

CPE 381 Final Exam material

	Must Know	Should Know
Chapter 0 -- Introduction	X	
0.2 Examples of signal processing applications		X
0.3, 0.4	X	
Chapter 1 – Continuous-time Signals	X	
1.2 Classification of time-depent signals	X	
1.4 Representation using basic signals	X	
Ex 1.2, 1.8, 1.9, 1.10, 1.11, 1.14	X	
Chapter 2 -- Systems	X	
2.2 System concept	X	
2.3 LTI continuous-time systems	X	
2.3.1 Linearity	X	
2.3.1.1 The Op-Amp	X	
2.3.2 Time invariance	X	
2.3.2.4 Representation of systems	X	
2.3.3 Convolution integral	X	
2.4 Causality	X	
2.5 BIBO stability	X	
Ex. 2.1, 2.2, 2.3, 2.5, 2.7, 2.16,	X	
Ex. 2.10,2.11,2.17, 2.18		X
Chapter 3 – The Laplace Transform	X	
3.2 Two-sided Laplace	X	
3.3 One-sided Laplace	X	
3.4 Properties	X	
3.5 Inverse Laplace transform	X	
3.6 Analysis of LTI systems	X	
Ex. 3.1, 3.2, 3.3, 3.4, 3.7, 3.8, 3.13, 3.14	X	
Ex. 3.22, 3.23, 3.24, 3.28	X	
Ex. 3.15, 3.16, 3.17, 3.18, 3.25, 3.26, 3.27		X

	Must Know	Should Know
Chapter 4 Fourier Series	X	
4.2 Eigenfunctions	X	
4.3 Complex exponential Fourier series	X	
4.3.6 Time and frequency shifting -- modulation	X	
4.4 Response of LTI Systems	X	
4.4.1 Filtering	X	
4.5 Operations using Fourier series	X	
Ex. 4.4, 4.5	X	
Ex. 4.1, 4.3, 4.7, 4.10, 4.14		X
Chapter 5 Fourier Transform	X	
5.2 From the Fourier series to the Fourier transform	X	
5.4 Fourier Transform from Laplace Transform	X	
5.5. Linearity, Inverse proportionality and Duality	X	
5.6 Spectral representation	X	
5.7 Convolution and Filtering	X	
5.8 Additional properties	X	
Ex. 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.16, 5.17	X	
Ex. 5.18,		X
Chapter 8 Sampling theory	X	
8.2 Uniform sampling	X	
8.2.5 Nyquist-Shannon sampling theorem	X	
8.3 Practical aspects of sampling	X	
8.4 Applications to digital communications	X	
Ex. 8.4, 8.5	X	
Ex. 8.1, 8.7		X
Chapter 9 -- Discrete-time signals and systems	X	
9.2 Discrete-time signals	X	
9.3 Discrete-time systems	X	
9.3.1 Recursive and non-recursive discrete-time systems	X	
9.3.2 Dynamic Discrete-time Systems Represented by	X	
Difference Equations	X	
Ex. 9.1, 9.3, 9.5, 9.20, 9.22, 9.23	X	

	Must Know	Should Know
Chapter 10 -- Z-transform	X	
10.2. Laplace transform of sampled signals	X	
10.3 Two-sided Z-transform		X
10.4 One-side Z-transform	X	
Ex. 10.7, 10.8, 10.9, 10.10, 10.11, 10.12, 10.20	X	
Ex. 10.1, 10.3		X
	Must Know	Should Know
Chapter 11 -- Fourier analysis of discrete-time signals and systems	X	
11.2 Discrete-time Fourier transform	X	
11.4 Discrete Fourier transform	X	
Ex. 11.4, 11.5	X	

Additional material:

- Basic formulas
 - Arithmetic ($\sum_{n=0}^N n = \frac{N(N+1)}{2}$) and Geometric ($\sum_{n=0}^{N-1} a^n = \frac{1-a^N}{1-a}$) series,
 - basic trigonometric formulas
- Basic transformations
- All examples in class
- All homework solutions and the midterm solution