Students who fulfill the following criteria may apply for a course exemption:

1. Have taken a course in epidemiology and a course in biostatistics within the last 3 years. The Course Director will judge the appropriateness of the courses.
2. Have written a critique of a published epidemiologic or clinical study as part of their course work or program.

Students who believe they are eligible for an exemption must do the following:

1. Inform the Course Director, Dr. Olaf Dammann, by email that they wish to apply for an exemption. This email must be sent to Dr. Dammann no later than August 8, 2014. Dr. Dammann's email address is olaf.dammann@tufts.edu.
2. Attach a transcript showing the courses and grades achieved.
3. Attach course descriptions.
4. Attach a copy of the study critique.
5. Students will take an exam on August 15, 2014. The exam content will be based on the learning objectives from the 2013 course syllabus (below). Students must score at least 70% on the exam.

Dr. Dammann will then notify the students if they have been granted an exemption. Pending notification from Dr. Dammann, students must comply with the course work.

**Learning objective for Med I Epidemiology & Biostatistics**

- Understand in general terms how the discipline of epidemiology is applied to medical sciences and its uses in clinical and community medicine, and public health.
- Understand what is meant by, the "population perspective" and its relevance to clinical practice.
- Understand what is meant by the following terms: risk factor/exposure/predictor/determinant; outcome/endpoint/event; association vs. causal association
- Have a general understanding of the natural history of disease and why it is important to consider this in evaluating epidemiologic studies seen in medical journal articles.
- Describe the types of epidemiologic study designs seen in the medical literature in the following terms: observational vs. intervention; analytic vs. descriptive
- Know which study designs fit into each of the above categories
- Define, calculate and contrast prevalence and incidence rates
• Know how to calculate cumulative incidence and incidence density
• Understand the relations among prevalence, incidence and disease duration
• Know what a cross-sectional study design is, as well as its strengths and limitations
• Know when it is appropriate/ feasible to use a RCT study design
• Understand the issues to consider in selection of participants / generalizability
• Understand how and why randomization is done
• Understand the purpose of a placebo
• Understand the strengths and weaknesses of the RCT design
• Define, calculate and interpret the relative risk
• Define and calculate absolute risk
• Define, calculate and understand how to use the concept of number needed to treat
• Understand how to set up and use a four-fold (2 x 2) table
• Understand why subgroup analyses are conducted
• Define and interpret the concept of effect modification Know when it is appropriate/feasible to use a cohort study design
• Understand the issues to consider in selecting exposed and comparison group
• Differentiate between a retrospective and prospective cohort study design
• Understand the strength and weaknesses of the prospective and retrospective cohort study designs compared to RCT
• Know when it is appropriate/feasible to use a case-control study design
• Understand the issues in the selection of case and control groups for a case-control study
• Understand the strength and weaknesses of the case-control study design
• Calculate and interpret the odds ratio
• Understand the limitations of the odds ratio as a measure of association
• Understand and distinguish the concepts of internal and external validity
• Understand what is meant by the term bias
• Distinguish bias from imprecision
• Understand what is meant by the term confounding
• Know the characteristics of a confounding variable
• Understand what study design features are used to avoid confounding
• Distinguish confounding and effect modification (interaction)
• Understand and distinguish the major types of bias including: selection bias, random misclassification of the exposure, random misclassification of the outcome, non-random misclassification of the exposure, non-random misclassification of the outcome, loss-to-follow-up bias
• Understand how the major biases will affect the study results: Underestimate of association? Overestimate of association?
• Know in general terms how each type of bias comes about in an epidemiologic study
• Understand what study design features are used to avoid common biases.
• Recognize biases seen in the medical literature
• Distinguish between types of data
• Know appropriate data presentation options for various data type
• Understand the strengths and limitations of various descriptive statistics
• Appreciate the special aspects of the normal distributions
• Understand the calculation and application of z-score
• Understand how a histogram can be read as a probability distribution
• Understand the importance of random sampling in Statistics
• Understand how sample means can have distributions
• Explain the behavior (distribution) of sample means and the Central Limit Theorem
• Know how to interpret confidence intervals as seen in the medical literature
• Know how to calculate a confidence interval for a mean
• Be able to perform the key steps to hypothesis testing
• Understand the concept and use of the alpha value
• Understand in general terms how the p value is derived
• Correctly interpret the p value
• Distinguish between type I and type II error
• Understand the relationships among sample size, power, type I and type II error
• Have a general notion of the concept of power as it relates to study conclusions
• Know how a two-sample t-test is applied
• Know how to interpret the results of a two-sample t-test
• Know when it is appropriate to use a chi-square test
• Know how to interpret the results of a chi-square test
• Define the following terms: hypothesis testing, null hypothesis, alternate hypothesis, type I error, type II error, p-value, power, chi square test, t-test
• Know when correlation analysis is used and how to interpret results
• Know when regression analysis is used and how to interpret results
• Know the basic differences between logistic and linear regression
• Know the purpose of multivariate regression techniques to handle confounding in the medical literature
• Know how to interpret a survival curve
• Know when Cox proportion hazards regression analysis is used and what the log-rank test is used for in survival analysis
• Define the following terms: correlation, simple linear regression, multiple linear regression, coefficient of determination, logistic regression, survival analysis
• Know the objectives of a screening program
• Define and calculate sensitivity, specificity and predictive values
• Understand impact of disease prevalence in determining predictive values
• Be familiar with the likelihood ratio in clinical decisions