Course Information	
Course title	Adaptive Signal Processing
Semester	109-1
Designated for	COLLEGE OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE GRADUATE INSTITUTE OF COMMUNICATION ENGINEERING
Instructor	CHUN-LIN LIU
Curriculum Number	EE5027
Curriculum Identity Number	921 U1170
Credits	3.0
Course Syllabus	
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Course Description	1. Wiener filter 2. Linear prediction 3. Least-mean-square adaptive filters 4. Basics of array signal processing 5. Beamforming 6. MUSIC and ESPRIT algorithms 7. Kalman filters
References	[1] F. Maloberti and A. C. Davies, Eds., A Short History of Circuits and Systems, River Publishers, 2016. Available at http://ieee-cas.org/short-history-circuits-and-systems. The history of adaptive filters and adaptive signal processing was reviewed in pp. 85-96. [2] B. Widrow and S. D. Sterns, Adaptive Signal Processing, Prentice-Hall, 1985. [3] S. Haykin, Adaptive Filter Theory, Fourth Edition, Prentice Hall, 2001. [4] A. H. Sayed, Adaptive Filters, John Wiley & Sons, 2008. (https://doi.org/10.1002/9780470374122) [5] T. Kailath, A. H. Sayed, B. Hassibi, Linear Estimation, Pearson, 2000. [6] P. P. Vaidyanathan, The Theory of Linear Prediction, Synthesis Lectures

	on Signal Processing, Morgan and Claypool Publishers, 2008. [7] D. H. Johnson and D. E. Dugeon, Array Signal Processing: Concepts and Techniques. Addison Wesley Pub. Co. Inc., 1993. [8] H. L. Van Trees, Optimum Array Processing: Part IV of Detection, Estimation, and Modulation Theory. Hoboken, NJ, USA: Wiley, 2002.

Progress

Week	Date	Topic
第 1 週	9/16	Course introduction; stochastic processes and models
第 2 週	9/23	Stochastic processes and models
第 3 週	9/30	Wiener filters
第 4 週	10/07	Wiener filters
第 5 週	10/14	Linear prediction
第 6 週	10/21	Linear prediction
第 7 週	10/28	LMS adaptive filters
第 8 週	11/04	LMS adaptive filters
第 9 週	11/11	Midterm exam
第 10 週	11/18	Adaption with vector random processes; array processing
第 11 週	11/25	Adaptive beamforming
第 12 週	12/02	Adaptive beamforming
第 13 週	12/09	Subspace methods
第 14 週	12/16	Subspace methods
第 15 週	12/23	Kalman filtering
第 16 週	12/30	Kalman filtering
第 17 週	1/06	Nonuniform sampling or other advanced topics