Veer Narmad South Gujarat University, Surat

Syllabus for: Electronics for F Y B Sc (Computer Science)

Semester- 1 (With effect from June 2011)

PAPER I: Components and Devices

[3 credit course- 3 hours per week]

Unit- I : CIRCUIT THEORY

Introduction; Voltage and Current Sources; Resistance; The Basic laws of Electric Circuits; Resistances in Series and Parallel; Capacitors, Inductors, General Methods of Network Analysis (KVL KCL); Network Theorems (Thevinin, Norton and Superposition Theorems)

RC Charging and discharging, Step Response of RC Circuits;

Electronic Devices and Circuits I J Nagrath PHI Chapter 10

Unit- II : SEMICONDUCTORS, DIODES AND DIODE CIRCUITS

Introduction to Electronics, Typical Electronic Systems; Classification of Electronic Systems and Devices; The Future; Conduction in Solids; Doped Semiconductors; Junction Diodes; DC Analysis of Diode Circuits; Zener Diode as Voltage Regulator; Diode Circuits with Time-Varying Sources; Transition and Diffusion Capacitances; Switching Characteristics of a Diode; Special Purpose Diodes; Rectifiers and Power Supplies; Filters; Some Diode Wave Shaping Circuits; Additional examples.

Electronics Analog and Digital I J Nagrath PHI Chapter 1

Electronic Devices and Circuits I J Nagrath PHI Chapter 1

Unit- III : TRANSISTORS AND IC FABRICATION

Introduction; Bipolar Junction Transistor; Junction Field Effect Transistor and Metal Oxide Semiconductor Field Effect Transistor;

FABRICATION Introduction; Pre-Fabrication Stage; IC Fabrication; The Planar Processes; Illustration-A Simple IC Fabrication; Monolithic Transistors-Bipolar; Fabrication of MOSFET; Monolithic Diodes; Integrated Resistors; Integrated Capacitors; Metal-Semiconductor Contact; Characteristics of IC Components; Monolithic Circuit Layout; Levels of Integration.

Reference Books:

1) Electronic Devices and Circuits I J Nagrath PHI Chapter 2
2) Electronics Analog and Digital I J Nagrath PHI Chapter 1
3) Electronics Devices and Circuits Bell, PHI
4)

Electronic Devices and Circuits I J Nagrath PHI Chapter 9

Practicals:

1.

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Semester- 1 (With effect from June 2011)

PAPER I: DIGITAL ELECTRONICS

[3 credit course- 3 hours per week]

Unit I: Number systems and codes

Introduction to number systems, Decimal, Binary, Octal and Hexadecimal number systems, inter conversion and arithmetic in various number systems, Binary codes, 8421, 2421, BCD, excess 3, Grey code, ASCII, error detecting code, parity and check sum methods, error correcting code, hamming code.

Unit II: Boolean algebra Logic Gates

Binary operations like AND, OR, NOT, truth table, NAND & NOR gates, De-Morgans Theorem, NAND & NOR as universal logic gates, Laws of Boolean algebra, simplification of Boolean expression using Boolean algebra, special logic gates XOR and XNOR truth table, logic and truth table, logic diagram/ circuit from expression and vice versa using basic and universal logic gates.

Unit III: K Maps & Combinational Circuits

Mean term and max term in Boolean expression, introduction of K map, drawing k map for 3 variable and 4 variable expressions, pairs, quads, octate in k map, reduction of Boolean expression using k map, Don't care problems and redundant groups, various examples

Half adder, full adder, half subtractor, full subtractor, code converter, parity detection and generation, multiplexer and demultiplexer, decoder, encoder

Reference Books:

1. Fundamentals of Digital Circuits by A Anand Kumar, PHI
2. Principles of Digital Electronics by K Meena, PHI
3. Digital Systems: Principles and Application, by Tocci and Widmer, PHI
4. Digital Computer Electronics by Malvino and Brown
5. Digital Electronics by Malvino and Leach

List of Experiments / Laboratory work for Semester-1 (Paper –I & II)

1. FET Characteristics
2. Study of Kirchoff's Current Law
3. Study of Thevenin's Theorem
4. Study of Norton Theorem
5. Study of Superposition Theorem
6. Study of Charging and Discharging of Capacitor
7. Diode and Zener Diode characteristics
8. BJT Characteristics
9. BJT as a Switch
10. Study of Kirchoff's Voltage Law
11. Study of Basic Logic Gates
12. Study of Universal Gates
13. Study of XOR and XNOR Gates
14. Study of Half adder
15. Study of Full adder
16. Study of MUX / DeMUX
17. Study of Code Converter

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Syllabus for: Electronics for F Y B Sc (Computer Science)

Semester- 2 (With effect from June 2011)

PAPER I: Electronic Switching Circuits

[3 credit course- 3 hours per week]

Unit- I : RESISTIVE AND CAPACITIVE CIRCUITS & DIODE SWITCHING

RC circuit operation, Charging graph and RC circuit equation, RC circuit response to square wave, differentiating and integrating circuits

The Diode as a switch, Diode Clippers and clampers

Solid State Pulse Circuits, David A Bell, PHI, Chapter 2 & 3

Unit- II : TRANSISTOR & IC SWITCHING CIRCUITS

Ideal transistor switch, practical transistor switch, Transistor switching times, direct coupled inverter circuits, capacitor coupled inverter circuits, JFET switch, MOSFET switch

Collector coupled mono stable Multivibrator, triggring monostable multivibrator, Astable multivibrator

Introduction to 555 timer, monostable and astable multivibrarors using 555

Solid State Pulse Circuits, David A Bell, PHI, Chapter 4,7 & 8

Unit- III : Basic Logic Family & Intergrated Circuits

Introduction, diode AND & OR Gates, NOT NAND & NOR Gates

Introduction to logic families, RTL, DTL etc., Standard TTL, Open Collector TTL, ECL, P-MOS and N-MOS logic gates, CMOS logic gates, Comparison of major logic families

Solid State Pulse Circuits, David A Bell, PHI, Chapter 10 & 12

Reference Books:

1) Solid State Pulse Circuits, David A Bell, PHI
2) Fundamentals of Digital Circuits by A Anand Kumar, PHI

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Syllabus for: Electronics for F Y B Sc (Computer Science)

Semester- 2 (With effect from June 2011)

PAPER 2: Logic Circuits

[3 credit course- 3 hours per week]

Unit- I : Flip-flops and Memory

Construction and working of RS Flip-flop, limitations, D flip-flop, construction and working, , construction and working of JK flip-flop, flip-flop as a memory element, types of semiconductor memory, RAM ROM EPROM DRAM SRAM etc.., basic concept of memory organization, address data lines, chip select-enable and its functions

Unit- II : Registers and Counters

Use of flip-flop as register, introduction to shift register, types of shift registers

Introduction to counter, basic ripple counter, working and waveforms of ripple counter, types of counters, UP / Down counters, modulus of counter, design of counters with various modulus values, synchronous and asynchronous counters

Unit- III : Some special digital circuits

Controlled inverter, digital comparator, parity checker, parity generator, 4 bit parallel binary adder, 4 bit parallel binary addition/subtraction, BCD adder, Digital clock

List of Experiments / Laboratory work for Semester-2 (Paper –I & II)

1. Study of RS Flip-Flop
2. Study of D Flip-flop
3. Study of JK flip-flop
4. Study of Ripple Counter
5. Study of Modulus Counter
6. Study of 4 bit parallel addition/ subtraction circuit
7. Study of BCD adder circuit
1. Study of Clipper Circuits
2. Study of Clamper Circuit
3. Study of Square Wave Response of RC Circuit
4. Study of Transistor as a switch
5. Study of Multivibrator
8. Study of IC 555
9. Study of Diode Gates