Fall 2020 Course Descriptions as of 04/05/2020 08:10 PM

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Biostatistics (BIOS)

BIOS 376: Introduction to Biostatistics (3 units)
Description: This course introduces biostatistical methods and applications, covering descriptive statistics, probability, and inferential techniques necessary for appropriate analysis and interpretation of data relevant to health sciences. Students will use a statistical software package.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Equivalent to: CPH 376
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Spring

Enrollment requirement: MATH 112 or higher.

BIOS 399: Independent Study (1 - 4 units)
Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.
Grading basis: Alternative Grading: S, P, F
Career: Undergraduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

BIOS 399H: Honors Independent Study (1 - 4 units)
Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer

Enrollment requirement: Student must be active in the Honors College.
Honors Course: Honors Course
Honors Course: Honors Course

BIOS 450: Health Data Acquisition and Assessment (3 units)
Description: Students learn how to identify and acquire medical and health data, assess quality, and integrate data from multiple sources. Students gain knowledge of how data collection procedures influence data quality and techniques for combining health datasets. Students gain skills by completing applied projects to collect, access and work with existing health data.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Also offered as: EPID 450
Course typically offered:
Main Campus: Fall

Home department: Epidemiology and Biostatistics
Enrollment requirement: EPID 309 and BIOS 376

BIOS 451: Health Data Management and Visualization (3 units)
Description: This course teaches students basic programming approaches for mapping large disparate health data to analyzable formats. Students will also gain data processing skills including version control, assessment for missing data, errors, and outliers. Students will develop hands-on skills including batch processing, and data aggregation and learn how to create and manage a database using REDCap. Students will also learn what data visualization is, and how they can use it to better present and understand health data.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Also offered as: EPID 451
Course typically offered:
Main Campus: Fall

Enrollment requirement: EPID 309 and BIOS 376

BIOS 452: Health Data Analysis and Communication Methods (3 units)
Description: This course bridges the concepts learned in introduction to epidemiology and biostatistics courses to teach students the skills to identify and implement the appropriate statistical methods to answer public health and biomedical research questions based on study and sampling designs. Students apply these skills to large public health and biomedical databases. Students learn how to present their results graphically and through the use of social media (e.g. YouTube) to communicate findings to lay audiences.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Also offered as: EPID 452
Course typically offered:
Main Campus: Spring

Enrollment requirement: EPID 309 and BIOS 376

BIOS 453: Health Data Science Practice (3 units)
Description: This course will provide a culminating research experience that tests all competencies through a hands-on semester-long project-based research course. This course will allow students to immerse themselves in a health data science project in public health and biomedical science. This project will entail a review of the current evidence-base for their specific research question and use the data scientist skills developed in the previous courses to assess and analyze public health data and communicate findings to the public.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Lecture Required
Also offered as: EPID 453
Course typically offered:
Main Campus: Fall

Home department: Epidemiology and Biostatistics
Enrollment requirement: EPID 309, BIOS 376, EPID 450, BIOS 451, BIOS 452

BIOS 491: Preceptorship (1 - 6 units)
Description: Specialized work on an individual basis, consisting of instruction and practice in actual service to a department, program, or discipline. Teaching formats may include seminars, in-depth studies, laboratory work, and patient study.
Grading basis: Alternative Grading: S, P, F
Career: Undergraduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 2 times.
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

BIOS 492: Directed Research (1 - 6 units)
Description: Individual or small group research under the guidance of faculty.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 2 times.
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

BIOS 493C: Global Experience in Public Health (1 - 3 units)
Description: This course provides a family or community focused public health experience in an international or under-served location working with a local governmental or non-governmental agency to improve the health and well-being of a vulnerable population. The course emphasizes an in-depth, field-based experience.
Grading basis: Alternative Grading: S, P, F
Career: Undergraduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 2 times.
Also offered as: EHS 493C, EPID 493C, HPS 493C, PHP 493C, PHPM 493C
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

Home department: Health Promotional Services

BIOS 498H: Honors Thesis (3 units)
Description: An honors thesis is required of all students graduating with honors. Students ordinarily sign up for this course as a two-semester sequence. The first semester the student performs research under the supervision of a faculty member; the second semester the student writes an honors thesis.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 3 times.
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

Enrollment requirement: Student must be active in the Honors College.
Honors Course: Honors Course
Honors Course: Honors Course
Writing Emphasis: Writing Emphasis Course

BIOS 499: Independent Study (1 - 4 units)
Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.
Grading basis: Alternative Grading: S, P, F
Career: Undergraduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

BIOS 499H: Honors Independent Study (1 - 4 units)
Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.
Grading basis: Regular Grades
Career: Undergraduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

Enrollment requirement: Student must be active in the Honors College.
Honors Course: Honors Course
Honors Course: Honors Course

BIOS 503: Introduction to Statistical Analysis Using STATA (1 unit)
Description: This course provides an introduction to statistical analysis using the STATA software package. It will introduce methods for entering, modifying and managing data, and provide examples of commonly used statistical analyses.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

Recommendations and additional information: BIOS/EPID/CPH 576A.

BIOS 504: Introduction to Statistical Analysis Using SAS (1 unit)
Description: This course provides an introduction to statistical analysis using the SAS software package. It will introduce methods for entering, modifying and managing data , and provide examples of commonly used statistical analysis.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Fall, Spring

Recommendations and additional information: Concurrent or previous enrollment in BIOS/EPID/CPH 576A.

BIOS 511: Healthcare Data Science (3 units)
Description: This course introduces you new tools and techniques used in healthcare related data sciences. Topics include: Basic knowledge of large clinical databases focusing on medical records, Cohort definition and extraction, Intro to SQL, Linux basic, Collaborative research using Git/GitHub, High performance computing and cloud computing, Shiny, Docker, TidyVerse, Basic predictive modeling, Select tool from data science for example spark (distributed analysis), TensorFlow.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Also offered as: EPID 511
Course typically offered:
Main Campus: Fall

Recommendations and additional information: Background in statistical computing, data management.
Field trip: none

BIOS 574B: Bayesian Statistical Theory and Applications (3 units)
Description: Basic theory of Bayesian inference, including analytical and numerical methods for assessing posterior and predictive distributions, and applications. Topics will include Bayesian analysis of normal linear regression and computational methods including Markov chain Monte Carlo.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: STAT 574B
Also offered as: ECON 574B, STAT 574B
Course typically offered:
Main Campus: Spring

Recommendations and additional information: ECON 522A, ECON 522B; concurrent registration, MATH 566 and MATH 571A.
Home department: Economics

BIOS 574E: Environmental Statistics (3 units)
Description: Statistical methods for environmental and ecological sciences, including nonlinear regression, generalized linear models, temporal analyses, spatial analyses/kriging, quantitative risk assessment.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 574E, MATH 574E
Also offered as: MATH 574E, STAT 574E
Course typically offered:
Main Campus: Spring

Recommendations and additional information: MATH 571B, or PSYC 507C, or equivalent.
Home department: Committee on Statistics

BIOS 576A: Biostatistics in Public Health (3 units)
Description: This course introduces biostatistical methods and applications, and will cover descriptive statistics, probability theory, and a wide variety of inferential statistical techniques that can be used to make practical conclusions about empirical data. Students will also be learning to use a statistical software package (STATA or SAS).
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 576A, EPI 576A
Course typically offered:
Main Campus: Fall, Spring
Online Campus: Spring

Recommendations and additional information: One year of college-level mathematics.

BIOS 576B: Biostatistics for Research (3 units)
Description: Descriptive statistics and statistical inference relevant to biomedical research, including data analysis, regression and correlation analysis, analysis of variance, survival analysis, biological assay, statistical methods for epidemiology and statistical evaluation of clinical literature.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 576B, EPI 576B
Course typically offered:
Main Campus: Spring
Online Campus: Spring

Recommendations and additional information: BIOS/EPID 576A, EPID 573A.

BIOS 576C: Applied Biostatistic Analysis (3 units)
Description: Integrate methods in biostatistics (EPID 576A, B) and Epidemiology (EPID 573A, B) to develop analytical skills in an epidemiological project setting.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 576C, EPI 576C
Course typically offered:
Main Campus: Fall

Recommendations and additional information: BIOS/EPID 576A, BIOS/EPID 576B, EPID 573A, EPID 573B or consent of instructor.

BIOS 576D: Data Management and the SAS Programming Language (3 units)
Description: This course will introduce students to the fundamentals of data management using the SAS programming language. Emphasis will be placed on data manipulation, including reading, processing, recoding, and reformatting data. The approach will be to teach by example, with an emphasis on hands-on learning.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 576D, EPI 576D, EPI 596D
Course typically offered:
Main Campus: Fall

Recommendations and additional information: BIOS/EPID 576A, EPID 573A.

BIOS 580: Integrated Public Health Learning Experience (1 unit)
Description: An analysis of public health cases that integrates core public health knowledge and competencies to determine the best systems, policies and programs for decreasing morbidity and premature mortality.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Also offered as: EHS 580, EPID 580, HPS 580, PHP 580, PHPM 580
Course typically offered:
Main Campus: Fall, Spring, Summer
Online Campus: Fall, Spring, Summer

Recommendations and additional information: Students must have completed or concurrently finishing their core public health courses and have completed at least 21 total units of course work.
Home department: Public Health and Practice

BIOS 585: Public Health Fundamentals for Researchers (3 units)
Description: The fundamental principles of public health are presented for students in any graduate academic program. The course explores theoretical aspects of public health and provides practical application designed to improve understanding and performance of researchers in public health settings. Mastery of course objectives will provide academic graduate students with a clear working knowledge of public health basics.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Lecture Required
Also offered as: EHS 585, EPID 585, HPS 585
Course typically offered:
Main Campus: Spring

Recommendations and additional information: Completion of an undergraduate degree in a field related to public health.
Field trip: The class will have two required field trips:(1) Evening in Tucson to attend Board of Health meeting; (2) One trip on Saturday to Nogales AZ address globalization issues.
Home department: Community, Environment & Pol

BIOS 593C: Global Experience in Public Health (1 - 3 units)
Description: This course provides a population focused public health experience in an international or under-served location working with a local governmental or non-governmental agency to assess and to improve people's health and well-being. The course emphasizes an in-depth field-based experience.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 2 times.
Also offered as: EHS 593C, EPID 593C, HPS 593C, PHP 593C, PHPM 593C
Course typically offered:
Main Campus: Fall, Spring, Summer 1 and 2

Recommendations and additional information: Permission of instructor.
Home department: Epidemiology and Biostatistics

BIOS 599: Independent Study (1 - 6 units)
Description: Qualified students working on an individual basis with professors who have agreed to supervise such work. Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699, or 799.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer

BIOS 609: Evaluating Public Health Literature (1 unit)
Description: Concepts for the critical analysis of the scientific literature within public health and the broader field of medicine are reviewed. Topics including understanding the research stream, study design, statistical methodology, and the accurate presentation of results are addressed.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Repeatable: Course can be repeated a maximum of 3 times.
Also offered as: EHS 609, EPID 609, HPS 609, PHPM 609
Course typically offered:
Main Campus: Fall, Spring

Home department: Health Promotional Services

BIOS 647: Analysis of Categorical Data (3 units)
Description: This course deals with the analysis of categorical data. It emphasizes applications in epidemiology, clinical trials, and other public health research, and will cover concepts and methods for binomial, multinomial, and count data, as well as proportions and incidence rates.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 647
Course typically offered:
Main Campus: Spring

Recommendations and additional information: BIOS/EPID 576A, BIOS/EPID 576B; one year of college calculus or consent of instructor.

BIOS 648: Analysis of High Dimensional Data (3 units)
Description: This course deals with the analysis of high dimensional data. It will cover multiple comparison, clustering and classification of high dimensional data, and regression methods involving high dimensional variables. Students will also learn the corresponding computer software.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 648
Course typically offered:
Main Campus: Spring (even years only)

Recommendations and additional information: BIOS/EPID 576A, BIOS/EPID 576B; one year of college calculus, a course in matrix algebra, or consent of instructor.

BIOS 675: Clinical Trials and Intervention Studies (3 units)
Description: A fundamentals course on issues in the design, operation and analysis of controlled clinical trials and intervention studies. Emphasis on randomized long-term multicenter trials.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 675, EPI 675
Also offered as: EPID 675
Course typically offered:
Main Campus: Spring (odd years only)

Recommendations and additional information: BIOS/EPID 576A, BIOS/EPID 576B.

BIOS 684: General Linear and Mixed Effects Models (3 units)
Description: This course introduces basic concepts of linear algebra that are essential for understanding more advanced statistical modeling methodology. This knowledge is used to understand the General Linear Model (GLM) which includes linear regression, ANOVA, and other special applications and modern methods for the analysis of repeated measures, correlated outcomes and longitudinal data, including the unbalanced and incomplete data sets characteristic of biomedical research. Topics include an introduction to matrices for statistics, general linear models, analysis of correlated data, random effects models, and generalized linear mixed models.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 684, EPI 684
Course typically offered:
Main Campus: Fall

Recommendations and additional information: BIOS/EPID 576A and BIOS/EPID 576B.

BIOS 685: Special Topics in Biostatistics (3 units)
Description: This course addresses special topics in Biostatistics. The course will study the theoretical development and application of advanced biostatistical methods.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Repeatable: Course can be repeated a maximum of 2 times.
Course typically offered:
Main Campus: Fall, Spring

Recommendations and additional information: MATH 564, MATH 566, and BIOS/CPH 687.

BIOS 686: Survival Analysis (3 units)
Description: This course introduces basic concepts and methods for analyzing survival time data obtained from following individuals until occurrence of an event or their loss to follow up. We will begin this course from describing the characteristics of survival data and building the link between distribution, survival and hazard functions. After that we will cover non-parametric, semi-parametric and parametric models and two-sample test techniques. In addition we will also demonstrate mathematical and graphical methods for evaluation goodness of fit and introduce the concept of dependent censoring/competing risk. During the class students will also learn how to use a computer package, SAS, Splus or Stata to analyze survival data.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: CPH 686
Course typically offered:
Main Campus: Spring

Recommendations and additional information: BIOS/EPID 576A, BIOS/EPID 576B.

BIOS 687: Theory of Linear Models (3 units)
Description: Theory of linear models including full-rank models and less than full rank fixed effects models. Topics will include distributional properties of quadratic forms, estimation methods, tests of hypothesis and confidence intervals as well as an introduction to computational aspects.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Equivalent to: EPID 687, STAT 687
Also offered as: EPID 687, STAT 687
Course typically offered:
Main Campus: Fall (even years only)

Recommendations and additional information: MATH 566.

BIOS 688: Statistical Consulting (3 units)
Description: The goal of this course is to teach statistics students to be effective statistical consultants. This is an advanced course in the selection and use of tools and statistical methods to analyze and interpret scientific, business and medical studies. This course will provide students with the ability to effectively and accurately acquire and convey information in verbal and written presentations.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Repeatable: Course can be repeated a maximum of 2 times.
Also offered as: STAT 688
Course typically offered:
Main Campus: Fall

Recommendations and additional information: STAT/MATH 571A; STAT/MATH 571B, or equivalent; Working knowledge of Stata, SAS, SPSS, or R (or equivalent). Preferred: Probability & Math Statistics sequence (STAT/MATH 564/566).
Enrollment requirement: MATH 564 and MATH 566. (MATH 571A and MATH 571B) or (BIOS/EPID 576A and BIOS/EPID 576B).

BIOS 689: Preparation for Statistical Research (3 units)
Description: This course will cover general linear models, mixed effects models, and other advanced statistical methods. Perspectives are important for developing and utilizing modern statistical methods. For this purpose, some time will also be devoted to studying perspectives of science and statistics. The course will most benefit PhD. students preparing to begin their dissertations, and graduate students hoping to survey advanced modern methods in Statistics and Biostatistics. A survey or preliminary research paper will be developed in the course.
Grading basis: Regular Grades
Career: Graduate
Course Components: Lecture Required
Also offered as: STAT 689
Course typically offered:
Main Campus: Fall

Recommendations and additional information: BIOS/CPH 687, MATH 564, and MATH 566.

BIOS 696S: Biostatistics Seminar (1 unit)
Description: This is a graduate-level seminar consisting of presentations by diverse speakers on a range of topics in biostatistics and in public health. This is also a forum in which biostatistics students will give presentations.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Seminar Required
Repeatable: Course can be repeated for a maximum of 6 units.
Equivalent to: CPH 696S
Course typically offered:
Main Campus: Fall, Spring

Recommendations and additional information: This course is restricted to graduate students in health related fields in Public Health, Medicine, and Biological or Social Sciences.

BIOS 699: Independent Study (1 - 6 units)
Description: Qualified students working on an individual basis with professors who have agreed to supervise such work. Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699 or 799.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer

BIOS 900: Research (1 - 9 units)
Description: Individual research, not related to thesis or dissertation preparation, by graduate students.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer

BIOS 909: Master's Report (1 - 12 units)
Description: Individual study or special project or formal report thereof submitted in lieu of thesis for certain master's degrees.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Independent Study Required
Repeatable: Course can be repeated for a maximum of 12 units.
Course typically offered:
Main Campus: Fall, Spring, Summer

BIOS 910: Thesis (1 - 6 units)
Description: Research for the master's thesis (whether library research, laboratory or field observation or research, artistic creation, or thesis writing). Maximum total credit permitted varies with the major department.
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer

BIOS 920: Dissertation (1 - 9 units)
Description: Research for the doctoral dissertation (whether library research, laboratory or field observation or research, artistic creation, or dissertation writing).
Grading basis: Alternative Grading: S, P, F
Career: Graduate
Course Components: Independent Study Required
Repeatable: Course can be repeated a maximum of 99 times.
Course typically offered:
Main Campus: Fall, Spring, Summer