Master of Science in Clinical & Translational Research Graduate Program

Graduate Student Handbook

2018-2019

Department of Complementary & Integrative Medicine
John A. Burns School of Medicine
University of Hawai‘i at Manoa
651 Ilao Street, BSB 211
Honolulu, HI 96813

Revised: January, 2018
# Table of Contents

- Introduction ..............................................................................................................................................................2
- Program Overview ...................................................................................................................................................4
- Graduate Faculty ......................................................................................................................................................6
- Administrative Staff .................................................................................................................................................8
- Academic Advising ...................................................................................................................................................9
- Student Learning Outcomes and Institutional Learning Objectives (ILOs) ....................................................10
- MS Curriculum .......................................................................................................................................................12
- MS Key Courses .....................................................................................................................................................15
  - Biomedical Sciences (BIOM) Course Descriptions ..........................................................................................15
  - Quantitative Health Sciences (QHS) Course Descriptions ..............................................................................16
- Program Requirements ..........................................................................................................................................17
  - MS Plan A (Thesis Option) ................................................................................................................................17
  - MS Plan B (Capstone Project Option) .............................................................................................................20
- Admission Requirements ......................................................................................................................................22
- Tuition & Financial Aid ...........................................................................................................................................23
- Academic Policies & Student Conduct ..................................................................................................................25
- Student Counseling and Title IX ...............................................................................................................................26
- Useful Links ............................................................................................................................................................27
Introduction

This handbook describes the basic policies, requirements and procedures for graduate students pursuing a degree in Clinical and Translational Research. As a graduate student in this program, you should read and become familiar with this handbook so that you are clear about your responsibilities as a student in the program and the responsibilities of the program to you. If you have any questions about any of the information presented herein, please contact your Academic Advisor or the Graduate Program Chair. The earlier you clarify any matter of concern to you, the less likely it will create any problems later. Ignorance of graduate program or university regulations and procedures is not a valid excuse. The faculty and staff of the graduate program wish you great success in pursuing your educational goals.
Program Overview

The Clinical and Translational Research (CTR) graduate program will prepare graduates with skills for successful careers in clinical and translational research and research support. The CTR program leading to a MS degree is currently offered with two tracks, both available in either Plan A (thesis option) or Plan B (capstone project option):

1. Clinical Research (CR)
2. Quantitative Health Sciences (QHS).

The CR track focuses on the study of methods suitable to investigate clinical research topics. Students enrolled in the CR track are required to complete a combination of course work and clinical research. The competency domains include clinical and translational research, quantitative health skill, professionalism, communication, and interdisciplinary collaboration. Students will also develop the ability to identify and resolve ethical issues in clinical research, to ensure the safeguarding of human subjects, and to understand the workings of Institutional Review Boards and relevant organizational requirements. In addition, students will develop and/or increase their capacity in obtaining research funding from agencies such as the National Institute of Health (NIH) and others.

The QHS track contributes to a field that requires specific analytic skills and is one that is currently lacking sufficient numbers of experts. Students enrolled in the QHS track will acquire skills in biostatistics and bioinformatics, and master the scientific principles and methodologies that underlie basic science, and clinical and translational research methods.

In 2003, with Grant R25 RR019321, entitled, “Clinical Research Education and Career Development (CRECD) in Minority Institutions” the department established a curriculum to support a track in Clinical Research under the umbrella of the Master of Science in Biomedical Science at the University of Hawai‘i (UH) John A. Burns School of Medicine (JABSOM). This educational program was expanded with Grant U54 MD007584 (NIMHD/NIH) and Grant U54 RR026136 (NCRR), “RCMI Multidisciplinary And Translational Research Infrastructure eXpansion, (RMATRIX),” containing a Multidisciplinary Research Education, Training, & Career Development Key Function that emphasizes education and training in research methodologies addressing health disparities and other translational health initiatives in Hawai‘i.


In addition to offering knowledge and skills needed for careers in clinical and translational research, the program functions as a supportive mechanism for newly trained investigators, actively facilitating career development and encouraging research collaborations, particularly those related to health disparities research. By providing high quality training to doctoral and post-doctoral candidates, the program aims to increase the critical mass of clinical and translational research at UH, including its minority investigators. Targeting junior faculty, fellows, residents,
and doctoral candidates from biomedical sciences, nursing, social work, psychology and public health, the interdisciplinary nature of the program broadens students’ perspectives and increases opportunities for innovative, cross-disciplinary collaborations in clinical and translational research. Graduates of the program pursue research and research support careers in academia, government laboratories, healthcare organizations, and pharmaceutical companies.

Regarding long-term career outlook and job opportunities for program graduates, the Bureau of Labor Statistics predicts that the employment in clinical and associated research will grow overall by 8% in the US. The State of Hawai‘i projects a higher, 34.8%, growth rate in medical scientists, and a 13.9% growth rate in computer and mathematics-related occupations by 2020.
## Graduate Program Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Home Department or Center</th>
<th>Research Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regular Graduate Faculty</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyeong Jun Ahn, Ph.D.</td>
<td>CIM</td>
<td>Categorical data analysis, biostatistics</td>
</tr>
<tr>
<td>Amy Brown, Ph.D.</td>
<td>CIM</td>
<td>Nutrition and diseases, plant extracts, dietary supplements</td>
</tr>
<tr>
<td>John J. Chen, Ph.D.</td>
<td>CIM</td>
<td>Data science, healthcare data analytics, biostatistics</td>
</tr>
<tr>
<td>Katalin Csizsar, Ph.D.</td>
<td>CIM</td>
<td>Medical and molecular genetics, translational research</td>
</tr>
<tr>
<td>James Davis, Ph.D.</td>
<td>CIM</td>
<td>Biostatistics, epidemiology</td>
</tr>
<tr>
<td>Youping Deng, Ph.D.</td>
<td>CIM</td>
<td>Bioinformatics, cancer genomics, data mining</td>
</tr>
<tr>
<td>Eunjung Lim, Ph.D.</td>
<td>CIM</td>
<td>Large data analytics, clinical trials</td>
</tr>
<tr>
<td>Terry Shintani, M.D.</td>
<td>CIM</td>
<td>Complementary &amp; integrative medicine</td>
</tr>
<tr>
<td><strong>Cooperating Graduate Faculty</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marla Berry, Ph.D.</td>
<td>CMB</td>
<td>Selenoproteins, antioxidants and human diseases</td>
</tr>
<tr>
<td>William Boisvert, Ph.D.</td>
<td>Medicine</td>
<td>Cardiovascular research</td>
</tr>
<tr>
<td>Mariana Gerschenson, Ph.D.</td>
<td>CMB</td>
<td>Mitochondrial medicine, metabolic and neurological diseases</td>
</tr>
<tr>
<td>Jerris Hedges, M.D.</td>
<td>Dean’s Office</td>
<td>Medical education, emergency medicine</td>
</tr>
<tr>
<td>Brenda Hernandez, Ph.D.</td>
<td>Cancer Center</td>
<td>HPV-induced carcinogenesis, ethnic disparities in cancers</td>
</tr>
<tr>
<td>Claire Townsend Ing, Ph.D.</td>
<td>Native Hawaiian Health</td>
<td>Social determinants of health disparities, CBPR</td>
</tr>
<tr>
<td>Lynn Iwamoto, M.D.</td>
<td>Pediatrics</td>
<td>Pediatrics</td>
</tr>
<tr>
<td>Deborah Taira, ScD</td>
<td>Pharmacy Practice</td>
<td>Health economics and cost-effectiveness analysis</td>
</tr>
<tr>
<td>Joseph Keawe’aimoku Kaholokula, Ph.D.</td>
<td>Native Hawaiian Health</td>
<td>Native Hawaiian health</td>
</tr>
<tr>
<td>Bliss Kaneshiro, M.D.</td>
<td>OB-GYN</td>
<td>Unintended pregnancy, contraceptive use.</td>
</tr>
<tr>
<td>Alan Katz, Ph.D.</td>
<td>Public Health</td>
<td>Epidemiology, infectious diseases</td>
</tr>
<tr>
<td>Sandi Kwee, M.D.</td>
<td>Cancer Center</td>
<td>Cancer detection, positron emission tomography</td>
</tr>
<tr>
<td>Loic Le Marchand, Ph.D.</td>
<td>Cancer Center</td>
<td>Epidemiology, cancer research</td>
</tr>
<tr>
<td>Kamal Masaki, M.D.</td>
<td>Geriatric Medicine</td>
<td>Geriatric Medicine</td>
</tr>
<tr>
<td>Michelle Matter, Ph.D.</td>
<td>CMB</td>
<td>Integrin regulated cell survival and apoptosis</td>
</tr>
<tr>
<td>DeWolf Miller, Ph.D.</td>
<td>Tropical Medicine</td>
<td>Epidemiology</td>
</tr>
<tr>
<td>Charles Neal, M.D.</td>
<td>Pediatrics</td>
<td>Neuroanatomical studies</td>
</tr>
<tr>
<td>Vivek Nerukar, Ph.D.</td>
<td>Tropical Medicine</td>
<td>Pathogenesis of infectious diseases, cellular and molecular mechanisms underlying microbe-host interaction</td>
</tr>
<tr>
<td>Jun Panee, Ph.D.</td>
<td>CMB</td>
<td>Selenoproteins and natural products as antioxidants</td>
</tr>
<tr>
<td>Name</td>
<td>Department</td>
<td>Research Area</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Marie Fialkowski Revilla, Ph.D.</td>
<td>Human Nutrition</td>
<td>Nutrition, child health assessment</td>
</tr>
<tr>
<td>Beatriz L Rodriguez, M.D., Ph.D.</td>
<td>Geriatric Medicine</td>
<td>Epidemiology, chronic diseases</td>
</tr>
<tr>
<td>Jennifer Salcedo</td>
<td>OB-GYN</td>
<td>Barriers to reproductive healthcare</td>
</tr>
<tr>
<td>Cecilia Shikuma, M.D.</td>
<td>Medicine</td>
<td>Infectious diseases, AIDS</td>
</tr>
<tr>
<td>Bruce Shiramizu, M.D.</td>
<td>Pediatrics</td>
<td>Pathology of HIV-associated disorders</td>
</tr>
<tr>
<td>Ralph Shoet, M.D.</td>
<td>Medicine</td>
<td>Molecular medicine</td>
</tr>
<tr>
<td>Reni Soon, M.D.</td>
<td>OB-GYN</td>
<td>Reproductive health</td>
</tr>
<tr>
<td>Andy Stenger, Ph.D.</td>
<td>Medicine</td>
<td>Neurosciences, particle astrophysics</td>
</tr>
<tr>
<td>Deborah Taira, Ph.D.</td>
<td>UH Hilo</td>
<td>Health policy and management</td>
</tr>
<tr>
<td>Michelle Tallquist, Ph.D.</td>
<td>Medicine</td>
<td>Cardiovascular biology and birth defects</td>
</tr>
<tr>
<td>W. Steve Ward, Ph.D.</td>
<td>Anatomy</td>
<td>Sperm physiology and genetics, assisted reproduction technology</td>
</tr>
<tr>
<td>Bradley Willcox, M.D.</td>
<td>Geriatrics</td>
<td>Aging research</td>
</tr>
<tr>
<td>Kelley Withy, M.D., Ph.D.</td>
<td>Family Medicine</td>
<td>Family medicine</td>
</tr>
</tbody>
</table>
## Administrative Staff

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Email Address</th>
<th>Phone No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jewellien Robinson</td>
<td>Institutional Support</td>
<td><a href="mailto:jllr@hawaii.edu">jllr@hawaii.edu</a></td>
<td>(808) 692-1465</td>
</tr>
</tbody>
</table>
Academic Advising

Each student will be assigned to an Academic Advisor during the course of his/her study. The role of the Academic Advisor includes but is not limited to:

- Serve as the point of contact between the advisee and the graduate program. Communicate to the graduate faculty committee any relevant concerns, changes or situations that may affect the student (e.g., leave of absence, medical concerns)
- Meet with advisee at least once during each semester to evaluate the advisee’s performance and to ensure that all requirements are progressing on schedule
- Outline the program of study for the advisee. Update and revise program of study as needed
- Provide the student with advice to help achieve his/her academic and career goal
- Advise on course selection and registration for the advisee and verify accuracy; make sure class registrations are done on time
- Maintain student documentation in advising folder and keep the student database accurate and up to date
- Lead in the development and implementation of remediation plans (academic and/or clinical), as needed
- Perform student exit interview and go over checklist before graduation
- In the event a situation cannot be resolved by the faculty and advisee, the Graduate Program Chair and the Executive Graduate Program Committee will be included to help resolve the issue.

OFFICE OF GRADUATE EDUCATION FORMS
http://manoa.hawaii.edu/graduate/content/forms

Master’s Forms
- Student Progress Forms I, II, III, IV
- Petition to Enroll in GRAD 700F
- Signature Page
MS Student Learning Outcomes

All students are expected to have developed the following competencies upon completion of the graduate program:

- Familiarity with the mechanics of scientific reporting sufficient to enable the students to prepare a publication for a scholarly journal
- Experience with oral presentation of material sufficient to enable the students to prepare and deliver reports on their work at seminars or meetings of scientific societies
- A degree of understanding and scientific maturity to enable the students to assess the work of others
- Knowledge of the process of clinical and translational research, including familiarity with techniques for searching the literature, principles of measurements, and practical experience in the design and conduct of scientific experiments, collection of data, and interpretation of quantitative data in the context of the scientific literature, and to embark upon the development of a research and research support career
- Demonstrate proficiency in written and verbal communication skills as required in various professional duties, including manuscripts for publication, grant applications, and conference presentations.

Specific to Clinical Research (CR) Track:
- Demonstrate a knowledge base in various disciplines of clinical and translational research
- Develop knowledge and skills to form a foundation upon which to function in an ethical and professional manner through their professional careers
- Demonstrate skills and knowledge required for clinical and translational research design and critical evaluation of data collection methodologies

Specific to Quantitative Health Sciences (QHS) Track:
- Demonstrate the knowledge and skills in quantitative health sciences, including biostatistics and bioinformatics
- Demonstrate sufficient mastery and scientific maturity to assess the analytic work of peers in related fields
- Demonstrate a mastery of experimental, clinical and translational research design and data analysis methodologies, including clinical trials

These educational outcomes are closely aligned with the approved UHM Advanced Degree Institutional Learning Objective (ILOs). The indicator/evidence for each of the seven ILOs of the proposed modified program is summarized in the following table:
Table. Alignment of CTR Program-specific objectives and learning indicators with the UHM Advanced Degree Institutional Learning Objectives (ILOs), Version 8 (UHM Senate approved Sept 20, 2017)

<table>
<thead>
<tr>
<th>ILO Major Focus Areas</th>
<th>Learning Outcomes</th>
<th>Program Learning Indicators and Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge and Understanding</td>
<td>1. Comprehensive knowledge</td>
<td>Comprehensive exam&lt;br&gt;Thesis defense&lt;br&gt;Research proposal, including literature review</td>
</tr>
<tr>
<td></td>
<td>2. Understanding of research methodology</td>
<td>Course exams&lt;br&gt;Comprehensive exam&lt;br&gt;Research proposal&lt;br&gt;Thesis defense</td>
</tr>
<tr>
<td>Intellectual and Applied Skills</td>
<td>3. Research methodology and scholarly inquiry techniques</td>
<td>Oral and/or written critiques of research papers&lt;br&gt;Hypothesis-driven original research project&lt;br&gt;Research proposal or grant proposal&lt;br&gt;Critical feasibility assessments, research design, and data analysis plan</td>
</tr>
<tr>
<td></td>
<td>4. Critical analyze and synthesize information and data</td>
<td>Critical review of relevant literature&lt;br&gt;Statistical analysis of the research data&lt;br&gt;Written synthesis and interpretation of data analysis results</td>
</tr>
<tr>
<td>Communication Skills</td>
<td>5. Communicate appropriately</td>
<td>Written research project proposal&lt;br&gt;Oral presentations, group discussions, and participation at scientific forums&lt;br&gt;Effective online communication</td>
</tr>
<tr>
<td>Professional Responsibility</td>
<td>6. Responsible, ethical, professional conduct of research</td>
<td>Professional:&lt;br&gt;Training in responsible conduct of research&lt;br&gt;Setting of timely and feasible goals&lt;br&gt;Appropriate priorities and conclusions&lt;br&gt;Adherence to research and publication standards and policies (authorship, collaborative efforts, data sharing, conflicts of interest)&lt;br&gt;Following through on commitments&lt;br&gt;Adherence to timelines&lt;br&gt;Ethical:&lt;br&gt;Formal training in research ethics&lt;br&gt;Adherence to ethical principles, including data handling&lt;br&gt;Commitment to protection of research subjects&lt;br&gt;Written ethical components to research projects and/or proposals&lt;br&gt;IRB approval of research projects</td>
</tr>
<tr>
<td></td>
<td>7. Interact professionally</td>
<td>Performance at professional meetings (platform and poster presentations)&lt;br&gt;Active involvement during lectures and poster sessions at meetings&lt;br&gt;Cultural competence and sensitivity to cultural values (including kuleana and aloha)</td>
</tr>
</tbody>
</table>
MS Curriculum

Prerequisites: All students are required to have a background of undergraduate courses in biology and mathematics. At least one semester of undergraduate level biology and one semester of pre-calculus course are required.

Section A. MS Program Core Courses

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOM 640</td>
<td>Introduction to Clinical Research</td>
<td>3</td>
</tr>
<tr>
<td>BIOM 644</td>
<td>Translational Research Methods</td>
<td>2</td>
</tr>
<tr>
<td>QHS 601</td>
<td>Biomedical Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>QHS 602</td>
<td>Biomedical Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>BIOM 646</td>
<td>Clinical and Translational Research Seminar*</td>
<td>2</td>
</tr>
</tbody>
</table>

*: Enrollment in this one-credit seminar each semester for A-F grade is required for the first year.

Section B. Track Required Courses

1. Clinical Research (CR) Track

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOM 641</td>
<td>Legal and Regulatory Issues and Bioethics</td>
<td>2</td>
</tr>
<tr>
<td>BIOM 645</td>
<td>Clinical Protocol Development</td>
<td>3</td>
</tr>
<tr>
<td>QHS 620</td>
<td>Introduction to Clinical Trials</td>
<td>2</td>
</tr>
</tbody>
</table>

Plan A:

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOM 700</td>
<td>MS Thesis research</td>
<td>8+ **</td>
</tr>
<tr>
<td>BIOM 699</td>
<td>Directed Research</td>
<td>4+</td>
</tr>
</tbody>
</table>

Elective Courses

Plan B:

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOM 699</td>
<td>Directed Research</td>
<td>4+</td>
</tr>
</tbody>
</table>

Elective Courses

**: Plan A requires that at least 6 research credits are from BIOM 700.

2. Quantitative Health Sciences (QHS) Track

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>QHS 610</td>
<td>Bioinformatics I</td>
<td>3</td>
</tr>
<tr>
<td>QHS 621</td>
<td>Design and Analysis of Clinical Trials</td>
<td>2</td>
</tr>
<tr>
<td>QHS 650</td>
<td>Secondary Data Analysis</td>
<td>2</td>
</tr>
</tbody>
</table>

Plan A:

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOM 700</td>
<td>MS Thesis research</td>
<td>8+ **</td>
</tr>
<tr>
<td>BIOM 699</td>
<td>Directed Research</td>
<td>4+</td>
</tr>
</tbody>
</table>

Elective Courses
Plan B:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>QHS 699</td>
<td>Directed Research</td>
<td>4+</td>
</tr>
<tr>
<td>Elective Courses</td>
<td></td>
<td>8+</td>
</tr>
</tbody>
</table>

**: Plan A requires that at least 6 research credits are from BIOM 700.**

Section C. Selected Elective Courses

To be selected by the student and his/her thesis advisor and committee according to the student’s interests and needs (Please see UH Manoa graduate catalog for additional and updated course listings).

1. **From BIOM, CAAM, PHRM, and QHS**

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOM 654</td>
<td>Medical Genetics</td>
<td>2</td>
</tr>
<tr>
<td>CAAM 401</td>
<td>Mindfulness</td>
<td>1</td>
</tr>
<tr>
<td>CAAM 445</td>
<td>Integrative Medicine</td>
<td>3</td>
</tr>
<tr>
<td>QHS 611</td>
<td>Bioinformatics II</td>
<td>3</td>
</tr>
<tr>
<td>QHS 651</td>
<td>Secondary Data Analysis Practicum</td>
<td>2</td>
</tr>
</tbody>
</table>

2. **From Other Related Programs**

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMB 606</td>
<td>Introduction to Neurosciences</td>
<td>4</td>
</tr>
<tr>
<td>CMB 625</td>
<td>Advanced Topics in Genetics</td>
<td>2</td>
</tr>
<tr>
<td>CMB 640</td>
<td>Neuropharmacology</td>
<td>2</td>
</tr>
<tr>
<td>GEOG 388</td>
<td>Introduction to GIS</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 389</td>
<td>GIS Data Visualization</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 489</td>
<td>Applied Geographic Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 680</td>
<td>Geospatial Analysis of Natural Resource Data</td>
<td>3</td>
</tr>
<tr>
<td>ICS 435</td>
<td>Machine Learning Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>ICS 475</td>
<td>Introduction to Bioinformatics Sequences and Genome Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ICS 484</td>
<td>Data Visualization</td>
<td>3</td>
</tr>
<tr>
<td>ICS 614</td>
<td>Medical Informatics I</td>
<td>3</td>
</tr>
<tr>
<td>ICS 624</td>
<td>Advanced Data Management</td>
<td>3</td>
</tr>
<tr>
<td>ICS 635</td>
<td>Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>ICS 663</td>
<td>Pattern Recognition</td>
<td>3</td>
</tr>
<tr>
<td>MBBE 650</td>
<td>DNA and Genetic Analysis</td>
<td>2</td>
</tr>
<tr>
<td>MBBE 683</td>
<td>Advanced Bioinformatics Topics for Biologists</td>
<td>4</td>
</tr>
<tr>
<td>PH 650</td>
<td>Ecological Epidemiology</td>
<td>2</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>PH 658</td>
<td>Computer Applications in Public Health</td>
<td>3</td>
</tr>
<tr>
<td>PH 663</td>
<td>Principles of Epidemiology I</td>
<td>3</td>
</tr>
<tr>
<td>PH 664</td>
<td>Principles of Epidemiology II</td>
<td>3</td>
</tr>
<tr>
<td>PH 669</td>
<td>Epidemiological Study Design Critique</td>
<td>2</td>
</tr>
<tr>
<td>PH 689</td>
<td>Nutritional Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PH 747</td>
<td>Statistical Methods in Epidemiological Research</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Tropical Medicine (TRMD)</strong></td>
<td></td>
</tr>
<tr>
<td>TRMD 675</td>
<td>Epidemiology of Tropical Infectious Diseases</td>
<td>3</td>
</tr>
</tbody>
</table>
MS Key Course Descriptions

Biomedical Sciences (BIOM) Course Descriptions

BIOM 640 Introduction to Clinical Research (3) Instruction in developing clinical research questions and creating a concise protocol that includes a literature review, study design, subject recruitment and sampling, instruments, other measures and bioinformatics, sample size, consent form, budget and timetable. A-F only. Pre: consent.

BIOM 641 Legal and Regulatory Issues and Bioethics (2) Ethical dilemmas in clinical research are identified and resolved in case studies, research on human subjects regulation are discussed. Research misconduct is defined. Ethical considerations in protocol development. A-F only. Pre: consent. (Cross-listed with CMB 626)

BIOM 644 Translational Research Methods (2) Lectures focus on translational research methods through selected genetic and acquired diseases including cancer, neurodevelopmental, inflammatory-immune and metabolic disorders with insight into analyses of DNA, RNA, genomics-proteomics, cell and animal models, and advanced imaging. A-F only. Pre: consent.

BIOM 645 Clinical Protocol Development (3) Provides training in proposal development. Governance structures of funding agencies; funding opportunities and decisions; review processes; NIH application and processes; reading RFAs; compliance issues; cultural sensitivity; and types of questions using databases are addressed. A-F only. Pre: consent.

BIOM 646 Clinical Research Seminar (1) Provides overview of research related to health and health disparities in Hawai'i. Seminar topics include ethnic disparities in health research, Native Hawaiian health, childhood research initiatives, fitness and obesity, social and cultural factors and ethics. Repeatable six times. A-F only. Pre: consent.

BIOM 654 Medical Genetics (2) Lectures focus on heritable disorders, genetic mechanisms, patterns of inheritance, phenotype-genotype correlations, genetic/environmental factors, clinical diagnoses, genomic and precision medicine. A-F only. Pre: consent.

BIOM 699 Directed Research (V) Students may register on approval of department. CR/NC only. Repeatable unlimited times.

Quantitative Health Sciences (QHS) Course Descriptions

QHS 601 Biomedical Statistics I (3) Fundamental biomedical statistics concepts and tools will be introduced, as well as their applications to biomedical data. Students will perform hands-on analysis and learn to interpret and present the results. A-F only. Pre: consent. (Cross-listed with TRMD 655)

QHS 602 Biomedical Statistics II (3) Advanced biomedical statistics principles and tools as well as their applications will be introduced. Topics include: model selection, hierarchical model, repeated measurements, classification methods, structural equation modeling and multivariate analysis. A-F only. Pre: QHS 601 or consent.

QHS 610 Bioinformatics I (3) Fundamental concepts in bioinformatics with a strong emphasis on hands-on training. Topics such as molecular biology, sequence alignment, biological databases, phylogeny, and genomics including microarray and RNA-Seq data analysis. A-F only. Pre: consent. (Cross-listed with TRMD 653)

QHS 611 Bioinformatics II (3) Focus on bioinformatics approaches for functional genomics related to DNA, RNA, and protein. Provides overview of virus, bacteria, and human genome and bioinformatics approaches to human disease. A-F only. Pre: QHS 610 or consent.

QHS 620 Introduction to Clinical Trials (2) Introduction to clinical trials. Topics include history, definitions/terminology, adverse events, FDA and government regulatory agencies, ethics, monitoring committees, recruitment, introduction to protocol development, basic designs. A-F only. Pre: consent.

QHS 621 Design and Analysis of Clinical Trials (2) Basic and advanced statistical methods utilized in clinical trials designs, conduct, and data analyze. Topics covers statistician’s role in drug development and DSMB, statistical theory in phase I-IV clinical trial designs and analysis. A-F only. Pre: QHS 601 or consent.

QHS 650 Secondary Data Analysis (2) Allows students who are new to using secondary data to become comfortable with accessing the data, forming hypotheses, and designing study proposals. It will introduce by examples both basic and advanced techniques. A-F only. Pre: consent.

QHS 651 Secondary Data Analysis Practicum (2) Introduction to issues in working with complex data sets and add the hands on experience needed to conduct individual research using secondary databases. A-F only. Pre: QHS 601 and QHS 650 or consent.

QHS 699 Directed Research (1-3 credits) Directed research in quantitative health sciences. Students will work closely with a QHS faculty member or mentor who will guide them through the process of conducting a research study. CR/NC only. Pre: consent.
Program Requirements

MS Plan A (Thesis Option)

Initial Conference with Graduate Program Chair
- During the first week of the first semester
- Appointment of an interim academic advisor

Preliminary Conference(s) with Interim Academic Advisor
- During the first month of the first semester
- If any academic deficiencies are identified, a remediation plan will be developed between the interim academic advisor and the student
- Relevant sections of the Pre-Candidacy Progress (Form I) will be used for the purpose of developing a remediation plan. The completed Form I will be submitted after the student has successfully passed the qualifying examination (please see below)

Qualifying Examination
- Taken at the beginning of the Fall semester of the second year of residence
- A closed book, multiple choice written and oral general examination, consisting of questions composed by graduate faculty members
- Evaluates student’s knowledge base of CTR core course contents (biostatistics, clinical and translational research methods, and either research ethnics (CR track) or bioinformatics (QHS track))
- Students must pass all sections of the exam at or above 80%

If the student passes the qualifying examination, the Pre-Candidacy Progress Form (Form I) can be submitted to the Office of Graduate Education (OGE). UHM Form I can be found at the website: https://manoa.hawaii.edu/graduate/content/forms

If the student fails the qualifying examination, the failed sections or the entire exam may be repeated once within 6 months of the first exam. A student who fails the qualifying examination a second time will be dismissed from the graduate program and the Office of Graduate Education.

Please refer to OGE exam policies for details at https://manoa.hawaii.edu/graduate/content/exam-policies

Coursework Requirements (the general credit requirements and the program core course requirements are the same for both tracks, but the track specific required courses are different for the two tracks. Please see section on curricula for details)
- 34 total credit hours for the MS program
- 24 credit hours of approved didactic core and elective course work (must be taken for an A-F letter grade)
- 2 credit hours of seminar component as a core requirement (A-F grade)
• Minimum of 8 credit hours of research component (at least 6 credits from BIOM700; other credits can be from BIOM 699 or QHS 699)

MS Plan A Thesis Committee
• Selection of a permanent advisor by end of the first year who will also serve as the chair of the thesis committee
• Appointment of at least two other members of graduate faculty to the thesis committee
• Preparation of individualized timeline for MS Plan A

MS Comprehensive Examination & Advance to Candidacy
• Consists of a written proposal and an oral presentation. The proposal should be based on the student’s thesis research project, engaging in hypothesis driven research
• Submission of the thesis topic and proposal to the thesis committee for review and approval as early as possible
• Written proposal and proposal seminar should be completed by the end of the third semester of the student’s training
• The written proposal should be submitted to the student’s thesis committee for review at least two weeks before the date of oral examination
• The proposal should be prepared in consultation with the student’s thesis advisor and thesis committee members
• The format of the written thesis proposal will be specified by the thesis committee, but should follow the general format of a grant proposal to a federal funding agency (e.g., NIH), including project summary and relevance, background and significance, specific aims, research design and methods, and preliminary studies.
• The content of the oral examination will include fundamental concepts underlying the hypotheses addressed in the proposal, technical or experimental design issues, and any other topics that the committee considers pertinent to the student’s understanding of his/her research area
• The majority of the committee must vote in favor in order for the student to pass the comprehensive exam

Note: Depending on the nature of the research project, the student may need to obtain specific certification, approvals and guidance as required, e.g., Committee on Human Studies (www.hawaii.edu/irb/) [Phone: (808) 539-3955]; Environmental Health & Safety Office (www.hawaii.edu/ehso/) [Phone: (808) 956-8660]; Institutional Animal Care and Use Committee (www.hawaii.edu/ansc/IACUC/) [Phone: (808) 956-4446].

If the student passes the comprehensive examination, the Advance to Candidacy Form (Form II) can be submitted to the Office of Graduate Education (OGE). UHM Form II can be found at the website https://manoa.hawaii.edu/graduate/content/forms.
If the student fails the comprehensive examination, the failed sections or the entire exam may be repeated once within 3 months of the first exam. A student who fails the comprehensive examination a second time will be dismissed from the graduate program and the Office of Graduate Education.

Please refer to OGE exam policies for details at https://manoa.hawaii.edu/graduate/content/exam-policies

**MS Thesis Defense / Final Examination**
- Research seminar and oral examination covering the thesis research and closely related areas
- Exam conducted by the thesis committee
- Seminar open to all graduate faculty, students and general public
- To be held at least 3 weeks before thesis submission deadline according to the UHM academic calendar
- A student who failed the final examination may repeat it once at the discretion of the thesis committee and the Office of Graduate Education
- A student who fails the examination a second time will be dismissed from the program and the Office of Graduate Education.

Please refer to the OGE website for details: https://manoa.hawaii.edu/graduate/content/final-defense

Once the student has successfully passed the final exam, the Thesis Evaluation Form (Form III), a certification of the final oral exam and thesis defense by the thesis committee, can be submitted to the Graduate Division. With the approval of the written thesis by the thesis committee, the thesis submission form (Form IV) can be submitted to the Graduate Division. Both UHM Form III and Form IV can be found at the website https://manoa.hawaii.edu/graduate/content/forms.
MS Plan B (Capstone Project Option)

**Initial Conference with Graduate Program Chair**
- During the first week of the first semester
- Appointment of an interim academic advisor

**Preliminary Conference(s) with Interim Academic Adviser**
- During the first month of the first semester
- If any academic deficiencies are identified, a remediation plan will be developed between the interim academic advisor and the student
- Relevant sections of the Pre-Candidacy Progress (Form I) will be used for the purpose of developing a remediation plan. The completed Form I will be submitted to the Office of Graduate Education after the student has successfully passed the qualifying examination

**Qualifying Examination**
- Taken at the beginning of Fall of the second year of residence
- A closed book, multiple choice written and oral general examination, consisting of questions composed by graduate faculty members
- Evaluates student’s knowledge base of core course content (biostatistics, clinical and translational research methods, and either research ethnics (CR track) or bioinformatics (QHS track))
- Students must pass all sections of the exam at or above 80%

If the student passes the qualifying examination, the Pre-Candidacy Progress Form (Form I) can be submitted to the Office of Graduate Education. UHM Form I can be found at the website: https://manoa.hawaii.edu/graduate/content/forms

If the student fails the qualifying examination, the failed sections or the entire exam may be repeated once within 6 months of the first exam. A student who fails the qualifying examination a second time will be dismissed from the graduate program and the Office of Graduate Education.

Please refer to OGE exam policies for details at https://manoa.hawaii.edu/graduate/content/exam-policies

**Coursework requirements** (the general credit requirements are the same for both the CR and QHS tracks, but the specific required courses are different. Please see curricula section for details)
- 34 total credit hours for the MS program
- 28 credit hours of approved didactic core and elective course work (must be taken for an A-F letter grade)
- 2 credit hours of seminar component as a core requirement (A-F grade)
- Minimum of 4 credit hours of research component (BIOM 699 or QHS 699)
MS Plan B Committee

- Appointment of a permanent adviser by end of the first year
- Appointment of two other members of graduate faculty members from the program graduate faculty list
- Preparation of individualized timeline for MS Plan B

Study Program and Capstone Project Proposal

- Meet with committee to decide on research project before the start of the third semester
- Take additional courses, if needed
- Submit capstone project proposal, approved by the committee

Capstone Project Presentation / Final examination

- Submit a written paper covering the project
- Presentation of the capstone project to the committee, at least 3 weeks before the end of term during which degree is conferred
- At the discretion of the committee, the presentation can be made as part of a seminar
- A student who failed the final examination may repeat it once at the discretion of the Plan B committee
- A student who fails the examination a second time will be dismissed from the program and the Office of Graduate Education
- Completion and internal filing of modified Progress Report Form III
- Certification of completion of research seminar and written paper

Please refer to OGE exam policies for details at https://manoa.hawaii.edu/graduate/content/exam-policies

Note: Depending on the nature of the research project, the student may need to obtain specific certification, approvals and guidance as required, e.g., Committee on Human Studies (www.hawaii.edu/irb/) [Phone: (808) 539-3955]; Environmental Health & Safety Office (www.hawaii.edu/ehso/) [Phone: (808) 956-8660]; Institutional Animal Care and Use Committee (www.hawaii.edu/ansc/IACUC/) [Phone: (808) 956-4446].

Once the student has successfully passed the final exam, a MS Graduate Program Memo, indicating the student’s successful completion of the MS Plan B, will be submitted by the graduate program chair to the Office of Graduate Student Services.
Admission Requirements

Requirements for admission into the MS in CTR (after completion of undergraduate degree):

- Curriculum Vitae
- Personal statement with career goals
- Undergraduate (and Medical School, if applicable) GPA 3.2 or greater
- Undergraduate level course requirements: one semester biology, or one semester of pre-calculus, or equivalent coursework as determined by the Graduate Program Committee
- At least three professional or academic letters of recommendation
- Professional exams such as GRE and MCAT within the last 5 years, with scores above 50th percentile of the national average
- For international students with non-English background, TOEFL (at least 90 for IBT and 570 for PBT) or IELTS (at least 7 on 9-point scale)
Tuition & Financial Aid

The most current UHM graduate tuition and financial aid information can be found at the following website:

https://www.hawaii.edu/fas/basics/student_budget/
https://www.hawaii.edu/fas/basics/types_of_aid/

Graduate Assistantships (GAs)
Limited and selective program graduate and research assistantships are offered by the Department of Complementary & Integrative Medicine (CIM) to outstanding MS students, usually during their second year of study. The CIM Admissions and Awards Committee administers the departmental GAs for students to work at department-operated school facilities and units, such as Biostatistics Core or Bioinformatics Core.

The two types of GAs that exist are:

1. Teaching Assistantship (TA): Usually a 9-month appointment during the academic year. Specific duties vary, but they generally consist of serving under the supervision of a faculty member to assist in the teaching of a course.

2. Research Assistantship (RA): In general, an RA supports the research and service activities of a faculty member who is the principal investigator of a funded project. The specific duties of an RA vary depending on the needs of the project and on the qualifications and experiences of the RA. The duties may be directly or tangentially related to the RA’s program of study, while results from the research project may be incorporated into a thesis or dissertation as relevant. Some RAs exercise a great degree of independence while performing their duties; others carry out specific tasks that leave little room for independent judgment. RAs should be knowledgeable about official university policies on research and publication. RA appointments usually have an 11-month appointment.

- **Compensation:** GA compensation adheres to the schedule (based on 0.50 FTE per year) approved by the UH Board of Regents. Newly appointed GAs/RAs are compensated at a pay step recommended by the department or unit of hire, with a minimum level of Step 6. GAs/RAs with research duties are usually appointed at pay steps depending on their qualifications and experiences, the needs of their departments or units, and the availability of funds. Please visit:
  https://manoa.hawaii.edu/graduate/content/compensation-tax-withholding

- **Tuition Exemption:** GAs with 0.50 FTE appointments may receive a full tuition exemption. All GAs must be employed for at least 12 weeks during the semester in order to receive the tuition exemption. Tuition exemptions apply only to fall and spring semesters, and may not be used for Outreach College and Distance Education courses. Summer Session tuition exemptions, when available, are issued by the Outreach College. GAs are responsible for the payment of fees. GAs who resign before serving at least three-quarters of a semester are liable for repayment of tuition exemptions. Please visit:
  https://manoa.hawaii.edu/graduate/content/rules-regulations

- **Health Plan & Parking Permits:** GAs with 0.50 FTE appointment who serve for a minimum of three months are eligible for health plan benefits. For more information, contact the personnel officer in the department or unit of hire. To purchase parking permits, GAs need to obtain first a memo from their
Office of Graduate Education Achievement Awards
A limited number of merit-based Graduate Division Achievement Scholarships are available to qualified graduate students.

- **Eligibility & How to Apply:** To be eligible, a student must be a student in the master’s program and have a cumulative GPA of 3.8 or above. Students apply through the MS graduate programs. These awards are very competitive.
- **Award Amount:** The award amount varies, depending on the purpose of the award and funding availability. Minimum award is $500.
- **Award Conditions:** Award recipients must maintain an enrollment of six credits or more of degree-related courses and a cumulative GPA of 3.8 or above, for the entire period of the award. If the student becomes ineligible for this award prior to the start of a term, he/she will forfeit the award and future terms of award application may be affected.
- **Award Distribution Procedure:** The Office of Graduate Education allocates achievement scholarships to graduate programs, which in turn distribute the awards to qualified students via BANNER and STAR at the time of registration.

Other Financial Support Opportunities
Besides the mechanisms described above, there are other intramural and extramural funding opportunities available to graduate students. For more information on these resources, please consult the Office of Graduate Education funding opportunities site: [http://manoa.hawaii.edu/graduate/content/financial-support](http://manoa.hawaii.edu/graduate/content/financial-support)

Finding Work at UHM Campuses
GA positions in other departments may also be available. The University of Hawaiʻi’s 10-campus system offers a wide range of career opportunities throughout the State of Hawaiʻi. Employment within the University system includes competitive compensation and benefits, a supportive work environment, and the opportunity to build a lifelong commitment to education by joining the ranks of our renowned scholars and researchers and dedicated staff. To search for GA positions at UH, please visit the following UH job website (select “Graduate Assistant” under “Position Type” box):

[http://workatuh.hawaii.edu/Search](http://workatuh.hawaii.edu/Search)
Academic Policy & Student Conducts

All undergraduate and graduate students in the John A. Burns School of Medicine must adhere to the academic policies of UH Mānoa. A summary description of these policies may be found in the online catalog:

http://www.catalog.hawaii.edu/about-uh/campus-policies/campus-policies.htm

Student Conduct Code Policies & Procedures

The University of Hawaiʻi expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to respect the rights, privileges, and property of others; and to observe national, state, and local laws and University regulations. Examples of behaviors that are in conflict with the community standards and UH values include: acts of dishonesty (cheating, plagiarism, false information, forgery), disruption of UH activities, behaviors that endanger health and safety, sexual advances, discrimination, theft, hazing, failure to comply with directions of UH officials or law enforcement, unauthorized entry, violations of UH policy and law, unauthorized use of controlled substances, public intoxication, unauthorized possession of firearms, disorderly conduct, and violation of copyright laws.

UH Mānoa Student Conduct Code
http://www.hawaii.edu/student/conduct/

Violations of the Student Conduct Code (possible suspension or expulsion)
http://www.catalog.hawaii.edu/about-uh/campus-policies1.htm

For questions or further information, contact the Office of Judicial Affairs (Address: 2600 Campus Road, QLCS 207, Honolulu, HI 96822 Phone: (808) 956-4416 Email: oja@hawaii.edu). The complete Student Conduct Code Policies & Procedures is available online at http://studentaffairs.manoa.hawaii.edu

Attendance and Leaves of Absence

Students are required to attend, continuously enroll, and be active participants in all class activities in the program. Attendance and participation is also a reflection of professionalism and respect for the institution, instructors, fellow classmates, and clients. If a class or assignment must be missed due to a legitimate reason, students are expected to provide prior notice to the necessary individuals (e.g., instructor, graduate program chair, group project teammates, etc.) as soon as possible. It is the student’s responsibility to arrange and request an extension of coursework, make up on missed work, and to arrange for clinical coverage. In case of extended absences due to personal or health reasons, please consult with your advisor and the Graduate program chair. An official Leave of Absence (LOA) may be appropriate. Here is the link:

http://manoa.hawaii.edu/graduate/content/leave-absence
Student Counseling and Title IX

Counseling:

The John A. Burns School of Medicine provides basic psychological counseling services from the Counseling Student and Development Center (http://manoa.hawaii.edu/counseling/about/meet_the_staff.php). You can call them at 808-956-7927. Dr. Michael Amrhein counsels students confidentially in the medical education building.

Title IX – Gender Discrimination and Sexual Harassment:

Title IX is a federal law that states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance."

Title IX of the Education Amendments of 1972 protects people from discrimination based on sex in education programs or activities which receive Federal financial assistance. Under Title IX of the Education Amendment Act of 1972, the University of Hawai‘i has a responsibility to ensure that students have a learning environment that is free of gender discrimination and sexual harassment. The United States Department of Education (ED) maintains an Office for Civil Rights, with 12 enforcement offices throughout the nation and a headquarters office in Washington, D.C., to enforce Title IX.

Please review the following web site: https://manoa.hawaii.edu/graduate/content/title-ix--gender-discrimination-and-sexual-harassment

If you want to report a Title IX concern or have questions, please contact:

Dr. Dee Uwono
Director and Title IX Coordinator
Hawai‘i Hall #124
2500 Campus Road
Honolulu, HI 96822
Telephone: (808) 956-2299
Email: t9uhm@hawaii.edu
Useful Links

UHM Office of Graduate Education (OGE) Sites

- OGE Home Page
  http://manoa.hawaii.edu/graduate/
- OGE Policies
  http://manoa.hawaii.edu/graduate/content/current-students
- Graduate Assistant Information
  http://manoa.hawaii.edu/graduate/content/graduate-assistants
- Graduate Academic Grievance Procedures
  http://manoa.hawaii.edu/graduate/content/academic-grievance
- UH Mānoa Student Conduct Code
  http://www.studentaffairs.manoa.hawaii.edu/policies/conduct_code/
- OGE Facebook Page
  http://www.facebook.com/uhmgd
- OGE Forms
  http://manoa.hawaii.edu/graduate/content/forms

Other Useful Sites

- University of Hawai‘i Home
  http://www.hawaii.edu/
  Select “UH Information” will open all information and related information for new students covering how to apply, financial aid, catalog, transfer credit search, new database, on-campus activities, housing (dorms), parking, etc.
- John A Burns School of Medicine (JABSOM)
  http://jabsom.hawaii.edu/jabsom/
- Department of Complementary & Integrative Medicine
  http://oitwp02.jabsom.hawaii.edu/cim/
- My UH
  http://www.hawaii.edu/myuh/manoa
  On-line registration of classes; Class schedule and class availability.
- UH Mānoa Online Catalog
  http://www.catalog.hawaii.edu/
- Get a UH username
  https://sunsys.its.hawaii.edu
- Health Insurance
  http://www.hawaii.edu/shs/studentinsurance.htm
- Graduate Student Organization
  http://gso.hawaii.edu/
- Health Sciences library (free access to many PubMed articles through this link)
  http://www.hawaii.edu/hslib
• JABSOM Bulletin (catalog)
  http://jabsom.hawaii.edu/JABSOM/about/jabsom10-11.pdf
• Laulima (Learning & Collaboration Server for the University of Hawai‘i Community)
  https://laulima.hawaii.edu/portal/
• University of Hawai‘i Department of Financial Aid
  http://www.hawaii.edu/fas/
• Students with Disabilities
  http://www.hawaii.edu/kokua/
• RCMI Multidisciplinary And Translational Research Infrastructure eXpansion
  http://www.rmatrix.jabsom.hawaii.edu/
• National Institute on Minority Health and Health Disparities
  http://www.nimhd.nih.gov/
• Association for Clinical and Translational Science
  http://www.actscience.org/
• American Association for the Advancement of Science
  https://www.aaas.org/
• American Statistical Association
  http://www.amstat.org/
• American Medical Informatics Association
  https://www.amia.org/
• Academic Consortium for Integrative Medicine & Health
  https://www.imconsortium.org/