Veer Narmad South Gujarat University, Surat
Syllabus of Applied Electronics for F Y B Sc
Semester- 1 (With effect from June 2012)
PAPER I: Components and Devices
[2 credit course- 3 hours per week]

Unit- I : CIRCUIT THEORY [10 Hrs]

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;

Unit- II : SEMICONDUCTORS, DIODES AND DIODE CIRCUITS [12 Hrs]

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.

Unit- III : TRANSISTORS AND IC FABRICATION [15 Hrs]

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
2) Electronics Analog and Digital I J Nagrath PHI
3) Electronics Devices and Circuits Bell, PHI

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Semester- 1 (With effect from June 2012)
PAPER II: DIGITAL ELECTRONICS
[3 credit course- 3 hours per week]

Unit I: Number systems and codes [10 Hrs]

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_ [12 Hrs]

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 [15 Hrs]

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 of Applied Electronics for Semester-1 (Paper – I & II) (Two days of 3hrs duration per batch per week):

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

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Semester- 2 (With effect from June 2012)
PAPER I: Electronic Switching Circuits
[3 credit course- 3 hours per week]

Unit- I : Resistive - Capacitive Circuits & Diode Switching [12 Hrs]

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

Unit- II : Transistor & IC Switching Circuits [15 Hrs]

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

Unit- III : Basic Logic Family & Intergrated Circuits [10 Hrs]

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

Reference Books:

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

Veer Narmad South Gujarat University, Surat
Syllabus of Applied Electronics for F Y B Sc
Semester- 2 (With effect from June 2012)
PAPER 2: Logic Circuits
[3 credit course- 3 hours per week]

Unit- I : Flip-flops and Memory [10 Hrs]

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 [15 Hrs]

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 [12 Hrs]

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

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 of Applied Electronics for Semester-2 (Paper –I & II) (Two days of 3hrs duration per batch per week):

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
8. Study of Clipper Circuits
9. Study of Clamper Circuit
10. Study of Square Wave Response of RC Circuit
11. Study of Transistor as a switch
12. Study of Multivibrator
13. Study of IC 555
14. Study of Diode Gates