

**TEMPLE UNIVERSITY  
COLLEGE OF ENGINEERING  
ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT**

**FALL**

**EE646**

**DR. Li Bai**

**COURSE OUTLINE**

**TITLE:** Estimation Theory

**LECTURE:** Wednesday 6:00-8:30pm (Fort Washington 118)

**REQUIRED TEXT:** John W. Woods, Henry Stark  
Probability and Random Processes with Applications to Signal  
Processing (3rd Edition)  
ISBN: 0-13-020071-9

Steven Kay  
*Fundamentals of Statistical Signal Processing, Vol. I – Estimation  
Theory*  
New Jersey, Prentice-Hall, Inc. 1993  
ISBN: 0-13-3457117

**INSTRUCTOR:** Dr. Bai - CEA Building, Room 710, (215) 204-6616  
lbai@temple.edu

**TU PORTAL** – <http://tuportal.temple.edu>

This course provides the background for the following courses:

**EE 510 - Digital Signal Processing**

**EE 551 – Computer Network**

**EE 520 Telecommunication**

**COURSE PLANS:**

Random processes and Random Sequences (Stark Book, 3-4 weeks)

Poisson random process and Wiener process

Random process for linear system

Wide sense stationary (WSS) processes

Random sequences for linear system, etc.

Classical Estimation (Deterministic Parameter) (Kay Book, 4-5 weeks)

Cramer-Rao Lower Bound (CRLB)

Minimum Variance Unbiased Estimation

Least Squares Estimation

Maximum Likelihood Estimation

Bayesian Estimation (Random Parameter) (Kay Book, 2-3 weeks)

Minimum Mean Square Estimation

Maximum A Posteriori Estimation

Optimal Filtering (Kay Book and references, 2-3 weeks)

Wiener Filtering

Kalman Filtering

**I. MIDTERMS AND FINAL.**

There will be 1 midterm given during this course. You will be given ample notice of when the midterm is given!

All examinations will be closed book, but students can take four pages of HANDWRITTEN notes (8.5x11) and a nonprogrammable scientific calculator. Failure to take the final will result in a grade of F. Partial credit on questions will be given where there is a clear indication that the student was proceeding in the proper direction and gave good evidence that he or she had a good grasp of the material.

## II. GRADE BREAKDOWN/SCALE

Activity	Percent	Grade	Points
		A	90-100
Midterm	50	B	80-89
Project	50	C	70-79
		D	60-69
		F	59 or below

**Note** - The grades include plus and minus. Therefore, 90 is not a A but rather an A<sup>-</sup> and 88 would be a B<sup>+</sup>.

## III. LATE SUBMISSIONS

All homework assignments will be announced in classes. Unless stated otherwise, the homework assignment is due on Thursday (5:59pm, before the class starts) following the week it was assigned. No late homework or project will be accepted for any reason.

If you miss an examination or quiz...

You need send me an email notification at least 48-hours before the examination.

## IV. INCOMPLETE

There will be no incomplete granted except for serious medical problems. No incomplete will be given on the basis of missed exams.

## V. ACADEMIC INTEGRITY

Sharing of thoughts and ideas is encouraged; sharing of work, computer code, etc. is not! You are strongly encouraged to discuss assignments and course material with your classmates! Note that discussion does not mean copying. For any incident of copying the person or persons who copied as well as the person or persons who were copied from will receive **zero** for that assignment. A second incident of copying will result in an **automatic F** for the course for all parties involved!

## VI. CELL PHONES

During class, you can turn cell phone on as silence mode. If you absolutely need to answer your cell phone, you have to leave the classroom.

## VII. WITHDRAWAL & REPEAT COURSE POLICIES

Beginning in Fall 2003, you may withdraw from a course within the first two weeks and no record of that course will appear on your transcript. However from week three through nine week you may withdraw and will receive a "W" on your transcript. It should be noted that you are not allowed to withdraw from a course after week nine. You may not withdraw from the same course more than once. Also you may withdraw from no more than five courses during the duration of your undergraduate career. Students thinking about withdrawing from a course should consult with their instructor and must receive approval from their academic adviser. (policy #02.10.14)

The **Repeat Course Policy** - now, instead of only the highest grade occurrence of a class counting, only the lowest will be removed. Which means if you take a course three times, the two highest grades will be averaged together. (policy #02.10.12)

## VIII. STUDENT INPUT

Your input is considered very important not only to this semester's class but to those who will take this course in the future. If you have any comments concerning the book, the quizzes or tests, or the material presentation, please let me know, either by stopping by my office to talk, sharing your thoughts or ideas with your class representative or dropping off an anonymous note.

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\* Approximate times when tests will be given

**Revised 2/8/2008**