303102	Title: Electronics I	45 L
Unit 1		**15 L**
	Transient response of circuits: Series LR, CR and LCR circuit. Growth and decay of current Ref.: CR: 14.1 to 14.3 ***Alternating current theory*** *(Concept of L, R and C: Review):* Complex numbers, AC circuit containing pure R, Pure L and pure C, Series L-R, C-R and LCR circuits. Resonance in LCR circuit (both series and parallel), Power in AC circuit, Q-factor, transformer. (CR: Art 5.12, Omit phasor diagram & Auto transformer) Ref.: CR: 15.2 ,15.5 to 15.12 ***Transistor Biasing:*** Inherent variations of transistor parameters, stabilization, essentials of transistor biasing circuit, stability factor, methods of transistor biasing, Base resistor method, biasing with feedback resistor (Collector to base bias), voltage divider bias method, midpoint biasing. Silicon versus germanium. Ref.: MM: 12.2 To 12.10, 12.12, 12.14 ***General amplifier characteristics:*** Concept of amplification, amplifier notations, current gain, Voltage gain, power gain, input resistance, output resistance Decibels and frequency response: general theory of feedback, reasons for negative feedback, loop gain, practical circuit of transistor amplifier, phase reversal. Ref.: AM 7.1-7.7, 17.1-17.3. SC: 9.3, 9.4. MM: 13.4, 13.5.	

Unit 2		**15 L**
	Transistor as amplifier: CB, CE, CC modes. Definition of gain (dc & ac) and relation between them. Ref.: VKM11.7 to 11.17, 11.21. ***Digital electronics*** *(Logic Gates : Review):* De-Morgan's Theorems, NAND & NOR as Universal Building blocks, EX-OR gate: Logic expression, logic symbol, truth table, Implementation using basic gates, Number system: Decimal, Binary and Hexadecimal (their conversion), Simple Addition and Subtraction of binary numbers.	

	Ref.: VKM 28.8 to 28.14, 28.19.	
	Number system: Decimal, binary, hexadecimal number system and their mutual conversions, binary arithmetic, representation of Binary numbers, addition and subtraction using 2's compliment. **Implementation of logic circuit from truth tables:** Sum of products and product of sums method **Flip-flop and counters:** R-S flip flops, clocked RS flip flop D Flip flop, edge triggered J K flip flop, Master slave flip flop, T flip flop, D Flip flop using JK flip flop, 4 bit binary ripple up counter, 4 bit binary ripple down counter. Ref.: SC 1)　　15.3, 15.3.1, 15.3.2, 15.3.4, 15.3.5, 15.3.6 2)　　15.7, 15.7.1, 15.7.2. 3)　　15.11, 15.11.1, 15.11.2, 15.11.3 TO 15.11.8, 15.12.2	
Unit 3		**15 L**
	Circuit theorems: Thevenin theorem, Norton theorem, Reciprocity theorem, Maximum power transfer theorem. Ref.: CR7.7, 7.8, 7.9, 7.10, 7.11 (More problems oriented). **A C bridges:** General AC Bridge, Maxwell, de-Sauty, Wien, Schering. Ref.: CR 15.14 (More problems oriented). **Electromagnetic Measuring Instruments:** General theory of MCG, Dead beat and Ballistic galvanometer. Difference between Dead beat and Ballistic galvanometer. Ref.: CR 12.1, 12.2, 12.4, 12.5. **Oscillators:** Introduction, effect of positive feedback. Requirements for oscillations, phase shift oscillator, Wien bridge oscillator, Colpitt's oscillator. Ref.: AM 18.0 to 18.3, 18.5, 18.6. **Operational amplifiers:** Symbol, ideal op-Amp, Op-amp IC, architecture, Inverting amplifier, Non inverting amplifier, frequency Response and slew rate, Op-amp applications: summing amplifier, differential amplifier, integrator, differentiator, and emitter coupled	

| | differential amplifier.
Ref.: SC 11.1-115.5, 11.8.2, 11.8.3, 11.9, 11.9.1 – 11.9.4.
MM 17.4. | |

References:

1) Electricity and Magnetism by D. Chattopadhaya and P. C. Rakshit (4th Ed, Reprint – 2000) Books and Allied (P) Ltd. (CR).
2) Principles of Electronics by V. K. Mehta &Rohit Mehta. (S. Chand – Multicoloured illustrative edition) (MM)
3) Electronic devices and circuits: An introduction by Allan Mottershead (PHI Pvt. Ltd; EEE; Reprint: 2007) (AM)
4) A textbook of electronics by SantanuChattopadhyay; New Central Book Agency; 2006 Ed. (SC)
5) Principles of Electronics by V. K. Mehta and Rohit Mehta (2006 revised Ed), S. Chand and Co (VKM)