Courses

Environmental and Radiological Health Services (ERHS)

ERHS 220 Environmental Health Credits: 3 (3-0-0)
Course Description: Impact of people on the physical and biological environment as well as impact of the environment on people; emphasis placed on human health.
Prerequisite: BZ 101, may be taken concurrently or BZ 104, may be taken concurrently or BZ 110, may be taken concurrently or BZ 120, may be taken concurrently or LIFE 102, may be taken concurrently.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 230 Environmental Health Field Methods Credits: 3 (0-6-0)
Course Description: Field and laboratory techniques necessary for practice of environmental health.
Prerequisite: CHEM 113 with a minimum grade of C and CHEM 114 with a minimum grade of C.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 320 Environmental Health--Water Quality Credits: 3 (3-0-0)
Course Description: Identify natural and man-made contaminants that impact water quality and human health; biological, chemical, and physical treatment techniques used to protect water quality.
Prerequisite: MIP 300, may be taken concurrently.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 321A Study Abroad--Mexico: Environmental Public Health--Water Quality Credits: 3 (0-0-3)
Course Description: Utilize community input from Todos Santos to examine and communicate strategies for prevention of and treatment techniques for water contaminants of environmental public health concern.
Prerequisite: MIP 300.
Registration Information: Offered as Mixed Face-to-Face. Credit not allowed for both ERHS 320 and ERHS 321A.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 332 Principles of Epidemiology Credits: 3 (3-0-0)
Course Description: Use of epidemiological methods in studying distribution of diseases in human populations.
Prerequisite: STAT 301, may be taken concurrently or STAT 307, may be taken concurrently.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 340 Cancer Biology, Medicine, and Society Credits: 2 (2-0-0)
Course Description: Overview of the molecular mechanisms of cancer biology and genetics. Introduction to cancer medicine and the societal issues of cancer.
Prerequisite: LIFE 102 or LIFE 162 or LIFE 210.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Junior standing. Credit not allowed for ERHS 210 and ERHS 340.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 350 Principles of Occupational Safety and Health Credits: 3 (3-0-0)
Course Description: Industrial and airborne hazards, disease prevention, hazard control and evaluation.
Prerequisite: (BMS 300) and (CHEM 245 or CHEM 341) and (ERHS 230) and (PH 121 or PH 141).
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 400 Radiation Safety Credits: 3 (3-0-0)
Course Description: Radiation physics, dosimetry, radiation measurement, emergencies and waste management. Essentials of radiation safety.
Prerequisite: CHEM 112 and ERHS 450 and PH 122.
Registration Information: Must register for lecture and laboratory.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 405 Fundamentals of Ergonomics Credits: 2 (2-0-0)
Course Description: Basic skills, knowledge, and abilities in ergonomics; focus on musculoskeletal injury prevention.
Prerequisite: None.
Registration Information: One college-level animal biology or anatomy/physiology or engineering design course or concurrent registration. Offered as an online course only. Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 410 Environmental Health-Air and Waste Management Credits: 3 (3-0-0)
Course Description: Preventing and managing hazards from air pollution sources and handling waste; administrative management for air and waste programs.
Prerequisite: (CHEM 245, may be taken concurrently or CHEM 341, may be taken concurrently or CHEM 346, may be taken concurrently) and (ERHS 230).
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Course Description</th>
<th>Prerequisite</th>
<th>Restrictions</th>
<th>Terms Offered</th>
<th>Registration Information</th>
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<th>Special Course Fee</th>
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<tr>
<td>ERHS 411A</td>
<td>Study Abroad--Mexico: Air Quality and Waste Management</td>
<td>3 (0-0-3)</td>
<td>Examines strategies for preventing and managing hazards from air pollution sources and solid, hazardous, medical and radiological wastes with a focus on program management strategies that reflect the needs of the community of Todos Santos in Baja Sur, Mexico.</td>
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<td><strong>Prerequisite:</strong> CHEM 245 or CHEM 345. <strong>Registration Information:</strong> Offered as Mixed Face-to-Face. Credit not allowed for both ERHS 410 and ERHS 411A. <strong>Term Offered:</strong> Summer. <strong>Grade Mode:</strong> Traditional. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 430</td>
<td>Human Disease and the Environment</td>
<td>3 (2-0-1)</td>
<td>Overview of the human diseases which are associated with the environment. <strong>Prerequisite:</strong> ERHS 230, may be taken concurrently. <strong>Registration Information:</strong> Must register for lecture and recitation. <strong>Term Offered:</strong> Fall. <strong>Grade Mode:</strong> Traditional. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 446</td>
<td>Environmental Toxicology</td>
<td>3 (3-0-0)</td>
<td>Essentials of environmental toxicology based on problem-oriented discussions addressing environmental impacts of organic/inorganic chemicals. <strong>Prerequisite:</strong> CHEM 241 or CHEM 245 or CHEM 343 or CHEM 345. <strong>Term Offered:</strong> Fall. <strong>Grade Mode:</strong> Traditional. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 448</td>
<td>Environmental Contaminants</td>
<td>3 (3-0-0)</td>
<td>Pathways of exposure and behavior of environmental contaminants. Exposure assessment in environmental health protection. <strong>Prerequisite:</strong> CHEM 241 or CHEM 245 or CHEM 343 or CHEM 345. <strong>Term Offered:</strong> Fall. <strong>Grade Mode:</strong> Traditional. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 450</td>
<td>Introduction to Radiation Biology</td>
<td>3 (3-0-0)</td>
<td>Genetic and somatic effects of radiation on cells, tissues, and the whole organism; tumor therapy; carcinogenesis; risks vs. benefits of radiation. <strong>Prerequisite:</strong> LIFE 102. <strong>Term Offered:</strong> Spring. <strong>Grade Mode:</strong> Traditional. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 479</td>
<td>Environmental Health Practice</td>
<td>1 (0-0-1)</td>
<td>Networking, preparation of resume and statement of qualifications for professional internship or employment. <strong>Prerequisite:</strong> ERHS 230, may be taken concurrently. <strong>Registration Information:</strong> Written consent of instructor. This is a partial-semester course. <strong>Term Offered:</strong> Spring. <strong>Grade Mode:</strong> Instructor Option. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 483</td>
<td>Internship-Environmental Health Practice</td>
<td>Var[4-7] (0-0-0)</td>
<td>Directed independent study or project under faculty guidance. <strong>Prerequisite:</strong> ERHS 220. <strong>Terms Offered:</strong> Fall, Spring, Summer. <strong>Grade Mode:</strong> Instructor Option. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 498</td>
<td>Research</td>
<td>Var[1-18] (0-0-0)</td>
<td>Research in environmental and radiological health sciences. <strong>Prerequisite:</strong> None. <strong>Registration Information:</strong> Written consent of instructor. <strong>Terms Offered:</strong> Fall, Spring, Summer. <strong>Grade Mode:</strong> Instructor Option. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 501</td>
<td>Biological Basis of Public Health</td>
<td>2 (2-0-0)</td>
<td>Broad overview of biological basis of underlying major public health problems, focusing on risk factors, pathogenesis, and pathophysiology, plus a review of the anatomy and physiology of selected major organ systems and associated diseases. Describe and identify public health problems with an understanding of the clinical terminology, the underlying biological mechanisms, and the biological impact of disease in public health.</td>
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<td><strong>Prerequisite:</strong> None. <strong>Restriction:</strong> Must be a: Graduate, Graduate cooperative program. <strong>Registration Information:</strong> Graduate standing. <strong>Term Offered:</strong> Fall. <strong>Grade Mode:</strong> Traditional. <strong>Special Course Fee:</strong> No.</td>
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<td>ERHS 502</td>
<td>Fundamentals of Toxicology</td>
<td>3 (3-0-0)</td>
<td>Fundamental principles of toxicology; dose-response, organ targets, toxic agents. <strong>Prerequisite:</strong> (BMS 300 or BMS 360) and (CHEM 245 or CHEM 341 or CHEM 345). <strong>Registration Information:</strong> Sections may be offered: Online. <strong>Terms Offered:</strong> Fall, Spring. <strong>Grade Mode:</strong> Traditional. <strong>Special Course Fee:</strong> No.</td>
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ERHS 503  Toxicology Principles  Credit: 1 (1-0-0)  
Course Description: Principles of toxicology for applications in industrial hygiene and environmental public health.  
Prerequisite: CHEM 113 and LIFE 102.  
Registration Information: This is a partial semester course.  
Term Offered: Spring.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 504 Occupational and Environmental Toxicology  Credits: 2 (2-0-0)  
Course Description: Toxic effects of harmful agents found in occupational and environmental settings.  
Prerequisite: ERHS 446 or ERHS 502 or ERHS 503, may be taken concurrently.  
Registration Information: This is a partial semester course.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 505 Publishing in Epidemiology and Public Health  Credit: 1 (1-0-0)  
Course Description: Explore all aspects of publishing in a peer reviewed scientific journal in the public health field, including literature searches, citation methods, structure of a manuscript, and the peer review process. Examines the process to conduct a systematic review.  
Prerequisite: None.  
Restriction: Must be a: Graduate.  
Registration Information: Graduate standing.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 507A Toxicology Toolbox: Fundamentals  Credit: 1 (1-0-0)  
Course Description: Qualitative description of toxicant molecules relevant to their behavior in biological systems and the environment. Quantitative characterization of toxicant concentrations (dose) and how they change with time (toxicokinetics).  
Prerequisite: ERHS 446, may be taken concurrently or ERHS 448, may be taken concurrently or ERHS 502, may be taken concurrently.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 507B Toxicology Toolbox: Metabolism and Disposition  Credit: 1 (1-0-0)  
Course Description: Qualitative and quantitative description of toxicant molecules and the consequences of molecular alterations resulting from biotransformation. The role of reactive molecules in toxic effects. Quantification of toxicant behavior in biological systems.  
Prerequisite: ERHS 502, may be taken concurrently or ERHS 504, may be taken concurrently or ERHS 601, may be taken concurrently.  
Term Offered: Spring.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 510 Cancer Biology  Credits: 3 (3-0-0)  
Also Offered As: VS 510.  
Course Description: Cancer biology will address each of the hallmarks of cancer, including sustained proliferative signaling, evasion of growth suppression, invasion and metastasis, replicative immortality, angiogenesis, resisting cell death, genome instability and mutation, tumor promoting inflammation, deregulation of cellular energetics and avoidance of immune destruction. Lectures will integrate the biology behind these hallmarks with strategies for the treatment and prevention of cancer.  
Prerequisite: BC 351 or BC 403, may be taken concurrently or BZ 310 or CM 501.  
Registration Information: Credit not allowed for both ERHS 510 and VS 510.  
Term Offered: Spring.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 515 Non-Ionizing Radiation Safety  Credits: 2 (2-0-0)  
Course Description: Evaluation and safe use of non-ionizing radiation sources. Calculation of safe distances for exposure and maximum permissible exposures.  
Prerequisite: (CHEM 107 or CHEM 113) and (MATH 118 or MATH 120 or MATH 127) and (PH 122 or PH 142).  
Registration Information: Sections may be offered: Online.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 520 Environmental and Occupational Health Issues  Credits: 3 (3-0-0)  
Course Description: Issues in environmental and occupational health sciences in the context of public health and regulatory concerns.  
Prerequisite: BZ 110 or CHEM 103 or CHEM 107 or CHEM 111 or ERHS 220 or LIFE 102.  
Registration Information: Admission to the Master of Public Health program can be substituted for LIFE 102. Sections may be offered: Online. Credit not allowed for both ERHS 520 and PBHL 530.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 526 Industrial Hygiene  Credits: 3 (3-0-0)  
Course Description: Theory and application of industrial hygiene principles to management of the occupational environment.  
Prerequisite: (CHEM 245 or CHEM 341 or CHEM 345) and (ERHS 520, may be taken concurrently) and (PH 110 or PH 121).  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.  

ERHS 527 Industrial Hygiene Laboratory  Credit: 1 (0-3-0)  
Course Description: Industrial hygiene field monitoring equipment and techniques.  
Prerequisite: ERHS 526, may be taken concurrently.  
Term Offered: Fall.  
Grade Mode: Traditional.  
Special Course Fee: No.
ERHS 528  Occupational Safety  Credits: 3 (3-0-0)
Course Description: Introduction to occupational safety hazard recognition and control.
Prerequisite: ERHS 350.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 530  Radiological Physics and Dosimetry I  Credits: 3 (3-0-0)
Course Description: Theory and detection of ionizing radiation; measurement and calculation of exposure and dose.
Prerequisite: (MATH 155 or MATH 160) and (PH 122).
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 531  Nuclear Instruments and Measurements  Credits: 2 (1-3-0)
Course Description: Instrument systems for measurements and identification of ionizing radiations.
Prerequisite: ERHS 530, may be taken concurrently.
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 532  Epidemiologic Methods  Credits: 3 (2-0-1)
Course Description: Method of epidemiologic investigation and study design. Applications to disease control with literature examples.
Prerequisite: ERHS 307 or STAT 307.
Registration Information: Must register for lecture and recitation.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 534  SAS and Epidemiologic Data Management  Credits: 3 (3-0-0)
Course Description: Basic concepts and skills necessary for data management and analyses using SAS programming in epidemiology studies.
Prerequisite: None.
Registration Information: Graduate standing in Environmental Health.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 535  R Programming for Research  Credits: 3 (2-2-0)
Course Description: In-depth instruction on data collection, data management, programming, and visualization, using data examples relevant to academic research. Taught using the statistical programming language R, but the principles are translatable to other programming languages (e.g., Python, Matlab, SAS). Conducting reproducible research in R and how to construct custom functions and bundle these in a shareable R package.
Prerequisite: None.
Registration Information: Graduate standing. Must register for lecture and laboratory.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 536  Advanced Occupational Health  Credits: 3 (3-0-0)
Course Description: Advanced topics in occupational health emphasizing contemporary issues, topics, trends, and problems in the field of industrial hygiene.
Prerequisite: ERHS 446 or ERHS 526.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 537A  R Programming: Research I  Credit: 1 (1-0-0)
Course Description: Introduction to data collection, data management, programming, and visualization, using data examples relevant to academic research. Taught using the statistical programming language R, but the principles are translatable to other programming languages (e.g., Python, Matlab, SAS). Focuses on getting students started using R programming within their scientific research.
Prerequisite: None.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. This is a partial semester course. Credit allowed for only one of the following: ERHS 535, 537A, or ERHS 580A3.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 537B  R Programming: Research II  Credits: 2 (1-3-0)
Course Description: In-depth instruction on data collection, data management, programming, and visualization, using data examples relevant to academic research. Taught using the statistical programming language R, but the principles are translatable to other programming languages (e.g., Python, Matlab, SAS). Provides extensive coverage on conducting reproducible research in R and introduces advanced topics like how to construct custom functions and build interactive data displays.
Prerequisite: ERHS 537A, may be taken concurrently or ERHS 581A3.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. Must register for lecture and laboratory. This is a partial semester course. Credit allowed for only one of the following: ERHS 535, ERHS 537B, or ERHS 581A4.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 538  Geographic Information Systems and Health  Credits: 3 (1-3-1)
Course Description: Applications of geographic information systems (GIS) in public health. Topics include geographic theory, spatial data, cartography, data visualization, spatial analysis, geocoding, primary and secondary data acquisition, and application of GIS for epidemiologic analyses.
Prerequisite: ERHS 532.
Registration Information: Must register for lecture, lab, and recitation.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 540  Principles of Ergonomics  Credits: 3 (3-0-0)
Course Description: Theory and practice of ergonomics.
Prerequisite: None.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
ERHS 541  Ergonomics in Product and Process Design  Credits: 3 (3-0-0)
Course Description: Application of ergonomics to design of products and processes with respect to health, safety, function, and quality.
Prerequisite: ERHS 540.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 542 Biostatistical Methods for Qualitative Data  Credits: 3 (3-0-0)
Also Offered As: STAT 544.
Course Description: Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.
Prerequisite: STAT 301 or ERHS 307 or STAT 307.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 544 Biostatistical Methods for Quantitative Data  Credits: 3 (3-0-0)
Course Description: Statistical analysis of categorical data as obtained in epidemiology, toxicology, occupational health, and clinical sciences.
Prerequisite: STAT 301 or ERHS 307 or STAT 307.
Registration Information: Credit not allowed for both ERHS 544 and STAT 544.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 545  Environmental Exposure Assessment  Credits: 2 (2-0-0)
Course Description: Approaches and techniques for quantitative characterization of environmental exposure to harmful agents via inhalation, ingestion, and dermal pathways.
Prerequisite: ERHS 448, may be taken concurrently.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 546  Environmental Health Risk Assessment  Credits: 2 (2-0-0)
Course Description: Sample collection, quality control, theory and application of equipment and instrumentation for analysis and confirmation of organic-inorganic chemicals.
Prerequisite: CHEM 241 or CHEM 245 or CHEM 341 or CHEM 345.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

ERHS 547  Equipment and Instrumentation  Credits: 3 (0-6-0)
Course Description: Approaches and techniques for quantitative characterization of environmental exposure to harmful agents via inhalation, ingestion, and dermal pathways.
Prerequisite: ERHS 448, may be taken concurrently.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 548  Environmental Health Risk Assessment  Credits: 2 (1-0-0)
Course Description: Application of basic radiation biology to the clinical application of radiation therapy. Radiation sensitivity and tolerance is evaluated based on normal tissue architecture and kinetics. The mechanisms of acute and late radiation effects are elucidated. The impact of time, dose, and fractionation on tumor control and radiation effects are clarified and related to established and newer treatment modalities, including combination therapies and emerging technologies.
Prerequisite: ERHS 551A.
Registration Information: Credit not allowed for both ERHS 551A and ERHS 550.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 550A  Radiation Biology Principles for Medicine: Principles of Radiation Biology  Credits: 2 (2-0-0)
Course Description: Biological responses to radiation exposure; DNA damage and repair, cell killing and survival, carcinogenesis and genetic effects.
Prerequisite: BZ 310.
Registration Information: Credit not allowed for both ERHS 551A and ERHS 550.
Term Offered: Online.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 550B  Radiation Biology Principles for Medicine: Principles of Radiation Oncology  Credits: 2 (2-0-0)
Course Description: Application of basic radiation biology to the clinical application of radiation therapy. Radiation sensitivity and tolerance is evaluated based on normal tissue architecture and kinetics. The mechanisms of acute and late radiation effects are elucidated. The impact of time, dose, and fractionation on tumor control and radiation effects are clarified and related to established and newer treatment modalities, including combination therapies and emerging technologies.
Prerequisite: ERHS 551A.
Registration Information: Credit not allowed for both ERHS 551B and ERHS 550.
Term Offered: Online.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 550C  Radiation Biology Principles for Medicine: Principles of Radiation Protection  Credit: 1 (1-0-0)
Course Description: Radiation risk assessment and protection; risk versus benefit associated with environmental and medical exposures.
Prerequisite: ERHS 550B.
Registration Information: Credit not allowed for both ERHS 551B and ERHS 550.
Term Offered: Online.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 551  Environmental Health Risk Assessment  Credits: 3 (3-0-0)
Course Description: Application of basic radiation biology to the clinical application of radiation therapy. Radiation sensitivity and tolerance is evaluated based on normal tissue architecture and kinetics. The mechanisms of acute and late radiation effects are elucidated. The impact of time, dose, and fractionation on tumor control and radiation effects are clarified and related to established and newer treatment modalities, including combination therapies and emerging technologies.
Prerequisite: ERHS 551A.
Registration Information: Credit not allowed for both ERHS 551B and ERHS 550.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 552  Environmental Health Risk Assessment  Credits: 3 (3-0-0)
Course Description: Application of basic radiation biology to the clinical application of radiation therapy. Radiation sensitivity and tolerance is evaluated based on normal tissue architecture and kinetics. The mechanisms of acute and late radiation effects are elucidated. The impact of time, dose, and fractionation on tumor control and radiation effects are clarified and related to established and newer treatment modalities, including combination therapies and emerging technologies.
Prerequisite: ERHS 551A.
Registration Information: Credit not allowed for both ERHS 551B and ERHS 550.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 553  Environmental Health Risk Assessment  Credits: 2 (2-0-0)
Course Description: Application of basic radiation biology to the clinical application of radiation therapy. Radiation sensitivity and tolerance is evaluated based on normal tissue architecture and kinetics. The mechanisms of acute and late radiation effects are elucidated. The impact of time, dose, and fractionation on tumor control and radiation effects are clarified and related to established and newer treatment modalities, including combination therapies and emerging technologies.
Prerequisite: ERHS 551A.
Registration Information: Credit not allowed for both ERHS 551B and ERHS 550.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 554  Environmental Health Risk Assessment  Credits: 2 (2-0-0)
Course Description: Application of basic radiation biology to the clinical application of radiation therapy. Radiation sensitivity and tolerance is evaluated based on normal tissue architecture and kinetics. The mechanisms of acute and late radiation effects are elucidated. The impact of time, dose, and fractionation on tumor control and radiation effects are clarified and related to established and newer treatment modalities, including combination therapies and emerging technologies.
Prerequisite: ERHS 551A.
Registration Information: Credit not allowed for both ERHS 551B and ERHS 550.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 555  Environmental Health Risk Assessment  Credits: 3 (3-0-0)
Course Description: Application of basic radiation biology to the clinical application of radiation therapy. Radiation sensitivity and tolerance is evaluated based on normal tissue architecture and kinetics. The mechanisms of acute and late radiation effects are elucidated. The impact of time, dose, and fractionation on tumor control and radiation effects are clarified and related to established and newer treatment modalities, including combination therapies and emerging technologies.
Prerequisite: ERHS 551A.
Registration Information: Credit not allowed for both ERHS 551B and ERHS 550.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 556  Environmental Health Risk Assessment  Credits: 3 (3-0-0)
Course Description: Application of basic radiation biology to the clinical application of radiation therapy. Radiation sensitivity and tolerance is evaluated based on normal tissue architecture and kinetics. The mechanisms of acute and late radiation effects are elucidated. The impact of time, dose, and fractionation on tumor control and radiation effects are clarified and related to established and newer treatment modalities, including combination therapies and emerging technologies.
Prerequisite: ERHS 551A.
Registration Information: Credit not allowed for both ERHS 551B and ERHS 550.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.
ERHS 560 Health Impact Assessment Credits: 2 (1-2-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: None.
Restriction: Must be a Graduate, Graduate cooperative program.
Registration Information: Graduate standing. Must register for lecture and laboratory.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 561 Radiation Public Health Credits: 2 (2-0-0)
Course Description: Aspects of radiation public health for students in health physics with emphasis on contemporary issues in radiation protection.
Prerequisite: ERHS 400 and ERHS 450 or ERHS 530 and ERHS 550, may be taken concurrently.
Registration Information: ERHS 400 with written consent of instructor or ERHS 530.
Terms Offered: Fall, Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 562 Environmental Contaminant Modeling I Credits: 2 (2-0-0)
Course Description: Mathematical modeling of radionuclide and chemical transport in aquatic and terrestrial ecosystems.
Prerequisite: MATH 155.
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

ERHS 563 Environmental Contaminant Modeling II Credits: 2 (2-0-0)
Course Description: Current understanding of chemical and biological agents used in asymmetric warfare.
Prerequisite: CHEM 241 or CHEM 245 or CHEM 341 or CHEM 345.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 564 Forensic Toxicology Credits: 3 (2-2-0)
Course Description: Toxic effects of commonly encountered abused substances and laboratory methods to identify and measure these.
Prerequisite: CHEM 241 or CHEM 245 or CHEM 341 or CHEM 345.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

ERHS 565 Chemical and Biological Warfare Agents Credits: 2 (2-0-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: CHEM 241 or CHEM 245 or CHEM 341 or CHEM 345.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 566 Forensic Toxicology Credits: 3 (2-2-0)
Course Description: Hands-on techniques exposure to molecular toxicology.
Prerequisite: None.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

ERHS 567 Cell and Molecular Toxicology Techniques Credits: 3 (0-6-0)
Course Description: Toxicology as applied in public (regulatory) and private (pharmaceutical, industrial) sectors.
Prerequisite: ERHS 446, may be taken concurrently or ERHS 502, may be taken concurrently.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 568 Pharmaceutical and Regulatory Toxicology Credits: 3 (3-0-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: ERHS 446 and MIP 342 or ERHS 502 or ERHS 503.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 569 Immunotoxicology Credits: 3 (2-0-1)
Course Description: Must register for lecture and recitation.
Prerequisite: ERHS 446 and MIP 342 or ERHS 502 or ERHS 503.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 570 Radiation Protection Credits: 2 (2-0-0)
Course Description: Environmental transport and exposure assessment of radioactive and other contaminants; estimating risk for human health and ecological impacts.
Prerequisite: None.
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

ERHS 573 Design and Conduct of Epidemiologic Research Credits: 2 (2-0-0)
Course Description: Design and implement an epidemiologic study from the development of a research question and study design through data analysis and dissemination.
Prerequisite: ERHS 532 or PBHL 570.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 595A Independent Study: Medical Radiotherapy Credits: Var[1-18] (0-0-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: ERHS 532 or PBHL 570.
Term Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: Yes.

ERHS 595B Independent Study: Medical Imaging Credits: Var[1-18] (0-0-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: ERHS 532 or PBHL 570.
Term Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: Yes.

ERHS 595C Independent Study: Large Animal Radiology Credits: Var[1-18] (0-0-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: ERHS 532 or PBHL 570.
Term Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: Yes.

ERHS 595D Independent Study: Radiation Therapy Credits: Var[1-18] (0-0-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: ERHS 532 or PBHL 570.
Term Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: Yes.

ERHS 595E Independent Study: Radiation Physics Credits: Var[1-18] (0-0-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: ERHS 532 or PBHL 570.
Term Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: Yes.

ERHS 595F Independent Study: Dosimetry Credits: Var[1-18] (0-0-0)
Course Description: Application of a Health Impact Assessment approach to systematically judge the potential health effects of a policy or project and the distribution of those effects within the population.
Prerequisite: ERHS 532 or PBHL 570.
Term Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: Yes.
ERHS 595H  Independent Study: Radiation Biology  Credits: Var[1-18] (0-0-0)
Course Description: 
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 595I  Independent Study: Radiological Health  Credits: Var[1-18] (0-0-0)
Course Description: 
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 595J  Independent Study: Radiation Ecology  Credits: Var[1-18] (0-0-0)
Course Description: 
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 595K  Independent Study: Microcomputer Analysis  Credits: Var[1-18] (0-0-0)
Course Description: 
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 603  Toxicological Pathology  Credits: 3 (3-0-0)
Course Description: Toxicological study of pharmacologic, chemical and environmental agents and resulting morphologic and cellular changes.
Prerequisite: BMS 300 or BMS 360.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 611  Cancer Genetics  Credits: 2 (2-0-0)
Course Description: Role of genetic background in determining individual susceptibility to cancer.
Prerequisite: BZ 350 or MIP 450.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 630  Radiological Physics and Dosimetry II  Credits: 3 (3-0-0)
Course Description: Calculations and measurement techniques for dosimetry shielding and protection from ionizing radiations.
Prerequisite: ERHS 530.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 632  Techniques in Radiation Dosimetry  Credit: 1 (0-3-0)
Course Description: Techniques for determining the absorbed dose in tissue from ionizing radiations.
Prerequisite: ERHS 630, may be taken concurrently.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 633  Radiation Detection Methods in Radiobiology  Credit: 1 (0-3-0)
Course Description: Detection and measurement of ionizing radiation appropriate for radiobiologists.
Prerequisite: ERHS 630, may be taken concurrently.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 636  Industrial Hygiene Control Methods  Credits: 3 (3-0-0)
Course Description: Controlling occupational exposures to chemical agents, emphasizing local exhaust ventilation; personal protective devices.
Prerequisite: ERHS 526 and ERHS 536, may be taken concurrently.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.
ERHS 637 Environment, Safety, and Health Management Credits: 3 (3-0-0)
Course Description: Environment, safety, and health management systems for occupational health practitioners; major environmental and DOT regulatory standards and laws.
Prerequisite: ERHS 526.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 638 Geospatial Analysis for Environmental Health Credits: 3 (2-2-0)
Course Description: Introduction to acquisition, organization, and analysis of data relevant to environmental health. Data sources covered include regulatory and low-cost ground-based air sensors, remote sensing (satellite) products, climate and weather model output, as well as data on water quality, traffic and mobility, and housing and sociodemographics. Methodological topics covered include geostatistical models, downscaling, predictive modeling, and machine learning.
Prerequisite: STAR 512 or STAR 531 or STAT 512.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Registration Information: Must register for lecture and laboratory.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 640 Advanced Epidemiology Methods I Credits: 3 (3-0-0)
Course Description: In-depth exploration of key epidemiologic concepts and methods.
Prerequisite: ERHS 532 or PBHL 570.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 642 Applied Logistic Regression Credits: 3 (3-0-0)
Course Description: Basic and advanced concepts of logistic regression with focus on practical applications in epidemiology using SAS.
Prerequisite: ERHS 532 and ERHS 542.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 656 Occupational Noise Control Credits: 3 (3-0-0)
Course Description: Measurement and control of industrial or environmental noise emphasizing practical solutions.
Prerequisite: ERHS 527.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 658 Environmental and Occupational Epidemiology Credits: 2 (2-0-0)
Course Description: Epidemiologic methods and concepts for and about the study of environmental and occupational determinants of disease presented through lectures and discussions based on relevant literature. Emphasis on the most suitable epidemiologic approaches to characterize the health effects of selected environmental and occupational agents.
Prerequisite: ERHS 532 or PBHL 570.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 665 Radiochemistry Credits: 3 (2-3-0)
Course Description: Radionuclide separation and measurement and radiotracer applications in physical and biological systems.
Prerequisite: (CHEM 114 and MATH 155) and (ERHS 530, may be taken concurrently).
Restriction: Must be a: Graduate, Professional.
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 670 Directed Readings Credits: Var[1-3] (0-0-0)
Course Description: Advanced study through supervised readings on specialized topics.
Prerequisite: ERHS 520.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 671 Experimental Radioecology Credit: 1 (0-3-0)
Course Description: Experimental techniques used in radioecological and environmental radioactivity studies.
Prerequisite: (ERHS 400 or ERHS 532) and (ERHS 570).
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

ERHS 675 Environmental Health Regulatory Compliance Credits: 3 (3-0-0)
Course Description: Requirements and strategies for meeting obligations under regulations and laws involved in environmental and occupational health protection.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: 15 credits of ERHS courses 500-level or above or written consent of instructor.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.
ERHS 679 Occ Env Health Interdisciplinary Symposium Credits: 2 (0-0-2)
Course Description: Evaluation of occupational and environmental health issues, through multidisciplinary interactions in seminars and field visits.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Enrollment in a graduate program related to occupational, environmental, or public health. May be repeated for credit. Required field trips.
Term Offered: Fall.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

ERHS 684 Supervised College Teaching Credits: Var[1-3] (0-0-0)
Course Description: Participation in environmental health course teachings under guidance of faculty in classroom, laboratory, or field.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 687 Internship Credits: Var[1-6] (0-0-0)
Course Description: Advanced study or research in environmental health with a governmental agency, private sector entity, or research facility.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 692 Seminar Credit: 1 (0-0-1)
Course Description: Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 693A Research Seminar: Epidemiology Credit: 1 (0-0-1)
Course Description: Presentation of student research and discussion of publications from scientific literature.
Prerequisite: None.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 693B Research Seminar: Industrial Hygiene Credit: 1 (0-0-1)
Course Description: Presentation of student research and discussion of publications from scientific literature.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 693C Research Seminar: Toxicology Credit: 1 (0-0-1)
Course Description: Presentation of student research and discussion of publications from scientific literature.
Prerequisite: None.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 693D Research Seminar: Health Physics Credit: 1 (0-0-1)
Course Description: Presentation of student research and discussion of publications from scientific literature.
Prerequisite: None.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695A Independent Study: Epidemiology Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in epidemiology under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695B Independent Study: Occupational and Environmental Health Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in occupational and environmental health under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695C Independent Study: Toxicology Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in toxicology under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695D Independent Study: Radiation Chemistry Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in radiation chemistry under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.
ERHS 695E Independent Study: Radiation Ecology Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in radiation ecology under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695F Independent Study: Cancer Biology Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in cancer biology under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695G Independent Study: Health Physics Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in health physics under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695H Independent Study: Exposure Assessment Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in exposure assessment under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695I Independent Study: Small Animal Radiology Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in small animal radiology under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695J Independent Study: Large Animal Radiology Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in large animal radiology under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695K Independent Study: Special Techniques in Radiology Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in special techniques in radiology under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695L Independent Study: Radiation Therapy Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in radiation therapy under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695M Independent Study: Computed Tomography Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in computed tomography under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695N Independent Study: Magnetic Resonance Imaging Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in magnetic resonance imaging under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695O Independent Study: Ultrasound Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in ultrasound under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 695P Independent Study: Nuclear Medicine Credits: Var[1-18] (0-0-0)
Course Description: Specialized study in nuclear medicine under supervision of faculty.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.
ERHS 696A Group Study: Epidemiology Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: ERHS 520.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 696B Group Study: Industrial Hygiene Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: ERHS 520.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 696C Group Study: Toxicology Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 696D Group Study: Health Physics Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: ERHS 530.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 698 Research Credits: Var[1-6] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Written consent of instructor. Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 699 Thesis Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 701 Advanced Diagnostic Imaging Modalities Credits: 4 (4-0-0)
Course Description: Interpretation/applications of advanced imaging methods including ultrasound, nuclear medicine, magnetic resonance imaging and computed tomography.
Prerequisite: VM 786A or VM 786B.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 701A Advanced Diagnostic Imaging Modalities: Small Animal Imaging Credits: 3 (3-0-0)
Course Description: Interpretation/applications of advanced imaging methods as applied to small animals including ultrasound, nuclear medicine, magnetic resonance imaging and computed tomography.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: This is a partial semester course. Credit allowed for only one of the following courses: ERHS 701, ERHS 701A, or ERHS 701C. Credit is allowed for both ERHS 701A and ERHS 701B.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 701B Advanced Diagnostic Imaging Modalities: Large Animal Credit: 1 (1-0-0)
Course Description: Interpretation/applications of advanced imaging methods as applied to large animals including ultrasound, nuclear medicine, magnetic resonance imaging and computed tomography.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: This is a partial semester course. Credit allowed for only one of the following courses: ERHS 701, ERHS 701B, or ERHS 701C. Credit is allowed for both ERHS 701A and ERHS 701B.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 701C Advanced Diagnostic Imaging Modalities: Small and Large Animal Imaging Credits: 4 (4-0-0)
Course Description: Interpretation/applications of advanced imaging methods including ultrasound, nuclear medicine, magnetic resonance imaging and computed tomography. Covers both small and large animal imaging.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Credit not allowed for both ERHS 701 and ERHS 701C. Students registering for ERHS 701C may not also receive credit for either ERHS 701A and/or ERHS 701B.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 702A Methods in Radiation and Cancer Biology: Mammalian Cell Culture Techniques Credit: 1 (0-3-0)
Course Description: Provides basic information to grow mammalian cells and control and monitor the cell behaviors after irradiation. Focus on mammalian cell culture basics and further biological endpoints after irradiation.
Prerequisite: ERHS 550, may be taken concurrently.
Restriction: Must be a: Graduate, Professional.
Registration Information: Credit not allowed for both CM 702B and ERHS 702A.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.
ERHS 702B Methods in Radiation and Cancer Biology: Radiation Molecular Biology Techniques Credit: 1 (0-3-0)
Course Description: Learn how to carry out molecular biology analysis with radiation. Focus on quantifying the changes in DNA, RNA, and proteins in mammalian cells. Learn techniques with actual sample handling.
Prerequisite: ERHS 550, may be taken concurrently.
Restriction: Must be a: Graduate, Professional.
Registration Information: Credit not allowed for both CM 702C and ERHS 702B.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 702C Methods in Radiation and Cancer Biology: Radiation Cytogenetics Credit: 1 (0-3-0)
Course Description: Learn how to carry out cytogenetic techniques and analyze DNA damage and chromosome aberrations under a microscope and other equipment. Focus on detecting DNA damage in mammalian cell culture exposed to ionizing radiation and other chemical mutagens.
Prerequisite: ERHS 550, may be taken concurrently.
Restriction: Must be a: Graduate, Professional.
Registration Information: Credit not allowed for both CM 702D and ERHS 702C.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 730 Principles of Flow Cytometry & Cell Sorting Credits: 2 (1-2-0)
Also Offered As: MIP 730.
Course Description: Explores the background of flow cytometry, fluorescent molecules, experimental design, Flow Cytometry data analysis, applications, and principles of cell sorting.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Must register for lecture and laboratory. This is a partial semester course. Credit not allowed for both ERHS 730 and MIP 730.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.
ERHS 732 Advanced Epidemiological Analysis Credits: 2 (2-0-0)
Course Description: Provides the opportunity to implement theoretical expertise through designing and conducting advanced epidemiologic research analyses. Gain in-depth experience analyzing datasets from the environmental epidemiology literature.
Prerequisite: (ERHS 534 or ERHS 535) and (ERHS 640) and (STAR 511 or STAT 511A or STAT 511B).
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 733 Environmental Carcinogenesis Credits: 3 (3-0-0)
Course Description: Molecular and cellular mechanisms by which environmental carcinogens exert effects.
Prerequisite: BC 403.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 740 Advanced Epidemiology Methods II Credits: 3 (3-0-0)
Course Description: Provides a strong foundation for understanding the theoretical basis of currently used epidemiologic methods and also to help acquire an understanding of the process of developing novel approaches. Emphasizes drawing causal inference from epidemiologic studies and evaluate strengths and limitations of different estimation approaches in light of specific studies and potential sources of bias.
Prerequisite: (ERHS 640) and (STAR 512 or STAT 512).
Restriction: Must be a: Graduate, Graduate cooperative program, Professional.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 750 Grant Writing for Environmental Health Credits: 2 (2-0-0)
Course Description: Explores the most common mechanisms of research grant proposals and covers all major aspects of developing an original grant proposal. Peer review concepts are also covered.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Written consent of instructor.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 751 Advanced Radiation Biology I Credits: 3 (3-0-0)
Course Description: Molecular and cellular mechanisms of radiation damage and repair; mammalian radiation genetics.
Prerequisite: ERHS 550.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 753 Advanced Radiation Biology II Credits: 3 (3-0-0)
Course Description: Perturbations in cell cycle and cell population growth kinetics by radiation; radiation effects on normal tissues; radiation oncogenesis.
Prerequisite: ERHS 550.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 760 Interpreting Epidemiologic Evidence Credits: 2 (2-0-0)
Course Description: Seeks to enhance versatility in combining subject matter knowledge and command of epidemiologic methods to make appropriate inferences from available research. Judge causality and identify gaps that future research needs to strengthen understanding of the substantive epidemiologic evidence.
Prerequisite: ERHS 740.
Restriction: Must be a: Graduate, Professional.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

ERHS 765 Environmental Contaminant Modeling II Credit: 1 (0-3-0)
Course Description: Development and analysis of advanced computer models for radionuclide and chemical transport in aquatic and terrestrial ecosystems.
Prerequisite: ERHS 563 and ERHS 570.
Restriction: Must be a: Graduate, Professional.
Term Offered: Summer.
Grade Modes: S/U within Student Option, Trad within Student Option.
Special Course Fee: No.

ERHS 770 Radiation/Cancer Biology-Comparative Oncology Credit: 1 (0-0-1)
Course Description: Seminar series covering current aspects of radiation and cancer biology pertinent to comparative oncology. Present individual projects and lead discussion of presentation topics.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

ERHS 784 Supervised College Teaching Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 786 Practicum Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: ERHS 530.
Restriction: Must be a: Graduate, Professional.
Term Offered: Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 787 Internship Credits: Var[1-6] (0-0-0)
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 792 Seminar Credit: 1 (0-0-1)
Course Description: Professional seminar series with student interaction on weekly basis; topics presented by outside experts, faculty, or doctoral candidates.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.
### ERHS 793 Seminar Credit: 1 (0-0-1)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795A Independent Study: Epidemiology Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795B Independent Study: Occupational and Environmental Health Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795C Independent Study: Toxicology Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795D Independent Study: Radiation Chemistry Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795E Independent Study: Radiation Ecology Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795F Independent Study: Cancer Biology Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795G Independent Study: Health Physics Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795H Independent Study: Exposure Assessment Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795I Independent Study: Small Animal Radiology Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795J Independent Study: Large Animal Radiology Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795K Independent Study: Special Techniques in Radiology Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795L Independent Study: Radiation Therapy Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.

### ERHS 795M Independent Study: Computed Tomography Credits: Var[1-18] (0-0-0)
**Course Description:**
**Prerequisite:** None.
**Restriction:** Must be a: Graduate, Professional.
**Terms Offered:** Fall, Spring, Summer.
**Grade Mode:** Instructor Option.
**Special Course Fee:** No.
ERHS 795N  Independent Study: Magnetic Resonance Imaging  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 795O  Independent Study: Ultrasound  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 795P  Independent Study: Nuclear Medicine  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 796  Group Study  Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

ERHS 799  Dissertation  Credits: Var[1-18] (0-0-0)
Course Description: Doctoral-level research and preparation of dissertation.
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.