Graduate Interdisciplinary Specialization in Biomedical Clinical and Translational Science
Curriculum

Curriculum Requirements

- All students enrolled in the GISBCTS must take PH 795: Topics in Clinical and Translational Science. This is a 2 credit hour course offered each quarter by the College of Public Health. It is recommended, but not required, that this course be taken first.
- Some of the participating colleges have internal procedures that are required to enroll in their courses. Please see each course for specific information about enrolling.
- Students must take at least one course from each of the Core Competency Clusters. The Competency Clusters are based on the NCRR Core Competencies for Clinical and Translational Research. There are a total of 14 competencies that have been grouped together to form four clusters.

Core Competencies

I. Identify major clinical/public health problems and relevant translational research questions.
II. Identify/interpret/critique literature/assess state of knowledge regarding problem.
III. Design and write protocol for clinical/translational research study for peer review (Study Design)
IV. Study Methods/Design/Implementation (Research Implementation)
V. Laboratory, Clinical, and Population Research Methods (Sources of Error)
VI. Statistical Methods and Analysis
VII. Informatics
VIII. Conduct Ethically Responsible Research
IX. Scientific Communication Skills and Dissemination (Scientific Communication)
X. Population Diversity and Cultural Competency (Cultural Diversity)
XI. Translational Teamwork
XII. Leadership and Professionalism
XIII. Cross-disciplinary Training and Mentoring
XIV. Community Engagement
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AM 895: PhD Research Seminar</td>
<td>Psych 826: Statistics in Psychology</td>
<td>DENT 884: Current Issues in Oral Biology</td>
<td></td>
</tr>
<tr>
<td>HBHP 824: Program Evaluation</td>
<td>Psych 827: Analysis of Variance</td>
<td>IBGP 707: Fundamentals of Grant Writing I</td>
<td></td>
</tr>
<tr>
<td>HBHP 827: Program Planning and Implementation</td>
<td>Psych 828: Correlational Analysis</td>
<td>IBGP 708: Fundamentals of Grant Writing II</td>
<td></td>
</tr>
<tr>
<td>HSMP 870.01: Health Care Outcomes Evaluation</td>
<td>PUBH/807: Practical Biostatistics for Biomedical Laboratory Researchers</td>
<td>IBGP 709: Statistical Aspects of Grant Writing</td>
<td></td>
</tr>
<tr>
<td>HSMP 871: Health Services Research</td>
<td>STAT 528: Data Analysis I</td>
<td>Nursing 710: Health Literacy</td>
<td></td>
</tr>
<tr>
<td>IBGP 805.01: Research Techniques &amp; Resources</td>
<td>STAT 529: Data Analysis II</td>
<td>HBHP 821: Community Health Assessment</td>
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</tr>
<tr>
<td>Nursing 912: Introduction to Methods of Nursing Science</td>
<td>STAT 530: Data Analysis III</td>
<td>PUBH 850: Fundamental Determinants of Population Health and Implications for Public Health Research and Practice</td>
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<tr>
<td>Nursing 917.01: Seminars in Determinants of Health</td>
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<td>PUBH 850: Social Ecological Strategies in Prevention</td>
<td></td>
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<tr>
<td>Nursing Practice 953: Clinical Effectiveness and Translation in Clinical Science</td>
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<td>Vis Sci 740: Survival Skills for Graduate Students</td>
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<tr>
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<td>Vis Sci 797: Grantsmanship</td>
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<td>PUBHBIO 701: Design &amp; Analysis of Studies in the Health Sciences I</td>
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<tr>
<td>PUBHBIO 702: Design &amp; Analysis of Studies in the Health Sciences II</td>
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Core Course:

**Course:** PUBH-HLTH 795 Topics in Clinical and Translational Science (2 units)
**Quarter:** AU, WI, SP  R 12:30-2:18
**Instructor:** Philip Binkley, MD, PhD

**Please note that this is a required course for the Graduate Interdisciplinary Specialization in Clinical and Translational Science.**

Students need to enroll in the GISBCTS program before trying to register for this class as it requires instructor permission. Once you have enrolled in the GISBCTS program your name will be given to the instructor and you will be permitted to register.

This 10-week course will provide a broad overview of the NCRR Core Competencies as well as be a major focus for interaction among all of the students from diverse academic backgrounds. The seminar will allow students pursuing different emphasis areas in clinical and translational science to design transdisciplinary research programs or solutions to a specific biomedical research questions.

Master List of Courses:

Information related to specific course offerings was obtained directly from departments and course instructors and may change during the academic year. Please check with the department to be sure specific courses will be offered as indicated.

**Allied Med 830 – Leadership and Policy in Allied Health**
This course will help students develop an in depth understanding of the laws and policies that influence higher education and the allied health professions. Students will gain a comprehensive understanding of 1) the role of faculty in policy development and leadership within the University setting, 2) the governmental and legal forces that have defined allied health professional practice, and 3) the role of faculty to advocate at state and federal levels, consult with governmental agencies, change and improve health care systems, and assume leadership roles within their professions. They will analyze and discuss leadership issues in academic institutions and professional organizations, with emphasis on the role of the individual in leadership. As a context for leadership, students will research federal and state laws and regulations that affect allied health professions. They will analyze how laws become regulations and policies that influence local health care systems. Given the particular laws and policies that define the regulations for a particular area of practice, students will analyze how allied health professions have
responded. They will identify barriers to effective health and human services and develop strategies to optimize the effectiveness of professional practice.

(WI; 3; Prerequisite: Instructor permission)

**Allied Med 892 Evidence Based Practice**

Course objectives are: 1) Identify the most valid and relevant research reports for analysis of a clinical question, 2) Analyze research on the specificity and sensitivity of measures to select the most appropriate measures given a clinical problem, 3) Critically appraise clinical trials; 4) Synthesize clinical trials to reach a bottom line; 5) understand how synthesized reviews and meta-analyses are used to create clinical guidelines; 6) Discuss how research evidence is used to support intervention program in the real world.

(SP; 3: Prereq: Instructor permission)

**Allied Med 895.01 – Ph.D. Research Seminar: Writing, Reviewing, and Publishing Journal Manuscripts**

Faculty and students present, discuss, critique, and debate interdisciplinary topics in Health and Rehabilitation Sciences research and teaching: Students develop skills in analyzing, discussing, and synthesizing health and rehabilitation research. Students present their own scholarship to other graduate students and faculty. The objectives are that students will: 1) apply tenets of good journal manuscript writing style, 2) understand manuscript submission, review, and publication process, 3) critically review of journal manuscript, apply the Uniform requirements for manuscripts submitted to biomedical journals. This course is graded S/U.

(SU, AU, WI, SP; 1-2 units; Prereq: Instructor permission)

**Allied Med 895.01 – Collaboration in Health and Rehabilitation Sciences**

Faculty and students present, discuss, critique, and debate interdisciplinary topics in Health and Rehabilitation Sciences research and teaching: Students develop skills in analyzing, discussing, and synthesizing health and rehabilitation research. Students present their own scholarship to other graduate students and faculty. The objectives are that students will: 1) identify and describe the varied disciplines that comprise the field of rehabilitation science, 2) develop skills in critical reading and presenting scholarship, and 3) integrate concepts related to distinct areas of rehabilitation. This course is graded S/U.

(SU, AU, WI, SP; 1-2 units; Prereq: Instructor permission)

**Den 884: Current Issues in Oral Biology**

Covers multiple topics of current oral health concerns.

(SU, AU, WI, SP; 3 units)

**HBHP 821: Community Health Assessment**

Health educators often are responsible for assessing communities in terms of their resources, needs, and health outcomes. The goal of this course is to help develop the practical knowledge and skills to conduct such assessments and to understand the range of goals of, and approaches to community health assessment.

(WI; 2; Prereq: Grad standing in Pub Hlth or permission of instructor.)

**HBHP 824: Program Evaluation**
This course will focus on planning useful program evaluations, with emphasis on meeting the needs of program administrators and planners. Coverage includes process and outcome evaluation questions and methods; qualitative and quantitative data collection approaches; and ethical considerations.

(SP; 4; Prereq: Grad standing in Pub Hlth or permission of instructor.)

HBHP 827: Program Planning and Implementation
In this course students will develop the skills required to plan programs that address public health problems for defined populations in a variety of settings. This course will provide students with the opportunity to develop a theory-based, health promotion program that is supported by the literature. In addition, students will learn how to review the literature and deliver a professional presentation.
(WI; 4; Prereq: 820 or permission of instructor.)

HSMP 870.01: Health Care Outcomes Evaluation
This course introduces students to measurement and evaluation issues associated with patient-centered pharmaceutical outcomes and quality of care studies, an increasingly important component of present-day pharmaceutical research. The focus will be application of measurements, rather than development. Selected topics that will be covered in this class include development of the discussion of frameworks for evaluation of health outcomes framework and quality of care, outcomes measures, risk adjustment of health outcomes, technical and practical issues with measurement and estimation, and empirical examples of health care outcomes research. Outcome and quality measures that will be covered include generic and condition-specific health status measures, satisfaction, patient trust, and patient adherence.

(2-4 units: Prereq: Instructor permission)

HSMP 871: Health Services Research
This course provides a broad introductory overview to the field of health services research in the United States and the role of health services research in improving health care delivery and, ultimately, the health of Americans.
(WI; 2; Prereq: PUBHBIO 702 and PUBHEPI 710 or Instructor permission)

IBGP 707: Fundamentals of Grant Writing I
The overall goal of this course and its sequel (Fundamentals of Grant Writing-II) is to provide graduate students with the background information for, and practical experience in writing research grant proposals.

(AU; 2; Prereq: Instructor permission)

IBGP 708: Fundamentals of Grant Writing II
The educational goal of this course is to provide graduate students with the background information for, and practical experience in reviewing research grant proposals. As Fundamentals of Grant Writing-2 is a sequel of Fundamentals of Grant Writing-1, at the beginning of this course students will already have a general idea about the administrative structure and process of grant reviewing, and will have submitted their grant application to the coordinators of the course. During this interactive mock review process the graduate students will review grant applications and learn to be critical, objective, and fair. They will write
reviews for three grant applications and score them. They will learn to express their scientific ideas and knowledge and participate in a scientific debate. They will have to make difficult and sometime painful decisions, and they will learn to overcome the psychological impact of the "summary statement". Finally, they will be exposed to the electronic grant application submission and review as the NIH moves in this direction. At the end of the course, graduate students will have had a real life experience, and will be better prepared for the competitive field of research funding.
(SP; 2; Prereq: Instructor permission)

**IBGP 709: Statistical Aspects of Grant Writing**
The goal of this course is to provide the student training and experience in interacting with statisticians to obtain their input into statistical aspects of a research grant proposal.
(WI; 1; Prereq: IBGP 707)

**IBGP 805.01: Research Techniques & Resources**
This course was designed to prepare the students for their laboratory rotations and dissertation research by covering three general areas: (1) Laboratory safety; (2) Commonly used laboratory techniques; (3) Research resources available to the students.
(SU; 6; Must register for both labs and lectures)

**Nursing 710: Health Literacy**
Examine and analyze issues of low health literacy, including populations at risk, research, measurement tools, writing in plain language; health communication techniques; and organizational approaches.
(AU, SP; 3; Prereq: Graduate student in Health Professions)

**Nursing 912: Introduction to Methods of Nursing Science**
Survey of research methods used to describe, explain, predict, and manipulate phenomena relevant to the discipline of nursing. Emphasis is placed on the systematic development of nursing knowledge.
(WI; 5; Prereq: Instructor permission)

**Nursing 914: Principles of Measurement in Health Related Sciences**
Study of measurement principles for concepts relevant to nursing science. Emphasis is on psychobiobehavioral measurement and measurement of variables for the study of health disciplines.
(SP; 5: Prereq: Nursing 912 or instructor permission)

**Nursing 917.01: Seminar in Determinants of Health**
Integration of theoretical and methodological approaches to the study of Psycho-bio-behavioral phenomena underlying determinants of health.
(AU; 3 credit seminar; optional 2 credit lab; Prereq: Nursing 916 or instructor permission)

**Nursing Practice 953: Clinical Effectiveness and Translation in Clinical Science**
Theory and survey of methods of critical appraisal of clinically relevant nursing research related to clinical effectiveness and translational science. Emphasis is placed on the systematic appraisal and utilization of clinical knowledge.
PSYCH 826: Statistics in Psychology
Basic concepts of descriptive and inferential statistics; includes estimation, hypothesis testing, and introductory treatment of analysis of variance, correlation and regression, and non-parametric techniques.
(4; Prereq: 320, or Stat 145, or equiv and grad standing in psych, or permission of instructor)

PSYCH 827: Analysis of Variance
Statistical inference in analysis of variance designs; basic concepts and procedures in one-way designs; factorial, repeated measures, randomized blocks, mixed models designs; procedures for planned and post hoc comparisons.
(4; Prereq: 826 or equiv)

PSYCH 828: Correlational Analysis
Correlation and regression techniques for quantitative and qualitative data analysis; simple linear regression and correlation, multiple linear regression, nominal scales, interactions; other related multivariate methods; use of computer programs.
(4; Prereq: 827 or equiv)

PUBH 850: Social-ecological strategies in prevention
This course will introduce students to the social-ecological approach to prevention in a public health context. Course material will contrast the social-ecological approaches to prevention with individual-based approaches. The historical and current application of this framework will be demonstrated in several areas of public health. This course is intended for CPH students who have an interest in prevention, social-ecological theory or population-based behavior change strategies.
(SP; 4; Prereq: Grad standing in Pub Hlth or permission of instructor.)

PUBH 850: Fundamental Determinants of Population Health and Implications for Public Health Research and Practice
An important goal of this course is to help students understand how to use their knowledge of the fundamental determinants of health to address important public health problems. To this end, course lectures will critique how the field of public health currently addresses population health and health disparities. In addition, we will discuss a theoretical framework and methodology to incorporate the social and economic context into public health interventions.
(AU; 4; Prereq: Grad standing in Pub Hlth or permission of instructor.)

PUBH 850: Research Methods in Public Health
This course provides an overview of research methods that are commonly used in public health research. The course will address topics such as selecting a theoretical framework, choosing a research design, conducting observational and experimental research, measurement and sampling issues, program evaluation, basic analytic concerns of observational and experimental research, scientific writing, and study proposal preparation. An important goal of this course is to help students develop the necessary skills to read, critique, design, and conduct high quality scientific research in health behavior and, more broadly, public health.
(SP; 4; Prereq: Grad standing in Pub Hlth or permission of instructor.)
PUBHBIO 607: Practical Biostatistics for Biomedical Laboratory Researchers
This is a five week summer course which will provide an introduction to issues in experimental design and statistical methods appropriate for the basic sciences. Considerable attention will be given to issues which are most relevant to experiments, such as replication, randomization, selection of controls, data transformation, and calibration. Topics will be motivated by real data sets from biological experiments. Since this is a four credit hour course taught over five weeks, students will need to devote approximately 7 hours per week for lecture and should expect to spend between 14-21 hours per week outside of class on assignments.
(SU; 4: Prereq: Instructor permission)

PUBHBIO 701: Design and Analysis of Studies in the Health Sciences I
This course is intended to provide students with comprehensive introduction to the principles of modern biostatistical methods and their applications in biomedical research. The course will cover material from basic data summary methods to formal statistical analysis on estimation and hypothesis testing, with an emphasis on the understanding of methodologies from statistical inference perspective. Application to real data from various studies in public health and clinic research will be used to illustrate the material.
(AU, WI; 4: Prereq: Instructor permission)

PUBHBIO 702: Design and Analysis of Studies in the Health Sciences II
Fundamental concepts of biostatistical inference will be presented, including categorical data methods, nonparametric statistical testing, analysis of variance designs, and regression methods. All statistical procedures will be integrated with the application of computer statistical packages.
(WI, SP; 4: Prereq: B- or above in PUBHBIO 701 or instructor permission)

PUBHEpi 715: Principles and Procedures for Human Clinical Trials
This course presents basic principles and procedures in the design, conduct, and analysis of human clinical investigations (trials). Our intent is to teach basic concepts necessary for the application of human clinical trials in medical research.
(SP; 4: Prereq: PUBHEPI 715 and PUBHBIO 702 or instructor permission)

STAT 528: Data Analysis I
In this non-calculus based course data collection, analysis, and preliminary statistical inferences are studied. More specifically, the course covers summaries of data, design of experiments, probability, confidence intervals, tests of hypothesis and other statistical inference as time permits. By the end of the course you should be able to design a simple experiment and analyze the data obtained using the statistical methods learnt in class.
(SU, AU, WI; 3; lab hours arranged)

STAT 529: Data Analysis II
Stat 529 and 530 will cover many of the common statistical methods that you will encounter when reading journal articles in your field, or that you will need to analyze data that you have collected. When covering any statistical method, our goal is for you to (1) understand the assumptions of the method and be able to check them, (2) be able to carry out the necessary computations on MINITAB, (3) be able to describe your results using correct statistical "jargon",
and (4) be able to interpret the results in a way that is meaningful to others in your field. We will try to accomplish these goals through homework and interactive classroom sessions. (WI, SP; 3; lab hours arranged; Prereq: STAT 528 or equivalent)

**STAT 530: Data Analysis III**
The material in 530 relies heavily on the additive model (see the early part of the text for a description of this model), simple linear regression and one-way ANOVA. The course will cover multiple linear regression and ANOVA designs beyond the one-way layout in detail. The goals for the course are for you to (1) understand the key ideas that underlie the models we'll work with, (2) appreciate the importance (and unimportance) of the assumptions that the models are based on, (3) be able to make sound decisions for an analysis, (4) implement formal techniques flawlessly, and (5) summarize an analysis appropriately. With these goals in mind, by the end of the quarter, you should be able to design and conduct an experiment of modest size, and you should be able to analyze the data from such an experiment. We will try to accomplish these goals through homework and interactive classroom sessions. (3; Prereq: 529 or Instructor permission)

**Vision Science 740: Survival Skills for Graduate Students**
The course will provide “survival skills” for graduate students. These include critiquing paper, writing abstracts, presenting data and analyses, preparing visual aids, and grant submissions. (SU, AU, WI, SP; 2; Prereq: Instructor permission)

**Vision Science 796: Ethics in Biomedical Research**
The student should finish the course with a general understanding of the issues surrounding the ethical conduct of science.
• The student should understand what constitutes scientific authorship.
• The student should be able to draft a protocol for research on human subjects.
• The student should have gained an ability to think about scientific conduct issues in an ethical decision-making way.
(AU; 2)

**Vision Science 797: Grantsmanship**
This course is designed to explain the structure of the National Institutes of Health, especially the National Eye Institute, to illustrate the principles of good grantsmanship, and to describe the review process grants undergo. Emphasis will be focused on two particular grant mechanisms: the Mentored Clinical Scientist Development Award (K23) and the Research Project Grant (R01). Students will participate in discussions about the grant writing process, will write sample grants, and will critically review each others’ grants in a mock “Study Section” review. Course evaluation will be based on an outline of the proposal at mid-term, class participation, and the completed grant at the end of the term. (WI; 2; Prereq: Instructor permission)

**Vision Science 799: Assessing the Literature**
Students will learn to critically evaluate the literature by participating in discussions of a variety of papers, including but not limited to scientific articles from peer-reviewed journals. A satisfactory/unsatisfactory grade is based solely on participation during class discussions. (WI; 2; Prereq: Instructor permission)