

Global Learning Initiatives Program Course Syllabus

Course Information

Course Name	Analysis and synthesis of digital audio signals
Lecturer(s)	LIU, YI-WEN
Course Description	To introduce application of signal processing methods in music, language, and other sounds in daily life, including two major parts: sound analysis and sound synthesis. After taking this course, students should be familiar with the core techniques and background knowledge in this field. Also, current research topics will be selectively covered. Final projects are required and students are encouraged to be creative. Prerequisite: Signals and Systems, Linear Algebra, or consent by the instructor. Undergraduates in junior or senior years are also welcome to take this course.
Course Objectives	<ul style="list-style-type: none"> • Ability to survey, analyze and comprehend technical knowledge in specialized expertise. • Ability to explore problems of specialized expertise and research new engineering methods to solve the problems independently. • Ability to design, innovate or improve electrical engineering systems. • Ability to plan and execute research projects, and to organize, communicate, coordinate and integrate in a team. • Ability to design and conduct experiments, analyze and summarize data for research in electrical engineering systems. • Ability to write technical reports and thesis based on study or research results. • Grasping technological trends and understanding the impacts of technology to human, environment, society and globe. • Proficiency in foreign languages and ability to participate in international technical communities.

Suggested Proficiencies (if any)	※ This course requires your total devotion. Preview and review are essential in keeping up!
Reading List (if any)	Textbook: None. References: This year, I plan to focus on speech and human voice. Below is a good reference I've found, L. R. Rabiner and R. W. Schafer, "Introduction to digital speech processing," Foundations and Trends in Signal Processing, Vol. 1, Nos. 1–2 (2007) 1–194. You may find its PDF online. https://www.nowpublishers.com/article/Details/SIG-001 Otherwise, lecture notes and papers for group discussion will be handed out throughout the semester. Course materials will be distributed through NTHU e-learn system.
Grading Criteria	-- Weekly assignments (50%): computer-based. -- Final Group Project (30%) -- Class participation (20%)

Course Schedule

Class	Date (YYYY/MM/DD)	Course Topic	Lecturer
Part I (5 weeks):		Basic Fourier Transform, speech perception and production	LIU, YI-WEN
Part II (5 weeks):		Speech synthesis related topics	LIU, YI-WEN
Part III (5 weeks):		Speech recognition related topics	LIU, YI-WEN