



**COURSE NAME/NUMBER****LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:**

Note: Learning objectives will vary with the course and the instructor. The following is a sample.

The successful student will be able to:

Be familiar with certain measures of disease occurrence and association that are commonly used in the epidemiologic literature;  
Understand the application of and themselves apply the classical methods of analysis of case-control studies, which include exact inference for a 2 x 2 table and the Cochran-Mantel-Haenszel test for multiple odds-ratios;  
Construct a design for a particular case-control study: e.g. sample size determination, stratification and use of matching factors;  
Apply modern computer intensive methods of analysis including multiple logistic regression and conditional logistic regression to case-control data.

**METHODS:**

Individual tutorials or small seminar groups; directed work on the computer.

**PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):**

Credit can be awarded for this course through PLAR (Please check :)  Yes  No

**METHODS OF OBTAINING PLAR:**

For this particular example of course content, a portfolio demonstrating extensive practical experience in university or governmental epidemiological research, analyzing retrospective data by methods including logistic and conditional logistic models.

**TEXTBOOKS, REFERENCES, MATERIALS:**

[Textbook selection varies by instructor. An example of texts for this course might be:]

The texts are chosen by a departmental curriculum committee.

Breslow, N.E. and Day, N.E. *Statistical Methods in Cancer Research, Volume 1 – The Analysis of Case-Control Studies*. International Agency for Research on Cancer, WHO.

Cox, D.R. *Analysis of Binary Data*. Chapman & Hall.

Fienberg, S.E. *The Analysis of Cross-Classified Categorical Data*. MIT Press.

**SUPPLIES / MATERIALS:****STUDENT EVALUATION:**

[An example of student evaluation for this course might be:]

Assignments (4/5)		20%
Projects (1)	20%	
Midterm examinations (2)	20%	
Final examination (essays and/or computer-aided analysis of data.)	40%	

Students must achieve at least 40% on the final exam in order to receive credit for this course.

## **COURSE CONTENT:**

[Course content varies by instructor. An example of course content might be:]

This particular course content description assumes that the student has covered the content of Math 402.

Role of the case-control (retrospective) study in epidemiology.

Fundamental measures of disease occurrence and association; point prevalence, incidence, rates, age- and time-specific incidence rates, the force of mortality, birth-cohorts, cumulative incidence rates; models of disease association, relative risk, odds ratio, invariance of odds-ratio from retrospective or prospective studies; attributable risk.

Design considerations for the applicability of case-control studies; bias, confounding, causality; stratification, matching factors; interaction and effect modification.

Classical methods of the analysis of categorical grouped data; exact inference for a single  $2 \times 2$  table, approximations, test-based confidence intervals; several  $2 \times 2$  tables – the Cochran-Mantel-Haenszel test; the  $2 \times K$  table.

Classical methods of analysis of matched categorical data; dichotomous exposure – the odds-ratio as the ratio of the two types of discordant pairs; 1:M matching; varying numbers of controls; multiple exposure levels.

Unconditional logistic regression for large strata; adaptation of the logistic model to case-control studies; the deviance.

Conditional logistic regression for matched sets; bias arising from the use of unconditional logistic analysis; matched 1:M designs; combining sets of  $2 \times 2$  tables; general methodology.