

Data Processing and Analysis  
(GEOP 505/Math 587)  
Overview and Syllabus for Fall, 2008

Rick Aster and Brian Borchers

August 28, 2008

- Notes and other web Information: [www.ees.nmt.edu/Geop/Classes/GEOP505.html](http://www.ees.nmt.edu/Geop/Classes/GEOP505.html)
- Contact information: [aster@ees.nmt.edu](mailto:aster@ees.nmt.edu) (x5924), [borchers@nmt.edu](mailto:borchers@nmt.edu) (x5813)
- Meets in: MSEC 105, M, W, F 11:00-11:50
- Text (recommended): *The Fourier Transform and Its Applications, 3rd ed.* by Ronald Bracewell, WCB/McGraw Hill, 2000. Earlier editions are also satisfactory.
- Primary and ancillary lecture notes will be provided by the instructors.
- Grades will be based on six homework assignments (75%), on a full class (approximately 45-minute; plus questions) referenced and scholarly class presentation, with an accompanying class handout and web-linkable PDF write-up, based on your research or general interests in an appropriate subject (20%), and on general class contributions such as stimulating discussion, illuminating applications, and identifying corrections and/or suggesting improvements to the notes (5%). There is no final exam, and we will not meet during finals week.
- Notes will cover all required material, but students are strongly encouraged to consult outside sources from the ancillary notes, bibliography or elsewhere as needed.
- It is required that numerical and graphical assignments be done in MATLAB. MATLAB is available on the Geop/Hydro workstations and at the Tech Computer Center. A MATLAB primer is provided on the class website.
- While we encourage students to discuss all aspects of the course with the instructors and each other, your work must be clearly your own. Sharing/copying of answers between students will be strongly penalized. Presentations and write-ups must be presented in an original manner with appropriate references. Plagiarism will be cause for severe downgrading of your final grade, likely to the point of failing.
- Notes and homework will be posted on the web site. Students are expected to download (and print at will) their own copies of the notes as they are posted.

- Dates and other details of the Syllabus are subject to revision as the semester proceeds. We will keep this schedule updated as travel and other responsibilities accumulate. We may need to schedule extra lectures at agreed-upon times to compensate for our travel days (thanks in advance for your flexibility!).

505/587 Class Schedule (subject to change)			
Date	Notes	Topics	Instructor
8/27	1	Class Overview/Linear Systems in the Time Domain	RA
8/29	1	Linear Systems in the Time Domain	RA
9/1	-	No Class (Labor Day)	
9/3	1	Linear Systems in the Time Domain	RA
9/5	1	Linear Systems in the Time Domain	RA
9/8	1	Linear Systems in the Time Domain	RA
9/10	2	Linear Systems in the Frequency Domain	RA
9/12	2	Linear Systems in the Frequency Domain; HW 1 due; RA Gone	BB
9/15	2	Linear Systems in the Frequency Domain	RA
9/15	3	Power Spectra	RA
9/17	3	Power Spectra	RA
9/19	4	Sampled Time Series; RA Gone	BB
9/22	4	Sampled Time Series	RA
9/24	4	Sampled Time Series ; HW 2 due	RA
9/26	4	Sampled Time Series	RA
9/29	4	Sampled Time Series	RA
10/1	5	Discrete Fourier Transform Techniques	BB
10/3	5	Discrete Fourier Transform Techniques; RA Gone	BB
10/6	5	Discrete Fourier Transform Techniques	BB
10/8	5	Discrete Fourier Transform Techniques	BB
10/10	6	Digital Filtering; Deadline for Presentation Topic Approval	RA
10/13	6	Digital Filtering; BB Gone; HW 3 due	RA
10/15	6	Digital Filtering BB Gone	RA
10/17	6	Digital Filtering	RA
10/20	6	Digital Filtering	RA
10/22	7	Random Processes	BB
10/24	7	49ers Academic Holiday	
10/27	7	Random Processes	BB
10/29	7	Random Processes; HW 4 due	BB
10/31	8	Statistical Aspects	BB
11/3	8	Statistical Aspects	BB
11/5	8	Statistical Aspects; Project Rough Drafts Due	BB
11/7	9	The Wiener Filter	BB
11/10	9	The Wiener Filter	BB
11/12	9	The Wiener Filter; HW 5 due	BB
11/14	10	The Kalman Filter	BB
11/17	10	The Kalman Filter	BB
11/19	10	The Kalman Filter	BB
11/21	10	The Kalman Filter	BB
11/24	-	Student Presentations	
11/26	-	Student Presentations	
11/28	-	Thanksgiving Academic Holiday	
12/1	-	Student Presentations; HW 6 due	
12/3	-	Student Presentations	
12/5	-	Student Presentations	
12/8	-	Student Presentations	
12/10	-	Student Presentations	
12/12	-	Student Presentations; Last Day of Class	