

ELEC40002									ELEC40003					
Analysis and Design of Circuits									Digital Electronics and Computer Architecture					
Explain the basic physics underlying the operation of the following electronic components: resistor, capacitor, inductor, diode, transistor	Perform DC analysis of circuits containing combinations of the above components to establish the nodal voltages and branch currents	Perform AC analysis of circuits containing combinations of the above components, using small-signal equivalent models to linearise any non-linear elements	Apply the operation of simple transistor level circuits including amplifier stages and logic gates	Analyse basic opamp circuits containing idealised opamps and passive components	Apply the concept of a transfer function and derive the transfer functions for a range of standard filter circuits	Analyse the transient behaviour of 1st order RC and RL networks	Use SPICE to simulate the behaviour of the circuits you have studied	Appreciate where and how the circuits you have studied are applied in real engineering applications	design significant synchronous sequential digital circuits using registers and combinational logic	design simple two's complement addition and subtraction digital circuits, with correct use of carry and overflow	use digital blocks: RAMs, ROMs, registers, adders, multiplexers and state machines to design and analyse the operation of simple pipelined RISC computer systems	model the operation of machine code instructions on a CPU at register-transfer level, and manipulate data using different numeric representations	write programs for arithmetic operations, manipulating bit fields within words, accessing memory, and calling subroutines	implement I/O in embedded computer systems using polling