending required minimum enrollment numbers. If curriculum changes are made, courses in the current curriculum will be offered for a specified period of time; students who decelerate or otherwise change their program plans may be asked to substitute another course for required courses being discontinued or with insufficient enrollment. All program plan changes will be discussed and approved by the student's Academic Program Advisor.

The Handbook is organized into 5 major sections. The first section provides general information regarding the CLSC Graduate Program. The next three sections provide information according to faculty roles within the program with a section dedicated to each role – *Section 2: Teaching*

Faculty, *Section 3: The Student Committee*, and *Section 4: Academic Advising*. The fifth and final section provides frequently asked questions.

CLSC Program Information

General Information

Mission

The mission of the Clinical Science Program is to prepare and train nationally competitive clinician/clinical translational scientists.

Vision

To provide a comprehensive knowledge base of translational research methods, theories, and techniques in clinical science in order to train and further prepare clinician scientists.

Core Competencies

To prepare students to perform state of the art translational clinical research, graduates of the Clinical Science Graduate program will:

- Adhere to legal, ethical and regulatory issues related to clinical research
- 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 clinical and patient-oriented research studies
- Publish research manuscripts in peer-reviewed journals
- Prepare and submit grant proposals
- Provide constructive reviews and feedback to colleagues
- Demonstrate effective communication and leadership skills
- Participate in interdisciplinary collaborative research

Clinical Science Graduate Program Core Faculty and Staff

Lisa Cicutto, PhD, APN, RN
Program Director

(303) 398-1538
lisa.cicutto@cuanschutz.edu

Allan Prochazka, MD, MSc
Education Director
Track Director, Clinical Investigation

(303) 399-8020 ex 2144
allan.prochazka@cuanschutz.edu

Matthew R.G. Taylor, MD, PhD
Track Director, Clinical Investigation

(303) 724-1400
matthew.taylor@cuanschutz.edu

Cathy Battaglia, PhD, MSHA, RN
Track Director, Health Services Research
Collaborative CSPH and CLSC

(303) 724-6387
catherine.battaglia@cuanschutz.edu

Richard Lindrooth, PhD
Track Director, Health Services Research
Collaborative CSPH and CLSC

(303) 724-5165
richard.lindrooth@cuanschutz.edu

Heather Haugen, PhD
Track Director, Health Information Technology

(303) 483-4308
heather.haugen@cuanschutz.edu

Galit Mankin, MSW
Program Administrator

T: (303) 724-1214
galit.mankin@cuanschutz.edu

Amanda Whiting
Program Assistant

T: (303) 724-1217
amanda.g.whiting@cuanschutz.edu

Main Office Address:

University of Colorado Denver Clinical Science Program
Colorado Clinical & Translational Sciences Institute (CCTSI)
Anschutz Medical Campus
Anschutz Health Sciences Building
1890 N. Revere Ct., Room 6149
Mail Stop B141
Aurora, CO 80045
Phone: 303-724-1214

Program Descriptions

Master of Science in Clinical Science (MSCS) Degree Program

The Master of Science in Clinical Science (MSCS) degree program provides formal training in clinical and translational sciences through theoretical and methodological coursework and the application of coursework to a research project. The requirements for the degree are the completion of a minimum of 30 credit hours, of which no less than 4 and no more than 6 must be research hours, and the completion and defense/final exam of a publishable paper. Students have 8-10 elective credit hours to allow for tailoring of coursework. It is important for students to determine their research interests early, ideally before starting the program, so that the best electives can be taken to meet students' needs. The Academic Advisor assists the student with identifying and scheduling required coursework, and selecting committee members to serve on the Final Examination Committee. The Academic Advisor meets with the student yearly to assist in identifying areas of research, existing possibilities and collaborations, and if necessary revise, the student's program plan of study. The Academic Advisor is one of the core CLSC Faculty members.

Clinical Science PhD Degree Program

The overall goal of CLSC doctoral training program is to prepare nationally competitive clinician/clinical scientists that are able to translate across the discovery-community continuum. Students in our program are highly motivated and bright individuals that seek additional rigorous training to become leaders in their field and make significant contributions to improving the health of citizens. The program allows specialization in one of three tracks or areas of focus: [Clinical Investigation](#), [Health Information Technology](#), or [Health Services Research](#).

The PhD program consists of successful completion of: didactic coursework, a Preliminary Examination, a Comprehensive Examination, and completion and defense of a thesis dissertation. See the Clinical Science PhD Program Course Curriculum in the following pages.

Tracks within the CLSC Program

Clinical Investigation (CI)

Clinical investigation is the discipline by which physicians, clinicians and other health related disciplines translate knowledge gained in the basic sciences or the laboratory setting to develop prevention and disease management interventions and strategies to improve health outcomes. It can also involve translating knowledge gained about the efficacy of successful strategies and interventions conducted in the academic clinical setting to the community setting to improve health related outcomes. The mission of the Clinical Investigation Track is to train the next generation of clinician scientists who will pursue successful careers in clinical translational research. Clinical investigation is clearly a primary mission of academic medical and health centers, and properly trained clinicians and scientists are uniquely qualified to engage in investigative and translational studies.

Competencies Specific to CI

Specific to the CI Track, graduates of the program will:

- Apply relevant study design methods commonly used in clinical and translational studies
- Develop a well-designed, successful research thesis project relevant to the clinical and translation sciences and fields

Health Information Technology track (HIT)

The Health Information Technology Track provides a background in clinical informatics: the study of how medical data and knowledge can be stored, analyzed, and delivered to facilitate research and to improve the quality, safety, and efficiency of care. Students will develop a fundamental understanding of the technical and organizational challenges particular to the field of health information technology and will train in evaluation and research methods. Graduates of the Health Information Technology Track will be prepared for leadership roles in developing, implementing, and evaluating clinical informatics applications in academia, industry and clinical practice. Within the HIT Track, formal training occurs in the following cross disciplines:

- Electronic health records
- Decision support
- Telehealth
- Public health informatics
- Research informatics
- Standards and data integrity
- Privacy and security

Competencies Specific to HIT

Specific to the HIT Track, graduates of the program will:

- Demonstrate understanding of relevant standards and terminologies for communication and representation of health data
- Demonstrate understanding of major types of clinical and administrative information systems and how they are integrated
- Demonstrate understanding of computerized provider order entry (CPOE) and clinical decision support systems (CDSS), including
 - Success factors for implementation
 - Methods of encoding rules/logic
- Ability to assess and develop methods to protect privacy (e.g. HIPAA issues) and security (confidentiality, integrity, and availability) of health information
- Design appropriate research and evaluation studies in HIT, with understanding of both experimental and quasi-experimental research designs
- Ability to apply systems life cycle approach to HIT planning, analysis, design, implementation and evaluation, including translation of user needs into functional requirement
- Apply database concepts to the design and implementation of databases for clinical, research, and public health applications

Health Services Research track (HSR), Collaborative Program with CSPH

The Health Services Research (HSR) PhD Program is a collaborative program between the Clinical Science Graduate Program and the Health Systems Management and Policy Department within the Colorado School of Public Health (CSPH). Please refer to the following website for additional information:

<http://www.ucdenver.edu/academics/colleges/PublicHealth/Academics/departments/HealthSystems/Academics/Pages/PhDHealthServicesResearch.aspx>

The Clinical Science Program MSCS curriculum for students admitted during or after Fall 2021

Note that course schedules may vary from term to term. To verify schedules and prerequisites for specific courses, please visit the CLSC courses and registration web page at:

<https://cctsi.cuanschutz.edu/training/clsc#resource>

Required Core Course Hours		<i>Credits</i>
BIOS 6601	Applied Biostatistics I	3
BIOS 6602	Applied Biostatistics II	3
BIOS 6648 or EPID 6626 or BIOS 6623 or EPID 6631	Design and Conduct of Clinical Trials (3 credits) or Research Methods in Epidemiology (3 credits; BIOS 6602 is a pre-requisite) or Advanced Data Analysis (3 credits) or Analytical Epidemiology (3 credits)	3
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
Total Required Core Course Credits for All Students		16

Required Research Hours		<i>Credits</i>
CLSC 6699	Masters Research Project: Publishable Paper	Var
Total Thesis / Research Credits		4-6

Required Elective Hours		<i>Credits</i>
Total Elective Course Credits		8-10

Total Required Hours for Degree = 30

[†] CLSC 6210 is taken over 1 year typically during the second year of your MSCS

A minimum of 30 credit hours are required, of which no less than 4 and no more than 6 must be thesis/research hours.

Clinical Investigation Curriculum (students admitted during or after Fall 2024)

Note that course schedules may vary from term to term. To verify schedules and prerequisites for specific courses, please visit the CLSC courses and registration web page at:

<https://cctsi.cuanschutz.edu/training/clsc#resource>

<i>Course Number</i>	<i>Course Title</i>	<i>Credits</i>
BIOS 6601*	Applied Biostatistics I	3
BIOS 6602*	Applied Biostatistics II	3
BIOS 6648 or EPID 6626 or BIOS 6623	Design and Conduct of Clinical Trials <u>or</u> Research Methods in Epidemiology (BIOS 6602 is a pre-requisite) <u>or</u> Advanced Data Analysis	3
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
CLSC 7202	Clinical Outcomes and Applications	2
CLSC 7300	Scientific Grant Review Process: CCTSI Proposals - Doctoral	1
EPID 6630*	Epidemiology	3
EPID 6631	Analytical Epidemiology	3
<i>Required Clinical Investigation Course Credits</i>		22
<i>Elective Course Credits</i>		8
<i>Minimum Number of Required Course Credit (Core + Electives)</i>		30
*CLSC 8990	Doctoral Thesis	≥ 30

* Courses required before Preliminary Exam (biostatistics, ethics, epidemiology). In addition, a second methods class is required (EPID 6626 or EPID 6631 or BIOS 6648 or BIOS 6623 or CLSC 6270 or CLSC 7202).

†CLSC 6210 is taken over 1 year typically during the second or third year of your PhD (after passing the Preliminary Examination but before completing the Comprehensive Examination).

* Must take the following prerequisite classes and pass the preliminary exam prior to registering for CLSC 8990:
BIOS 6601, BIOS 6602, BIOS 6648 or EPID 6626 or BIOS 6623 or EPID 6631, CLSC 7150, EPID 6630

Health Information Technology Curriculum (students admitted during or after Fall 2024)

Note that course schedules may vary from term to term. To verify schedules and prerequisites for specific courses, please visit the CLSC courses and registration web page at:

<https://cctsi.cuanschutz.edu/training/clsc#resource>

<i>Course Number</i>	<i>Course Title</i>	<i>Credits</i>
BIOS 6601*	Applied Biostatistics I	3
BIOS 6602*	Applied Biostatistics II	3
BIOS 6648 or EPID 6626 or BIOS 6623 or EPID 6631	Design and Conduct of Clinical Trials <u>or</u> Research Methods in Epidemiology (BIOS 6602 is a pre-requisite) <u>or</u> Advanced Data Analysis <u>or</u> Analytical Epidemiology	3
CLSC 6210†	Research Seminars in Clinical Science	1
CLSC 6270	Critical Appraisal Seminars in Clinical Science	1
HLTH 6071 or NURS 6286	Intro to Health Information Technology <u>or</u> Foundations of Healthcare Informatics	3
NURS 6290	Information Systems Life Cycle	4
CLSC 7101	Grant Writing I	1
CLSC 7150*	Ethics and Responsible Conduct of Research	1
CLSC 7202	Clinical Outcomes and Applications	2
EPID 6630*	Epidemiology	3
NURS 6293 or ISMG 6080	Database Management Systems (Informatics focus) Database Management Systems (Information Systems focus)	3
<i>Required Health Information Technology Course Credits</i>		28
<i>Elective Course Credits</i>		2
<i>Minimum Number of Required Course Credit (Core + Electives)</i>		30
*CLSC 8990	Doctoral Thesis	≥ 30

* Courses required before Preliminary Exam (biostatistics, ethics, epidemiology). In addition, a second methods class is required (EPID 6626 or EPID 6631 or BIOS 6648 or BIOS 6623 or CLSC 6270 or CLSC 7202).

† CLSC 6210 is taken over 1 year typically during the second or third year of your PhD (after passing the Preliminary Examination but before completing the Comprehensive Examination).

* Must take the following prerequisite classes and pass the preliminary exam prior to registering for CLSC 8990:
BIOS 6601, BIOS 6602, BIOS 6648 or EPID 6626 or BIOS 6623 or EPID 6631, CLSC 7150, EPID 6630

Teaching

This section describes important information that details a faculty member's responsibilities for teaching and serving as course director/instructor of a course. It details the steps necessary to prepare and teach a course, as well as general Graduate School information and requirements. A checklist is provided for you at the end of this section to assist with planning and preparation. Before a graduate course can be offered to students, many steps and processes need to be completed. Below is a complete list of those steps.

- Graduate School Faculty Appointments
- Course Set-up and Course Proposal and Inventory Forms
- Planning and Submission of a Course Syllabus
- Course Scheduling
- Student Registration
- Grading
- Online Courses
- Course Evaluations
- Submission of Grades

CLSC Faculty Appointments

Graduate Faculty

A Graduate Faculty appointment is required to mentor or teach graduate students or to participate in student committees (comprehensive exam, thesis defense committees). A Graduate Faculty appointment is a privilege extended to those who have a faculty appointment at an accredited college or university and who qualify through their research, teaching and mentoring ability, and demonstrate a commitment to graduate education and students.

To obtain a graduate faculty appointment, the individual must be nominated by one of the Graduate Programs and the nomination approved by the Appointment Committee and the Graduate School Dean. A nomination letter, CV and appointment request form must be sent to the Graduate School from the CLSC Graduate Program Director. The CV and letter must provide sufficient evidence of specific academic contributions and/or skills to warrant an appointment.

There are two types of Graduate School faculty appointments: regular and special.

1. Regular appointments are generally limited to full-time faculty with the rank of Assistant Professor or above. A doctoral or terminal degree appropriate to their discipline is required. A regular appointment is required to serve as a research mentor or to chair a student exam or thesis committee.
2. Special appointments for faculty members at any level and from any accredited university or college may be requested. Faculty with a special appointment may serve on – but not chair – student committees.

Program Faculty

With a valid Graduate School appointment, faculty members may be appointed to Graduate Programs. Determining who is on a program's faculty is up to the individual Program Director. To serve as a CLSC's student research mentor or to chair a student committee, a faculty member must – in addition to having a current Graduate School appointment – be a member of the CLSC's program's faculty. These individuals are referred to as "in" faculty members. The majority of all student committee members must be "in," and at least one member must NOT be "in."

Course Information

Course titles, credits and semester offerings are listed on the [Course Schedule](#) available on the CLSC website. To review a course description of CLSC courses, required courses, and commonly taken electives, please see the website for the CLSC Course Listing. Consultation of the [Graduate School Coursebook](#) is also recommended.

The semester listed is the term that each course is usually offered and is subject to change. Some courses require pre-requisites. Courses have a minimum enrollment of 5 students; a course with less than the minimum enrollment on the first day of the semester is subject to cancellation. The program reserves the right to provide a substitute course.

Course Proposals/Inventories

Course proposals/inventories are kept on file at the CLSC Program Office and the Office of the Registrar for active and inactive courses. Any variation of existing course information, except for a name change for the course instructor, must have a completed and signed Course Proposal/ Inventory form submitted to the Office of the Registrar via the CLSC Program Administrator.

Please work with Amanda Whiting (amanda.g.whiting@cuanschutz.edu) to obtain and/or complete a new or updated Course Proposal/Inventory form that is due six weeks prior to the beginning of the course.

Course Syllabi

A course syllabus should be available at least one week before the beginning of the semester. Students may request to see the syllabus prior to registering. The course syllabus needs to include course dates and meeting times, instructor contact information, pre-requisites, course description, course objectives, required textbooks and other readings, class structure/organization, assignments, the CLSC grading policy, and Canvas access and helpdesk information. Determine the appropriate number of credit hours: the minimum number of student-faculty contact hours throughout the semester is 15 hours for a 1 credit course, 30 hours for a 2 credit course and 45 hours for a 3 credit course. Please see below for a sample syllabus template. Once your course syllabus is complete, please email it to Amanda Whiting (amanda.g.whiting@cuanschutz.edu) for course record keeping and student inquires.

Course Scheduling

Course scheduling and classroom reservation is coordinated from one year to six months before the beginning course date. Please communicate to Galit Mankin your time, date, and room preferences to ensure accurate scheduling. You may also reserve classrooms through the UCDenver Online Room Management System, located here: <https://www1.ucdenver.edu/offices/office-of-information-technology/services/meetings-and-events> .

Course Syllabus (Template)

CLSC xxxx
Name of Course
x Credit Hours
Semester (Fall, Spring, Summer) 20??

Instructor(s): Name and title

Contact:

e-mail
Phone
Office location and hours

Class time and location

Prerequisites

Course Description

This course provides an overview of the major issues of...

Course Objectives

At the end of the course, learners will be able to:

-
-
-
-

Core Clinical Science Competencies Addressed in this Course (Note Instructor: From the list below, please select the competencies you believe are addressed in this course)

To prepare students to perform state of the art translational research, this course addresses the following clinical science competencies:

- Perform human research that adheres to the principles and guidelines of ethical conduct
- 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
- Adhere to legal, ethical and regulatory issues related to clinical research
- 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

Readings

Required: Title of Textbook, Edition, Author/eds ISBN xxx-x-xxx-xxxx-x

Optional/Additional:

Additional reading materials may be posted on Canvas.

Students are expected to read materials in advance to prepare for active class participation.

Class Structure

Due to the tight time line of our classes, it is important to arrive on time. The format of classes will ...

Course Schedule *(Please provide the dates or weekly schedule and the accompanying topics and assignments)*

Assignments and Grading *(Please detail each of the assignments, the weighting of the assignment (e.g. 20% for on line exam, 30% for the term paper) criteria used for grading, and the due date)*

Late Policy/Attendance (example)

- Instructors are not responsible for providing information related to classes missed. Handouts and/or lecture notes should be obtained from other participants in attendance.
- Participants are responsible for all information presented in class. Please note; the lectures will cover some materials not found in the textbook and handouts.
- Group presentations cannot be turned in late—your peers are counting on you!
- If you know an assignment will be late, notify the instructor before the due date to establish a revised deadline and to determine if deductions will apply. Failure to communicate and coordinate an acceptable plan with your instructor could result in receipt of an “F” or “0%” for the assignment.
- For each day an assignment is late, 2% for each day it is late will be deducted from the assignment’s grade.

Letter Grade	GPA	%Grade
A	4.00	93-100
A-	3.70	90-92
B+	3.30	87-89
B	3.00	83-86
B-	2.70	80-82
C+	2.30	77-79
C	2.00	73-76
C-	1.70	70-72
D+	1.30	68-69
D	1.00	63-67
D-	0.70	60-62
F	0.00	<60

Any course grade below a B will not be accepted for credit hours applied to the PhD in Clinical Science degree.

Course Evaluation

Students are encouraged to complete the course evaluations administered at the end of the course.

Canvas Website

Canvas can be accessed at <http://canvas.cuonline.edu>.

For access assistance, please contact the UC Denver Online Help Desk at 303.315.3700 (Monday through Friday, 7:00 am – 7:00 pm), or email cuonlinehelp@cuanschutz.edu. The help desk provides email assistance 24 hours a day, 7 days a week. They guarantee a 24-hour response time to inquiries, but generally respond in much shorter time.

Badge Access

A UC Denver Student ID Badge is NEEDED TO ACCESS CLASSROOM. If a new badged is needed or current badge has expired, please contact the Badge Access Office at IDAccess.Badges@cuanschutz.edu or 303.724.0399.

Honor Code

A University-wide honor code that all students are required to follow was instituted in the Fall of 1988. The code includes specific procedures, including rights of appeal, when violations are reported. A copy of the Code is located in Graduate School Policies and Procedures. Matriculation into a Graduate School Program at the University of Colorado Denver, Anschutz Medical Campus indicates your willingness to abide by this Code. Questions and concerns may be directed to the Graduate School.

Academic Honesty

Students should adhere to the highest standards of academic honesty and integrity. Examples of behavior that violates these standards include: plagiarism (including the undocumented use of internet and web-based information), cheating, illegitimate possession and/or use of examinations, violation of the ethical standards for conducting research, and falsification of official records.

The following activities will be considered academic dishonesty:

- Copying the work of current or past students or using solutions given to students in past semesters for any class assignments
- Paying external parties to complete part or all of assignments or exams
- Using material from other sources (such as websites, books and articles) without crediting the source

If a student is caught engaging in one of these activities, the program will enforce the standard penalty for academic dishonesty. The standard penalty for a first violation is an F on the assignment resulting in at least a one letter grade penalty for the course. The penalty for subsequent academic penalties can involve removal from the program.

Special Considerations

You can work directly with Office of Disability Access and Inclusion (ODAI). Visit their website (<https://www.cuanschutz.edu/offices/disability-resources-and-services>), send them an email (disabilityresources@cuanschutz.edu) or book directly (<https://cuadisabilityresources.youcanbook.me/>). Every year, students are diagnosed with learning disabilities or mental health conditions for the first time because coping mechanisms that worked previously are inadequate for the intense pace of graduate school. ODAI and Student Mental Health can help you get assessed. Because assessment and intake can take time, we encourage you to begin this process as soon as possible so that your accommodations are available by the start of class. We are all committed to your success and look forward to supporting you on your academic journey.

Inclusive Learning Environment

In this class, we will work together to develop a learning community that is inclusive and respectful. Our diversity may be reflected by differences in race, age, sexual orientation, gender identity and expression, religion/spirituality, ability, socioeconomic background, and myriad other social identities and life experiences. In a diverse community, the goal of inclusiveness encourages and appreciates expressions of different ideas, opinions, and beliefs so that conversations and interactions are opportunities for intellectual and personal enrichment.

A dedication to inclusiveness requires respecting what others say, their right to say it, and the thoughtful consideration of others' communication. Both speaking up and listening are valuable tools for furthering thoughtful and enlightening dialogue. Respecting one another's individual differences is critical in transforming a collection of diverse individuals into an inclusive and collaborative learning community. We will hold ourselves and one another accountable, which includes bringing attention to times when microaggressions or macroaggressions happen in a classroom. Our core commitment shapes our core expectations for behavior inside and outside of the classroom.

Incidents involving microaggressions in the classroom may be reported to the appropriate university Title IX office listed below. Please refer to the CU Anschutz campus Office of Equity website for a self-learning guide about [microaggressions](#).

CU Anschutz Campus: On the CU Anschutz campus, please contact the [Office of Equity](#). The Office of Equity staff, including the University's Title IX Coordinator, may be reached at (303) 315-2567 or equity@ucdenver.edu.

Registration

Student registration opens three to four weeks before the beginning of summer and fall semesters, and even earlier for spring semester. The Academic Calendar is posted on the Graduate School's website. The drop/add periods vary and students and course instructors need to check the Graduate School calendar for these dates. Students are responsible for full tuition and fees for any classes dropped after this period, and a late fee is charged for any class added after this period. Payment is due within 30 days of the beginning of the semester, regardless of the registration date. Note that new students are not allowed to register until after being cleared by the Graduate School.

Grading within the CLSC Program

Standards for assigning grades are as follows:

Letter Grade	GPA	% Grade
A	4.00	93-100
A-	3.70	90-92
B+	3.30	87-89
B	3.00	83-86
B-	2.70	80-82
C+	2.30	77-79
C	2.00	73-76
C-	1.70	70-72
D+	1.30	68-69
D	1.00	63-67
D-	0.70	60-62
F	0.00	<60

Any course grade below a B will not be accepted for credit hours applied to a degree in Clinical Science.

The following activities will be considered academic dishonesty:

- Copying the work of current or past students or using solutions given to students in past semesters for any class assignments
- Paying external parties to complete part or all of assignments or exams
- Using material from other sources (such as websites, books, articles and AI) without crediting the source

If a student is caught engaging in one of these activities, the program will enforce the standard penalty for academic dishonesty. The standard penalty for a first violation is an F on the assignment resulting in at least a one letter grade penalty for the course. The penalty for subsequent academic penalties can involve removal from the program.

Incomplete Grades

After the Add/Drop deadline, courses may not be dropped unless there are special circumstances. The student must ask the instructor for an “I” (Incomplete) grade if his/her circumstances warrant it. If this is the case, the student and the instructor must develop a written plan for the work that needs to be completed and the time frame for its completion (up to a year). If the outlined work is completed according to the agreed upon time frame, the Instructor of Record must submit the final grade to the CLSC administrative office for processing. If the agreed upon work is not completed by the agreed upon time frame, the course grade will be changed to an “F” (Fail).

Submission of Grades

It is extremely important that course grades are submitted on time in the Student/Faculty portal, [CU Access](#).

Graduate school web grade rosters for each course instructor’s classes are available by logging into the portal with the instructor’s campus credentials using the same id and password used to access University web mail.

Go to <https://portal.prod.cu.edu/UCDAccessFedAuthLogin.html> to log on, and click on the Faculty Tab in the upper left hand corner of the page, then on Faculty Center in the yellow box. Click on ‘My Schedule’ and your grade roster(s) will appear on the left side of the page next to your class roster(s). Only those with faculty appointments including teaching assistants are able to submit grades. Administrative Assistants, Course Coordinators, Program Assistants, or Teaching Assistants without faculty appointments do not have grading access. Grades cannot be submitted if not complete. Every student on the grade roster must have a grade designated in order to post. Those grade rosters that are not complete and cannot process will have to have a hard copy grade change form submitted for every student on that roster signed by the instructor of record. It has to be an original signature, not a stamp.

If you need assistance with your logon credentials, call the ITS help desk at (303) 724–4357.

If you can logon to CU Access but the Faculty tab does not appear, please send an email to UCDSecurityAccess@cuanschutz.edu.

Online Course Management

Canvas is used in almost all courses available through the CLSC Program. Course syllabi, notes, lectures, articles, discussion groups, and assignments are to be posted online. Online quizzes, exams, and assignments can also be conducted online or submitted via Canvas. Canvas allows faculty, instructors, and trainers to easily upload course content; manage course communication; test students online; post multimedia materials; manage student grades online, and many other course-related functions. Using a common web browser, students can access the materials from home or work at their convenience. Canvas is primarily used for web-enhanced courses (traditional courses with Internet enhancement), and hybrid courses (courses that blend the traditional format with online).

Canvas can be accessed at <http://canvas.cuonline.edu> and accessed with your UC Denver email log-in. Upon enrollment, your registered courses will be attached to Canvas and content made available at the beginning of the semester.

For access assistance, please contact the UC Denver Online Help Desk at 303.315.3700 (Monday through Friday, 7:00 am – 7:00 pm), or email cuonlinehelp@cuanschutz.edu. The help desk provides email assistance

24 hours a day, 7 days a week. They guarantee a 24-hour response time to inquiries, but generally respond in much shorter time.

Course Evaluations

At the end of the semester students will complete an overall evaluation of the course and instructor. Students are asked to evaluate components of the course on a 1-5 scale (1-poor, 2-fair, 3-good, 4-very good, 5-excellent) and have the opportunity to add free text. In addition, faculty members can submit up to three additional questions specific to the course that they would like added to the evaluations. These questions should be sent to Galit Mankin 4-6 weeks prior to the end of the term. The CLSC standard evaluation questions are shown below.

CLSC Overall Course Evaluation

1. How well were the overall course objectives described?
2. Please rate the overall course content in contributing to your knowledge and meeting the course objectives.
3. How well did the course promote critical analysis?
4. Please rate the quality of (instructor's name) as an instructor.
5. How well did the course promote exchange of ideas and discussion?
6. How well did the course assignments extend your understanding?
7. What suggestions would you make to improve the course?
8. Please provide any other comments, concerns, or issues.

CLSC Guest Instructor Course Evaluation

- 1 How well were the session's objectives described?
- 2 Please rate the overall session's content in contributing to your knowledge and meeting the objectives.
- 3 Please rate the overall quality of (guest instructor's name).
- 4 Please provide any comments, concerns, or issues.

Additional Information

I.D. Badge and Parking Information

New instructors will be contacted by email to receive a badge. The signing authority for the Graduate School will let you know when to contact the Badge Office at the Anschutz Medical Campus (AMC). A driver's license, state ID, or passport is necessary to have your photo taken and to receive your badge. The Badge Office is located in Building 500, Room N1207 behind the café and on the same floor as the bookstore. The Badge Office can be reached at 303-724-0399 and at IDAccessBadges@cuanschutz.edu

Pay parking is available at the Anschutz Medical Campus. For maps, permits and rates, go to <https://www.cuanschutz.edu/offices/facilities-management/parking-transportation-maps/parking>

The Strauss Health Sciences Library at Anschutz Medical Campus

As a faculty member in the CLSC program, you have access to the outstanding state-of-the-art Anschutz Medical Campus' Health Sciences Library, which houses more than 2000 online journals, many information databases, computer workstations, group study rooms, and online text references. This is a valuable resource that is available to you for your professional use throughout your enrollment in the CLSC Program. We encourage you to read the materials from the Health Science Library and to explore the assistance available on the home page at <https://library.cuanschutz.edu/> The "Online Information Rack" from the library also provides helpful information about the library and its online services. If you have questions about using the library, the librarians can be reached at 303-724-2152.

Scholarship Information and Financial Aid

No scholarship opportunities to support students of the Clinical Science Program exist at this time. Financial aid information is available from the campus financial aid office at: <https://www.cuanschutz.edu/student-finances/financial-aid>

Faculty Course Preparation Checklist

Please use this checklist at the beginning of each semester to ensure an efficient and successful teaching experience in the Clinical Science Program:

- Ensure a current CLSC Faculty Appointment
- Obtain or update your UC-Denver Badge if necessary through the Badge Office
- Update and/or submit Course Proposal and Inventory forms, if applicable
- Submit up-to-date course syllabus to Galit Mankin 4 wks before the start of the course
- Ensure grading policy is consistent with the CLSC Program and the Graduate School
- Complete course scheduling (room, dates, times) with Galit
- Order necessary books and software
- Know important dates for the Graduate School, e.g. add/drop dates, grade submissions
- Prepare Online Courses through Canvas and utilize the Help Desk if necessary
- Coordinate Course Evaluations to occur throughout or at the end of the semester
- Submit Grades to CLSC Program/Graduate School Office of the Registrar

CLSC 6650/7650 Guided Research Tutorial

A Guided Research Tutorial, also known as an independent study course, may be taken for 1-3 credit hours given that the requirements for doing so are fulfilled. Independent study courses (CLSC 6650/7650 Guided Research Tutorial) cannot exceed 8 credit hours for the doctoral degree and 6 credit hours for the Master's degree.

No required courses may be taken for credit as independent study.

Planning for the Guided Research Tutorial should begin 3-4 weeks prior to the term of planned enrollment. There are several steps that need to occur prior to enrollment.

1. First, the student should discuss the intent and plan for the Guided Research Tutorial with his/her Academic Advisor to get preliminary approval.
2. Discuss with the proposed course instructor the Academic Advisor's availability to supervise the course of study and to review and agree on the course plan. Specifically, a course plan should be mutually developed and agreed upon and include:
 - proposed number of credit hours,
 - course objectives
 - course content covered, activities and the time frame (outline)
 - assignments or outcomes/products of the course and due dates to the course instructor.
3. Determine the appropriate number of credit hours
 - Regular meetings need to occur with the course instructor
 - For instructional activities conducted by the faculty that require student participation, experimentation, observation or practice, the minimum number of weekly student-faculty contact hours is 2 hours for a 1 credit course, 4 hours for a 2 credit course and 6 hours for a 3 credit course throughout the semester.
 - For a private instruction-based course, there needs to be formal presentations in a one-to-one relationship between the student and the instructor weekly. Over the course of 15 weeks, there needs to be at least 7.5 hours with the instructor for a 1 credit hour course; 15 hours with the instructor for a 2 credit hour course; and 22.5 hours with the instructor for a 3 credit hour course.
4. Submit the course plan that has the approval of the course instructor to Dr. Lisa Cicutto, Program Director.

Steps 1-4 need to be completed prior to registering for CLSC 6650/7650 Guided Research Tutorial. This is a closed registration course meaning that self-registration is not allowed. The CLSC program must register students for this course.

Sample Course Plan for CLSC 6650

Clinical Sciences (CLSC) 6650 or 7650 Guided Research Tutorial

Fall 2008

Student: Jane Kanduit

Primary Instructor: Onlywith Myhlp, MD

Credits: 3 hours

Course Focus: Manuscript Preparation, Writing and Submission of Pilot Study on Surviving a PhD and Avoiding Bankruptcy

Course Objectives:

At the end of this course, I will be able to:

1. Perform literature searches related to surviving a PhD and avoiding bankruptcy
2. Synthesize and integrate the literature related surviving a PhD and avoiding bankruptcy by writing a literature review
3. Write a structured abstract related to pilot study re: surviving a PhD and avoiding bankruptcy
4. Describe and write the statistical analyses section of the manuscript
5. Prepare tables and figures that support the text in the manuscript for publication
6. List and discuss the pros and cons of possible journals to submit to and publish in
7. Submit a manuscript for peer-review publication on surviving a PhD and avoiding bankruptcy

Weekly Course Content Outline:

- | | |
|-------|---|
| 1-2 | Review literature for guidance on publishing in scientific journals. |
| 2-4 | Perform literature search and review literature on surviving a PhD and avoiding bankruptcy. |
| 3 | Interview mentors and colleagues about strategies for publishing in the area |
| 2-5 | Identify appropriate journals for manuscript |
| 5 | Write Background/Introduction section |
| 6 | Meet with psychologist, stress physiologist, life coach and financial planner to seek advice in the write-up of methodology used in pilot study |
| 7 | Write Methods section |
| 8 | Meet with statistician about writing statistical analysis section and presentation of results |
| 9-10 | Write Results section (2 weeks) |
| 10-11 | Write Discussion and abstract |
| 11-12 | Solicit feedback on entire manuscript and draft cover letter to editor |
| 13-14 | Revise and incorporate comments |
| 14-15 | Submit to chosen journal |

Meeting Plans with Instructor:

1. Meet with Dr. Onlywith Myhlp, every week on Mondays at the VA hospital from 2:00- to 4:00 (2x15=30 hours).
2. Meet with psychologist, stress physiologist, life coach and financial planner (all co-authors) each for 1-2 hrs while writing the manuscript and perhaps again after completing first draft.

Assignments:

1. Outline of manuscript: Due week 3, 5% of final grade
2. Introduction section: Due week 6, worth 15%
3. Methods section: Due week 9, worth 15% of final grade
4. Results section: Due week 11, 2% of final grade
5. Discussion and abstract: Due week 12, 20% of final grade
6. Cover letter and revised paper submitted: 20% of final grade

Serving on a Student Committee

This section describes important information that details a faculty member's responsibilities for being part of a student committee. It defines expectations and roles of the student and faculty member as the student completes the final master's project or doctoral thesis. It also explains the requirements of the program and provides the necessary forms.

Expectations of the Student

Good supervisory practice entails responsibilities not only of the Research Mentor but also of the student. When a student enters a PhD program, that student commits time and energy necessary for research leading to a dissertation that makes a substantial and original contribution to knowledge and the field. This contribution is comparable to three published manuscripts. It is the responsibility of the student to conform to University and Clinical Science program requirements and procedures. Although it is the duty of the Research Mentor to be reasonably available for consultation, the primary responsibility for keeping in touch and **setting up thesis committee meetings and examinations rests with the student**. It is the student's responsibility to ensure continued progress of their academic program and thesis research. The student's responsibilities include the following:

- Becoming familiar with, and adhering to, the rules, policies, and procedures in place in Clinical Science (CLSC) Program, and the University as outlined in available resources such as [CLSC student handbooks/web site](#) and [University policies and thesis requirements](#).
- Developing an Individualized Career Plan (ICDP) that includes the CLSC Academic Plan and reviewing it regularly with your Academic Advisor, Thesis Research Mentor, and Thesis Committee members.
- Selecting and planning an original research topic that can be successfully completed within the expected time frame for the degree, in consultation with the Research Mentor and Chair.
- Learning and adhering to responsible conduct of research standards for their field, as well as the [Principles of Responsible Conduct for Research at the University](#).
- Meeting with the Research Mentor regularly and when requested, reporting on progress and results, including informing the Mentor of any significant changes that may affect the progress of the research.
- Establishing a PhD Thesis Committee, with the assistance of the Mentor, early in the PhD program.
- Once a student passes the Comprehensive Examination, arrange two thesis committee meetings per year. At a minimum, an annual PhD thesis committee must be held. **If an annual PhD Thesis Committee meeting is not held, the student is at risk of being placed on academic probation.**
- Organizing thesis committee meetings including identification of meeting dates and time, agenda formation, creating and sharing a progress report with the Chair and Research Mentor one week in advance of the meeting. During the meeting, progress and accomplishments should be shared as well as challenges and areas for assistance and guidance.
- Maintaining good records of each stage of the research.
- When appropriate, planning to seek additional funding as needed well in advance.
- Regularly seek input of PhD Thesis Research Mentor and Committee members on drafts of student's research proposal and thesis (this may also include manuscripts in preparation) and allow sufficient time (2-4 weeks) for review and provision of feedback.
- Planning to complete the MSCS degree requirements in 2 years (the Graduate School's maximum duration for MSCS degree completion is 7 years)

Expectations of the Research Mentor

The Thesis Research Mentor has the overall responsibility for guiding the student through the process of successful completion of a thesis that fulfills the expectations of scholarly work at the appropriate level as well as meets the requirements of the Clinical Science Program. It is highly recommended that Research Mentors be trained and prepared through participation in an official mentoring program, such as Mentoring3: Mentors, Mentees, Peers, CO-Mentor or CIMER. In addition to the expectations of serving as a PhD Thesis Committee member (described below), the Thesis Research Mentor will:

- Be able and willing to assume principal responsibility for advising the student related to the research project (design, conduct, analysis) and write up adhering to rigor and reproducibility principles/standards and ethical and regulatory principles.
- Have and provide adequate time to commit to the student for successful completion of the research/thesis and be accessible to the student.
- Guide the student in the selection and planning of an original research topic that can be successfully completed within the expected time frame (2 years for a MSCS and 4 years for a PhD). The maximum time the Graduate School allows for completion of the MSCS is 7 years and the PhD is 8 years).
- Provide adequate and timely feedback to both the student and the PhD Committee regarding student progress toward degree completion.
- Guide and provide continuing feedback on the student's development of a research project by providing input on the intellectual appropriateness of the proposed activities, the reasonableness of project scope, acquisition of necessary resources and expertise, necessary facilities (lab, etc.).
- Establish key academic milestones and communicate these to the student and appropriately evaluate the student on meeting these milestones.
- Review the student's career and research milestones identified on their Individualized Career Development Plan on a regular basis (at least quarterly).
- Assist the student in selecting and forming the PhD Thesis Committee.

Expectations of Members

In order to provide good supervisory practice, Comprehensive Exam and Thesis Committee Members will:

- Commit adequate time to meet with students to advise and provide expertise.
- Provide input in the selection and planning of an original research topic that can be successfully completed within the expected time frame (2 years for a MSCS and 4 years for a PhD).
- Be accessible to the student for meetings (at a minimum this implies availability for Committee meetings, meeting individually with the student, the student's Comprehensive Examination and PhD Thesis Defense.
- Attend and participate in PhD Thesis Committee meetings twice a year and at a minimum once a year. Failure to do so jeopardizes the student's standing in the program.

- Ensure the student's work conforms to the highest standards of scholarly performance within the discipline and within the expertise provided by the Committee member.
- Provide advice to both the student and the student's Research Mentor(s) on the quality, suitability and timeliness of the work being undertaken.
- Approve the student's degree plan (e.g., courses of study, compliance with program's qualifying process, thesis proposal, etc.), assuring that the plan not only meets the intellectual needs of the student, but also all institutional and program requirements.
- Review dissertation drafts as provided by the student and provide feedback in a timely fashion to the student and the Research Mentor, as appropriate.
- Provide input in the selection and planning of an original research topic that can be successfully completed within the expected time frame (3-4 years for full-time study and 5-6 years for part time students).
- Ensure that students understand the relevant theories, methods, technical skills necessary for the research.
- Advise on and contribute to career development and professional development, examples include preparation of the CV, providing letters of reference, reviewing applications, and strategies for launching an academic career.
- Participate in evaluating the student's performance throughout the program and be honest with the student when academic performance is not meeting expectations.

Expectations of the Chair

The Chair plays the primary role in ensuring that the committee meets all of its responsibilities and that Graduate School and Clinical Science Program's requirements, policies and practices are followed

- He/she is responsible for the completion and submission of the appropriate paperwork or forms and that these forms are scanned and e-mailed to [Galit Mankin](#).
- He/she is responsible for chairing the committee meetings and examinations
- He/she are also an advocate for the student and will assist with managing conflict, if it should arise
- Specific to PhD students (PhD student committees are chaired by core CLSC faculty):
 - Responsible for completion and submission of the appropriate CLSC and Graduate School documentation and forms, which are submitted to Galit Mankin (galit.mankin@cuanschut.edu), Program Administrator.
 - Responsible for chairing PhD Thesis Committee meetings, the Comprehensive Examination and PhD Thesis Defense.
 - Reviewing student progress reports, plans and ICDP prior to the PhD Thesis Committee meetings (provided by student one week prior to meeting).
 - Serve as a key advocate for student success, being available to discuss any issues of importance, including thesis project, career planning, etc.
 - Ensures that the committee meets twice yearly and at minimum, once yearly and completes and submits the Thesis Committee Report form to document the student's progress, accomplishments and areas of concern or disagreement.
 - If conflicts arise between the student and the Research Mentor or PhD Thesis Committee members, the Chair will take the lead for resolution and management of conflicts and will notify the CLSC Program Director.

Acknowledgment of NIH Funding on CCTSI Publications and Projects

The Clinical Science graduate program is a CCTSI (Colorado Clinical & Translational Sciences Institute) - sponsored Training and Education Resource. Any publications, patents, projects, or other tangible outcomes (including MSCS thesis/Publishable paper and PhD thesis) that benefit from any CCTSI resources **must credit the CTSA Grant**.

The following language should be used when citing the grant:

“This project/publication is supported in part by NIH/NCATS Colorado CCTSI Grant Number UL1 TR004399. Contents are the authors’ sole responsibility and do not necessarily represent official NIH views.”

In addition, publications should be registered with PubMed Central.

More information is available on the CCTSI website at <https://cctsi.cuanschutz.edu/resources/grant-language>

MSCS Final Project and Examination

As described above, in addition to completing the required coursework, students must complete and write-up a final research project, provide an open-to-the-public oral presentation of the final project, and defend the project to satisfy the MSCS degree requirements. The final research project may take the form of a publishable paper or thesis (requires permission from the Program Director). The thesis/publishable paper should be thought of as the demonstration of the student’s ability to organize and communicate, in a clear and effective manner:

- a statement of a problem;
- a researchable hypothesis;
- the methods used to address the hypothesis/research question
- a discussion of pertinent findings; and
- coherent conclusions and implications of the issue being studied.

The scope of work expected from the student should:

- involve substantial contribution to the development of the scientific question being studied;
- demonstrate the ability to partition a complex question into a workable set of specific objectives and/or answerable research questions/testable hypotheses;
- demonstrate the ability to critically review and document the current state of the evidence that addresses the study topic;
- involve a substantial contribution to the study design and selection of the study subjects;
- demonstrate the ability to organize results/observations; and
- demonstrate the ability to adequately identify and discuss the results, study limitations and implications of the observations in the context of previously known theories, recommendations and practices.

Although it is extremely difficult to be highly specific about the content of either a thesis or a publishable research paper, it is anticipated that all final projects, whether written as a thesis or a research paper, will include the collection and appropriate analysis of quantitative or qualitative data. Although primary data collection is desirable, use of existing data sets involving significant additional analyses are acceptable at the master's level.

The thesis is submitted to the Clinical Science Program and the Graduate School and the research paper is submitted to the examination committee and to a refereed journal approved by the examination committee. Otherwise the steps are the same.

Steps for Student Completion of the MSCS Final Project and Examination

The student will:

1. Choose and delineate a problem for investigation.

- Consider topics previously pursued which can perhaps be taken a step further
- Review current literature in the area

2. Choose a three-member examination committee.

Students select three members to serve as an examination committee for the thesis/publishable paper project. Two members, including the committee Chair, must have or be eligible for a Graduate School faculty appointment (Regular or Special). A Graduate School faculty appointment listing is posted on-line at https://gs.ucdenver.edu/tbl_gradfac_curr.php

For a committee member that does not have a Graduate School appointment, students may request that the CLSC Program submit an appointment nomination to the Graduate School. To begin this process, the student must submit to Galit Mankin (Galit.Mankin@cuanschutz.edu) a CV, and a written explanation of how this potential member contributes to the committee. The nomination/approval process takes 6-8 weeks. Guidelines are posted on-line at <https://graduateschool.cuanschutz.edu/forms-resources/resources>

In addition, the committee as a whole must meet the following three criteria:

- One member must be from outside the department. An outside member is defined as a person without a primary appointment in the Clinical Science Program.
- The Chair and Research Mentor must come from the CLSC faculty (listed as "IN CLSC" on the faculty appointment listing).

3. Prepare a written proposal for the research project.

It is suggested that students register for one thesis/research paper credit during the term they work on finalizing the proposal and that they distribute the remaining credits over the terms in which the bulk of the research is conducted. Students who complete the thesis option are to enroll in CLSC 6950 Masters Research Project: Thesis and students who complete the publishable paper option are to enroll in CLSC 6699 Masters Research Project: Publishable Paper. The total number of course credit hours that students may complete for their final project (thesis or publishable paper) is 4-6 credit hours. While the final project is in progress, credits for either CLSC 6950 or CLSC 6699 are assigned the grade IP (in progress). The grade is changed retroactively by the final project examination committee chair when the final project is completed and a grade can be assigned. ***Students can enroll in either of these two options in their last 1-2 semesters in the program.***

In general, whether doing a thesis or research paper, the proposal should contain the following elements:

- A problem statement, including justification as to the significance and scope of the study question.

- A review of the relevant literature, discussing the scope and limitations of the available literature relative to the issue studied.
- Hypotheses/research question - levels of hypotheses/research question, alternative and rival hypotheses, specification of the variables.
- Planned methodology for the study:
 - A. study setting,
 - B. data source,
 - C. sampling techniques,
 - D. size of sample,
 - E. plan of analysis including the organization and summary of the data and statistical techniques to be used,
 - F. proposed timetable for completion of project.

4. Present the written proposal to the examination committee prior to conducting the study.

5. Implement the investigation and develop a timeline for completion and graduation.

6. Prepare the written report.

Guidelines for thesis content:

- a) A statement of the problem, including formulation of hypotheses when appropriate;
- b) A review of relevant literature to identify research that has preceded and led to the thesis problem and rationale for the study;
- c) A description of the study setting;
- d) A description of the method(s) of inquiry to be used including data collection instruments and statistical techniques, and explanation of why these methods are appropriate for meeting the objectives of the study;
- e) A presentation of the findings/results of the study;
- f) Discussion of the implications or application of the results, integration with other published research findings, and suggestions for further research.

Guidelines for content of publishable research paper - adapted from McMaster University and Structured Abstract Guidelines:

- a) A statement of the study objective/s;
- b) A description of the study design;
- c) A description of the study setting;
- d) A description of the patient(s), population, or events being studied;
- e) A discussion of the methods and interventions (if applicable);
- f) A presentation of the main results;
- g) A discussion of the results, contribution to the literature and limitations;
- h) Conclusions.

7. It is suggested that students work with their committee throughout the project.

8. Give all members of the examination committee a draft of the written report.

Allow committee members at least two weeks to review the draft and return their comments. Incorporate these comments into a final draft.

9. Scheduling the Thesis/Publishable Paper Final Exam.

Students should not schedule their Final Exam unless they are confident that their thesis can be finalized or their publishable paper can be finalized and submitted to a peer-reviewed journal **within 60 days of the Final Exam date.**

When the committee chair agrees that the thesis/publishable paper is ready to defend and all committee members have signed the [Final Exam Schedule Approval form](#), a day and time acceptable to all committee members can be scheduled. Faculty signatures on this form ensure that the full committee agrees that the student is ready to defend his/her final thesis/publishable paper. Students should plan on a meeting of **at least two hours** unless the committee chair advises differently. **The defense can be held in a room on the AMC campus or an approved affiliated campus or remotely by zoom. Contact CU Denver | Anschutz Medical Campus Educational Support Services to reserve a room and any necessary audio-visual equipment (e.g., projector): <https://www1.ucdenver.edu/offices/office-of-information-technology/services/meetings-and-events>**

All members of the committee must be present for the examination.

Students must be enrolled for either thesis credit (CLSC 6950) or research paper credit (CLSC 6699) hours during the semester in which the final exam (oral defense) is held. It is expected that all CLSC course work (required and elective courses) be completed prior to the final exam defense. However, students can be completing course work during the semester in which the final exam is held.

Please note that the following forms must be submitted to the Program Administrative Office at least 4 weeks in advance:

- 1) [Request for Exam form](#) (a Graduate School form SUBMITTED VIA DOCUSIGN)
- 2) [Application for Candidacy](#) (a Graduate School form SUBMITTED VIA DOCUSIGN)
[Final Exam Schedule Approval form](#) (a CLSC program form)

If your examination is occurring within four months of graduation, it is extremely important that you check the Graduate School deadlines for graduation listed on the Graduate School website. Students **MUST check the Graduate School deadlines as they change frequently.**

10. Thesis/Publishable Paper Final Exam.

The thesis/publishable paper defense is open to the public and is publicly advertised. Upon completion of the student's presentation (approximately 40 minutes) and answering of any questions from attendees (30 minutes), the committee chair will close the meeting so that the committee may discuss with the student any issues, concerns, or required changes to the thesis/publishable paper. All members of the committee must be present for the examination.

This committee will evaluate both the oral defense and written thesis/publishable paper. Following deliberations, the committee will vote to pass, conditionally pass (with modifications required to the written thesis draft), or fail a student. The committee may require changes to the final thesis/publishable paper. If changes are required, a timetable for re-submitting the revised document to committee members should be established. A timetable is particularly important when a student expects to graduate in the semester in which he/she defends the thesis/publishable paper. The maximum time allowed for these changes to be made or disparities reconciled is 60 days. The Chair will be expected to facilitate completion of required forms by the committee and to scan and e-mail the completed forms to the CLSC Administration Office (galit.mankin@cuanschutz.edu). The student is at no times to be in possession of the Graduate School Final Examination Results Report form.

11. Prepare final document for Defense.

After the oral defense, incorporate any additional changes into the final version of the thesis or publishable paper.

Thesis: A current Format Guide for Theses and Dissertations is available on the [Graduate School website](#). Your final thesis or dissertation must be submitted by the published deadline in order to graduate in that semester. In addition, an electronic copy of your thesis **MUST** be submitted to the program within 60 days of your Final Exam date. **The student must be registered in the semester they are graduating. If graduation does not occur in the same semester as the Final Exam, the student will be required to register for an additional 1 thesis credit (CLSC 6950) in the following semester.**

Research Paper: Copies of the final research paper are submitted to each member of the examination committee, the program office, and to a refereed journal approved by the examination committee. Students completing the research paper option will not be assigned a final grade until a copy of the research paper and a copy of the transmittal letter submitting the paper to the agreed upon journal is received in the program office, which **MUST** occur within 60 days of your Final Exam date. Once this is received, the program office will submit the final grade to the Graduate School. **The student must be registered in the semester they are graduating. If graduation does not occur in the same semester as the Final Exam, the student will be required to register for an additional 1 publishable paper credit (CLSC 6699) in the following semester.**

*Please Note: It is common that all committee members be included as authors on final research papers, although this is not always the case. The issue of authorship should be discussed in **every** instance with all committee members. If, by mutual agreement, a committee member is not included as an author, he/she should be acknowledged in the research paper. The chair of the examination committee will have primary responsibility for assuring that the final report is completed and that the grade is submitted to the Graduate School.*

UNIVERSITY OF COLORADO DENVER
CLINICAL SCIENCE GRADUATE PROGRAM
MASTERS DEGREE

Final Exam Schedule Approval Form

The following members of the Final Research Project Examination Committee have received, reviewed and agree that the thesis/publishable paper submitted by _____
Masters Candidate

is ready to proceed to the final examination.

Chairperson

Print name

Signature

Date

Committee Member

Print name

Signature

Date

Committee Member

Print name

Signature

Date

This form is to be submitted to the Clinical Science Graduate Program's Administrative Office: Galit.mankin@cuanschutz.edu

**Clinical Science MSCS Program: Final Exam Process Checklist
(Expectations of the Chair)**

Checklist for Master's Thesis/Publishable Paper Final Exam Process

2-4 days prior to the Final Research Project Examination, ensure that you have received the necessary paperwork:

- Graduate School Defense Information/Instruction sheet
- Graduate School Final Examination Confirmation Sheet
- Graduate School Final Examination Results Report form
- Student's completed coursework and grades record
- CLSC MSCS Final Project Examination Report

- Copy of Student's Thesis or Publishable Paper – should be provided by the student directly to the committee members (It is also the chair's responsibility to ensure all authors listed on the publishable paper agree that the student is ready for the exam)

If you have not received these documents, please contact Galit Mankin at galit.mankin@cuanschutz.edu

Day of the Final Research Project Examination

1. Introduce the student and the title of his/her project

2. Explain the structure of the Examination
 - Open forum session will include MSCS candidate's presentation (approx. 40 mins) followed by questioning (approx. 30 mins)
 - Closed session follows (only committee members and candidate)

3. Following the presentation and questioning, thank and dismiss attendees and begin the closed session (ONLY committee members and student)

4. Ask candidate to step outside room (5-10mins), while the examination committee discusses the following points:
 - a. Ensure all members have read the project
 - b. Determine order and format of questioning
 - c. Determine if there are major concerns of the candidate

5. Call candidate back into the examination room to begin closed session questioning

6. Once questioning is completed, ask student to step outside the room (10-15 mins) until asked to return.

7. Chair the Committee member executive session
 - a. Determine examination grade: pass, pass with conditions, or fail
 - If pass with conditions, the conditions need to be clearly documented and a date by which the conditions must be met identified on paper (conditions must be satisfied within 60 days) which is submitted to the CLSC Program Administrator, Galit Mankin.

- b. Committee members sign Graduate School Final Examination Report form
 - c. Complete the MSCS Final Research Project Examination Report form with committee member input
8. Call the candidate back into the room to join the committee and share the results of the examination. If there are conditions, explain the steps that the student must complete and the timeframe for completion
9. Remind the student that the CTSA grant must be cited in the finalized version of the student's Thesis or Publishable Paper.
The following language should be used when citing the grant:
"This project/publication is supported in part by NIH/NCATS Colorado CTSI Grant Number UL1 TR004399. Contents are the authors' sole responsibility and do not necessarily represent official NIH views."

In addition, publications should be registered with PubMed Central.
10. **Completed Graduate School forms will be submitted via DocuSign. CLSC forms should be emailed to: Galit.mankin@cuanschutz.edu**

AT NO TIME IS THE STUDENT TO HAVE POSSESSION OF ANY OF THE GRADUATE SCHOOL FORMS

PhD Comprehensive Exam, Thesis Process and Thesis Defense

Comprehensive Examination and Thesis Committee

The PhD Thesis Examination will examine the student for both the Comprehensive Examination, to qualify for PhD candidacy, and the PhD Thesis Defense Examination to complete the requirements of the PhD degree. Students select at least five members to serve on their PhD Thesis Committee. The PhD Thesis Committee is to be formed and meet once within 12 months of successful completion of the Preliminary Examination. It is expected that once the student passed the Comprehensive Examination that the PhD Thesis Committee will meet twice a year and at minimum once per year. Students should meet with individual committee members more regularly to take advantage of the individual member's expertise for successful project completion. Following the Comprehensive Examination and each Thesis Committee meeting, documentation of the student's progress and areas discussed is to be completed and forwarded to the CLSC Administrator (galit.mankin@cuanschutz.edu) using the Thesis Committee Report Form. The Chair is responsible for completing and submitting the form.

Prior to forming the PhD Thesis Committee, we encourage students to talk with a number of faculty members about possible topics during their first year of study. Following successful completion of the Preliminary Examination and within one year of this milestone, the PhD Thesis Committee must be formed and meet at least once. Academic Advisors are a wonderful resource for networking and identifying potential Research Mentors and committee members.

Once students have selected a Research Mentor, also known as the thesis supervisor, (which is the person the student will work most closely with on the PhD research project and thesis) and are fairly confident he or she have identified a topic or specific aims for their research, students will begin forming the committee. The student and Research Mentor should identify other faculty to serve as PhD Thesis Committee members with whom they would like to work and would add expertise needed for the project. When the student and the Research Mentor have agreed on a list of possible members, the student should meet with each of those people to describe the proposed work and request committee membership. The student and the committee should meet as a group every six months and a minimum once every year. The student will also need to identify the Chair of the committee. The Research Mentor and Chair must be different. The Chair is responsible for adhering to the Graduate School and CLSC program requirements and processes and reporting their outcome to the Clinical Science Graduate Program and the Graduate School. Specifically, they will complete and submit the CLSC Thesis Committee Report form (at the end of this section) following each committee meeting, chair both the Comprehensive Examination and the PhD Thesis Defense Examination, and will complete and submit necessary forms/documentation.

All members of the committee must have or be eligible for a Graduate School faculty appointment. A Graduate School faculty appointment listing is posted on-line at https://gs.ucdenver.edu/tbl_gradfac_curr.php

For a committee member who does not have a Graduate School appointment, students may request that the CLSC Program submit an appointment nomination to the Graduate School. To begin this process, the student must submit to Galit Mankin (galit.mankin@cuanschutz.edu) a CV of the nominee, which includes the teaching portfolio, and a written explanation of the contribution brought to the committee. Nomination requests must be submitted to the CLSC Program no less than two months before the planned Comprehensive and the PhD Thesis Defense examination date, if membership of the committee changes.

Committee Composition

- The committee must contain at least 5 members.
- The majority of committee members must be CLSC faculty.
- At least 1 member must NOT be from the CLSC faculty.
- The Research Mentor (the person with whom the student will work most closely with to develop and conduct the research project) needs to be a member and MUST attend the Comprehensive Examination and the Thesis Defense Examination but is NOT allowed to chair the committee nor the exams.
- The Chair of the committee must be a CLSC core faculty member (This includes the Track Directors, Educational Director, Program Director and Program Director Emeritus). This individual will chair the Comprehensive Examination, your committee meetings, and the Thesis Defense Examination.

Comprehensive Examination Planning Process

Admission to Candidacy

Graduate School Policies & Procedures apply to Comprehensive Exams of all CLSC PhD students. The purpose of the Comprehensive Examination is to provide the candidate with the opportunity to demonstrate mastery of a broad range of knowledge in clinical science. While specific courses completed by the candidate are important, their content has been tested as a portion of the grading process for the course and the Preliminary Examination. The Comprehensive Examination is not, therefore, a re-examination of course content but rather the integration and application of knowledge and skills. A form of evidence of this ability is the student's thesis proposal. The candidate should demonstrate synthesis of knowledge in the areas of:

- theory construction, analysis, and evaluation;
- research and analytic methods required to answer significant clinical science questions;
- existing and emerging knowledge in clinical science, the identified clinical science track and other contributing fields.

Before admission to candidacy for the PhD in Clinical Science, each student must pass a Comprehensive Examination in the selected track or field of concentration. This examination will include: 1) a written exam component, 2) a presentation of the thesis proposal that is open to the public, and 3) a closed oral exam on the proposal, related clinical science topics and synthesis of completed coursework. The format of the written exam requirement is the first three chapters of the doctoral thesis dissertation, which includes the introduction and problem statement, review, critique and synthesis of the literature, specific aims, research questions/hypotheses and the methods used to address research.

Requirements Prior to Scheduling the Comprehensive Examination

- Preferably completed by the end of the student's third year or early in the fourth year.
- Successful completion of the Preliminary Examination.
- Completion of or current registration for all program-required, non-thesis coursework.
- Validation of any course work to count toward the degree that was taken more than 7 years before the Comprehensive Exam.
- A cumulative 3.00 G.P.A. or higher for completed CLSC program coursework.

- Students must be registered for a minimum of one credit during the semester of the Comprehensive Examination.
- Attend at least one CLSC peer’s public presentation portion of the Comprehensive Examination.
- A CLSC program approved list of committee members including the Research Mentor and Thesis Committee Chair.
- The student must prepare a written research proposal that consists of the first three chapters of the thesis dissertation, which was reviewed by your entire PhD Thesis Committee with feedback provided to the student and Research Mentor.
- The student must initiate the “Approval of Thesis Proposal Form” (signed/email chain documenting approval by Chair & Mentor) and circulate the thesis proposal to the Thesis Committee and Galit Mankin at least 8 weeks before the exam.
- Final draft of the thesis proposal must be distributed to PhD Thesis Committee members at least 4 weeks in advance of the Comprehensive Examination.

All required paperwork must be completed and submitted to [Galit Mankin](#) **NO LESS THAN 30 DAYS** before the exam is held.

- Instructions and forms are available at the Graduate School website: <https://graduateschool.cuanschutz.edu/forms-resources/resources>
Please read all instructions carefully. An “[Application for Admission to Candidacy](#)” form must be submitted along with the “[Request for Scheduling Exam](#)” form. Both forms should be submitted electronically via DocuSign.
- The paperwork requires the CLSC Program Director to sign the form before the Graduate School will accept it.
- Any student who does not meet the Graduate School deadline will be required to re-schedule his/her Comprehensive Examination. Therefore, we strongly recommend students begin the paperwork process **NO LESS THAN 8 WEEKS** before the planned exam date.

Extremely Important: Students must be registered at the time they take the Comprehensive Examination. Students who schedule their examinations after the last day of a given term must register in the subsequent term.

- In addition to the maximum 10 thesis hours that may be completed *prior* to the Comprehensive Exam (and *after* passing the preliminary exam), up to 10 additional thesis hours may be completed *during* the semester in which the Comprehensive Exam is done.

Scheduling

- Due to limited faculty availability during the Summer semester, Comprehensive Exams will normally be held during Fall and Spring semesters. The Comprehensive Exam can be held in a room on the AMC campus or an AMC-affiliated campus. If there are extraordinary circumstances that do not allow one or more committee members to attend the exam in person, the Committee chair might choose to hold the exam by Zoom or as a hybrid.
- The Graduate School requires that students and committee members set aside 3 hours for the Comprehensive Exam.
- CU Denver-Anschutz Medical Campus Educational Support Services (<https://www1.ucdenver.edu/offices/office-of-information-technology/services/academic->

[technology-and-classroom-support](#)) is available for reserving a room and providing equipment (e.g., projector).

Comprehensive Examination Procedure/Content

All members of the committee must be present for the examination. Any costs incurred to bring an outside member to campus or to connect the member by interactive video/telephone are the responsibility of the student. The examination form, indicating the pass, conditional pass, or fail status of the exam, will be initiated by the Graduate School in DocuSign and will be routed for signatures to all committee members.

The thesis proposal should describe the proposed topic, background and relevant literature, theoretical foundations, specific aims, research questions and hypotheses, and methods. The student and the Research Mentor (and perhaps other committee members) should work together to get the proposal in good shape, and then circulate it to the committee for comments. This process is meant to help assess the level of agreement between the student and the committee, describing expectations and scope of work. The PhD research project and thesis should show originality on the part of the student and be of peer-reviewed publishable quality for three scholarly papers.

Thesis Proposal

- 1) Cover letter/memo: Provide a list of the names of the Comprehensive Examination Committee, provide the date, time, location (including room number) and title of the proposal and oral presentation.
- 2) Chapter 1- Introduction: Provide a brief overview, conceptual framework, purpose, and problem statement of the proposal.
- 3) Chapter 2- Background/Review of the Literature: Perform a review of the literature that identifies, reviews, and critically appraises existing knowledge in the identified fields and topics. Gaps in evidence, knowledge and/or practice should be identified that the proposed project addresses.
- 4) Chapter 3- Study Hypotheses, Methods and Analysis Plan: Briefly present the proposed study's hypotheses/research questions, the methods proposed to address the hypotheses/questions and the accompanying analysis plan.

Evaluation Criteria for the Paper/Written Element

- Focuses on a substantive topic in clinical science that synthesizes theory, research and practice.
- Reflects breadth of knowledge in the field.
- Reflects understanding of the issues and problems related to the topic.
- Presents original ideas and sound rationale; the significance for clinical science is convincing.
- Discusses and suggests methods and approaches to the inquiry.
- Is concise, logical and readable.
- The content is well founded and accurate.
- Citation and documentation of sources used are accurate and comprehensive.

Comprehensive Exam Structure

A form titled "CLSC PhD Program Comprehensive Examination Process Checklist: Expectations of the Chair" is provided on the following pages to ensure compliance with a proper and standardized protocol.

The Comprehensive Examination has two components: 1) a formal, public presentation of the student's thesis (dissertation) proposal, and 2) a closed discussion with the exam committee during which the student is required to demonstrate in-depth knowledge of the methodological, clinical and social issues pertinent to the student's project and selected track.

The public presentation should last approximately 40 minutes, followed by an open question-answer session. Following the public presentation is a closed meeting with committee members. During this exam component, content from track-specific courses and the student thesis proposal will be covered (related fields of study, methodology, statistics). Listed below are some examples of core content areas according to track.

- **Clinical Investigation:** Students will be expected to demonstrate their knowledge and understanding of the challenges and potential solution/approaches used in clinical investigations, research methods, and principles of clinical translation.
- **Health Information Technology:** Students will be able to present and discuss the goals and objectives for HIT in clinical, financial and administrative realms; describe the role of HIT in improving patient safety, quality, and operational efficiencies; and explain the major barriers to implementing HIT.
- **Health Services Research:** Students will be expected to demonstrate their understanding of research methods, health economics, and the principles of health services research including the major seminal HSR literature.

Prior to their own Comprehensive Exam, CLSC students must attend at least one of their CLSC peer's public presentation component of the Comprehensive Examination. Students are encouraged to attend more than one to become familiar with the process and to participate in the scholarly dialogue.

Examination Grading

There are three possible outcomes for the Comprehensive Exam:

- 1) **Pass** – The student must receive affirmative (passing) votes from the majority of the committee members to pass.
- 2) **Pass with conditions** – The committee may decide that although the student has passed the examination the student should complete additional work on the thesis proposal or coursework. Areas of additional work or other conditions will be specified on the examination form and must be completed to the satisfaction of the examination committee within 4 months of the examination. The committee chair is responsible for monitoring the conditions and reporting the outcome to the Graduate School and to the Clinical Science Program office. Failure to satisfy these conditions will result in failure of the examination.
- 3) **Fail** – If the student fails the examination, per Graduate School Policies & Procedures, the student may be subject to immediate dismissal from the program. At the program's discretion, the student may be allowed to re-take the examination once. The re-examination will be in the form designated by the committee and must be completed within twelve (12) months. The original examination form noting the failure is signed by the committee and returned to the Clinical Science Program office. New examination forms will be generated when the examination is rescheduled. The student will be required to meet registration requirements and be registered during the term in which the repeat exam is taken.

Upon completion of the Comprehensive Examination, the Chair ensures completion of the proper forms. Please refer to the PhD Comprehensive Examination Checklist to ensure completion of all required Graduate School and CLSC forms. Graduate School forms should be submitted via DocuSign. *These forms should never be in the student's possession.* Copies will be kept in the student's file.

UNIVERSITY OF COLORADO DENVER
CLINICAL SCIENCE GRADUATE PROGRAM

Approval of Thesis Proposal

The following members of the Thesis Committee have approved the dissertation proposal submitted by _____
Doctoral Candidate

Chairperson

Print name

Signature

Date

Research Mentor

Print name

Signature

Date

This form is to be submitted to the Clinical Science Graduate Program's Administrative Office:
Galit.mankin@cuanschutz.edu

CLSC PhD Program: Comprehensive Examination Checklist

(Expectations of the Chair)

2-4 days prior to the Comprehensive Examination, ensure that you have received the necessary paperwork:

- Graduate School Information/Instruction sheet
- Graduate School Confirmation Sheet
- Graduate School Comprehensive Examination Report form
- CLSC Comprehensive Examination Attendance form
- Student's completed coursework and grades record
- CLSC Comprehensive Examination Report form

- Copy of student's thesis proposal – should be provided by the student directly to the committee members

If you have not received these documents, please contact Galit Mankin at galit.mankin@cuanschutz.edu

Day of the Comprehensive Examination

1. Have attendees sign-in using the CLSC Comprehensive Exam Attendance form
2. Introduce the student and the title of his/her thesis proposal
3. Explain the structure of the Comprehensive Examination
 - Open forum session will include PhD student's presentation (approx. 40-45 mins) followed by questioning (approx. 20-30 mins)
 - Closed session follows the open forum (only committee members and student)
4. Following the presentation and questioning, thank and dismiss attendees and begin the closed session (ONLY committee members and student)
5. Ask student to step outside room (10mins), while the examination committee discusses the following points:
 - i. Ensure all members have read the proposal
 - ii. Determine order and format of questioning
 - iii. Review student's coursework and grades
 - iv. Determine if there are major concerns of the candidate
6. Call student back into the examination room to begin closed session questioning
7. Once questioning is completed, ask student to step outside the room (10-15 mins) while committee deliberates.
8. Chair the committee member executive session
 - a. Determine examination grade: pass, pass with conditions, or fail
 - If pass with conditions, the conditions need to be clearly documented and a date by which the conditions must be met identified on paper (conditions must be satisfied within 4 months). This paper should be provided to the CLSC Program Administrator, Galit Mankin.
 - b. Have committee members sign Graduate School Comprehensive Examination Report form
 - c. Complete the CLSC Comp Exam Form with committee member input

9. Call the candidate back into the room to join the committee and share the results of the examination. If there are conditions, explain the steps that the student must complete and the timeframe for completion.
10. Remind the student that the CTSA grant must be cited in the finalized version of the student's Thesis. The following language should be used when citing the grant:
"This project/publication is supported in part by NIH/NCATS Colorado CTSI Grant Number UL1 TR004399. Contents are the authors' sole responsibility and do not necessarily represent official NIH views."

In addition, publications should be registered with PubMed Central.

11. **Completed Graduate School forms will be submitted via DocuSign. CLSC forms should be emailed to: Galit.mankin@cuanschutz.edu**

AT NO TIME IS THE STUDENT TO HAVE POSSESSION OF ANY OF THE GRADUATE SCHOOL FORMS

CLSC PhD Program: Comprehensive Examination Report

Student: _____ **Date of Exam:** _____

Chair: _____ **Research Mentor:** _____

Members in Attendance: _____

The student's performance during the Comprehensive Examination and review of the written thesis proposal and coursework grades suggest that the student is progressing as follows towards CLSC core competencies:

1. Understands legal, ethical and regulatory issues related to clinical research and principles for Responsible Conduct of Research.
 Exceeds expectations Meets expectations Below expectations
2. Critically appraises existing literature and sources of information.
 Exceeds expectations Meets expectations Below expectations
3. Accurately selects, uses and interprets commonly used statistics.
 Exceeds expectations Meets expectations Below expectations
4. Applies appropriate study designs and methods to address research questions/hypotheses.
 Exceeds expectations Meets expectations Below expectations
5. Identifies and measures clinically relevant and meaningful outcomes.
 Exceeds expectations Meets expectations Below expectations
6. Designs and conducts clinically and patient oriented research studies.
 Exceeds expectations Meets expectations Below expectations
7. Demonstrates effective communication and leadership skills.
 Exceeds expectations Meets expectations Below expectations
8. Participates in interdisciplinary collaboration.
 Exceeds expectations Meets expectations Below expectations

Comments:

Please submit completed form to: Galit.mankin@cuanschutz.edu

CLSC Comprehensive Examination Attendance Form

SPEAKER: _____

DATE: ____ / ____ / ____

ATTENDEES (please PRINT name clearly):

1.	26.
2.	27.
3.	28.
4.	29.
5.	30.
6.	31.
7.	32.
8.	33.
9.	34.
10.	35.
11.	36.
12.	37.
13.	38.
14.	39.
15.	40.
16.	41.
17.	42.
18.	43.
19.	44.
20.	45.
21.	46.
22.	47.
23.	48.
24.	49.
25.	50.

Post Comprehensive Exam Requirements

Registration

- After passing the Comprehensive Examination, students must register for at least 5 dissertation/thesis credits every semester (excluding the summer semester).
- The student must register for a minimum of 5 thesis credits during the semester in which he/she defends the PhD dissertation (summer is NOT excluded in this instance).
- A maximum of 10 thesis credits can be taken in any semester. Only 10 thesis credits taken prior to the Comprehensive Examination (and *after* passing the preliminary exam) to be counted towards the minimum 30 credit hours required.
- In addition to the maximum 10 thesis hours that may be completed *prior* to the Comprehensive Exam (and *after* passing the preliminary exam), up to 10 additional thesis hours may be completed *during* the semester in which the Comprehensive Exam is taken.

Important Note: There is some strategy required in taking thesis credits. Because of the continuous registration requirement, taking too many credits early may result in additional expense; however, if a student takes too few, it may limit how quickly the student can graduate.

Committee Meetings

Once the student passes the Comprehensive Examination, the PhD Thesis Committee should meet twice a year and at minimum once per year (failure to do so can place the student on academic probation). The student should also meet with individual committee members more regularly to take advantage of the individual members' expertise for successful project completion. The Chair should complete and return the [CLSC Thesis Committee Report Form](#) to the CLSC Program Administrator immediately following each Committee meeting.

**CLINICAL SCIENCE GRADUATE PROGRAM
Thesis Committee Report**

Student: _____ **Date of Meeting:** _____

Research Mentor: _____ **Dissertation Chair:** _____

Committee Members in Attendance:

1. Has the student made satisfactory progress? YES NO
If yes, attach student's progress summary.
If no, explain the reasons.

2. Please list publications submitted, In Press, published and/or grants submitted, or awarded since the last committee meeting.

3. Is there evidence that the student is sufficiently committed to the research? YES NO

4. Does the student have sufficient knowledge of the current literature?
 Exceeds expectations Meets expectations Below expectations Unable to assess/Too early

5. Is the student able to critically appraise evidence and various sources of information?
 Exceeds expectations Meets expectations Below expectations Unable to assess/Too early

6. Does the student have sufficient knowledge to apply legal, ethical, and regulatory issues related to clinical research and principles for the Responsible Conduct of Research?
 Exceeds expectations Meets expectations Below expectations Unable to assess/Too early

7. Did the student display the ability to select, use and interpret commonly used statistics and forms of analyses?
 Exceeds expectations Meets expectations Below expectations Unable to assess/Too early

8. Did the student demonstrate the ability to use appropriate research design to address the research questions or hypotheses?
 Exceeds expectations Meets expectations Below expectations Unable to assess/Too early
9. Does the student have ability to identify and measure clinically relevant and meaningful outcomes?
 Exceeds expectations Meets expectations Below expectations Unable to assess/Too early
10. Through the final research project, is the student participating in interdisciplinary research?
YES NO
11. Has the student communicated effectively (written and oral) in committee meetings?
 Exceeds expectations Meets expectations Below expectations Unable to assess/Too early
12. What are the specific concerns of the committee related to the project/student?
13. The committee recommends the following activities, experiments and/or goals to be accomplished by the next meeting.
14. Has the student been made aware of concerns, expectations or recommendations of the committee?
YES NO
If yes, explain.
15. Are there any disagreements within the committee or between committee members and the student?
YES NO
16. Date by which next meeting should be held? _____

This form is to be submitted to the Clinical Science Graduate Program's Administrative Office: Galit.mankin@cuanschutz.edu

Thesis Process

1. Form the committee: See above Comprehensive Examination and Thesis Committee Membership.
2. Draft a proposal: See above Comprehensive Examination Process/Content.
3. Conduct the research: The student will work with the Research Mentor and committee members to carry out the proposal. As things develop there will likely be some variation from the proposal, which is okay. Research involves collaboration. Some committees or individual members meet regularly (e.g., weekly) while others meet upon request. However, the student should not spend long periods of time working alone without talking with the Research Mentor – this is a recipe for delay, expenses, and/or failure. PhD Thesis Committees should meet twice a year and MUST meet at least once a year. Failure to meet once a year jeopardizes the status of the student in the program. [Thesis Committee Report](#) is to be submitted to the CLSC Administrative Office following the meetings by the Thesis Committee Chair. Students must register for at least five thesis hours each fall and spring semester extending through the semester of the PhD Thesis Defense Examination. The final grade for the thesis (thesis course credit hours) will be withheld until the thesis is completed and approved by the Graduate School; the student will receive a grade of “In Progress” (IP) until that time.
4. Write the thesis: The thesis must meet the formatting criteria outlined in CU Denver | Anschutz Medical Campus [Graduate School Thesis Specifications](#). The student will draft and circulate thesis elements as progress is made. The Research Mentor should review and work with the student before drafts are provided to Thesis Committee members. The goal is for the student to initiate and receive feedback often and to incorporate all required changes/revisions.

Thesis Chapter Content Requirements

There is some variation in the chapters across theses, but all theses must contain the information listed below and adhere to the Graduate School requirements.

Chapter 1- Introduction: Provide a brief overview, conceptual framework, purpose, and problem statement of the project.

Chapter 2- Background/Review of the Literature: Perform a review of the literature that identifies, reviews, and critically appraises existing knowledge in the identified fields and topics. Gaps in evidence, knowledge and/or practice should be identified that the project addresses.

Chapter 3- Study Hypothesis/es or Research Questions, Methods, and Analysis Plan: Provide the study's overall purpose, research question(s) hypothesis/es, specific aims, and a detailed description of the research methodology and analytical approach used. Where appropriate, detailed lab protocols should be specified (but may be included in an appendix). A power calculation/sample size calculation would normally be included. If qualitative or exploratory work was involved to complement the primary hypothesis-driven study approach, these study aims and methods should be described also. Appendices are helpful to provide copies of instruments, calibration assessments, key diagnostic tests, clinical performance metrics, study data forms, study data definitions, survey instruments, or any other source documents related to the study. The student's thesis COMIRB application and (at a minimum) COMIRB approval documentation (including HIPAA documentation if appropriate) should be included as a separate appendix.

Chapter 4- Study Results: Tables, graphs, and a detailed summary of the study findings should be presented.

Chapter 5- Conclusion/Discussion: The clinical science) provided. The impact on patient care should be discussed. Strengths and limitations of the work are also described. Future research directions and/or research projects planned may be discussed in this chapter or an additional chapter.

Thesis Defense

The PhD Thesis Defense is the official Graduate School final exam for the PhD degree. Graduate School Policies & Procedures apply to PhD Thesis Examinations of all CLSC PhD students.

Due to limited faculty availability during the Summer semester, PhD Defense Examinations will normally be held during Fall and Spring semesters. The PhD Defense Examination can be held in a room on the AMC campus or an AMC-affiliated campus. If there are extraordinary circumstances that do not allow one or more committee members to attend the exam in person, the Committee chair might choose to hold the exam by Zoom or as a hybrid. All members of the committee must be present for the examination. Any costs incurred to bring an outside member to campus or to connect the member by interactive video/telephone are the responsibility of the student. The examination form, indicating the pass, conditional pass, or fail status of the exam, will be initiated by the Graduate School in DocuSign and will be routed for signatures to all committee members.

- The Graduate School requires that students and committee members set aside 3 hours for the PhD Defense Examination.
- CU Denver-Anschutz Medical Campus Educational Support Services (<https://www1.ucdenver.edu/offices/office-of-information-technology/services/academic-technology-and-classroom-support>) is available for reserving a room and providing equipment (e.g., projector).

Please note that the following forms need to be completed and submitted to CLSC Administrative Office.

Allow a minimum of **4 weeks** for the CLSC and the Graduate School to process the required forms:

- 1) [Request for Scheduling Exam form](#) (a Graduate School form SUBMITTED VIA DOCUSIGN)
- 2) [Biosketch](#) (a Graduate School form SUBMITTED VIA DOCUSIGN)
- 3) **Permission to Proceed to Defense form** (a CLSC program form)

- Students are strongly advised to begin the paperwork process **NO LESS THAN 8 WEEKS** before the planned exam date. The student must initiate the “Permission to Proceed to Defense” form (signed/email chain documenting approval by each Committee Member) and circulate the thesis dissertation to the thesis Committee and Galit Mankin at least 8 weeks before the exam.
- Final draft of the thesis dissertation must be distributed to PhD Thesis Committee members at least 4 weeks in advance of the PhD Defense Examination.
- Students who have passed the Defense Examination and whose final copy of their thesis/dissertation has been examined and found to meet scholarly and presentation standards of work in their program must submit the [Thesis Approval Form](#) through DocuSign by the required Graduate School deadline.

Graduate School deadlines for graduation are listed in the [Deadlines and Forms section of the Graduate School website](#). ***It is crucial to check the Graduate School deadlines to ensure a smooth process.*** Graduation packets containing all necessary instructions and paperwork are available from the Graduate School office or website.

Students must be enrolled for at least 5 thesis credits (CLSC 8990) during the semester in which the PhD Thesis Defense is held.

Similar to the Comprehensive Examination, the thesis defense consists of an open-to-the-public oral presentation and question period followed by a closed session with the members of the examination committee. All CLSC Program faculty and students will be invited to attend the oral presentation. The public presentation should last approximately 50 minutes with 20-30 minutes available for open public discussion.

At the thesis defense, a majority vote of the Comprehensive and Thesis Committee members is required. This committee will evaluate both the oral defense and written thesis. Following deliberations, the committee will vote to pass, conditionally pass (with modifications required to the written thesis draft) or fail a student for his/her thesis defense. If changes are required, final review and approval by the committee chair (who will determine that the committee's stipulated modifications have been completed successfully) will be obtained. If a student passes the examination with conditions, those conditions must be satisfied within 60 days for the PhD degree.

A current Format Guide for Theses and Dissertations is available on the [Graduate School website](#). The student's final thesis dissertation **must be uploaded by the published deadline** in order to graduate in that semester. In addition, an electronic copy **MUST** be submitted to the program within 60 days of the thesis defense date.

Clinical Science Program Guidelines for Doctoral Dissertations

Please review and follow the Graduate School Formatting Guidelines
<https://graduateschool.cuanschutz.edu/forms-resources/resources>

Length: Most range between 150-200 pages

General Outline for Doctoral Dissertation

Title

The title must be pertinent to your project, but it should also indicate a sufficient grasp of the subject matter to suggest a focused effort.

Abstract

The abstract is a brief summary of your proposal. It should include the research question to be answered, the proposed methodology and the key results. If more than one hypothesis is to be tested, this should be stated in the abstract. The abstract is typically written last. Abstract uses a structured format Background/ Rationale, Objective/Purpose, Methods, Results, Conclusion and is within the 350 words limit.

Chapter 1 Elements

Introduction

This is a *general* introduction to what the thesis is all about -- it is *not* just a description of the contents of each section. Briefly *summarize* the question (you will be stating the question in detail later), some of the reasons why it is a worthwhile question, and perhaps give an overview of your main results. This is a birds-eye view of the answers to the main questions answered and how this thesis adds value to the known literature.

What is the topic and why is it important? State the problem(s) as simply as you can. Try to step back mentally and take a broader view of the problem. How does it fit into the broader world of your area/discipline?

In the introduction, do not overestimate the reader's familiarity with your topic. You are writing for researchers in the general area, but not all of them need be specialists in your particular topic. The introduction should be interesting. If you bore the reader here, then you are unlikely to revive his/her interest in the methods chapter. For the first paragraph or two, tradition permits prose that is less dry than the scientific norm. Try to make the reader want to read the heavy bundle that has arrived uninvited on his/her desk. Go to the library and read several thesis introductions. Did any make you want to read on? Which ones were boring?

This section might go through several drafts to make it read well and logically, while keeping it short. For this section, it is a good idea to ask someone who is not a specialist to read it and to comment. Is it an adequate introduction? Is it easy to follow? There is an argument for writing this section---or least making a major revision of it---towards the end of the thesis writing. Your introduction should tell where the thesis is going, and this may become clearer during the writing.

Literature Review

The topic of the dissertation must be well grounded in the relevant theoretical and/or empirical literature related to the topic. This means that an extensive literature review needs to be conducted as the basis for the proposal and the dissertation, in defense of the chosen topic. The extent and type of literature search strategy should be discussed with your mentor. You should have a table or algorithm that describes your search strategy and results and approach to finding and reviewing the relevant research. This literature review must also widely and firmly support the research questions, the research design, and any hypotheses that may be tested.

Here you review the state of the literature relevant to your thesis. The idea is to *present* the major ideas right up to, but not including, your own personal brilliant ideas.

This section is organized *by idea*, and not by author or by publication.

Where did the problem come from? What is already known about this problem? What other methods have been tried to solve it?

Ideally, you will already have much of the hard work done, if you have been keeping up with the literature. If you have summarized those papers, then you have some good starting points for the review.

For example, when you start reading about a topic, you should open a spread sheet file, or at least a word processor file, for your literature review. Of course, you want the reference but you also write a summary (anything from a couple of sentences to a couple of pages, depending on the relevance). In other columns of the spread sheet, you can add key words (your own and theirs) and comments about its importance, relevance to you and its quality.

How many papers? How relevant do they have to be before you include them? Well, that is a matter of judgment. You are the world expert on the topic of your thesis: you must demonstrate this.

Problem Statement, Research Questions, Hypotheses

You need to describe the overall or general "problem" to be solved and the specific research questions and/or hypotheses to be answered. In either case, this section has three main parts:

1. a concise statement of the problem, the research questions/hypotheses that your thesis tackles
2. justification, by *direct* reference to the Literature Review chapter, that your question is previously unanswered
3. discussion of why it is worthwhile to answer this question.

Item 2 above is where you *analyze/critically appraise* the information which you presented in the Literature Review. For example, maybe your problem is to "develop an algorithm capable of handling very large scale problems in reasonable time" (you would further describe what you mean by "large scale" and "reasonable time" in the problem statement). Now in your *analysis* of the state of the art you would show how each of the current approaches fails (i.e. can handle only small problems, takes too much time, requires very expensive software). In the last part of this section you would explain why having a large-scale fast algorithm is useful; e.g., by describing applications where it can be used.

You must make it clear in this section how what you want to do differs from what has been done before and

how it builds upon the past work. You should also be able to show that the question you want to answer will further the state of knowledge in your field. Finally, the statement of problem should culminate in the identification of one or more testable hypotheses/research questions that you think will address the statement of problem.

Chapter 2 Elements

Theoretical OR Conceptual Model

The dissertation must have a theoretical framework that is steeped in and builds upon the relevant knowledge base. Theoretical frameworks must contribute to conceptual or theoretical models that can be tested by theoretical or empirical means. The theoretical or conceptual framework should be used to motivate the hypotheses and the empirical specifications that are used to test hypotheses.

Study Design, Methods and Statistical Approach

The topic of the dissertation and the nature of the research question(s) or hypothesis(es) must lead the research design. Some questions/hypotheses may require different research designs. For example, some topics and research questions in the field are best suited to some form of qualitative research while others may be best suited to some form of quantitative research. Some topics may be best suited for some combination of qualitative and quantitative research. It is the nature and research questions that determines the appropriate research design.

Methods of data collection and techniques of analysis must be consistent with the research design. For example, if the research questions call for survey research, then they must conform to the best standards of survey research and subsequent statistical analysis. If the research questions call for an econometric model, then the methods of data collection and analysis must conform to the best standards of econometric modeling. If the research questions call for some form of qualitative research design, then the methods of data collection and analysis must conform to the best standards of a particular form of qualitative research. Data collection and analysis, whether quantitative or qualitative must build a strong bridge between conceptualization and operationalization. Standard Operating Procedures should be mentioned and provided in Appendices. Data collection instruments are also provided in the Appendices.

IRB and IACUC

Include COMIRB and other IRB submitted to and approved along with the protocol number(s) for all research involving human subjects/participants. For live animals, animal tissue or observational animal work, include your IACUC protocol number. Include your IRB and or IACUC submissions in Appendices.

Chapter 3 Elements

Results

Results of the research are presented clearly and address the research questions/ hypotheses. Styles for presenting results in your dissertation may vary. In general, there are 3 options:

1. Results are described through tables, figures, graphs, images and text.
2. Results are written as full manuscripts that are in submission-ready form as they would be

submitted for publications (3 papers).

3. Published, In Press or submitted peer-reviewed manuscripts (3 papers) of your research results are presented in the results section or contained in the dissertation as separate chapters following chapter 2 (theoretical/conceptual framework and methods).

*For students that choose option 3, dissertations that use the style of presenting/inserting three Published, In Press or submitted peer-reviewed manuscripts may choose to have each published paper serve as a separate chapter of the dissertation. The published papers must be re-formatted to follow the Graduate School Format Guide for Theses and Dissertations. (See above at the top of the document). In addition, for multi-authored papers, a description must be included that provides the full reference citation and describes the student's role and contributions. Students who use this approach may have shorter methods and final conclusions and discussion chapters. Students should discuss this option of the published papers for their thesis early in the process (before the Comprehensive Examination). In addition, it is important to consult with your thesis committee regarding expectations for the methods and final conclusions and discussion chapters. For this option, at least one peer-review paper is published or *in press* before the doctoral dissertation defense.*

Last Chapter: Conclusions and Discussion

Generally, three things are covered in the Conclusions and Discussion section/chapter, and each of these usually merits a separate subsection:

1. Conclusions
2. Summary of Contributions and Implications
3. Limitations of Research
4. Future Research

Conclusions are *not* a rambling summary of the thesis: they are *short, concise* statements of the inferences that you have made because of your work. It helps to organize these as short numbered paragraphs, ordered from most to least important. All conclusions should be directly related to the research question stated in the Problem Statement, Research Questions, Hypotheses chapter.

The Summary of Contributions and Implications will be sought and carefully read by the examiners. Here you list the contributions of *new* knowledge that your thesis makes and how it builds on existing literature as well as how your work contradicts the previous work of others. Of course, the thesis itself must substantiate any claims made here. There is often some overlap with the Conclusions, but that's okay. You also want to highlight/discuss the implications of your work. This summary should be organized around your contributions to and implications for research/methods, theories/models/framework, and clinical practice.

The Future Research subsection is included so that researchers picking up this work in future have the benefit of the ideas that you generated while you were working on the project. Future work should relate to the clinical area, methods, and theory.

Dissertations that use the style of presenting three Published, In Press or submitted manuscripts approach has the last chapter presents and discusses linkages (i.e., similarities and differences) between the separate manuscripts that are included in the dissertation, striving as much as possible to present the document as representative of a coherent body of work. The conclusion chapter 'ties' everything together and helps the reader see how the various manuscripts, taken together, make a contribution to the knowledge base regarding the problem. The conclusion chapter should present/discuss research imperatives, or knowledge

gaps, not visible when each manuscript is considered individually and should articulate an agenda for future research on the issues addressed in the dissertation. It should be clear the contributions to the literature made by the student's body of work in terms of research, theory, and practice as well as next steps to be taken or considered to move the state of the evidence forward.

References

The list of references is closely tied to the Literature Review. Most examiners scan your list of references looking for the important works in the field, so make sure they are listed and referred to in the Literature Review. All references given *must* be referred to in the main body of the thesis. Note the difference from a Bibliography, which may include works that are not directly referenced in the thesis.

Appendices

What goes in the appendices? Any material which impedes the smooth development of your presentation, but which is important to your dissertation. Generally, it is material that is of too nitty-gritty a level of detail for inclusion in the main body of the thesis, but which should be available for perusal by the examiners to convince them sufficiently. Examples include data collection instruments, immense tables of data, lengthy statistical formulae or outputs or derivations, etc.

Doctoral Dissertation Checklist

1. The title is clear and concise.
2. Abstract uses a structured format Background/Rationale, Objective/Purpose, Methods, Results, Conclusion and is within word limit.
3. Include COMIRB/IRB protocol number(s) in your Acknowledgements and Methods Chapter/Section. For live animals, animal tissue or observational animal work, include your IACUC protocol number in your Acknowledgements and Methods Chapter/Section.
4. Problem is significant and clearly stated.
5. Review of the literature is efficiently summarized.
6. Limitations of the literature are highlighted and well defined.
7. Important terms are well defined.
8. Hypotheses or research questions are clearly stated and are testable, discoverable, or answerable.
9. Problem statement, hypotheses, or research questions derive from the review of the literature. Rationale for work is clearly articulated.
10. Research design is clearly and comprehensively described, and demonstrated to be related to the research questions, and/or hypotheses.
11. Theoretical or conceptual model/framework used to guide work is well described.
12. Methods of data collection are clearly presented and demonstrated to be related to the research questions/hypotheses.
13. Plans for analysis whether quantitative or qualitative are clearly stated and justified within the context of the research design.
14. Tables and figures are used effectively. Textual explanation of the tables/figures is provided along with the tables and figures.
15. Results of the research are presented clearly and address the research questions/hypotheses.
16. Major findings are discussed clearly and related to previous research.
17. Importance of the findings is explained.
18. The relationship between the research and the findings is demonstrated with tight, logical reasoning.
19. Conclusions are clearly stated.
20. Conclusions are based on the results.
21. Generalizations are confirmed.
22. Limitations and weakness of the study/body of work are discussed.
23. Implications of findings to clinical care, research, methods and theory are discussed.
24. Relationship of the study to previous research is clear.
25. Suggestions for future research are offered regarding clinical care, research, methods and theory.
26. References are included (usually > 75).
27. Data collection instruments are included in Appendices.
28. IRB submission in Appendices
29. Sentence structure, grammar, spelling, and punctuation are correct.
30. Thesis is clearly written.
31. Tone is unbiased and impartial.

*Grossly borrowed with some adaptations from J. E. Mauch and J. W. Birch (1998), *Guide to the Successful Thesis and Dissertation*, Marcel Dekker.

CLSC PhD Program Checklist for Thesis Defense (Expectations of the Chair)

2-4 days prior to the Thesis Defense, ensure that you have received the necessary paperwork:

- Graduate School Defense Information/Instruction sheet
- Graduate School Thesis Defense Confirmation Sheet
- Graduate School Thesis Defense Results Report form
- CLSC Thesis Defense form
- Student's completed coursework and grades record

- Copy of Student's Thesis - should be provided by the student directly to the committee members

- Thesis/Dissertation Approval form – Student is instructed to complete the form on-line (from the [GS website](#)). The handling of this form is the responsibility of the student.

If you have not received these documents, please contact Galit Mankin at galit.mankin@cuanschutz.edu

Day of the Thesis Defense

1. Introduce the candidate student and the title of his/her thesis.

3. Explain the structure of the Defense:
 - Open forum session will include PhD candidate's presentation (approx. 50-55 mins) followed by questioning (approx. 30 mins)
 - Closed session follows (only committee members and candidate)

4. Following the presentation and questioning, thank and dismiss attendees and begin the closed session (ONLY committee members and the candidate student).

5. Ask the candidate to step outside the room (5-10mins), while the examination committee discusses the following points:
 - Ensure all members have read the Thesis
 - Determine order and format of questioning
 - Determine if there are major concerns of the candidate

6. Call candidate back into the examination room to begin closed session questioning.

7. Once questioning is completed, ask student to step outside the room (10-15 mins) until asked to return.

8. Chair the Committee member executive session
 - a. Determine examination grade: pass, pass with conditions, or fail

- If pass with conditions, the conditions need to be clearly documented and a date by which the conditions must be met identified on paper (conditions must be satisfied within 60 days), which is submitted to the CLSC Program Administrator, Galit Mankin.
 - b. Committee members sign Graduate School Thesis Defense Report form
 - c. Complete the CLSC Thesis Form with committee member input
9. Call the candidate back into the room to join the committee and share the results of the examination. If there are conditions, explain the steps that the student must complete and the timeframe for completion
10. Remind the student that the CTSA grant must be cited in the finalized version of the student's Thesis. The following language should be used when citing the grant:
"This project/publication is supported in part by NIH/NCATS Colorado CTSI Grant Number UL1 TR004399. Contents are the authors' sole responsibility and do not necessarily represent official NIH views."

In addition, publications should be registered with PubMed Central.

11. **Completed Graduate School forms will be submitted via DocuSign. CLSC forms should be emailed to: Galit.mankin@cuanschutz.edu**

AT NO TIME IS THE STUDENT TO HAVE POSSESSION OF ANY OF THE GRADUATE SCHOOL FORMS

UNIVERSITY OF COLORADO DENVER
PhD PROGRAM, CLINICAL SCIENCE GRADUATE PROGRAM

Permission to Proceed to Defense

The following members of the Dissertation Committee have approved the thesis submitted

by _____ for the Thesis Defense Examination.
Doctoral Candidate

Dissertation Chairperson

Print name

Signature Date

Research Mentor

Print name

Signature Date

Committee Member

Print name

Signature Date

Committee Member

Print name

Signature Date

Committee Member

Print name

Signature Date

This form is to be submitted to the Clinical Science Graduate Program's Administrative Office: Galit.mankin@cuanschutz.edu

CLSC PhD Dissertation\Thesis Defense Report

Student: _____ **Date of Exam:** _____

Chair: _____ **Research Mentor:** _____

Members in Attendance: _____

Rate the student’s ability regarding the CLSC core competencies taking into account the written thesis/dissertation, the oral presentation and response to questioning:

1. Applies legal, ethical and regulatory issues related to clinical research and principles for Responsible Conduct of Research.

Exceeds expectations Meets expectations Below expectations
2. Critically appraises existing literature and sources of information.

Exceeds expectations Meets expectations Below expectations
3. Accurately select, use and interpret commonly used statistics.

Exceeds expectations Meets expectations Below expectations
4. Apply and use appropriate study designs and methods to address research questions/hypotheses.

Exceeds expectations Meets expectations Below expectations
5. Identify and measure clinically relevant and meaningful outcomes.

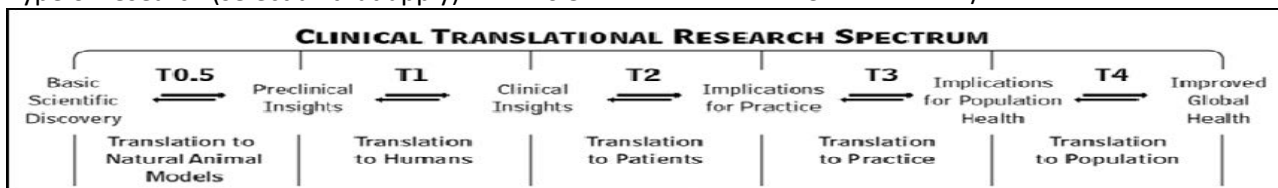
Exceeds expectations Meets expectations Below expectations
6. Design and conduct clinically and patient oriented research studies.

Exceeds expectations Meets expectations Below expectations
7. Demonstrate effective communication and leadership skills.

Exceeds expectations Meets expectations Below expectations
8. Participate in interdisciplinary collaboration.

Exceeds expectations Meets expectations Below expectations

Type of research (select all that apply) T0.5 T1 T2 T3 T4 N/A



Comments:

Academic Advisement

Advisor Responsibilities & Program Plans

This section describes important information that details a faculty member's responsibilities as an Academic Advisor. It defines the Academic Advisor's role and the use of the MSCS and PhD track specific Program Plan as a roadmap for charting the student's progress. As well, steps needed to prepare for and details regarding the PhD Preliminary Exam are addressed.

Meeting with an Academic Advisor once a year to plan and discuss a student's progress through the program is crucial to a successful academic experience and is thus **mandatory**. The Academic Advisor will assist the student with identifying and scheduling required coursework, identifying areas of research and collaborations, and selecting committee members for the student's thesis and comprehensive examination. At the time of the student's admission to the program, an Academic Advisor will be identified.

1. **The Academic Advisor** will assist the student in selecting and sequencing courses and planning other activities to progress through the program. The projected courses for meeting the degree requirements, plans for additional course requirements, and a projected date for completion of the Preliminary and Comprehensive Examinations and the Thesis Defense will be recorded on the Program Plan Form (see CLSC track specific PhD Program Plan Forms). Students should visit with their Academic Advisor regularly (at least once per year) for discussions of research ideas, grant and course opportunities, and other advisement.

New students should familiarize themselves with the curriculum requirements prior to meeting with their Academic Advisor. In conjunction with their Academic Advisor, all new students should develop a proposed plan of study. Copies of the track-specific planning forms are provided (See below). These plans are maintained electronically and accessed via a secure link provided by the program administrator.

2. It is expected that every Clinical Science Graduate Program student, for every year that s/he is in the program, will have a program plan form completed or updated, approved by the Academic Advisor, and submitted electronically the **first week of September**. You may receive notices from your Academic Advisor of specific requirements and timelines for this process. This information is key for planning future course offerings and insuring completion of the program in a reasonable period of time. **Updated program plans are the responsibility of the student.**
3. Program Plans for both the MSCS and the PhD degrees are located on the CLSC website at <https://cctsi.cuanschutz.edu/training/clsc>

The PhD Preliminary Examination

At the end of the first year of didactic course work, students will take a written Preliminary Exam to assess their comprehension of the educational concepts covered in the coursework. The Graduate School requires a Preliminary Examination to ensure that students are qualified for doctoral study. The purpose of the Preliminary Examination is to determine potential for successful completion of the program and to use the results in subsequent academic advising. The Preliminary Examination covers the core content areas of:

- Biostatistics
- Ethics
- Research Methods

The Preliminary Examination is held every year over a three-day period between the end of the spring and beginning of the summer terms (typically late May or early June). You will be asked to indicate your intent to take the examination about 3 months prior to the date of the Preliminary Examination. Students typically take the Preliminary Examination after completing the first year of required core courses.

Course Requirements for Taking the Preliminary Exam

CLSC Students:

The following courses must be completed prior to taking the Preliminary Examination:

Biostatistics: BIOS 6601 and BIOS 6602

Ethics: CLSC 7150

Methods: EPID 6630 plus one of the following

- CLSC 6270
- CLSC 7202
- EPID 6626
- BIOS 6648
- EPID 6631
- EPID 6623

Exam Format

The Preliminary Examination is **OPEN BOOK and completed off campus**. Students should feel free to use textbooks, reference materials, class notes, peer-reviewed publications, and credible websites.

On the morning of the exam, students will be required to attend a Zoom orientation to review the instructions for the exam and receive the exam questions. Honor codes must be signed prior to attending the orientation.

Honor Code and Grading Policy

All doctoral students taking the Preliminary Examination will be requested to sign the following statement for their work:

“As noted in the exam instructions, I have abided by the CU Denver | Anschutz Medical Campus Graduate School honor system whereby I have not used any reference material, computer files, or worked with any person in a manner that would unfairly advantage my performance on this Ph.D. Program in Clinical Science Preliminary Examination. Moreover, I will not share a copy of this Preliminary Exam (either the questions or my responses) with anyone without written pre-authorization from the Ph.D. Program in Clinical Science administration.”

Faculty members will be using a grading rubric for scoring each exam section. The pass/fail designation you receive will reflect faculty scores submitted for: 1) Research Methods, 2) Ethics, and 3) Biostatistics. **In order to pass the Preliminary Exam, you will need to receive a passing designation in ALL three sections. If you fail any one of the sections, you will need to talk with the Program Director and your Academic Advisor to identify the next steps. If you fail any two or all three sections, you will be administratively withdrawn from the Clinical Science graduate program.** Possible next steps include re-taking the failed section of the exam within a designated time period, completing additional courses before retaking the examination, or withdrawal from the program.

The scoring is as follows:

100 to 80 score = Pass

Less than 80 = Fail

Historically, the most **common error** made is **not reading the instructions carefully** and/or **not answering ALL components** of each question. This exam process is the equivalent to writing academic papers. Ensure your thoughts are well thought out, articulated, and supported by references.

Skipping a question or a section of a question is not a wise choice. It is better to provide your best answer possible than no answer at all. You should respond in full sentences – not outline format. The use of tables and figures to illustrate points is encouraged. Overall writing style and correct use of spelling and grammar are taken into consideration during scoring. Organizing responses according to the sections of the examination questions and sub-questions (with headers) is a useful approach (and makes the exam easier to grade).

Criteria Used for Grading

ANALYSIS

- Identify and organize elements in ways that demonstrates a logical coherent response
- Explain the central issues, problems and “puzzles” with respect to the topic under discussion
- Identify and explain unstated assumptions, logical fallacies, and extraneous aspects of an issue, problem or position
- Project the implications of an issue, problem, or position
- Explain and compare alternative views

SYNTHESIS

- Present succinct summaries of ideas that reflect comprehension of the whole while building a deliberate message concerning the topic under discussion
- Convey abstract relationships that form conceptual wholes
- Integrate a variety of sources to form a foundation for the student’s unique ideas

CRITICAL SCHOLARLY ABILITIES

- Demonstrate critical self-awareness and reflective thinking
- Provide succinct, complete and direct responses to the issues
- Demonstrate a breadth of knowledge of the topic under discussion that is consistent with the breadth covered in the entry doctoral level courses
- Interpret existing literature without misrepresentation
- Demonstrate the ability to defend a logical position without prejudice

Transfer of Credits

Pending CLSC Program and Graduate School approval, transfer of up to 12 semester credits for the MSCS and 30 semester credits for the PhD may be coordinated.

Transfer credit is defined as any credit earned at another accredited institution. The maximum amount of transfer work that may be applied toward a graduate degree at CU | Anschutz Medical Campus is 12 semester hours for M.S. and 30 semester hours for Ph.D. degree programs. The Graduate School accepts transfer credits only after approval of those transfer credits by the student's Program Director and the Dean of the Graduate School.

All courses accepted for transfer must:

- Be graduate level (5000 or above);
- Have a "letter" grade (courses in which the grading is either satisfactory/unsatisfactory or pass/fail are not accepted);
- Have a grade of "B" or better
- Not have been applied toward an undergraduate degree or another graduate degree on the same level (e.g., Ph.D. to Ph.D.);
- Be validated if not taken within seven (7) years of the PhD comprehensive exam or the Master's final exam, if applicable, to ensure that the course content is still considered current; and
- Be transferred prior to the semester in which the PhD comprehensive or Master's final examination, if applicable, is taken.

Credit cannot be transferred until the student has established a satisfactory record of at least one term of enrollment at the CU | Anschutz Medical Campus (CU|AMC) and earned a minimum 3.00 GPA. Transferred courses do not reduce the residency requirement but may reduce the amount of work required for the degree.

Transfer of Credits for Core CLSC Courses: Students must contact the current course instructor for each course that they are substituting (or attempting to transfer in) to determine that the course is comparable. This will involve submitting the course syllabus to the course instructor for review to assist with determining comparability. Students must copy/forward emails from the current course instructors identifying whether or not the course being transferred is comparable to the core CLSC course to Ms. Galit Mankin (galit.mankin@cuanschutz.edu).

Transfer of credits for elective courses into the CLSC program: Students will submit a copy of the course syllabus to their Academic Advisor for each course that they are seeking to transfer into the program and

apply towards the degree. The Academic Advisor will review the materials in light of the focus of the student's program of research and level of academic rigor. Ms. Galit Mankin (galit.mankin@cuanschutz.edu) needs to be copied on or forwarded emails detailing the decision to recommend or not the transfer of credit hours.

Students wishing to transfer credits for courses taken over 7 years prior to completing the comprehensive exam need to be validated. The validation process is similar to the transfer of core credit hours. Students need to contact the course instructor for each of the courses taken more than 7 years ago to determine whether or not the course content has changed substantially since the student completed the course. Emails of the instructor's assessment must be forwarded or copied to Ms. Galit Mankin (galit.mankin@cuanschutz.edu).

The onus for contacting instructors, collecting course syllabus/syllabi for review, and the coordination of the review and communication process, as well as paperwork is on the student.

Finally, a Graduate School form detailing the recommended courses for transfer is required to be signed by the program and submitted to the Graduate School. The Transfer of Credit form is not required for non-degree credit transfers as these courses appear on the University of Colorado transcripts. Approval of the courses by the program and the Graduate School on the Application for Candidacy will constitute approval of the transfer of courses toward the degree.

It is not always a good idea to transfer in credit hours for CLSC core courses, especially if they were completed several years ago. It is often wiser to repeat similar coursework so that you are well prepared for your preliminary and comprehensive examinations.

General Graduate School Related Information

I.D. Badge and Parking Information

New students will be contacted by email to receive a badge. The signing authority for the Graduate School will let you know when to contact the Badge Office at the Anschutz Medical Campus (AMC). A driver's license, state ID, or passport is necessary to have your photo taken and to receive your badge. The Badge Office is located in Building 500, Room N1207 behind the café and on the same floor as the bookstore. The Badge Office can be reached at 303-724-0399 and at IDAccessBadges@cuanschutz.edu.

Pay parking is available at the Anschutz Medical Campus. For maps, permits and rates, go to <https://www.cuanschutz.edu/offices/facilities-management/parking-transportation-maps/parking>

Guidelines for Studying

A good rule of thumb to remember is that for each credit hour of a course, you will spend about double to triple that number of hours each week doing work for the class. Thus, you will spend about 6-12 hours each week, out of class, on average, for a 3-credit-hour class. Students with less experience in the subject matter of a particular unit or course should anticipate a greater time commitment.

The Strauss Health Sciences Library at Anschutz Medical Campus

As a student in the CLSC Program, you have access to the outstanding state-of-the-art Anschutz Medical Campus' Health Sciences Library, which houses more than 2000 online journals, many information databases, computer workstations, group study rooms, and online text references. This is a valuable resource that is available to you for your professional use throughout your enrollment in the CLSC Program. We encourage you to read the materials from the Health Science Library and to explore the assistance available on the home page at: (<https://library.cuanschutz.edu/>). The "Online Information Rack" from the library also provides helpful information about the library and its online services. If you have questions about using the library, the librarians can be reached at 303-724-2152.

Scholarship Information and Financial Aid

No scholarship opportunities specifically designed to support students of the CLSC Program exist at this time. Financial aid information is available from the campus financial aid office: <https://www.cuanschutz.edu/student-finances/financial-aid>

Honor Code

Students are expected to review and follow the Graduate School Honor Code Guidelines and Academic Integrity Expectations: <https://graduateschool.cuanschutz.edu/forms-resources/resources>

Clinical Science Program Frequently Asked Questions

Where is the Graduate School located?

The Graduate School is located on the Anschutz Medical Campus in Aurora, CO at 13001 E. 17th Place in Building 500, Room W5107.

Where is the Clinical Science Program Administrative Office located?

The Clinical Science Program Administrative office is located on the Anschutz Medical Campus in Aurora, CO at 1890 N. Revere Ct in the Anschutz Health Sciences Building, Room 6149

I am interested in the Clinical Science Program and would like to know more about the admissions requirements. Who do I contact?

Please contact Galit Mankin galit.mankin@cuanschutz.edu for more information.

What forms do I need to complete for exams/graduation?

Forms, deadlines and instructions for exams/thesis defense are located on the [Graduate School website](#). See the Master's Resources page if you are a master's student. PhD students should refer to the PhD Resources page.

How can I verify that members of my committee have current Graduate Faculty appointments?

See the [Graduate Faculty Directory](#) for a list of faculty with current or expired appointments. New appointment paperwork is received on a regular basis from the programs. If a faculty member's appointment is showing as expired or they are not currently listed on the website, contact Galit Mankin, CLSC Program Administrator, to see if appointment paperwork has already been forwarded to the Graduate School or to request new appointment paperwork be completed.

What is the maximum number of credits I can transfer?

Master's degree students can transfer in 12 semester hours. Transfer credit is defined as any credit earned at another accredited institution. PhD degree students can transfer in 30 semester hours. Credits must meet the transfer credit requirements and be approved for transfer by the program and the assistant dean.

What opportunities are there for loan repayment for clinical researchers?

The NIH Loan Repayment Program (LRP) for Clinical Research is designed to recruit and retain highly qualified health professionals as clinical investigators, repaying lenders directly for the existing principal, interest, and related expenses of qualified government and commercial education loans obtained for undergraduate, graduate, and health professional school expenses. For more information, visit the LRP website.

Is financial support available for international students?

No student financial support [for either educational costs (e.g., tuition) and/or stipend support] is available through the Clinical Science Program. As part of the application materials required, all international applicants must document that adequate financial support will be available for the entire period of study. For additional information, please review the International Student Requirements for Graduate School admissions.

Who might I contact for a CLSC course billing-related question?

For billing questions, contact the UCD Anschutz Medical Campus Bursar's Office:

<https://www.cuanschutz.edu/student-finances/tuition-fees>