GUJARAT UNIVERSITY
Ahmedabad
B.Sc.(ELECTRONICS SCIENCE)Semester-V
Syllabi for Electronics Science (Theory and Practicals)
Academic year 2013-2014

	ELECTRONICS THEORY (CORE COMPULSORY) CREDIT-4 INTERNAL:30 EXTERNAL:70 TOTAL:100 4HRS PER WEEK	ELECTRONICS THEORY (CORE COMPULSORY) CREDIT-4 INTERNAL:30 EXTERNAL:70 TOTAL:100 4HRS PER WEEK	ELECTRONICS THEORY (CORE COMPULSORY) CREDIT-4 INTERNAL:30 EXTERNAL:70 TOTAL:100 4HRS PER WEEK	ELECTRONICS THEORY (CORE COMPULSORY) CREDIT-4 INTERNAL:30 EXTERNAL:70 TOTAL:100 4HRS PER WEEK	ELECTRONICS THEORY (Subject Elective) CREDIT-2 INTERNAL:30 EXTERNAL:70 TOTAL:100 3HRS PER WEEK	ELECTRONICS (CORE COMPULSORY) CREDIT-5 INTERNAL:60 EXTERNAL:140 TOTAL:200 12HRS PER WEEK
Paper Code & Name	ELE :301 Linear Analog circuits & Voltage Regulators	ELE:302 Digital Electronics & Microprocessor	ELE:303 Electronics Instrumentation	ElE:304 Electronics Communications	ELE:305 (Elective) Student has to select one subject elective course from the University approved subject elective courses	ELE:306 <u>practicals</u> Note: Perform all the experiments listed in the curricula on either Electrical & Electronics Trainer or Practical Bread board or Practical trainer Board There are A,B,C & D groups. A,B &C have experiments D group is Project Group
Unit-1	OP-AMP Theory	Counters	Electronic voltmeter & Multi meter	AM Modulation & De-modulation		
Unit-2	OP-AMP Application	Micro-processor Ch-4	Digital Voltmeter	FM Modulation		
Unit-3	IC Voltage Regulators	Micro-processor Ch 5 & 6	Cathode Ray Oscilloscope	Antenna		
Unit-4	Switching Regulator	Micro-processor Ch-7	Signal Generator	Satellite Communication		

In order to give exposure of industry, research institutes and higher learning in the field of electronics industrial visits may be arranged. It is expected that students of B.Sc.(Electronics Science) semester 5 & 6 must visit industry / research institute / institute of higher learning. College can also offer (student can also select) subject elective course from the subject electives of Physics semester 5 & 6.

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B.Sc.(ELECTRONICS SCIENCE)Semester-VI
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Paper Code & Name	ELE :307 Non Linear Electronics and Thyristors	ELE:308 Advanced Digital Electronics & Microprocessors	ELE:309 Electronic Communication Systems	ElE:310 Physics of Electronics	ELE:311 (Elective) Student has to select one subject elective course from the University approved subject elective courses	ELE:312 practicals Note: Perform all the experiments listed in the curricula on either Electrical & Electronics Trainer or Practical Bread board or Practical trainer Board There are A,B,C & D groups. A,B &C have experiments D group is Project Group
Unit-1	Non linear applications of OP-AMP	D/A Conversion and A/D Conversion	Fiber Optic Technology	Sensors & Transducers		
Unit-2	PLL (Phase Locked Loop)	Micro-processor Ch- 8	Radio Receiver	DSP(Digital Signal Processing)		
Unit-3	Thyristor-I	Micro-processor Ch-9	Television	Electrodynamics		
Unit-4	Thyristor-II	Micro-processor Ch 15 & 19	Digital Communication	Semiconductor Physics		

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B.Sc. (Electronics Science) Semester-V

Academic Year 2013-2014

Ele-301: **Linear analog circuits and Voltage Regulators**

(4 Credit:4 hrs/week)

Unit – 1

Opamp Theory

Differential amp., Transfer charecteristics , Low frequency small signal analysis of differential amplifier,Circuits for improving CMRR, Basics of amplifier applications.

Article no 2.4.1 to 2.4.4, 4.2

Book Linear integrated ckts. by Roy chaudhary 4^{th} Edition.

Unit -2

Opamp applications

Voltage to current converter, opamp circuits using diodes, log and antilog amplifier, multiplier and divider, differentiator and integrator circuits, electronic analog computation.

Article no 4.5,4.6,4.8,4.9,4.10,4.11,4.12

Book Linear integrated ckts. by Roy chaudhary 4^{th} Edition.

Unit -3

IC voltage regulator

Internal circuit arrangement, Zener reference regulation protection , error amp, series pass transistor, 3 terminal positive voltage regulators,3 terminal negative voltage regulators, 3 and four terminal adjustable voltage regulators, 4 terminal positive voltage regulators, 4 terminal negative voltage regulators, dual non tracking voltage reg, dual tracking votage reg, precision multi terminal regulators, positive regulators using IC 723 , fold back current limiting of positive regulators, using IC 723, negative voltage regulators using IC 723 ,electronic shut down of a positive regulators ,current regulators,open loop current regulators, constant current regulators using 3 terminal regulators, current regulators using IC 723,

Articleno.2.4.1,2.4.2,2.4.4,2.4.5,2.4.6,2.5.1,2.6,2.7,2.7.1,2.8,2.9,2.10.1,2.10.2,2.12,2.12.1,2.12.3,2.13,2.14.1,2.15.,2.15.1,2.15.5,2.15.5.1

Book: Modern Power Electronics by P.C. Sen. 2^{nd} Edition.

Unit 4

Switching regulators

Introduction , circuit scheme basic switching regulators, minimum load current and filter inductance,input and output power, control circuit consideration in a bulk switching regulator,free running switching regulators. ,switch mode operation using linear voltage regulators,switching regulators using 3 terminal linear regulators, positive switching regulators using LM105,LM 205 OR LM 305 Article no.3.1 to 3.3 ,3.3.1,3.3.5,3.5,3.5.2.1,3.5.2.2

Book: Modern Power Electronics by P.C. Sen. 2nd Edition.

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Academic Year 2013-2014

Ele-302: Digital Electronics and Microprocessor :

(4 Credit:4 hrs/week)

Unit:1

Ch:10 Counters

10.1 Asynchronous Counters: Ripple Counters, The 54/7493A

10.2 Decoding Gates

10.3 Synchronous Counters: The 54/74193A

10.4 Changing the Counter Modulus: A mode- 3 Counter, A mode- 6 Counter

10.5 Decade Counters: A mode- 5 Counter, A mode- 10 Counter

Ch:11 Design of Sequential Circuit:

11.1 Model Selection

11.2 State Transition Diagram: State Definitions: Moore Model, State Transition diagram: Moore Model, State Definitions: Mealy Model, State Transition diagram: Mealy Model,Conversions of Models.

11.3 State Synthesis Table: state Assignment, State Synthesis Table, Moore Model,Mealy Model.

11.4 Design Equations and Circuit Diagram: Moore Model, Mealy Model

Text Book: Digital Principles and Applications 6th edition
by Donald P. Leach, Albert Paul Malvino and Gautam Saha
(Special Indian Edition) Publisher: McGraw-Hill Companies
Reference Book:Digital Electronics by Subrata Ghoshal
Publisher :Cengage Learning

Unit:2

Ch:4 8085 Microprocessor Architecture and memory Interfacing

4.1 The 8085 MPU : The 8085 Microprocessor, Microprocessor communication and Bus timings, De multiplexing the Bus AD_7-AD_0,Generating Control Signals, A Detailed look at the8085 MPU and its Architecture, Decoding and Executing an Instruction

4.2 Example of an 8085 based microcomputer: Opcode Fetch Machine Cycle, Memory Read Machine Cycle, How to recognize Machine Cycle

4.3 Memory interfacing: Memory Structure and Its Requirements, Basic Concepts In Memory Interfacing, Address Decoding, Interfacing Circuit, Address Decoding and Memory Addresses

Unit:3

Ch-5 Interfacing I/O devices.

5.1 Basic interfacing concepts: Peripheral I/O Instructions, I/O Execution, Device Selection and Data transfer, Absolute vs. Partial Decoding, Input Interfacing, Interfacing I/O Using Decoders.

5.2 Interfacing output Displays: Illustration : LED Display for Binary Data, Illustration :Seven Segment LED Display as an Output

5.3 Interfacing Input devices: Illustration : Data Input from DIP Switches, Hardware, Interfacing Circuit, Multiple Port Addresses, Instructions to Read Input Port

5.4 Memory mapped I/IO devices: Execution of Memory-Related Data Transfer Review of Important Concepts.

Ch-6 Introduction to 8085 instructions.

6.1 Data transfer (Copy) operations: Addressing Modes, Illustrative Program: Data Transfer From Register to Output Port, Illustrative Program: Data Transfer to Control Output Devices

6.2 Arithmetic Operations: Addition, Illustrative Program: Arithmetic Operations-Addition and Increment, Subtraction, Illustrative Program: Subtraction of Two Unsigned Numbers

6.3 Logic Operations: Logic AND, Illustrative Program: Data Masking with Logic AND,OR, Exclusive-OR, and NOT, Setting and Resetting Specific Bits, Illustrative Program: ORing Data from Two Input Ports

6.4 Branch Operations: Unconditional Jump, Illustrative Program: Unconditional Jump to Set Up a Continuous Loop, Conditional Jumps, Illustrative Program: Testing of the carry Flag

6.5 Writing assembly language programming: Getting Started, Illustrative Program: Microprocessor-Controlled Manufacturing Process

Unit:4

Ch-7 Programming techniques with additional instructions

7.1 Programming techniques looping, counting and indexing: Continuous Loop, Conditional Loop.

7.2 Additional data transfer and 16 bit arithmetic instructions:16-Bit Data Transfer to Register Pairs(LXI), Data Transfer(Copy) from Memory to Microprocessor , Data Transfer(Copy) from Microprocessor to Memory or Directly into Memory, Arithmetic Operations Related to 16 Bits or Register Pairs, Illustrative Program: Block Transfer of Data Bytes

7.3 Arithmetic operations related to memory: Instructions, Illustrative Program: Addition with Carry, Instructions, Illustrative Program: Checking Sign with Rotate Instructions.

7.4 Logic Operations: Rotate: Instructions, Illustrative Program: Use of Compare Instruction to Indicate End of Data String, Illustrative Program: Sorting.

7.5 Logic Operations: Compare

Text Book: Microprocessor Architecture, Programming and Applications with 8085 5th edition by Ramesh Gaonkar
Publisher: Penram International Publishing. (India) Pvt. Ltd.

Reference Book:The 8085 Microprocessor Architecture, Programming and Interfacing by K. Udaya Kumar and B.S.Umashankar
Publisher:Pearson

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Ele-303: ELECTRONIC INSTRUMENTATION

(4 Credit:4 hrs/week)

Unit-1

Electronic Volt meter

4.7 Transistor voltmeter (TVM),4.8 Chopper type DC Amp. Voltmeter,4.9 Solid state Voltmeter, 4.10 Differential Voltmeter, 4.11 DC standard /Difference Voltmeter.4.12 AC voltmeter using Rectifiers. 4.13 AC voltmeter using Half wave rectifier.4.14 AC voltmeter full wave rectifier. 4.15 Multirange AC voltmeter,4.16 Avg. Responding voltmeter.4.17 Peak responding voltmeter.4.18 True RMS voltmeter,4.20 Consideration in choosing an analog voltmeter.4.21 Ohmmeter (series type Ohmmeter). 4.22 Shunt type Ohmmeter.4.25 Multimeter.4.26 Multimeter operating Instructions.

Articles no.4.7 to 4.18 ,4.20 4.21,4.22, 4.25,4.26.

Book:- Electronic instrumentation by H. S. Kalsi (3rd Edition)

Unit-2

Digital voltmeter.

Ch5.1 Introduction.5.2 Ramp technique.5.3 Dual slope integrating type DVM,

5.4 Integrating type DVM., 5.5 Most commonly used principle of ADC, 5.6 Successive approximation.,5.8 3 $\frac{1}{2}$ Digit.,5.9 Resolution and sensitivity of digital meters.,5.10 General specifications of a DVM.

Articles no. 5.1 to 5.6 ,5.8 to 5.10

Book:Electronic Instrumentation by H.S.Kalsi,2nd Edn.

Unit-3

C.R.O.

7.1 Introduction.,7.2 Oscilloscope Block-Diagram.,7.3.1 Early CRT, 7.3.3 Post deflection Acceleration.,7.3.4 Screens for CRTs.,7.3.5 Graticulles.7.5 Vertical Deflection system,7.6 Delay line.,Function of delay line., 7.8 Horizontal deflection system.,7.10 Oscilloscope Techniques.

Articles no. 7.1 to 7.2,7.3.1, 7.3.3 to 7.3.5, 7.5,7.6,7.8,7.10.

Book: Helfric and Cooper.

Unit-4

Signal Generator.

8.1 Introduction.,8.2 The sine wave genetator.,8.7 Pulse and Square wave Generator., 8.7.1 Pulse characteristic and Terminology.,8.7.2 Astable Multivibrator., 8.7.3 Laboratory square and pulse generator.

Articles no. 8.1 to 8.2, 8.7,8.7.1 to 8.7.3.

Book:Helfric and Cooper.PHI publications.

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Ele-304: Electronics Communication :

(4 Credit:4 hrs/week)

Unit-1.

Amplitude Modulation and Demodulation

8.1 Introduction

8.2 Amplitude modulation

8.3 Amplitude Modulation Index.

8.4 Modulation index for sinusoidal AM.

8.5 Frequency spectrum for sinusoidal AM.

8.6 Average power sinusoidal AM.

8.7 Effective voltage and current for sine AM.

8.11 Amplitude demodulation circuit.

Diagonal peak clipping and negative peak clipping.

Articles no. 8.1 to 8.7 and 8.11.

Book : Electronic communication by Roddy and coolen. Prentice Hall ,4th Edition.

Unit-2

Frequency Modulation.

10.1 Introduction.

10.2 Frequency Modulation.

10.3 Sinusoidal Frequency Modulation.

10.4 Frequency spectrum for sinusoidal FM.

10.5 Average power in sine FM.

10.8 Phase modulation.

10.9 Equivallence between PM and FM.

Articles no. 10.1 to 10.5 and 10.8 and 10.9.

Book: Electronic communication by Roddy and Coolen. Prentice Hall, 4th Edition.

Unit-3

Antenna.

Ch.25 Antenna.

Introduction.Basic antenna principles, fundamental antenna, resonance in half wave dipole, antenna parameters, directivity of a resonant half wave dipole, the folded dipole, the effect of ground on radiation of energy , parasitic elements, Yagi antenna, simple Vertical Aerial, Loop Aerial, ferrite rod Aerial.

Articles no. 25.1 to 25.9,and 25.20 and 25.31.

Book: Electronic and Radio Engineering by M.L.Gupta. Dhanpat Rai and sons. Delhi .8 th Edition.

Unit-4

Satellite communication. Introduction, Satellite system, fixed satellite service, satellite telecommunication Earth station, Indian Domestic satellite INSAT, television.

Articles no. 37.1 to 37.4, 37.16, 37.19

Book: Electronic and Radio Engineering by M.L.Gupta. Dhanapat rai and sons. Delhi. 8th Edition.

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Ele-305: Consumer Electronics (Subject Elective Course)

(2 Credit:3 hrs/week)

Unit-I

Audio systems

- PA system – Microphone,
- Amplifier, Loudspeakers, Radio receivers – AM/FM
- Audio recording and reproduction – Cassettes, CD and MP3

Unit-II

Landline and Mobile telephony

- Basic landline equipment – CLI, Cordless Telephone.
- Intercom/ EPABX system
- Mobile phones, GPRS, Bluetooth, GPS Navigation system

Unit-III

Office Equipments

- Scanners – Barcode / Flat bed,
- Printers
- Xerox
- Multifunction units (Print, Scan, fax, copy)

Unit-IV

Electronic Gadgets and Domestic Appliances

- Digital clock,
- Digital camera,
- Handi-cam,
- Home security system,
- CCTV
- Air conditioners,
- Refrigerators,
- Washing Machine/Dish Washer,
- Microwave oven,

- Vacuum cleaners

Recommended Books:

1. Consumer Electronics by R. P. Bali Pearson Education (2008)

2. Audio and Video systems by R. G. Gupta Tata McGraw Hill (2004)

OR

College can also offer(Student can also select)subject elective course from the subject electives of Physics Sem 5 and 6

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Academic Year 2013-2014

Ele-306: Electronics Practicals:

(5 Credit:12 hrs/week)

List of Practicals

Group A

1. Op-amp as Adder and Subtractor.
2. Op-amp as Integrator and Differentiator.
3. Op-amp as current amplifier.
4. Complimentry pair Push pull amplifier.
5. Active filter using Op-amp (First order, high pass, low pass).

Group B

6. Monostable Multivibrator by IC-74121.
7. Hartly Oscillator using transistor.
8. UJT as a relaxation oscillator.
9. Wien bridge oscillator using Op-amp.
10. Crystal oscillator using TTL Logic.

Group C

11. voltage regulator using IC-317.
12. Low voltage regulator using IC-723.
13. PWM with IC-555.
14. Microprocessor-1 (List given below*).
15. Variable Microprocessor-2 (List given below).

Group D

PROJECT : Voluntary Arbitrary Projects to be decided. **(**Student has to submit the project report and give a project presentation and project viva-voce)

*** Microprocessor-1 (List of Experiments of Microprocessor practical Programs):**

1. Write the program to interchange the data byte between two location.
2. Write the program to exchange the data byte stored in register D with register H and data byte stored in register E with register L.
3. Sixteen bytes of data are stored in memory location starting from the address location C050H to C05FH. Transfer the entire block of data to new memory location starting from C070H.
4. Write a program to add N 8 bit binary numbers considering possible overflow.
5. To sort ten bytes of data initially stored in memory location starting from C100H onwards in the ascending/descending order.

Note:

Total:200 Marks Internal 60 Marks External 140 Marks

There are A,B,C and D four groups. A,B and C group are practicals and D group is project group.

Group A : One Practical:35 Marks:3 Hours

Group B : One Practical:35 Marks:3 Hours

Group C : One Practical:35 Marks:3 Hours

Group D : Project Group:35 Marks:3 Hours

Practical Batch Size : Maximum 10 Students.

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B.Sc. (Electronics Science) Semester-VI

Academic Year 2013-2014

Ele-307 :Non Linear Electronics and Thyristors

(4 Credit:4 hrs/week)

Unit-1

Non-linear applications of Opamp.

Basic opamp applications,Voltage to Current and Current to Voltage converter, log and antilog amplifier, multiplier and divider, differentiator,Integrator.

Article no:- 4.2,4.5,4.8,4.9,4.10,4.11.

Book:- D. Roy Choudhury and Shali B. Jain.

Unit-2

Phase Locked Loop

Introduction, Basic principles, Phase Detector and comparator,voltage controlled oscillator (VCO),low pass filter, monolithic phase locked loop., PLL applications (frequency multiplication/division, frequency translation, AM detection,

Article no. 9.1 to 9.6,9.7.1 to 9.7.3.

Book:-. D. Roy Choudhury and Shali B. Jainand & co.

Unit -3

Thyristor -1

SCR, Working of SCR, equivalent circuit of SCR, Important terms, V-I characteristics of SCR,SCR in normal operation, SCR as a switch,SCR switching , SCR H.W. rectifier, SCR F.W. rectifier, Applications of SCR ,

Article no 23.1 to 23.11.

Book:- Principles of electronics by V.K. Mehta 10th Edition.

Unit-4

Thyristor-2

TRIAC, TRIAC construction, TRIAC operation, TRIAC characteristic, Application of TRIAC, the DIAC, Application of DIAC ,UJT as relaxation oscillator and over voltage detector .

Articles no. 24.2 to 24.8,24.13

Book:- Principles of electronics by V.K Mehta 10th Edition S Chand & Co.

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Academic Year 2013-2014

Ele-308: AdvancedDigital Electronics and Microprocessor :

(4 Credit:4 hrs/week)

Unit:1

Ch-12 D/A Conversion and A/D Conversions

12.1 Variable Resistor Network: Binary Equivalent Weight, Resistive Divider,
12.2 Binary ladders
12.3 D/A Converters: Multiple Signals, D/A Converter Testing, Available D/A Converters
12.4 D/A Accuracy and Resolution
12.5 A/D Converters-Simultaneous Conversion
12.6 A/D Converter-Counter Method
12.7 Continuous A/D Conversion
12.8 A/D Techniques: Successive Approximation, The ADC 0804, Section Counter
12.9 Dual-Slope A/D Conversion: Single Ramp A/D Converter, Dual-Slope A/D Converter
12.10 A/D Accuracy and Resolution

Text Book: Digital Principles and Applications 6th edition
by Donald P. Leach, Albert Paul Malvino and Gautam Saha
(Special Indian Edition) Publisher: McGraw-Hill Companies
Reference Book: Digital Electronics by Subrata Ghoshal
Publisher: Cengage Learning

Unit:2

Ch-8 Counters and Time Delays.

8.1 Counters and Time Delays: Time Delay Using One Register, Time Delay Using RegisterPair, Time Delay Using Loop within Loop Technique.
8.2 Illustrative program: Hexadecimal Counter
8.3 Illustrative Program: zero to ten (Modulo Ten) counter
8.4 Illustrative Program: Generating pulse wave forms

Unit:3

Ch-9 Stacks and Subroutines

9.1 Stack
9.2 Subroutines: Illustrative Program: Traffic Signal Controller
9.3 Restart , conditional Call and Return Instructions: Restart (RST) Instructions,

Unit:4

Ch-15 General purpose programmable Peripheral Devices.

15.1 The 8255A Programmable Peripheral Interface: Block Diagram of the 8255A Mode 0; Simple Input and Output.

Text Book: Microprocessor Architecture, Programming and Applications with 8085 5th edition by Ramesh Gaonkar
Publisher: Penram International Publishing. (India) Pvt. Ltd.

Reference Book: The 8085 Microprocessor Architecture, Programming and Interfacing by K. Udaya Kumar and B.S.Umashankar Publisher:Pearson

Ch-19 Analog data Input and output

19.5 DAC Specifications.

19.6 Solved problems

19.7 Standard DAC chips

- 19.7.1 DAC 0800
- 19.7.2 DAC 0808

19.9 DAC applications

- 19.9.1 Sawtooth Waveforms
- 19.9.2 Reverse Sawtooth Waveforms
- 19.9.3 Square Wave
- 19.9.4 Triangular wave

19.10 Analog to Digital Converters, ADCS

19.16 ADC Interfacing

Book: 8 bit Microprocessor:by Late V.J.Vibhute and P.B. Borole

Publisher: Technova Publishing House

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Ele-309 : Electronics communication Systems

(4 Credit:4 hrs/week)

Unit 1 -:

Fiber Optic Technology
Introduction to history of fiber optics , WHY Fiber optics?
Introduction to light: Reflection and Refraction , Dispersion, Diffraction , Absorption , Scattering.
Articles No. 18.1,18.2,18.3(18.3.1,18.3.2)
Book: Electronics Communication Systems By(4th edition MGH)

Unit 2-:

Radio Receiver
Introduction, Receiver Types: TRF Receiver, super-heterodyne receivers, AM Receiver: RF Section and Characteristics, Frequency changing and traking,IF and IF Amplifier, Detection and AGC.
Articles No. 6.1(6.1.1,6.1.2,),6.2(6.2.1,6.2.2,6.2.3,6.2.4)
Book: Electronics Communication Systems By(4th edition MGH)

Unit 3 –:

Television
TV Fundamentals, Requirements and standards(Introduction and Standards)Black and white transmission(Fundamentals, Beam scanning, Blanking and synchronizing pulses)Black and White reception(fundamentals, Common ,video and sound circuit, synchronising circuit),color reception(introduction, Color Reception)
Articles no. 17.1(17.1.1,17.1.2), 17.3(17.3.1 to 17.3.3),17.4(17.1.1,17.1.3)
Book: Electronics Communication Systems By(4th edition MGH)

Unit 4-:

Digital Communication Digital fundamentals, The emergence of data communications systems, characteristics of datatransmission, Digital codes ,Error detection and correction.
Articles no:14.1 (14.1.1,),14.2(14.2.1, 14.2.2, 14.2.3,14.2.4)
Book:Electronic Communication Systems by (Kennedy,Davis)

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Ele-310: Physics of Electronics :

(4 Credit:4 hrs/week)

Unit-1

Sensors and Transducers:

Classification of transducers, selecting a transducer, strain gauge, displacement transducer, temp. measurement and photo sensitive device.

Article no. 11.1 to 11.6 Book: Modern electronic instrumentation and mesurement techniques.

7th edition.

Unit-2

Digital Signal processing

Classification of signal and systems ,introduction, classification of signal, singularity functions , amplitude and phase spectra , classification of system , simple manipulation of discrete time signal, representation of system.

Z-transform , introduction –definition of Z transform , Definition of inverse z transform, region of conversion, properties of Z –transforms, linearity ,time reversal , time shifting , differentiation, co-relation, initial value theorems ,final value theorem, time delay, time advance , evaluation of inverse Z- transform , long division method.

Article no :1.1 to 1.7 and 4.1 to 4.4.

Book: digital signal processing by s. salivahanan.

Unit-3

Electrodynamics

Boundary value problems in electrostatic field , poison and laplace equation, boundary conditon and uniqueness theorem , solution of laplace equation in rectangular coordinates, hysteresis, Maxwell equation, potential of electromagnetic field , plane waves in non conducting media , polarization, energy flux in a plane wave, radiation pressure and momentum.

Article no: 3.1,3.3,3.4,5.7,5.8,5.10,6.1,6.2,6.3,6.4.

Book : Electromagnetism by B.B. laud. by new age international publishers. 3rd Edition.

Unit-4

Semiconductor Physics

Electrical conduction in solid ,formation of energy band, band theory from collective approach, conduction mechanism in solid , semiconductor conductivity . Articles no.:-1.2.6 to 1.5

Conservation and motion of charge- diffusion of carriers , current flow in semiconductors, derivation of continuity equation , application of continuity equation, current flow in single semiconductor, Einstein relationship.

Articles No:-3.1 to 3.6.

Book:Electronic Devices and Linear Circuits by G.N. Garud and L.C. Jain TMH Publications.

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Ele-311: **Modern Communication (Subject Elective Course)**

(2 Credit:3 hrs/week)

Unit I.

Telecommunication Systems:

Telephones, The local loop, telephone Set, Standard Telephone and local loop, Electronic Telephones, Cordless Telephones, Telephone System, Subscriber Interface, Telephone Hierarchy, Private Telephone System.

Articles No : 18.1 and 18.2

Book: Principles of Electronic Communication System by Louis E. Frenzel THM 3rd Ed.

Unit II.

Cellphone Technologies:

Cellular Telephone System, Cellular Concept, Frequency Allocation, Multiple Access, The Advanced Mobile Phone System, Typical Amps Hands, Digital Cell Phone Systems, 2G Cell phone Systems, IS-136 TDMA,GSM, IS-95 CDMA, Digital Cell Phone Circuits (only Block diagram for a 2G Digital Cell Phone),2.5 G Cell phone System, 3G Cell phone System, UMTS 3G, CDMA 2000, 4G Systems, Location based technology, Base Stations.

Articles No : 20.1,20.2,20.3

Book: Principles of Electronic Communication System by Louis E. Frenzel THM 3rd Ed.

Unit III.

Internet Technologies:

Internet Applications, Internet Transmission Systems, Frame Relay, Asynchronous Transfer Mode, Routers, Internet Backbone, The Packet Switching Transmission System, TCP/IP, UDP, Internet and Addressing, Reverse Host ID Numbers, Network Mask, Subnet Mask, MAC address versus IP address, Storage Area Networks, Fiber Channel, Internet SCSI, Internet Security, Types of Security Threats, Security Measure.

Articles No : 15.1 to 15.3

Book: Principles of Electronic Communication System by Louis E. Frenzel THM 3rd Ed.

Unit IV.

Introduction to networking and Local Area Networks:

12-1 Network Fundamentals: Types of Networks, Network topologies, LAN Applications, Client-Server and Peer-to-Peer LANs, 12-2 LAN Hardware: Cables, Connectors, Network Interface Cards and Chips, Repeaters, Hubs, Bridges, Switches, routers, Gateways, Modems 12-3, Ethernet LANs,21-1 Wireless LAN, 21-4 WiMAX.

Articles No : 12.1,12.2,12.3,21.1,21.4

Book: Principles of Electronic Communication System by Louis E. Frenzel THM 3rd Ed.

OR

College can also offer(Student can also select)subject elective course from the subject electives of Physics Sem 5 and 6.

OR

In sem 6 student can choose minor/major project under the guidance of the teaching faculty.
(Student has to submit the project report and give a project presentation and project viva-voce)

Gujarat University

Ahmedabad

B.Sc. (Electronics Science) Semester-VI
Academic Year 2013-2014

Ele-312: Electronics Practicals:

(5 Credit:12 hrs/week)

List of Practicals

Group A

1. Op-amp as comparator.
2. Log Amplifier using Op-amp .
3. PLL: Lock range and capture range.
4. Op-amp based voltage regulator.
5. Fixed voltage regulator using IC-7805.

Group B

1. Microprocessor Hardware Interfacing experiment. (Square wave and Triangular wave generation).
2. Synchronous counter using IC-74193 (up/down and variable modulo) and synchronous counter using IC-7490.
3. IC-8255 to drive LED / RELAY Op-amp.
4. Microprocessor-1*
5. Microprocessor-2.*

Group C

1. Characteristic of Diac.
2. Characteristic of SCR (AC/DC).
3. Characteristic of Triac (AC/ DC).
4. Study of solar cell (V to I characteristics and form factor) .
5. To measure Threshold current of LASER diode. Unit – 4

Group D

PROJECT : Voluntary Arbitrary Projects decided by student.(Student has to submit the project report and give a project presentation and project viva-voce)

***List of Experiments of Microprocessor practical Programs:**

1. Write a program to add two sixteen bit binary numbers.
2. Write a program to multiply two eight bit binary numbers.
3. Write a program to convert two digit BCD number into binary equivalent.
4. Write a program to set up decimal counter to count and display from 00 to 99.

Note:

Total:200 Marks Internal 60 Marks External 140 Marks

There are A,B,C and D four groups. A,B and C group are practicals and D group is project group.

Group A : One Practical:35 Marks:3 Hours

Group B : One Practical:35 Marks:3 Hours

Group C : One Practical:35 Marks:3 Hours

Group D : Project Group:35 Marks:3 Hours

Practical Batch Size : Maximum 10 Students.

In order to give exposure of industry, research institutes and Institute of higher learning in the field of electronics industrial visits may be arranged. It is expected that students of B.Sc.(Electronics Science) semester 5 & 6 must visit industry / research institute / institute of higher learning.