Clinical & Translational Science Institute
of Southeast Wisconsin

MEDICAL COLLEGE OF WISCONSIN

CTS Academic Bulletin

Academic Year 2020-2021

* indicates core course in the MS program

Core Courses

***20101 Introduction to Clinical and Translational Science** *3 credit hours*. **Fall**
The course will provide the student with a broad understanding of clinical translational science. By the end of the course the student will be able to understand key concepts underlying translational research including methods used to move basic science discoveries to clinical practice and enhancing the health of the public through the provision of evidence-based care. Coursework will include weekly reading of peer reviewed manuscripts, assignments, and a final project. Weekly classes will include discussion of reading and assignments are designed to allow practice of critically reading and planning translational science projects. The course will meet once per week for a total of 18 weeks.

***20220 Clinical Statistics I**. *3 credit hours*. **Fall**
This is an introductory course in evidence discovery that demonstrates the concepts and application of statistical techniques/tools, given the role of statistics as an information science. The course is intended to inform and provide quantitative skills for graduate students interested in undertaking research in clinical medicine, epidemiology, public health, translational and biomedical sciences. This course emphasizes the basic dogma of statistics namely the central tendency theorem as well as sampling as the core of statistics. With the characterization of statistics as descriptive and inferential, the descriptive arm of statistics is stressed in this course namely summary statistics. Basic probability concepts are covered to stress the importance of sampling prior to reliable inference from the sample data. Sample estimation of the population and the precision (confidence interval) are described as well as the hypothesis testing notion in inferential statistics. The parametric and non-parametric methods are introduced with the intent to describe the methods as applicable to continuous (ratio, interval, cardinal) and discrete (categorical binary, dichotomous) data.

***20151 Introduction to Epidemiology** *3 credit hours*. **Fall**
This course is designed to provide epidemiology research methodologies to clinical practical applications. Topics include diagnostic testing, meta-analysis, qualitative research, data collection and survey design. Students will learn to apply research methodologies to large data sets or populations, while understanding the reliability, and validity of their methods.

***10226 Regulatory Issues in Human Subject Research Protections** *3 credit hours*. **Spring**
There is no question that the fruits of research have fueled medical progress. Yet, the history of research involving human subjects is not unblemished. Federal regulations, based on ethical principles set forth in the Belmont Report, now govern much of the research undertaken in the United States. In this course, we will explore the history and substance of research regulations in the United States, the application of the regulations to specific research issues, and situations where the regulations do not provide clear guidance.

***20160 Foundations in Health Services Research**. *3 credit hours*. **Spring**
The course will provide the student with a broad understanding of health services research design and methodology, as well as provide the student with the opportunity to engage in a mentored, individualized, in-depth study experience. By the end of the course the student will be able to understand key theories that serve as the foundation of health services research and understand the process of developing a research idea and translating it into an R-series level NIH proposal. Coursework will include weekly reading of peer-reviewed manuscripts, one introductory textbook on health services research, and one introductory textbook on designing clinical research. Weekly classes will include discussion of reading and assignments are designed to allow practice of critically reading and planning health services research projects.

***20302 Research Seminar**. *3 credit hours*. **Spring**
The goal of this course is to provide Master's students protected time to develop their thesis questions and to provide students with an opportunity to receive feedback on their thesis project at regular intervals in a structured format. By the end of the course students will be able to develop a research question, conduct a comprehensive literature review, select appropriate methods to answer the research question, and present their findings in written and oral formats. This course will also teach students how to provide constructive criticism and to effectively evaluate the work of their peers. Coursework will include developing a systematic review, providing constructive critiques of the work of other students in the seminar, developing a PowerPoint presentation, and developing a scientific poster presentation. All MS students will be required to take the course. First year Master's students will develop their research question, complete a through literature review of the topic of interest in the form of a systematic review, and begin to identify methods that will be used to answer their research question. While second year students will conduct the necessary steps to answer their research question, write their results and conclusions, and prepare an oral presentation of their thesis work to be presented before their colleagues at the end of the semester and during MCW student research day. All students will be expected to provide feedback to their classmates and will receive feedback from their peers and the course director. Each class period four students will present some aspect of their project and will receive feedback from peers and the course director. The course will meet once per week for a total of 18 weeks.

***20299 – Master's Thesis** *6-9 credit hours*. **Fall, Spring, Summer**
6-9 Master's Thesis credits are required for program completion. All students will complete a Master's thesis describing a translational or clinical research project in which he or she participated in both the design and execution. The Committee will be comprised of a thesis mentor and two additional faculty members (one of whom is a biostatistician). The Committee will approve the project in advance, will provide guidance and supervision of the project, and will critique and, if appropriate, approve the thesis.

Suggested Electives

20262 Introduction to Health Economics. *3 credit hours*. **Fall**
The course is an introduction to health economics both theoretical and applied. By the end of the course the student will be able to understand the basics of health economics including the principles and research methodology used to apply economic concepts to the health field. Coursework will include weekly reading of peer-reviewed manuscripts and one introductory textbooks on health care economics. Weekly classes will include discussion of reading and course projects are designed to allow practice of critically reading and conducting health economic research.
Emphasis Track(s) suggested for: Population Science, Health Systems Science

20120 Introduction to Health Disparities Research *3 credit hours*. **Fall**
The course is an introduction to health disparities. By the end of the course, the student will be able to understand the relationship between inequities in social determinants of health and health outcomes in various populations. Coursework will include weekly readings from one textbook on multicultural medicine and health disparities as well as peer-reviewed articles to demonstrate the concepts in real-world experiences. Weekly classes will include discussion of the readings. Course projects will be assigned and are designed to allow practice of critically reading and appraising the literature related to applied health disparities research and also to understand the theoretical bases for health equity research. The course will meet once per week for a total of 18 weeks.
Emphasis Track(s) suggested for: Community Based Science

20241 Translational Genomics. *3 credit hours*. **Spring**
The primary goal of this course is to teach students how to develop a research program to ask relevant genetic questions in the clinical setting utilizing the molecular genetics toolbox. To this end, students will be provided with background in molecular genetics strategies and study designs as well as an understanding of common genetics questions emanating from the clinic so that they will be better able to make connections between bench and bedside. In addition, they will be challenged to think creatively and through a translational focus during course-long case studies and group projects.
Emphasis Track(s) suggested for: Translational Science

20260 Introduction to Dissemination and Implementation Science. *3 credit hours*. **Spring**
The course is an introduction to dissemination and implementation and science research methods both theoretical and applied. By the end of the course the student will be able to understand the science of dissemination and implementation, and applied methods for dissemination and implementation. Coursework will include weekly reading of peer-reviewed manuscripts and one introductory textbooks on dissemination and implementation science. Weekly classes will include discussion of reading and course projects are designed to allow practice of critically reading and planning implementation research.
Emphasis Track(s) suggested for: Health Systems Science, Community Based Science

20265 Clinical Quality Improvement *3 credit hours*. **Spring**
The course will address core content in process improvement as well as provide active learning in the implementation of a quality improvement project. Specific content will include:
- Understanding a problem and framing a question
- Utilization of teams
- Process improvement approaches including workouts, rapid cycle improvement, Lean, Six σ
- Use of tools such as process mapping, root cause analysis, driver diagrams, A3's
- Understanding metrics and measurement
- Approaches to change management - Kotter, ADKAR

Emphasis Track(s) suggested for: Health Systems Science

Additional Electives

19225 Introduction to Statistics using Stata. *3 credit hours*. **Fall**
This course will provide an introduction to the foundations of using Stata for data analysis through an applied format. Statistical analyses covered will include descriptive statistics, univariate and bivariate analysis, and basic regression. Students will become acquainted with the basics of cleaning and organizing datasets, completing descriptive analysis, coding and interpreting results of univariate and bivariate analyses, as well as, linear and logistic regression. By the end of the course students will be able to analyze data independently and interpret results. Coursework will include weekly reading, in-class Stata analyses, and completion of a focused course project developed throughout the semester. Course projects will allow students to develop their skill set and experience independently coding in Stata to complete statistical analyses and interpreting results within the context of strengths and limitations of their data. The final project will also incorporate both literature review and developing a research question that can be analyzed using existing data
Department: Public and Community Health
Emphasis Track(s) suggested for: Population Science, Health Systems Science

19226 Regression Analysis using Stata. *3 credit hours*. **Spring**
This course will provide an introduction to the foundations regression through hands-on training in advanced regression techniques using Stata. Statistical analyses covered will include multiple linear regression, analysis of variance, logistic, polytomous, and ordinal logistic regression, and mixed models. Students will become acquainted with the basics of coding and interpreting results of regression analyses, as well as, diagnostics to confirm correct model fit. By the end of the course students will be able to conduct regression analyses independently and interpret results. Coursework will include weekly reading, in-class Stata analyses, and completion of a focused course project developed throughout the semester. Course projects will allow students to develop their skill set independently coding in Stata to complete statistical analyses and interpreting results within the context of strengths and limitations of each test. The final project will also incorporate both literature review and developing a research question that can be analyzed using existing data.
Prerequisites: Introduction to Statistics using Stata (19225)
Department: Public and Community Health
Emphasis Track(s) suggested for: Population Science, Health Systems Science

19210 Health and Medical Geography. *3 credit hours*. **Fall**
Geography and physical and social environments have important implications for human health and health care. This course will explore the intersections among geography, environments and public health, with an emphasis on geographical analysis approaches for health data, to address two key questions: (1) How can concepts from geography help us to better understand health and well-being? (2) How can geographic tools, such as Geographic Information Systems (GIS) be used to address pressing questions in health and medical research?
Department: Public and Community Health
Emphasis Track(s) suggested for: Population Science, Community Based Science

19230 Qualitative and Mixed Methods. *3 credit hours*. **Fall**
Qualitative and mixed methods can be highly useful in the conduct of community-based population health research. This course will provide introductory classroom and field-based learning experience in qualitative and mixed methods research. Students will receive training in the design, implementation, analysis, and synthesis or qualitative and mixed methods. Emphasis will be given to the appropriate uses of commonly-used methods in community-based health research. Course participation will provide students with the basic foundation necessary to develop a research study using qualitative or mixed method designs. This course is for graduate students in the doctoral degree program for Public and Community Health.
Department: Public and Community Health
Emphasis Track(s) suggested for: Community Based Science

18258 Advanced Epidemiological Methods. *3 credit hours*. **Spring (even years)**
Builds on introductory epidemiology courses by providing a more in-depth understanding of fundamental epidemiologic principles presented in introductory epidemiologic courses such as study design and bias. This course also emphasizes more advanced concepts needed in establishing causal relationships from observational data. It is particularly relevant to students who intend to conduct studies investigating the occurrence and determinants of diseases or who wish to be sophisticated consumers or critics of epidemiologic research conducted by others. The course emphasizes practical application of Epidemiologic Methods to real world problems.
Prerequisites: Principles of Epidemiology (18201) or equivalent
Department: Public Health
Emphasis Track(s) suggested for: Population Science, Health Systems Science

14200 Survey of Biomedical Engineering *3 credit hours*. **Fall**
This course is a review of biomedical technologies employed in medicine for the diagnosis, treatment and prevention of chronic and acute diseases. The goal of the course is to familiarize students with the operating principles, economic aspects of technology use in clinical practice. Over the duration of the course each student will prepare three reports and one lecture on the use of technology in medicine.
Department: Healthcare Technologies Management
Emphasis Track(s) suggested for: Translational Science