Veer Narmad South Gujarat University, Surat
Proposed Syllabus for S Y B Sc (Electronics)
Semester–3 (with effect from ***June 2018***)
Electronics Paper – 3 (*Electronics Circuits & Applications*)

Unit-I: ***Transistor Biasing***

Transistor Biasing:
Introduction; Need for biasing; Factors contributing to thermal instability; Effect of temperature increase; Stability factor; Operating point; Different methods for transistor biasing: Fixed –bias circuit; Collector-to-base bias; Disadvantages of collector-to-base bias; Voltage divider bias with emitter bias; Bias compensation; Design operations

Unit-II: ***Small Signal Amplifier model***

h- Parameter:
Introduction; General "black box" theory; Generalized approximate model; Conversion of an amplifier circuit to a standard form; Hybrid h parameters; Obtaining the hybrid h-parameters; Simplified CE hybrid model; Typical h-parameter values

Unit-III: ***Small Signal Amplifier Analysis***

Introduction; Classification of amplifiers; General theory of amplifier Analysis; CE, CC, CB amplifier analysis using simplified hybrid model; Voltage and current gains taking into account Rg of source; Dependence of amplifier characteristics on RL and Rg; Effect of an emitter bypass capacitor and coupling capacitor on low frequency response; RC coupled transistor amplifier; Lower cut-off frequency *f1*; Upper cut-off frequency *f2*; Frequency response curve and band width;

Unit IV: ***FET Amplifier***

Biasing of FET; FET Parameters; FET small signal model; MOSFET small signal model; Low frequency common source amplifier

Recommended Books:
1) A Mottershead, Electronics Devices and Circuits An Introduction, PHI, New Delhi.
2) R Boylestad and L Nashelsky, Electronics Devices and Circuits
3) I J Nagrath, Electronics Devices and Circuits, PHI, New Delhi (2007)
4) Millman, Halkias, Satyabrata, Electronics Devices and Circuits, TMH, New Delhi
5) Electron Device and Circuits. G K Mittal
5) Sanjeev Gupta, Electronics Devices and Circuits, Dhanpat Rai Publications

Veer Narmad South Gujarat University, Surat

Proposed Syllabus for S Y B Sc (Electronics)

Semester–3 (with effect from ***June 2018***)

Electronics Paper – 4 (*Advance Digital Electronics & Circuit Design*)

Unit-I: Combinational Circuit Design

Simplification of Boolean expression, Concept of canonical form of Boolean expression, SOP and PSO expression, Basic principle of Karnaught Map methods for digital circuit design, concept of two, three, and four variable K-map, Don't care condition, digital circuit design using NAND, NOR, XOR and XNOR building blocks, combinational circuit design for Adder, Subtractor, and Multiplication, Design of Encode-Code circuits, (Binary-Gray-Binary, Binary-BCD-Binary,), concept of MUX and DMUX,

Unit-II: Flip-flops and Concept of Memory

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

Unit-III: Registers and Counters

Use of flip-flop as register, introduction to shift register, types of shift registers (SISO, SIPO, PIPO, PISO), Left-shift register Universal Shift register, Application of Shift register,

Introduction to Binary counter, basic ripple counter, working and waveforms of ripple counter, types of counters, Up/Down counters, modulus-2^N counter, design of counters with various modulus values, synchronous and asynchronous counters,

Unit-IV: Sequential Circuit Design

Introduction; Analysis of clocked sequential circuits: State table, State diagram, state equation, Flip-flop input function; State reduction and assignment; Flip-flop excitation table; Design procedure: design with unused states; Design of Counters; Design with state equitation; Tabulation method; Determination of prime-implicants; Selection of prime-implicants; QuineMc-Clusky Method. (3.9, 3.10, 3.11, 3.12, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9 of Digital Logic and Computer Design by M Mano, PHI)

Recommended Books:

1) Logic Design Theroy, N N Biswas, PHI New Delhi
2) Computer System Architecture, M Mano, PHI, New Delhi
3) Digital Electronics and Logic Design, B Somnathan Nair, PHI
4) Digital Logic and Computer Design, M Mano, PHI, New Delhi
5) Fundamentals of Digital Circuits, A Anand Kumar, PHI, New Delhi
6) Digital Principles and Applications, Malvino & Leach, TMH
7) Digital Electronics An Introduction to Theory and Practice, W H Gothamann, PHI, new Delhi

Veer Narmad South Gujarat University, Surat
Proposed Syllabus for S Y B Sc (Electronics)
Semester–3 (with effect from ***June 2018***)
Electronics Paper – 5 (*Linear Power Electronics*)

Unit-I: ***Rectifiers and Filters***

Introduction; half and full wave rectifier; capacitor filter: capacitor filter with full wave rectifier,ripple voltage; Inductor filter: Inductor filter with full wave rectifier, L section filter.

Unit-II: ***Regulators***

Introduction; Stabilization; Reference element, Zener shunt regulator: Designing of Zener shunt regulator; ripple, other features, limitation of basic Zener shunt regulator, Extending power and current range of basic Zener diode; Transistor shunt regulator, emitter follower regulator; Series pass regulators, Feedback regulators; Sample, reference, comparator and controller.

Unit-III ***Three terminal Regulators***

Three Terminal Regulators: Introduction, block diagram of three terminal regulator: applications of three terminal regulator; adjustable output voltage three terminal regulator; variable output power supply, dual power supply. (78xx series, 79xx series, LM317 & LM337)

Unit-IV: ***Battery Chargers***

Electric current, electro chemical action in simple cell, primary and secondary cell, dry cell,lead acid accumulator or secondary cell, battery charging, testing of storage battery, maintenance of battery, button cells, resistance of battery, measurement of internal resistance of cell, Nickel-Cadmium rechargeable cell, comparison between Ni-Cd cell and lead acid cell, other sources of EMF, solar cell, battery charger circuits.

Recommended Books:

1) N C Goyal& R K Khetan, Monograph on Electronics Design Principles, Khanna Publishers
2) M D Singh and K B Khanchandani, Power Electronics, TMH, New Delhi
3) A K Sawhney, Electricals and Electronics Measurement and Instrumentation,

Veer Narmad South Gujarat University, Surat

Syllabus for Practical Laboratory work in Electronics at S Y B Sc (Electronics)

Semester–3 (with effect from ***June 2018***)

Three will be three days of Laboratory/practical work per week each of two hours duration. The examination will be one practical each from the three groups viz Electronics Circuits, Digital Electronics and Power Electronics.

List of Laboratory Experiments Electronics for S Y B Sc Semester - 3:

Group A

1. Study of h-parameter h_{fe} and h_{ie}
2. Study of RC Coupled Amplifier.
3. Study of emitter follower.
4. FET Amplifier

Group B

5. Study of D Flip-flop
6. Study of RS flip-flop.
7. Study of JK flip-flop.
8. Study of 4-bit up/down counter
9. Mode N counter
10. Shift register
11. Study Multiplexer and Demultiplxer
12. Study of decade counter.
13. 4 bit parallel binary addition/subtraction
14. BCD adder

Group C

15. Study of rectifier and filters (LC, π-filters)
16. Zener Regulator
17. Design, built and test 3 terminal regulator
18. Design build and test variable output 3 terminal regulator

Veer Narmad South Gujarat University, Surat
Proposed Syllabus for S Y B Sc (Electronics)
Semester–4 (with effect from ***June 2018***)
Electronics Paper – 3 (*Amplifiers & Linear Integrated Circuits*)

Unit-I: ***Feedback in Amplifier***

Introduction; Feedback concepts; General theory of feedback; Reasons for negative feedback; Loop gain; Types of negative feedback in transistor circuits; Advantages of negative feedback; Change input impedance and output impedance in voltage series feedback, current shunt feedback, voltage shunt feedback, voltage series feedback, current shunt feedback, current series feedback; Increase in bandwidth; Stabilization; reduction in non-linear distortion; Reduction in noise; Emitter follower; Practical feedback circuits

Unit- II: ***Oscillators and Multivibrators***

Oscillators: Introduction; Effect of positive feedback; Oscillator operations; Types of oscillators; Requirement for oscillator; Phase Shift oscillator; Wein bridge oscillators; Resonant circuit oscillator; Colpitt's oscillator, Hartley oscillator; Unijuction oscillator; Schmitt trigger

Multivibrators: Introduction to multivibrators and transistor switch; Bistable multivibrator; Triggering of Bistable multivibrator, Astable multivibrator & Monostable multivibrator.

Unit –III: ***Large Signal Amplifier & Tuned Amplifier***

Introduction; Difference between voltage amplifier and power amplifier; Terms used in power amplifier; Class-A amplifier; Transformer coupled Class-A amplifier; Harmonic distortion in amplifier; Class-A Push-pull power amplifier; Class-B power amplifier; Class-B Push-pull amplifier; Cross-over distortion; Class-AB Push-pull amplifier; Complementary Symmetry Tuned amplifier

Unit-IV ***Tuned Amplifier***

Need for Tuned amplifier; few fundamentals about tuned amplifier; Single Tuned amplifier; Double tuned amplifier;

Recommended Books:
1) A Mottershead, Electronics Devices and Circuits An Introduction, PHI, New Delhi.
2) Sanjeev Gupta, Electronics Devices and Circuits, Dhanpatrai Publications
3) R Boylestad and L Nashelsky, Electronics Devices and Circuits,
4) I J Nagrath, Electronics Devices and Circuits, PHI, New Delhi (2007)
5) Millman, Halkias, Satyabrata, Electronics Devices and Circuits, TMH, New Delhi

Veer Narmad South Gujarat University, Surat

Proposed Syllabus for S Y B Sc (Electronics)

Semester–4 (with effect from ***June 2018***)

Electronics Paper – 4 (Microprocessor)

Unit-I: ***Microprocessor 8085A***

Introduction; Intel 8085A: Architecture, functional diagram and pin configuration of microprocessor 8085, Register Structure, ALU, Timing and Control unit, Systems buses, Addressing modes and instructions of 8085A microprocessor, concept of Instruction Cycle, Concept of timing diagram of execution of basic operation of 8085A microprocessor, Concept of interrupt and Interrupt structure of 8085, Memory interfacing techniques and addressing scheme of 8085.

Unit – II : ***Peripheral Chips for 8085A Microprocessor***

Programmable Peripheral Interface 8255; Functional Description: Operational Modes, Functional Organization, Block diagram of 8255; Programming and Operation; Programming in Mode 0, Mode 1, mode 2.

Programmable Interval Timer 8253: Modes of Operation: Mode 0, Mode 1, Mode 2, Mode 3,

Unit-III: ***Assembly Language Programming***

Concept and importance of algorithm and flow chart, introduction to assembler and use of assembler for the following programs

Suggested list of program to be done in class and practical

1. Addition of two/three and series of 8-bits/16-bits numbers
2. Decimal addition and Decimal subtraction
3. One's and Two's complement of 8-bit/16-bits
4. Shifting and Mask-off certain bits
5. To find Largest number and Smallest number from a three data and data array
6. To arrange data in ascending and descending order with concept of subroutine
7. Movement of data block and exchange of data block from one memory location to other
8. Binary up/down counter with appropriate delay
9. Decimal up/down counter with appropriate delay
10. Delay subroutine using one/two registers
11. Blinking an LED
12. Detecting a KEY

(Note: Above list of Programs is only a suggestive list. Students should practice sufficient programs covering the complete Instruction set and concept of 8085A microprocessor programming.)

Unit-IV: ***Introduction to 8051 Microcontroller***

Block diagram of Microcontroller, Comparison between Microcontroller and Microprocessor, Pin configuration of 8051 microcontroller: ALU, SFRs, ROM-RAM memory mapping, registers and register banks, Program Counter, PSW Register, Stack, IO Ports, Timer Interrupt, Serial Port, External memory, Clock cycle, machine cycle, Instruction Cycle, Instruction fetching and execution.

Recommended Books:

1) R S Gaonkar, Microprocessor, TMH
2) Mathur, Microprocessor 8085 and its interfacing, 2nd Ed, PHI, New Delhi
3) The 8085 Microprocesor Architecture, Programming and Interfacing, K Udaya Kumar and B S Umashankar, Pearson Education
4) Srinath, 8085 Microprocessor: Programming and Interfacing, PHI, New Delhi
5) Ghose & Sridhar, 0000 to 8085 Introduction to Microprocessors for Engineers and Scientists, PHI New Delhi
6) 8051 Microcontroller, Kenneth Ayala

Veer Narmad South Gujarat University, Surat
Proposed Syllabus for S Y B Sc (Electronics)
Semester–4 (with effect from ***June 2018***)
Electronics Paper – 5 (Switching Power Supply)

Unit-I: ***Thyristors***

Four layer devices, construction and working of an SCR, two transistor analogy, characteristics of SCR, construction working DIAC & DIAC characteristics, construction working TRIAC & TRIAC characteristics

Unit-I ***BJT, FET and MOSFET Switch***

Application of BJT as a switch; design of a BJT Switch; FET and MOSFET switches

Unit-II: ***SMPS and Inverter-Choppers***

SMPS: Introduction, comparison of SMPS, and linear type power supplies, principle, fly-back convertors, forward type converters, selection of transformer, transistors, diodes and capacitors, control IC for SMPS, applications of SG 3524.

Inverter-Choppers: principle of inverter: Series, parallel and bridge inverter, McMurray inverter, McMurray Bedford inverter, Voltage controlled and current source inverter, Principles of choppers: single and two thyriator chopper, step up chopper, AC chopper.

Unit-III: ***UPS***

Types of UPS: Continuous duty UPS & stand by UPS, comparison, UPS configurations: forward and reverse transfer, selection of UPS, Component: Battery charger, battery bank and transfer switch.

Noise: Types, reduction of induced voltage, evaluation of noise, noise in BJT and FET, Signal to noise power ratio, noise figure.

Recommended Books:

1) N C Goyal & R K Khetan, Monograph on Electronics Design Principles, Khanna Publishers
2) M D Singh and K B Khanchandani, Power Electronics, TMH, New Delhi
3) A K Sawhney, Electricals and Electronics Measurement and Instrumentation

Veer Narmad South Gujarat University, Surat

Proposed Syllabus for Practical Laboratory work in Electronics at S Y B Sc (Electronics)
Semester–4 (with effect from ***June 2018***)

There will be three days of Laboratory/practical work per week each of two hours duration.
The examination will be three practicals (one practical from each group) from the three groups. In case student opts for minor project, then he/she will be examined for two practicals from within the whole list of practical and project will be equivalent to one practical examination.
There will be a minor project work to be carried out by students in a group of not more than four students per group.

List of Laboratory Experiments Electronics for S Y B Sc Semester - 4:

Group A

1. Phase shift oscillator
2. Wein bridge oscillator
3. Colpitt's oscillator
4. Hartley oscillator

Group B

5. Astable multivibrator
6. Monostable multivibrator
7. Bistable multivibrator
8. Power Amplifier
9. SCR characteristics

Group C

1. Addition of two and series of 8-bits/16-bits numbers
2. Decimal addition of two 8-bits/16-bits numbers
3. Decimal subtraction
4. One's and Two's complement of 8-bit/16-bits
5. Shifting and Mask-off certain bits
6. Largest number, Smallest number from a data array
7. To arrange data in ascending and descending order
8. Movement of block of data and exchange of block of data from one memory location to other
9. Binary up/down counter with appropriate delay
10. Decimal up/down counter with appropriate delay
11. Delay subroutine using one/two registers
12. Blinking an LED
13. Detecting a KEY

Project:

- A student is required to take up a **minor project** work as a part of the laboratory work
- Objectives of the project is to learn small concepts of electronics & the project methodology
- **The project work will carry one-third proportion of the laboratory work**

- The project work should be carried out by the students in a group of not more than 4 students (Preferably 3)
- The students are required to make a project report and demonstrate their work and appear for the project viva
-

Veer Narmad South Gujarat University, Surat

Proposed Syllabus for S Y B Sc (Electronics)

Advance Microprocessor (Generic Elective-GE/IDS) (with effect from ***June 2018***)

Unit-I: 8086 Architecture and Programming Model

Pin description and architecture of 8086 microprocessor, Addressing modes, template for data transfer between register and register/memory, code generation using template, Instruction set of 8086 microprocessor**,**

Unit-II: Instruction Set of 8086 Microprocessor

Data transfer and data conversion instructions, Arithmatic and logical instruction, process control instruction, string instruction, branch and interrupt related instruction

Unit-III: 8087 Numeric co-processor

Need for numeric co-processor, overview and pin configuration of 8087 co-processor, data types of 8087 co-processor. Instruction set for 8087 co-processor

Unit-IV: Assembly Language Program

Explanation of Assembly directives, multi byte addition and subtraction, computation of LCM, GCD of four numbers, computation of factorial, computation of Fibonacci numbers

Recommended Books:

1) Advanced Microprocessors & IBM-PC Assembly Language Programming, K Udaya Kumar and B S Umashankar, TMH
2) Microprocessors 8086/8088, 80186/80286, 80386/80486 and the Pentium Family, Nilesh B Bahadure, PHI, New Delhi.