Course Policies

Degree Program:

■ECE-Electrical & Computer Engineering

□ME -Mechanical Engineering

□General Courses for Both ECE & ME Degree Programs

Course Name: Introduction to Signals and Systems

Course Code: VE216

Course Credits: 4

Course Category: ■ Required □ Elective

Terms Offered:

□Fall ■Spring □Summer 2018

Course Pre/Co-requisites:

Vv156 Applied Calculus

Ve215 Electric Circuits

Textbook:

Alan V. Oppenheim, Alan S. Willsky and S. Hamid Nawab, “Signals and Systems”, Second Edition, 1997, Prentice Hall (Portions of Chapters 1-10)

Other References:

1) Online resources: You are encouraged to view the course “Signals and Systems” of the MIT Open Courseware at http://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/, which includes the video lectures taught by Oppenheim.
2) Charles L.Phillips, John M.Parr and Eve A.Riskin, “Signals, Systems, and Transforms”, Fifth Edition (November 3, 2013), Prentice Hall

Instructors:

Yong Long, yong.long@sjtu.edu.cn (Office), 13:00-15:00, Wednesday, JI Building, Room 418

Lectures:

Tuesday 14:00-15:40, Wednesday and Friday, 10:00–11:40, TBD

Labs:

Week 7-9

Section 1: 18:00-21:00 Wednesday, Section 2: 9:00-12:00 Thursday, Section 3: 18:00-21:00 Thursday

Office Hours:

TBD, JI Building, Room 418 (Or reserve individual time in advance)

Teaching Assistants:

Siqi Ye, yesiqi@sjtu.edu.cn, Cell 150-0078-2653, 20:00-22:00, Thursday, Yuliming Center

Yuhong Zhao, zyhabc@sjtu.edu.cn, Cell 152-2112-3928, 20:00-22:00, Monday, Yuliming Center

Zhipeng Li, zhpenli@126.com, Cell 158-9590-2029, 20:00-22:00, Tuesday, Yuliming Center

Jing Dong, kyle_dj@sjtu.edu.cn, Cell 133-8664-2221, 20:00-22:00, Wednesday, Yuliming Center

Recitation Classes: TBD

RC	#1	#2	#3	#4	#5	#6	#7
Date	Mar. 7	Mar. 14	Mar. 27	Apr. 4	Apr. 18	Apr. 24	Apr. 27

Grading Policy:

Your final grade will be determined as a weighted combination of your homework, quiz, labs and midterm exams, and final exam.

- Homework: 10%
- Quiz: 5%
- Labs: 15%
- Midterm Exam1: 20%
- Midterm Exam2: 20%
- Final Exam: 30%

Requests for re-grades of exams must be submitted in writing within one week of exam return. All questions may be re-graded. Letter grades will be assigned using a curve following past practice in the recent 3 years. **The median grade will be B or B+** (depending on overall performance).

Academic Integrity:

3) Homework: Homework will be assigned very week. Homework and solutions will be posted on SAKAI only. Solutions will be provided for all problems. **ABSOLUTELY NO LATE HOMEWORK**

ASSIGNMENTS WILL BE ACCEPTED. The lowest homework score will be automatically dropped.

HW	#1	#2	#3	#4	#5	#6
Chap. (slides)	1	2	3	4	6、7、8	9
Due date	Mar. 9	Mar. 16	Mar. 27	Apr. 8	Apr. 20	Apr. 27

4) Quiz: **You are responsible for establishing a study group of 3 to 5 students at the beginning of the semester.** Each study group completes each quiz collaboratively and submits one solution set with the group number, IDs, names and signatures of each student. Please always bring A4 paper to the class to be prepared. Based on SJTU's academic regulations, attendance will be randomly taken at least 5 times. There are at least 5 quizzes, and the quiz time will be random and not announced in advance. **ABSOLUTELY NO LATE QUIZ ASSIGNMENTS WILL BE ACCEPTED. The lowest quiz score will be automatically dropped.**

5) Exam: All students must take all exams during the scheduled times. Exceptions must be approved by Prof. Long, in writing stating why you could not attend (severe disease, for example). **The exams will be closed book. Electronic media (including calculators) are not allowed.** You must solve all exam problems by yourself. Copying exam solutions from another student or from solutions from previous semesters will be considered violations of the JI honor code. Tentative schedules of exams:
   a) Midterm Exam1 on **Mar. 16, 2016** from 12:00-14:00. Venue: TBD
      You are permitted to use **one** A4 sheets of notes (both sides), all of which must be your own handwriting.
   b) Midterm Exam2 on **Apr. 6, 2016** from 12:00-14:00. Venue: TBD
      You are permitted to use **two** A4 sheets of notes (both sides), all of which must be your own handwriting.
   c) Final Exam, Time and Venue: TBD
      You are permitted to use **three** A4 sheets of notes (both sides), all of which must be your own handwriting.

6) Labs: **ABSOLUTELY NO LATE LAB REPORTS WILL BE ACCEPTED.** The labs will help you develop engineering skills. Unexcused absence will result in a grade of zero. Students have the responsibility of contacting the instructor or teaching assistant to make up the missed lab.

7) Collaboration: You must attempt to solve all homework problems by yourself. Copying homework solutions from another student or from solutions from previous semesters will be considered violations of the JI honor code (http://umji.sjtu.edu.cn/academics/academic-integrity/honor-code/). However, after making a genuine attempt to solve the homework problems, you are encouraged to discuss the answers with other students currently enrolled in 216 to check the answers and compare solution approaches. After such a discussion, you may rewrite your answer as long as you do so

individually, without referring to the solutions of other students or to solutions from previous terms. Basically, the answers you turn in should reflect your own level of understanding, not someone else's. This also applies to the Matlab coding portion of the course; these are to be done individually.

8) Dialogue: Classes this large can seem impersonal, and using email makes it more so. I will read email sent to me, but I will only reply (to the entire class) for matters that affect the whole class such as typos in a HW problem. Please come to my office hours, tell me your name, and ask questions, and there I will gladly reply in person!
9) MATLAB: Knowledge of the MATLAB software environment will be a required part of this course. MATLAB will be required for solving some weekly homework assignments. If you are not familiar with MATLAB, you are strongly encouraged to study the MATLAB tutorial on SAKAI. Remember that you will be responsible for knowing MATLAB in exams, so you are encouraged to work as independently as possible.

Course Description:

This course introduces students to basic concepts in continuous-time linear system theory. The analysis of continuous-time systems is considered in both the time and frequency domains. Topics include linearity, impulse response, convolution, frequency response, filtering, Fourier series, Fourier transforms, sampling theorem, relationship between continuous-time and discrete-time systems (as time perm its), Laplace transforms, system transfer function, poles and zeros, stability. Applications of these techniques will be discussed using examples from circuits, signal processing, communication and control. Weekly recitations and hardware laboratories will also be included in this course.

Teaching Schedules: (Tentative: subject to adjustment.)

Lecture slides will be posted on SAKAI one day before each lecture and updated after each lecture according to the actual coverage in class.

Week	No.	Date	Lectures and Exams	Labs
1	1	Feb. 27	• course policies • overview • signal and system definition • classifications of signals	-
	2	Feb. 28	• signal notation • transforms of CT signals • signal characteristics	
	3	Mar. 2	• Exponential signals • Singularity functions (unit step signal, rect	

			function, unit impulse function) • Input-output description of systems • Block diagrams • Interconnection of systems	
2	4	Mar. 6	• System classes • Amplitude properties • Time properties (causality, memory, time-invariance) • Summary of chap. 1	-
	5	Mar. 7	• impulse response • Impulse representation of CT signals • Convolution for CT LTI systems	
	6	Mar. 9	• Properties of convolution and LTI systems • LTI system properties via impulse response	
3	7	Mar. 13	• Step response • diffeq systems (important class of LTI systems) • Summary of Chap. 2	-
	8	Mar. 14	• Introduction to Chap. 3 • LTI system response for complex-exponential input signals • Preview • Fourier series	
	9	Mar. 16	• Convergence of Fourier series • Properties of Fourier series (one signal properties, two signal properties, Parseval's relation)	-
4		Mar. 20	• Midterm Exam 1	
	10	Mar. 21	• Power density spectrum • Fourier series and LTI systems	
	11	Mar.23	• Filtering and applications • Filters described by diffeqs • Summary of Chapter 3	-
5	12	Mar. 27	• Fourier transform (FT) definition • FT Existence • FT Examples	
	13	Mar. 28	• FT of periodic signals	-

			• FT Properties	
	14	Mar. 30	• convolution property and LTI systems • Parseval's relation / energy density spectrum • Time-domain multiplication	
6	15	Apr. 3	• Partial fraction expansion (PFE) • Application of FT to RLC and diffeq systems • Summary of Chapter 4 • ideal filters • real filters • Bode Plots • Summary of Chap. 6	
	16	Apr. 4	• Introduction to sampling • FT of impulse-train sampled signals • sampling theorem aliasing	
	17	Apr. 8	Introduction of Labs by TAs	
7		Apr. 10	Midterm Exam 2	Lab 1: LTI Systems
	18	Apr. 11	• Reconstruction via interpolation • Realistic non-impulse sampling	
	19	Apr. 13	• Discrete-time Fourier transform (DTFT) • Summary of Chap. 7 • Introduction to communications • Sinusoidal amplitude modulation • Demodulation	
8	20	Apr.17	• Frequency-division multiplexing (8.3) • Summary of Chap. 8	Lab 2: AM Radio
	21	Apr. 18	• Laplace transform (LT) definition / computation by integration • ROC of Laplace transform • Rational Laplace transforms • Pole-zero plot	
	22	Apr. 20	• Some important Laplace transform pairs • Inverse Laplace transform • ROC and causality and stability of LTI systems • Geometric properties of FT from pole-zero plot	
9	23	Apr. 24	• Laplace transform properties • System functions and block diagram representations • Feedback control • summary of Chapter 9	

	24	Apr. 25	• Introduction to discrete-time signals and systems	Lab 3: Feedback Systems
	25	Apr. 27	• Z-transform • Course review	
10		TBD	Final Exam	-