

SARDAR PATEL UNIVERSITY
Revised syllabus Effective from June 2003
T.Y.B. Sc ELECTRONICS
DISCRETE AND LINEAR CIRCUITS
EL-301

Total marks: 120 marks (External-80, Internal-40), 3 periods per week
University examination duration -3 hours

UNIT: 1

Nonlinear distortion, Classification of feedback amplifiers, The feedback concept. The transfer gain with feedback, General characteristics of negative feedback amplifier, Input Resistance, output resistance, Classification of oscillators, The phase shift oscillator, Resonant circuit oscillator, A general form of oscillator circuit, The wein bridge oscillator, Crystal oscillator, frequency stability.

UNIT: 2

Classification of power amplifiers, class A large-signal amplifier, Second harmonic distortion, Higher-order harmonic distortion, The transformer-coupled audio power amplifier, Efficiency, Push-pull amplifiers, Class B amplifiers, Class AB operation, Block diagram of regulated power supply, Discrete voltage regulator circuit, General purpose IC regulator, Application of IC 723 regulator, Switching regulator (SMPS)

UNIT: 3

Differential amplifier, OP-AMP Parameters: D.C. parameters, A.C. parameters, Inverting. Amplifiers & It's application, Difference amplifier and subtractor, Instrumentation amplifier, Analog computer, Comparison of active & passive filter, Active low pass filter, Active high pass filter, Active band elimination filter, Notch filter, All pass filter.

UNIT: 4

Non linear OP-AMP applications: Non linear devices & their models, Nonlinear OP- AMP amplifier, Comparator(Schmitt trigger),feedback diode comparator, Precision rectifier, (AC/DC converter), Bridge circuits using OP-AMP, Peak detector, sample & Hold(S/H) circuit, Monostable multivibrator (Free running oscillator), Voltage controlled Oscillator, sinusoidal oscillator, Log & Antilog amplifier, Basic equation, Basic logarithmic amplifier, Temperature compensated LOG amplifier, Antilog(exponential) amplifier, Log-ratio Analog voltage multipoint circuit, Analog voltage divider circuit.

UNIT: 5

A.C. amplifiers, Gyration & its applications, NIC & GIC, Frequency dependence negative resistor, Waveform generator with voltage control of frequency, Bridge amplifier, Charge amplifier, Precision peak detector, Frequency to voltage (F-V) conversion, Modulation, Single power supply operation with OP-AMP, Variable voltage source, Clipper and clamper circuits, Sweep generator, Analog voltmeter, Temperature to voltage converter, AC to DC converter, Notch filter using twin-T circuits.

UNIT: 6

555 timer IC and its applications: Salient features of 555 timer, pin diagram & Functional Diagram, Astable Multivibrator and its applications, Monostable multivibrator and its Applications, Bistable multivibrator, Schmitt trigger, Basic operating principles, Digital Phase detector, Low pass filter, Voltage controlled oscillator (VCO)

Text Books:-

1. Integrated electronics (Unit 1.2)
J. Millman & C. Halkias
2. Linear integrated circuits and its applications (Unit 3,4,5,6)
P.W. Wan & P.V. Bhatt

Reference Books:-

1. Electronics circuit & devices
G.K. Mithal
2. OP-amp & Linear integrated circuits
R.A. Gaywad.

SARDAR PATEL UNIVERSITY
T.Y.B. Sc REVISED SYLLA BUS
EFFECTIVE FROM JUNE 2003
Digital System
EL-302

Total Marks:-120(Internal: 40 & External 80), 3 Periods per week
University Exam Duration-3 hours

UNIT: 1 SHIFT REGISTERS:

Introduction, Buffer register, Controlled Buffer Register, Data transmission in shift Registers, Serial-in Serial-out, Shift register, Serial –in Parallel-out, Shift Register, Parallel in- serial out, shift register, Parallel in-Parallel out-Shift register, Bidirectional Shift register, Universal shift register, Dynamic Shift register, Application of shift register, ANSI/IEEE Standard symbols.

UNIT: 2 MEMORIES:

The role of memory in a computer system, Memory type and terminology, memory organization and operation, Reading and writing, RAMs, ROMs, and PROMs, Constituents of Memories, Read only Memory (ROM), ROM Organisation, ROM timing, Types of ROMs, Semiconductor RAMs, Static RAMs (SRAMs), ECL RAMs, Dynamic RAMs, Address Multiplexing, DRAM Refreshing.

UNIT: 3 ARITHMATIC & LOGIC OPERATIONS:

The Look- ahead Carry Adder, IC parallel adders, Two's complement addition and subtraction Using parallel adders, Serial Adder , BCD Adders, Binary multipliers, Comparators , IC comparators

UNIT: 4 A/D & D/A CONVERSION TECHNIQUE:

Introduction, Digital to Analog conversion (D/A), Conversion, The R-2R Ladder type DAC, The weighted resistor type DAC, Analog to Digital Conversion, The counter type A/D Converter, The Tracking type A/D Converter, The Flash type A/D Converter, The Dual slop type A/D Converter.

UNIT: 5

Successive approximation, The Counting converter, A Comparison of Converter types, A Converter using Voltage to Frequency conversion, Converter using Voltage toTime conversion, A/D Converter Specifications, Interconnecting the S/H & A/D Converter, Introduction to ADC 0801.

UNIT: 6 Interfacing & Data Transmission:

Interfacing Logic Families, Interfacing with buses, Interfacing Digital and Analog System, Modems & Interfaces, The Schmitt trigger as an interface circuits.

Text Books:-

1. Fundamentals of Digital Circuits By : A. ANAND KUMAR (Unit 1 to 4)
2. Digital Integrated Electronics By: Herbert Taub & Donald Schilling (Unit 5)
3. Digital Fundamentals By: Floyd (Unit 6)

SARDAR PATEL UNIVERSITY
Revised syllabus from June 2003
T. Y. B. Sc. ELECTRONICS
EL-303

8-bit Microprocessor Programming and Application

Total marks: 120 (External 80, Internal 40) 3 periods per week
University Examination duration-3hours

Unit – 1

The 8085 microprocessing unit, BUS timing, Demultiplexing the bus, Generating control signal, A detailed look at the 8085 MPU and its architecture, Example of 8085 based microcomputer.

Unit – 2

Instruction classification, Instruction format, Method of wiring & executing a simple program, Instruction timing & operation status, Overview of the 8085 instruction set, Arithmetic instruction set, Addressing modes, Data transfer instruction set, Logical instruction set.

Unit -3

Branch operations, Writing assembly language programs, Debugging a program, Programming techniques: looping, counting and indexing, Additional data transfer and 16 – bit arithmetic instructions, Arithmetic operation related to memory, logic operation: rotate and compare, Dynamic debugging.

Unit – 4

Counter & time delays, Hexadecimal counter, Modulo 10 counter, Pulse timing for flashing lights, Debugging counter & time delay programs, Stack subroutines : Conditional & unconditional CALL & RETURN instructions, Advanced subroutine concepts.

Unit – 5

Code conversion: BCD to BINARY, BINARY to BCD, BCD to Seven segment, Binary to ASCII, ASCII to Binary, BCD addition, BCD subtraction, Introduction to advanced instruction and applications, Multiplication Subtraction with carry.

Unit – 6

The 8085 interrupts, Interrupts instructions and their utilization, restart as software instructions, interfacing data converter: DAC & ADC.

Text Books:

Microprocessor, architecture, programming & applications with 8085/8080
Ramesh S. Gaonkar (Unit 1 to 6)

SARDAR PATEL UNIVERSITY
Revised syllabus from June 2003
T. Y. B. Sc. ELECTRONICS
EL-304
INSTRUMENTATION

Total marks: 120 (External 80, Internal 40) 3 periods per week
University Examination duration-3hours

Unit -1

Wheastone Bridge, Kelvin Bridge, AC Bridge & their application, Maxwell Bridge, Hay Bridge, Schering Bridge, Unbalance – conditions, Wein Bridge.

Unit -2

Classification of transducers, selection of transducers, Capacitive transducer, Inductive transducer, Linear Variable Differential Transformer Transducer, Photoelectric transducer, Piezoelectric transducer, Strain gauges, Displacement Transducer, Thermocouple, Thermister characteristics & applications.

Unit – 3

Amplified DC meter, chopper stabilized amplifier, AC voltmeters using rectifiers, True RMS Responding voltmeter, Electronic multimeter-basic circuit, Differential voltmeter, Digital voltmeter-Ramp type DVM, Successive approximation DVM, Q meter, Measuring methods.

Unit – 4

Sine wave generator, Frequency synthesized generater, Frequency divider generator, Signal generator modulation, Pulse & Square wave generater, Audio frequency generator.

Unit – 5

Introduction of Data acquisition, Resolution & Accuracy, Number of channels & the sampling rate, Signal conditioning of the inputs, Ratiometric conversion, Logarithmatic compression, Single channel data acquisition system-preamplification and filtering, Multi channel DAS, Analog Display and recorders.

Unit – 6

Computer controlled Test system, Testing an Audio Amplifier, Testing a Radio Receiver, Instruments used in computer-controlled instrumentation, IEEE 488 Electrical interface Digital Control Description, Example of signal Timing in a Microprocessor based measurement.

Text Books:-

- 1) Modern Electronics Instrumentation & Measurements Techniques (Unit – 1to4 & 6) by A.D.Helfrick & W.D.cooper
- 2) Instrumentation Devices & System (Unit – 5)
By C. S. Ranjan, sharma and V.S.V. Mani.

SARDAR PATEL UNIVERSITY
Revised syllabus from June 2003
T. Y. B. Sc. ELECTRONICS
EL-305
INDUSTRIAL ELECTRONICS

Total marks: 120 (External 80, Internal 40) 3 periods per week
University Examination duration-3hours

UNIT: 1

Thyristor: Symbolic representation, Constuction details, principles of operation and transistor, analog, Methods of turning ON, Turn off mechanism, Device specification, Ratings and nomenclature, Gate characteristics, Circuit for gate triggering, Internal power dissipation and temperature rise, Series and Parallel operation of SCRs, String efficiency.

UNIT:2

Thyristors, Low power devices: UJT, UJT relaxation oscillator, UJT's frequency stability, Triac, Triggering mode, Phase control using Triac, Power control, static circuit breaker, Over voltage protection, Zero voltage switch, Integral cycle triggering, Time delay circuit, soft start circuit, Logic and digital pulse circuit, Pulse circuit.

UNIT:3

AC, DC Stepper Motor, Types of inverters, Working of inverter with simplified circuit, Analysis of single phase inverter, Effect of feedback diode, Current fed inverters, Series capacitive inverters, Unilateral and Bilateral inverters, Series inverters.

UNIT: 4

Phase control, Full wave control circuits, Half wavecontrol bridge circuits, Dual converter, Phase control circuit, Modified RAM control, Control by VCO, Deratings of SCRs in phase controled, Application to speed control of motors, Regulated DC power supplies.

UNIT: 5

Choppers : On Off control, Rotor on-off control of DC motor, Chopper circuits, Improved chopper circuits, Step up choppers, Multiphase chopper circuits, Two quadrant choppers, AC choppers, Thyristor protection circuits, Gate control circuit, Over voltage and over circuit protection, Design of snubber circuit, SCR mounting.

UNIT: 6

Introduction to digital control system, Digital control system modeling, Sampling process, System terminology, General sample data system variable, Advantage and Disadvantage of digital control systems.

Text Book:

1. An introduction to thyristor and their application (Unit 1, 2, 4, 5)
M. Ramamoorthy
2. Thyristor power controller (Unit 3, 6)
G.K.Dubey, S.R.Doralde, A.Joshi.

Reference Books:

1. Power Electronics by P. C. Sen
2. Industrial Electronics By James T. Humptires and Lestic Sheets.

SARDAR PATEL UNIVERSITY
Revised syllabus from June 2003
T. Y. B. Sc. ELECTRONICS
EL-306
Analog Communication and Fiber Optics

UNIT: 1

Definition of AM, Expression of AM Voltage, Waveforms of AM Signal, Definition of FM, Expression of FM Voltage, Waveforms of FM signal, Classification of Radio receiver, Salient Features of broadcast receiver, Basic function of AM Receiver, Principal and block diagram of super heterodyne receiver, RF amplifier Image signal rejection, frequency Mixer and Converter IF amplifier, Detector stage Automatic Gain Control Automatic Frequency Control.

UNIT: 2

Introduction, Aspect ratio, Rectangular Switching Interlaced scanning, Composite Video signal, Video Modulation, Sound Modulation, Reception techniques of Vestigial sideband signal, TV camera Tubes, Image orthicon, Vidicon, Video Processing of camera tube output.

UNIT: 3

Block diagram and function of RF tuner, RF tuner circuits, Video IF amplifier, Inter stage coupling methods, Transistor video If amplifier circuits, Video detector, Polarity of video detector output, DC component restoration, Separation and reproduction of sound, Intercarrier sound system, Video amplification, Low frequency compensation, TV receiver video circuits, AGC circuits, Transistor keyed AGC.

UNIT: 4

Introduction, Principles of colour TV, Colour TV camera, Picture tube in CTV system, Picture tube in CTV, Shadow mask picture tube, Trinitron colour picture tube, In line colour picture tube, Colour TV transmission & reception, NTSC encoder and decoder, Secam system, PAL system.

UNIT: 5

Comparison of fibre with metal cable, Fibre construction, Principal of fiber optics, Advantage of fibre optics, Types of Fibre: Step index fiber, Single mode and multimode fibre, Graded index fibre and other type of fiber, Acceptance angle and Numerical aperture, Fiber losses and dispersion.

UNIT: 6

Sources: LED, Laser, Detector- photodiode, Avalanche photodiode, splicing of fiber, Block diagram of fiber optics communication system, Repeaters, Fiber cables.

Text Books:

(Applied Electronics Vol. II)

1. Radio Engineering : G.K.Mithal (Unit – 1 to 4)
2. Electronics Communications : Robert. J. Schoenbeck (Unit 1 to 6)
3. Basic Radio and Television : S.P.Sharma
4. Electronics Communication : Dennis Roody & John Coolen
5. Electronics Communication system : George Kennedy
6. Fiber optics Communication : D.C.Agarwal (Unit – 5, 6)
7. Optics Fiber Communication: Gerd Keiser (Unit – 5, 6)

SARDAR PATEL UNIVERSITY
Revised syllabus from June 2003
T. Y. B. Sc. ELECTRONICS
EL-307
PRACTICALS

Total marks: 120 (External 80, Internal 40)

University Exam duration-2 practicals of 3hours each

Number of periods per week: Total 18 periods for EL-307, EL-308 & EL-309

LIST OF EXPERIMENTS

1. Feedback Amplifier
2. Wide band amplifier
3. Phase shift and Wein bridge Oscillator Using Transistor
4. Hartley and Colpits Oscillator Using transistor
5. Push Pull Amplifier
6. Regulated power supply using 78XX, 79XX
7. Regulated power supply using 723
8. SMPS
9. OP-AMP Parameters
10. OP-AMP Application- I (Inv, Noninv, Instru- amplifier, Adder, Sub, Scalar)
11. OP-AMP Application- II (Wein Bridge, Phase shift, Hartley, Colpits, Square wave generator)
12. OP-AMP Comparator
13. Filter Using OP-AMP (Low pass, Band Pass, Band reject, All pass)
14. Astable and its application using 555
15. Monostable and its application using 555
16. Clipping and Clamping Circuit
17. Shift registers (SISO, SIPO, PIPO, PISO)
18. 74LS83 Applications
19. R-2R, Weighted registers, (DAC)
20. Counter type A/D Converter
21. Dual slope (ADC)
22. ADC 0801 & DAC 080
23. Wheatstone Bridge
24. Kelvin Bridge
25. Maxwell Bridge
26. Hay Bridge
27. Schering Bridge

And other experiments based on Syllabus.

SARDAR PATEL UNIVERSITY
Revised syllabus from June 2003
T. Y. B. Sc. ELECTRONICS
EL-308
PRACTICALS

Total marks: 120 (External 80, Internal 40)

University Exam duration-2 practical of 3hours each

Number of periods per week: Total 18 periods for EL-307, EL-308 & EL-309

LIST OF PRACTICALS

1. Decimal addition of two-8bit number Sum, 16-bit using microprocessor 8085
2. Hexadecimal Addition of two-8-bit number sum;16-bit using Microprocessor 8085
3. Addition of two 16-bit numbers Sum; 16 bit using microprocessor 8085
4. 2's Compliment of 16 bit number any microprocessor 8085
5. Find the largest from a series of numbers using microprocessor 8085
6. To arrange a series of number in desending order using microprocessor 8085
7. Sum of series of 8-bit Hexadecimal number
8. Sum of 8-bit/16-bit
9. Sum of series of 8-bit decimal number sum : 16 bit
- 10.Hexadecimal Multiplication – Product:16Bit
- 11.Hexadecimal division-division:16bit
- 12.LVDT
- 13.SCR Characteristics
- 14.Triac Characteristics
- 15.UJT Characteristics
- 16.Diac Characteristics
- 17.Phase Control Circuit using Triac
- 18.Ramp Generator Using UJT
- 19.Amplitude Modulation & Demodulation
- 20.Frequency Modulation & Demodulation
- 21.Phase Modulation & Demodulation
- 22.Application Based on Fibre Optics
- 23.Study of Radio-receiver
- 24.Study of TV-receiver

And other experiment based on Syllabus.

SARDAR PATEL UNIVERSITY
Revised syllabus from June 2002
T. Y. B. Sc. ELECTRONICS
EL-309
PROJECT

Total: 120 marks

In this course every students of T. Y. B. Sc.(Electronics) is expected to complete one project during the tenure of course and required to submit the project report of 25-30 pages after completion of project for examination through demonstration and oral discussion Some project as a guideline are suggested below but specification within the projects may be varied or an all together new project can be taken upon the suggestion of the teacher commensurate with the existing facilities and the syllabus in force.

1. Design and construction of Transistor Tester
2. Design, construction and testing of a power supply of desired specification
3. Assembly of a radio receiver
4. Assembly of different section of TV set
5. Construction of Function Generator
6. Construction of binary counter with LED display
7. Construction of Digital Clock
8. Construction of Traffic Light signal Model
9. Construction of Timer
10. Design & Construction of Electronics Fan Regulator
11. Design & Construction of different tone Doorbell
12. Fault finding and repair of multimeter/CRD
13. Construction of sound generator
14. Construction of in circuit transistor tester
15. Construction of Electronics Stop watch
16. Construction of Electronics thermometer
17. Microprocessor based Electronics applications
18. Two way intercom
19. Miniature Hearing Aid
20. Water level indicator
21. Light activated Alarm
22. Emergency Light
23. Stereo Amplifier
24. Universal Logic Probe
25. Burglar or Fire alarm
26. Automatic Defroster
27. Temperature Controller
28. TV Booster
29. Combined inverter, Charger and Eliminator
30. Capacitance Meter
31. Troubleshooting in measuring instrument, Electronics equipment
32. PCB Designing

And other projects based on Syllabus

Reference Book: Electronics Projects- Volume 1 to 14 (EFY publication)

and other Electronics Magazine