

電機工程研究所(乙組)
博士班資格考 選考科目 及 參考書目

Department of Electrical Engineering (Program B)
List of Courses and Reference Textbooks for Ph.D. Qualifying Examination

108.11.12_108-6 組務會議修訂通過

選考科目 Courses	參考書目 Reference Textbooks	參考範圍 Topics and Chapters
數位信號處理 Digital Signal Processing	(1)J.G. Proakis and D.G. Manolalis, Digital Signal Processing, Prentice Hall International , New Jersey , 1996 (2)A.V. Oppenheim, R.W. Schafer, Discrete-Time Signal processing, 2010	The Discrete Fourier Transform/ Fast Fourier Transform/ Design of Digital Filter/ Sampling of Continuous-Time Signals
隨機程序 Random Processes for Engineers	"Probability and Stochastic Processes - A Friendly Introduction for Electrical and Computer Engineers", Roy D. Yates and David J. Goodman (third edition)	Ch9 : Sums of Random Variables Ch10 : The Sample Mean Ch12 : Estimation of a Random Variable Ch13 : Stochastic Processes
數位通訊理論 Digital Communications Theory	(1)S. Haykin: Communication Systems,4 rd Ed, 2001	Ch3 : Pulse Modulation Ch4 : Baseband pulse transmission Ch5 : Signal Space Analysis Ch6 : Passband Data Transmission Ch9 : Fundamental limits in information theory
	(2)John G. Proakis and Masoud Salehi, Digital Communications, 5th Edition, McGraw-Hill, 2008.	Ch.11 : Multi-channel and Multi-carrier Systems Ch13 : Fading Channels I: Characterization and Signaling
通訊網路 Communication Networks	Data Communications and Networking, 5/e Behrouz A. Forouzan	Part 1 : The Internet and Network Models Part 2 : Physical Layer and Media Part 3 : Data Link Layer Part 4 : Network Layer Part 5 : Transport Layer
天線理論 Antenna Theory	C.A. Balanis , Antenna Theory Analysis and Design, John Wiley & Sons ,New York, 1997	Principles of Antenna Theory Antenna Equivalent Circuit Feed System Linear Arrays Radiation Patterns Yagi-Uda Antennas Microwave Antennas Microstrip Antennas Antenna Measurements

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微波工程 Microwave Engineering	David M. Pozar, Microwave Engineering, Addison-Wesley Publishiy Company , New York, 1990	Ch1 : Electromagnetic Theory Ch2 : Transmission Line Theory Ch3 : Transmission Lines and Waveguides Ch4 : Microwave Network analysis Ch5 : Impedance Matching and Tuning Ch6 : Microwave Resonators Ch7 : Power Dividers and Directional Couplers
高頻電路設計 High Frequency Circuit Design	Reinhold Ludwig and Pavel Bretchko, RF Circuit Design Theory and Applications	Ch1 : Introduction of microwave circuit design Ch2 : Transmission line and waveguide theory Ch3 : Using Smith Charts and impedance matching Ch4 : Microwave network theory Ch5 : The design of microwave coupler and divider Ch6 : The design of microwave filter Ch7 : The design of microwave amplifier Ch8 : The design of microwave oscillator Ch9 : The design of microwave mixer
高等電磁學 Advanced Electromagnetic Theory	(1)Constantine A. Balanis, “Advanced Engineering Electromagnetics”, John Wiley, NY, 1989	Ch1 : Time Varying and Time-Harmonic Electromagnetic Fields Ch3 : Wave Equation and its Solutions Ch6 : Auxiliary Vector Potentials, Construction of Solutions, and Radiation and Scattering Equations Ch7 : Electromagnetic Theorems and Principles
	(2)Roger F. Harrington, “Time-harmonic Electromagnetic Fields”, IEEE Press, 2001	Ch4 : Plane Wave Solutions Ch5 : Cylindrical Wave Solutions Ch6 : Spherical Wave Solutions Ch7 : Perturbational and Variational Techniques
影像處理 Image Processing	Digital Image Processing (4th Edition) Rafael C. Gonzalez, Richard E. Woods	Ch2 : Digital Image Fundamentals Ch3 : Intensity Transformations and Spatial Filtering Ch4 : Filtering in the Frequency Domain Ch5 : Image Restoration and Reconstruction Ch7 : Color Image Processing Ch9 : Morphological Image Processing Ch10 : Image Segmentation I: Edge Detection, Thresholding, and Region Detection Ch12 : Feature Extraction
高等資料結構與演算法	Data Structures and Algorithms with Python Kent D. Lee and Steve Hubbard Springer, 2015	Ch2 : Computational Complexity Ch3 : Recursion Ch4 : Sequences Ch5 : Sets and Maps Ch6 : Trees Ch7 : Graphs Ch9 : Heaps Ch10 : Balanced Binary Search Trees Ch11 : B-Trees Ch12 : Heuristic Search

選考科目 Courses	參考書目 Reference Textbooks	參考範圍 Topics and Chapters
機器學習 Machine Learning	<p>Hands-On Machine Learning with Scikit-Learn and TensorFlow Aurélien Géron · O'Reilly · 2017</p> <p>Pattern Classification (2nd Edition) Authors: Richard O. Duda, Peter E. Hart, David G. Stork · Wiley-Interscience New York, NY, USA ©2000</p>	<p>Classification Regression Clustering Dimensionality reduction Feature extraction and normalization Nonparametric techniques Multilayer perceptron</p>
資訊系統軟體設計與重構 Design and Refactor of Information Systems	<p>Refactoring improving the design of existing code 2nd edition · Martin Fowler · Addison-Wesley Professional</p>	<p>Ch2 : Principles in refactoring Ch3 : Bad smells in code Ch6 : Composing methods Ch7 : Moving features between objects Ch8 : Organizing data Ch11 : Dealing with generalization</p>