

QA 895 001: Topic in Quantitative Analysis/Statistics Bayesian Prediction Analysis

This course is a hodge-podge of topics orbiting Bayesian Prediction Analysis. Topic wise, the course is a mixture of two courses that I have offered previously, mixed together with new topics, some of which will be supplied by the student participants in their presentations. The two courses of which I speak (write) are the old QA 892, Statistical Decision Theory and Bayesian Analysis, and an iteration of QA 895 last offered by me about 10 years ago. The course has a strong prerequisite of Probability a mild prerequisite of Statistical Inference. I have notes, if needed, to cover topics that we will use involving concepts from Statistical Inference. In addition to these, main topics include

1. Introduction to Bayesian Concepts
2. Prior and Posterior Distributions: A few concepts and methods
3. Bayesian Predictive Distributions
4. Applications of Predictive Distributions including,
 - a. Decisive Prediction (with an introduction to decision theory)
 - b. Informative Prediction (with an introduction to tolerance region construction)
 - c. Mean coverage tolerance prediction
 - d. Guaranteed coverage tolerance prediction
 - e. Other approaches to prediction, including frequentist, empirical Bayes, and distribution free prediction
 - f. Special applications chosen from among the following: sampling inspection, regulation, control and process optimization, calibration, diagnosis, treatment allocation, and interim analysis.

The format of the course is lecture-based. We will use two texts, the main one being Statistical Prediction Analysis, by J. Aitchison and I.R. Dunsmore, and the other Predictive Inference: An Introduction by S. Geisser. In addition, several papers may form the basis for lectures and/or projects including some of my own work.

Because this is a seminar course, students enrolled for the full 4 credits will be expected to participate from time to time. I will announce in the next week or two a list of topics from which students may choose. After choosing a topic, a report should be prepared on that topic (I will discuss the length and scope later). During the final part of the course, each student will make a presentation on his/her topic. I will announce the exact schedule later.

I have inquired to find out if this is a variable credit course. I was told by our departmental administrative assistant that it is **not**. Maybe she is wrong. I don't know. But if it turns out to be a variable credit course, I will be happy to agree to assign fewer than 4 credits. I don't think it is my choice. Students who manage to get registered for fewer than 4 credits may be exempt from the report and presentation. But I will have alternative assignments for such students one of which will be that they **must** attend every class. Their grade will be based on attendance and some other assignments that are less work-intensive than the reports and presentations for the full 4 credits. These homework assignments will be announced as the seminar progresses and their solutions will be collected and/or presented.