

# Clinical Translational Science

M.S. in Clinical Translational Science (<https://catalog.und.edu/graduateacademicinformation/departmentalcoursesprograms/clinicaltranslationalscience/cts-ms/>)

Ph.D. in Clinical Translational Science (<https://catalog.und.edu/graduateacademicinformation/departmentalcoursesprograms/clinicaltranslationalscience/cts-phd/>)

## **PATH 500. Biochemistry and Cell Biology. 6 Credits.**

Knowledge in biochemistry and cell biology form the core concepts that underlay all study and research endeavors in the clinical sciences. Since the basics in these two disciplines are paramount to a successful graduate studies program, the course is designed to emphasize proficiency in basic concepts. The course is highly didactic and makes no assumptions of previous educational experiences of the incoming graduate student. This is deemed essential for a course that forms the stem in a multi-disciplinary graduate program. Thus the course is focused on basic textbook-based foundational knowledge and problem solving skills. The course begins by relating basic general and organic chemistry to biochemical systems, followed by addressing actual biochemical, synthetic and degradation reactions, and expanding this to the macromolecular and cell biological components of the process. Thus the study is first presented with the biochemical and molecular aspects of cellular processes and then uses this to build a more comprehensive picture of how molecular structures come together to form structures visible by various forms of microscopy. F.

## **PATH 505. Seminar in Clinical and Translational Science. 1 Credit.**

All students and faculty within the program will participate in longitudinal seminars discussing their research area and interrelationships with complimentary disciplines. This may be in form of discussions, "chalk talks" of current efforts, literature or topic review. This will give students and faculty interdisciplinary and collaborative exposure to broad areas of inquiry and foster creativity and collaboration. This course will be taken annually by all students in the CTS program. Repeatable to 11.00 credits. S/U grading. F,S.

## **PATH 520. Biochemistry and Cell Biology II. 4 Credits.**

Knowledge in biochemistry and cell biology form the core concepts that underlay all study and research endeavors in the clinical sciences. Since the basics in these two disciplines are paramount to a successful graduate studies program, the course is designed to emphasize proficiency in basic concepts. The course is highly didactic and makes no assumptions of previous educational experiences of the incoming graduate student. This is deemed essential for a course that forms the initial foundation in a multi-disciplinary graduate program. Thus, the course is focused on basic textbook-based foundational knowledge and problem-solving skills. The first semester course, PATH 500 covers biochemical concepts of proteins and extends through molecular biology, covering topics in DNA, genomes, gene expression, DNA damage, protein synthesis, and cell cycle control. Prerequisite: PATH 500. S.

## **PATH 575. Molecular and Pathological Basis of Human Disease. 4 Credits.**

Pathogenesis of Human Disease is an advanced graduate course that is based on lectures and discussions with a strong element of self-study through the use of extensive reading materials as well as lecture videos. This course is intended to cover aspects of the fundamental molecular, cellular and pathological mechanisms underlying various human diseases while the courses offered in the various CTS 590 special topics course will focus on diseases of specific organ systems. By the end of this course the student will have demonstrated a significant knowledge base of the molecular and pathological basis of human disease that is applicable to clinical and translational research. The student will also have sufficient knowledge of pathology to be capable of teaching this material to medical, professional, and graduate students. This course is open to all graduate students in the School of Medicine and Health Sciences as well as graduate students in biological sciences enrolled at the University of North Dakota who meet the prerequisites. Prerequisite: MBIO 509, PATH 500, and ANAT 517. F.

## **PATH 590. Readings. 1-3 Credits.**

The primary goal of this course is for students to learn critical thinking and data analysis of the literature in their field of research study. Course sections will range from general training to journal clubs with an advanced topic focus. 1-3 credits There are two modes of this course 1)CTS 590 Readings: Scientific Reading This course is designed to promote critical reading of the literature. The primary goal is to teach students the process by which scientists identify problems, formulate testable hypotheses, collect data through experiments, and eventually establish new models describing biological processes. 1 credit 2)CTS 590 Readings: Journal Club The goal of the journal club is to familiarize students with the most up-to-date scientific literature and to develop the tools necessary to be a life-long learner. Students led by a faculty facilitator will discuss experimental methods and observations and this will provide graduate students the opportunity to develop oral skills. The course will also facilitate scientific communication between various clinical disciplines. The prerequisite for this course is CTS590 Readings: Scientific Reading; or equivalent with permission from course director. Repeatable to 3.00 credits. S/U grading. F,S.

## **PATH 591. Special Topics. 1-12 Credits.**

The course sections offered under Special Topics are designed to bring a wide range of advanced topic learning to students within the Clinical and Translational Science Program and are where the sub-program specialization courses will be focused. Most of these topics are advanced focus areas of pathology such as in breast or urologic disease, advanced topics in toxicology such as metals, or topics in bioinformatics such as human population genetics. Scientific writing is another special topic that is germane to all in the CTS program. Topic areas will be advertised the semester previous to being offered. Prerequisite: PATH 500 and PATH 575. Repeatable to 8.00 credits. F,S.

## **PATH 593. Research. 1-6 Credits.**

Research experience is offered in the specialty fields of the faculty within the Clinical and Translational Science Program and involves an intensive research experience on a variety of unique research problems utilizing modern methods and tools. Credits arranged (generally 1-6 credits per semester). Repeatable. F,S,SS.

## **PATH 620. Urologic Function and Disease. 2 Credits.**

This course focuses on the organs of the urinary tract especially the bladder. The focus is on bladder cancer, but all bladder disorders are covered. The course also includes the prostate, testes, and seminal glands. General anatomy, histology, physiological function and the various diseases of these organs is presented. Prerequisite: PATH 575. S.

## **PATH 996. Continuing Enrollment. 1-12 Credits.**

This course is designed to allow the student to continue working on their thesis or dissertation when all the Research Credits have been used up. Repeatable to 12.00 credits. S/U grading. F,S,SS.

## **PATH 998. Thesis. 1-9 Credits.**

The course is to enable the student time to complete the thesis or dissertation in the event that that student has already used up all the required courses to the maximum extent before graduating. Repeatable to 9.00 credits. S/U grading. F,S,SS.

## **PATH 999. Dissertation. 1-15 Credits.**

This required course is taken in the students last semester(s) as they prepare their doctoral dissertation. Progress will be overseen by the student's faculty advisor in the Clinical and Translational Program. Repeatable to 15.00 credits. F,S,SS.