UNIT 2
STUDY GUIDE*

THE UNIVERSITY OF UTAH

To pass the unit exam, you must be able to do the following (using books and notes):

CONCEPTUAL TOOLS	Learning Objective	Reading
FILTERS RC AND RL FILTERS Example 1 (pdf) Example 2 (pdf) Example 3 | (pdf)	2.1 Calculate transfer functions, cutoff frequencies, and outputs for passive low-pass and high-pass RC and RL filters. Qualitatively sketch frequency responses of these filters.	Chap 13 Sec 13.4-13.7 Chap 14 Sec 14.1-14.3
FILTERS RLC FILTERS Frequency response EXAMPLE 1 (PDF) EXAMPLE 2 (PDF) EXAMPLE 3 | (PDF) LC resonance | (pdf) EXAMPLE | (PDF) Qualitative response | (pdf) EXAMPLE 1 | (PDF) EXAMPLE 2 (PDF) EXAMPLE 3 | (PDF) EXAMPLE 4 | (PDF) EXAMPLE 5 | (PDF)	2.2 For RLC passive bandpass and bandreject filters, calculate the transfer function, the resonant frequency, the cutoff frequencies, the bandwidth, and the quality factor. Qualitatively sketch frequency responses of these filters and explain how R, L, and C affect the frequency response.	Chap 14 Sec 14.4-14.5
FOURIER SERIES EXAMPLE SERIES Example 1 (pdf) Example 2 (pdf) Example 3 (pdf)	2.3 Find numerical values for the coefficients of the Fourier series of a given periodic function. (You may use integral tables.)	Chap 16 Sec 16.1-16.2
FOURIER SERIES SYMMETRY Example 1 | (pdf) Example 2 | (pdf) Example 3 | (pdf)	2.4 Determine whether a given function is odd, even, or neither, and whether its Fourier coefficients will contain only sine terms, or only cosine terms, or both. Determine whether a given periodic function possesses half-wave symmetry, and whether its Fourier series contains odd harmonics, even harmonics, or both. Determine whether a given periodic function possesses quarter-wave symmetry, and what effect this has on its Fourier coefficients.	Chap 16 Sec 16.3
FOURIER SERIES CIRCUIT RESPONSE Example (pdf)	2.5 Calculate voltages and currents in circuits excited by nonsinusoidal periodic sources.	Chap 16 Sec 16.5
FOURIER SERIES POWER Example | (pdf)	2.6 Calculate ave power in terms of Fourier series using $p \propto a_v^2 + \frac{1}{2}\sum_{k=1}^{\infty}\left(a_k^2 + b_k^2\right)$.	Chap 16 Sec 16.6

* The material in this handout is based extensively on concepts developed by C. H. Durney, Professor Emeritus of the University of Utah.