Department: Mathematics and Statistics, San José State University
Location: MacQuarrie Hall (MH) 320
Time: Tuesdays & Thursdays
Section 1: 1:30–2:45 PM
Section 2: 4:30–5:45 PM
Website: Course materials, such as problems sets and solutions, are accessible through Canvas at https://sjsu.instructure.com/.

Instructor: Dr. Bee Leng Lee
Office: MH 414
E-mail: beeleng.lee@sjsu.edu
Phone: 924-5099

Office Hours: Tuesdays & Thursdays: TBA.
Note: If you wish to ask questions on the homework problems during the office hours, you are expected to have completed the relevant reading assignments, read the problems thoroughly, and at least attempted to solve them.

Course Description
Catalog Description: Sampling distributions, confidence intervals, order statistics, sufficient statistics, the Rao-Blackwell Theorem, completeness, uniqueness, point estimation, maximum likelihood, Bayes’ methods, testing hypotheses, likelihood ratio tests, categorical data analysis, nonparametric tests.
Prerequisite: MATH 163 with a grade of C− or better, or instructor consent.

Learning Outcomes: Upon successful completion of this course, students should be able to:

• explain the notion of a statistical model and distinguish between parameter, nonparametric, and semiparametric models.
• derive a point estimator for the one or more parameters of a parametric model using the method of moments or maximum likelihood.
• evaluate the finite-sample properties of point estimators.
• evaluate the large-sample properties of point estimators.
• explain the concept of sufficiency and completeness, and determine if a statistic is sufficient and complete.
• construct a confidence interval for a single parameter using the method of pivotal quantity or the general method.
• derive a test of statistical hypotheses based on the Neyman-Pearson lemma or the generalized likelihood ratio approach.
• explain and calculate the probability of a Type I or II error associated with a test of statistical hypotheses.
• determine whether a hypothesized distribution provides an adequate model for a set of data (goodness-of-fit tests).
• explain and demonstrate the use of nonparametric statistical methods.
Textbook  

References  

Course Requirements

**Homework (20%)** will be assigned on a regular basis. No credit will be given for late work under any circumstances. To allow you flexibility to deal with any emergencies that may arise in your personal life, one homework grade will be dropped from the final grade calculation. No credit will be given for an answer unless you show how it is calculated or derived.

**Exams (80%)** will include materials from lectures, reading assignments, and homework.

- There will be two midterm exams and a final exam. The exams will be cumulative.
- For the first exam, you may bring a one-sided, letter-size sheet of notes for reference during the exam. For each of the two remaining exams, you may add one more one-sided, letter-size sheet of notes. The notes may not contain any examples and must be turned in with your exam papers; for every example found in your notes, 5 points will be deducted from your exam score.
- PDAs and cell-phones are not allowed during exams.
- Tentative schedule of exams:

<table>
<thead>
<tr>
<th>Exam Type</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>First midterm exam</td>
<td>March 15, Tuesday</td>
</tr>
<tr>
<td>Second midterm exam</td>
<td>April 26, Tuesday</td>
</tr>
</tbody>
</table>
  | Final exam         | Section 1: May 19, Thursday, 12:15–2:30 PM  
                              Section 2: May 20, Friday, 2:45–5 PM  

- No early or late exams will be given. If you miss an exam without the express permission of the instructor, you will receive an F grade for the course.

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at [http://www.sjsu.edu/senate/docs/S12-3.pdf](http://www.sjsu.edu/senate/docs/S12-3.pdf).

University policy F69-24 at [http://www.sjsu.edu/senate/docs/F69-24.pdf](http://www.sjsu.edu/senate/docs/F69-24.pdf) states, “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”
Grading

The course grade is based on a weighted average of homework and exam scores.

<table>
<thead>
<tr>
<th>Final score</th>
<th>95, 100</th>
<th>90, 95</th>
<th>85, 90</th>
<th>80, 85</th>
<th>75, 80</th>
<th>70, 75</th>
<th>65, 70</th>
<th>Below 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>A+</td>
<td>A</td>
<td>A-</td>
<td>B+</td>
<td>B</td>
<td>B-</td>
<td>C</td>
<td>F</td>
</tr>
</tbody>
</table>

The instructor reserves the right to lower the cutoffs.

Tentative Schedule

The following schedule is tentative and subject to change according to the students’ progress.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Number of Lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Statistical models</td>
<td>2</td>
</tr>
<tr>
<td>Parameterization, identifiability, classification of models (parametric, nonparametric, and semiparametric), classes of models (exponential and location-scale family).</td>
<td></td>
</tr>
<tr>
<td>B. Point estimation</td>
<td>3</td>
</tr>
<tr>
<td>Point estimators, method of moments, method of maximum likelihood.</td>
<td></td>
</tr>
<tr>
<td>C. Properties of point estimators I</td>
<td>5</td>
</tr>
<tr>
<td>D. Properties of point estimators II</td>
<td>4</td>
</tr>
<tr>
<td>A review of convergence concepts, Slutsky theorem and continuous, mapping theorem, delta method, asymptotic unbiasedness, consistency, asymptotic relative efficiency, properties of maximum likelihood estimators.</td>
<td></td>
</tr>
<tr>
<td>E. Interval estimation</td>
<td>3</td>
</tr>
<tr>
<td>Confidence intervals, method of pivotal quantity, general method, coverage, expected length.</td>
<td></td>
</tr>
<tr>
<td>F. Tests of hypotheses I</td>
<td>3</td>
</tr>
<tr>
<td>Statistical hypothesis, simple, composite, critical region, Type I error, Type II error, significance level and size, power function, tests for the normal distribution.</td>
<td></td>
</tr>
<tr>
<td>G. Tests of hypotheses II</td>
<td>4</td>
</tr>
<tr>
<td>Most powerful tests and Neyman-Lemma lemma, uniformly most powerful tests and monotone likelihood ratio, likelihood ratio tests, chi-squared goodness-of-fit tests.</td>
<td></td>
</tr>
<tr>
<td>H. Nonparametric Inference</td>
<td>4</td>
</tr>
<tr>
<td>Midterm exams</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>
Classroom Protocol

Please read the university policies on student conduct at http://www.sjsu.edu/studentconduct/policies/. Note that

“Disruption,” as applied to the academic setting, means behavior that a reasonable faculty or staff member would view as interfering with normal academic functions. Examples include, but are not limited to:

- Persistently interrupting or using disrespectful adjectives in response to the comments of others.
- Use of obscene or profane language.
- Persistent and disruptive late arrival to or early departure from class without permission.
- Physical threats, harassing behavior, or personal insults (even when stated in a joking manner).
- Use of personal electronic devices such as pagers, cell phones, PDAs in class, unless it is part of the instructional activity.

University Policies

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU’s policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. To learn important campus information, view University Policy S90-5 at http://www.sjsu.edu/senate/docs/S90-5.pdf and SJSU current semester’s Policies and Procedures at http://info.sjsu.edu/static/catalog/policies.html. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not address the issue, it is recommended that the student contact the Department Chair as the next step.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc.

- Refer to the current semesters Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html
- Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/
- The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/

Students should be aware of the current deadlines and penalties for dropping classes. Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructors permission to record the course.
Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructors permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.

Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.

Academic integrity
Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Campus Policy in Compliance with the American Disabilities Act
If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

THE CONTENT OF THIS GREENSHEET IS SUBJECT TO CHANGE AND ANY CHANGES WILL BE ANNOUNCED IN CLASS. IF YOU MISS A CLASS, IT IS YOUR RESPONSIBILITY TO FIND OUT FROM YOUR CLASSMATES WHAT YOU HAVE MISSED.