

# Statistical Inference - STA 5327

## Spring 2015

**Prerequisite:** Distribution Theory (STA 5326) or equivalent background in probability, and some exposure to statistical methods.

**Classes:** Tuesday/Thursday 9:30 AM – 10:45 AM, **HCB 0315**

**Instructor:** Dr. Debdeep Pati

- Email: debdeep@stat.fsu.edu ( *When you send me an e-mail, use subject-line “[STA5327]”* )
- Office: OSB 201D
- Office Hours: Monday/ Wednesday: 3:00 – 4:00 pm ( *If you are unable to meet at these times, then schedule an appointment with the instructor for an alternative time.* )
- Mailbox location: 214 OSB (accessible during 8:00am-5:00pm on working days only)

**Teaching Assistant:** Jiwon Lee

- Email: jlee@stat.fsu.edu / jl11k@my.fsu.edu
- Office: OSB 208B
- Office Hours: Monday/ Tuesday: 2:00 – 3:00 pm

**Course Webpage:**

- **Class website:** [http://stat.fsu.edu/~debdeep/5327\\_s15.html](http://stat.fsu.edu/~debdeep/5327_s15.html) The class web site will have important information about the course.
- **Blackboard class website:** To access the blackboard site go to <http://campus.fsu.edu/> and login using your FSUID and password. Only grades will be posted on that site and you can access it. All the important information will be posted on the course webpage.

**Textbooks (Required):** The material taught in the class will be based on

- *Statistical Inference* (Second edition) by Casella and Berger (CB).

**Course objective:** This course introduces students to the basics of statistical inference and its applications.

**Syllabus:** Tentatively, we will cover following topics.

1. Location-scale and exponential families of distributions.
2. Sufficient statistics and the factorization criterion.
3. Complete statistics.
4. Complete sufficient statistics for exponential families.
5. Ancillary statistics, Basu’s Theorem, invariance.
6. Methods of estimation: frequency substitution, empirical estimates, method of moments, least squares, maximum likelihood, Bayes estimates.
7. Bayesian models and examples using conjugate priors.
8. Estimation criteria: unbiasedness and mean squared error.
9. Uniformly minimum variance unbiased estimates.
10. Fisher information and the information inequality. The multi-parameter case.
11. Large sample theory: consistency, asymptotic normality, and asymptotic efficiency. Asymptotic behavior of MLEs. The  $\delta$ -method.
12. Introduction to hypothesis testing. The Neyman-Pearson lemma. Uniformly most powerful tests. Likelihood ratio tests.

**Grading policies:** Your grade will be based on three exams given in class (95%) and attendance (5%). The exams are equally weighted. They are not cumulative (except in the sense that the material is naturally cumulative). The grade cutoffs are 90.0% for the lowest A-, 80.0% for the lowest B-, and 70.0% for the lowest C-. However, these grade cutoffs may be adjusted downward at my discretion.

**Attendance:** You will get the 5% points for attendance and class participation if you do not miss more than four classes. Please note that if you miss more, except in very special cases, you will get 0% on attendance. You are strongly encouraged to attend all classes.

**Homeworks:** There will be assigned homework exercises. Solutions to the exercises will be provided. The homework will not be collected, but tests will strongly emphasize the homework material.

**Exam dates:**

- Exam 1: Feb 19 (Thurs).
- Exam 2: March 26 (Thurs).
- Exam 3 (Final): April 28 (Tue), 10 AM to 12 PM.

**Add/drop dates:** See [http://registrar.fsu.edu/dir\\_class/fall/acad\\_cal.htm](http://registrar.fsu.edu/dir_class/fall/acad_cal.htm)

**Homework/exam regrade:** You have one week to request a regrade of a homework or exam from the date on which the graded homework/exam is available to the students of the class. Submit a written request detailing the nature of the grading error to the grader or instructor along with the relevant homework or exam.

**Exam policies:** The exams will be closed book and closed notes, but the use of a pocket calculator will be permitted. No student is exempt from any exams. If you have a medical or some other situation that prevents you from appearing at the exam, you have to talk to me in advance and obtain permission.

*“The Academic Honour System of The Florida State University is based on the premise that each student has the responsibility to uphold the highest standards of academic integrity in the students work, refuse to tolerate violations of academic integrity in the academic community, and foster a high sense of integrity and social responsibility on the part of University community.”* Please note that violations of this Academic Honor System will not be tolerated in this class. Specifically, incidents of plagiarism of any type or referring to any unauthorized material during examinations will be rigorously pursued by this instructor. Before submitting any work for this class, please read the Academic Honor System in its entirety (as found in the FSU General Bulletin and in the FSU Student Handbook) and ask the instructor to clarify any of its expectations that you do not understand.

**Disability policy:** Students with disabilities needing academic accommodation should:

1. register with and provide documentation to the Student Disability Resource Center; and
2. bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.

This syllabus and other class materials are available in alternative format upon request. For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center 874 Traditions Way

108 Student Services Building

Florida State University

Tallahassee, FL 32306-4167

(850) 644-9566 (voice)

(850) 644-8504 (TDD)

[sdrc@admin.fsu.edu](mailto:sdrc@admin.fsu.edu)

<http://www.disabilitycenter.fsu.edu/>

**Free Tutoring from FSU:** On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services comprehensive list of on-campus tutoring options - see <http://ace.fsu.edu/tutoring> or contact [tutor@fsu.edu](mailto:tutor@fsu.edu). High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

**Syllabus Change Policy:** Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.