UNIVERSITY OF CALICUT
(Abstract)

B.Sc Programme in Electronics-under Choice Based Credit Semester System-Scheme and syllabus-implemented with effect from 2009 admission onwards-approved-orders issued.

GENERAL AND ACADEMIC BRANCH – I 'J' SECTION

No. GAI/J1/3967/08 Dated, Calicut University P.O 25.6.09

Read: 1. U.O.No.GAI/J2/3601/08(vol II) dtd 19/06/09.

2 Minutes of meeting of Board of Studies in Electronics held on 30.04.2009.

3. Item No. 2 (xx) of the minutes of meeting of Faculty of Science held on 05.05.09.

4. Item No.II. A.21 of the minutes of meeting of the Academic Council held 14.05.09.

O R D E R

Choice based Credit Semester System and Grading has been introduced for UG Curriculum in all affiliated colleges under this University with effect from 2009 admission onwards and the Regulations for the same implemented vide paper cited (1) above.

As per paper read as (2) above, the Board of studies has resolved to approve the Scheme and Syllabus of BSc Programme in Electronics under Choice based Credit Semester System .

As per paper read as (3) & (4) above, the Faculty of Science held on 05.05.09 endorsed the minutes of Board of studies and the Academic Council of 14.05.09 approved the same.

Sanction has therefore been accorded to implement the scheme and syllabus of BSc Programme in Electronics under Choice based Credit Semester System in this University with effect from 2009 admission onwards.

Orders are issued accordingly . Scheme syllabus appended.

Sd/-
DEPUTY REGISTRAR (G&A I)
For REGISTRAR

To

The Principals of all affiliated Colleges

offering BSc Programme in Electronics.

Copy to: CE/EGI/EXI/DR-BSc/System Administrator-with a request to upload in the University website/Tabulation Sn/Enquiry/GAI-FSn/SF/DF/FC.

Forwarded/By Order

SECTION OFFICER

UNIVERSITY OF CALICUT

B.Sc Electronics Programme

Restructured UG Syllabi
Core, Open & Complimentary Courses

2009

Programme Objective

There are two main objectives to the B.Sc Electronics Programme.

a) To produce electronic professionals who can be directly employed or

start his/her own work as Electronic circuit Designer, Electronics consultant, Testing professional, Service engineer and even an entrepreneur in electronic industry.

b) To train students to a level where they can readily compete for seats for advanced degree courses like MSc (Electronics) and MBA etc.

On completion of the B.Sc Electronics Programme, the student will:

- Have basic communicative skill in the English language
- Have environmental and civic awareness
- Communicative skills and literary sensibility in languages other than English
- Have sound knowledge of the theory behind core subjects like, Electronic components, Electronic measuring and testing instruments, Analog and Digital IC's, Electronic circuit design and implementation, Troubleshooting and maintenance of electronic and electrical devices.
- Have sound skills in assembly Language and High Level Language programming, Interfacing of electronic devices with computers, etc
- Be in a position to develop industrial and entrepreneur applications

Eligibility

Candidate of admission to the B.Sc Electronics Programme should have passed the Higher secondary / Technical higher secondary / Vocational Higher secondary examinations of Govt. of Kerala or CBSE or IELE or any other examinations recognized as equivalent there to by the University of Calicut with Mathematics or Computer Science or Computer Applications as one of the optional subjects.

Duration of the Programme

Duration of the programme shall be 6 semesters. Each semester should have 90 instructional days with 5 hours of instruction per day 5-days a week system. The University will conduct semester-end examinations.

Programme Structure

Semester	Course No	Courses	Course Code	Course Title	Contact Hours			Credits
					Theory	Lab	Total	
I Semester	1	Common Course – 1	EL1A01	Communication Skill	4	0	4	4
	2	Common Course – 2	EL1A02	Academic Writing and Presentation	4	0	4	4
	3	Common Course – 3	EL1A03	Literature in Languages other than English	4	0	4	4
	4	Core Course – 1	EL1B01	Basic Electronics	3	2	5	2
	5	Complementary Course – 1	EL1C01	Mathematics - I	4	0	4	3
	6	Complementary Course – 2	EL1C02	Optional Complimentary – I	4/2	0/2	4	2
	Total (6 Courses)						**25**	**19**
II Semester	7	Common Course – 4	EL2A04	Sustainable Environment and Contemporary Issues	4	0	4	4
	8	Common Course – 5	EL2A05	Reading Prose	4	0	4	4
	9	Common Course – 6	EL2A06	Translation & Communication in Languages other than English	4	0	4	4
	10	Core Course – 2	EL2B02	Electronic Circuits	3	2	5	2
	11	Complementary Course – 3	EL2C03	Mathematics – II	4	0	4	3
	12	Complementary Course – 4	EL2C04	Optional Complimentary – II	4/2	0/2	4	2
	Total (7 Courses)						**25**	**19**
Semeste	13	Common Course – 7	EL3A07	History and Philosophy of Science	4	0	4	4
	14	Common Course – 8	EL3A08	General Informatics	4	0	4	4

	15	Core Course – 3	EL3B03	Analog Integrated Circuits	4	2	6	3
	16	Core Course – 4	EL3B04	Electro Magnetic Theory	4	0	4	3
	17	Complementary Course – 5	EL3C05	Mathematics – III	3	0	3	3
	18	Complementary Course – 6	EL3C06	Optional Complimentary – III	4/2	0/2	4	2
	Total (6 Courses)						**25**	**19**
IV Semester	19	Common Course – 9	EL4A09	Basic Numerical Skills	4	0	4	4
	20	Common Course - 10	EL4A10	Entrepreneurship Development	4	0	4	4
	21	Core Course – 5	EL4B05	Digital Electronics	3	2	5	6
	22	Core Course – 6	EL4B06	Communication Systems I	4	0	4	3
	23	Complementary Course – 7	EL4C07	Mathematics – IV	4	0	4	3
	24	Complementary Course – 8	EL4C08	Optional Complimentary – IV	4/2	0/2	4	6
	Total (6 Courses)						**25**	**26**
V Semester	25	Core Course – 7	EL5B07	Micro wave and Radar Engineering	4	0	4	3
	26	Core Course – 8	EL5B08	Communication Systems II	4	2	6	3
	27	Core Course - 09	EL5B09	Network Theory	4	0	4	3
	28	Core Course - 10	EL5B10	Microprocessors	4	2	6	3
	29	Core Course - 11	EL5B11	Project Work – 1	0	3	3	0
	30	Open Course – 1	EL5D**	Choose a Course from Open Course – I	2	0	2	2
	Total (6 Courses)						**25**	**14**
VI Semester	31	Core Course - 12	EL6B12	Programming Language C++	4	2	6	5
	32	Core Course - 13	EL6B13	Control System Engineering	4	0	4	4
	33	Core Course - 14	EL6B14	Micro Controllers And Applications	4	2	6	5

	34	Core Course - 15	EL6B15	Digital Signal Processing	4	0	4	3
	35	Core Course - 16	EL6B16	Project Work - 2	0	3	3	4
	36	Open Course – 2	EL6D**	Choose a Course from Open Course - II	2	0	2	2
	Total (6 Courses)						**25**	**23**

Total 36 Theory Courses

Open Course – I

EL6D01 – Semi Conductor Fabrication Technology & VLSI Devices

EL6D02 – Electronic Instrumentation

Open Course – II

EL6D03 – Power Electronics

EL6D04 – Computer Hardware & Networking

Total practical courses: 6

Projects :1

Total Credits: 120

There shall be theory examinations at the end of each semester. Practical examinations shall be conducted at the end of fourth and sixth semesters.

Practical Examinations – Fourth semester
1) Electronic Devices & Circuits 2) Analog and Digital Lab 3) Complementary course practical
Practical Examinations – Sixth semester
1) Communications Lab 2) Microprocessor and Microcontroller Lab 3) C++ Lab 4) Project Work

Distribution of courses, hours and credits

Course		1st sem		2st sem		3st sem		4st sem		5st sem		6st sem		Total Credits
		Hrs/ wk	Credit	Hrs/ wk	Credit	Hrs/ wk	Credit	Hrs/ wk	Credit	Hrs/ wk	Credit	Hrs/ wk	Credit	
Common Course English and others		8	8	8	8	8	8	8	8					32
Common course 2nd language		4	4	4	4									8
Core course theory		3	2	3	2	8	6	7	5	16	12	16	12	39
Core course practical		2		2		2		2	4	4		4	5	9
Open course I										2	2			2
Open course II												2	2	2
Project										3		3	4	4
Complementary course Mathematics		4	3	4	3	3	3	4	3					12
Complementary course Computer science	b)Practical	2	2	2	2	2	2	2	2					12
	a) Theory	2		2		2		2	4					
		25	19	25	19	25	19	25	26	25	14	25	23	120

Question Paper Scheme

Type of Questions	Question Numbers	Weightage
Twenty objective questions (multiple choice or fill up the blank) (4 choices for each question)	1 - 4	1
	5 - 8	1
	9 - 12	1
	13 - 16	1
	17 - 20	1
Six Short Answer Questions to be answered in one or two sentences	21	1
	22	1
	23	1
	24	1
	25	1
	26	1
Six Short Essays to be answered in 50 words each. Only four questions (best four) will be considered for weightage.	27	4×2 = 8
	28	
	29	
	30	
	31	
	32	
Three Long Essays to be answered in 100 words each. Only two questions (best two) will be considered for weightage.	33	2×4 = 8
	34	
	35	
Total Weightage		**27**

Web Resources

Students are generally advised to make use of the resources available on the internet. Some useful links related to electronics are given below.

1. M.I.T. open course ware video lectures are available at

   http://ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/6-002Spring-2007/VideoLectures/index.htm

2. www.electronics-tutorials.com
3. http://electronics.howstuffworks.com
4. www.science-ebooks.com/electronics
5. http://computer.howstuffworks.com
6. www.geocities.com/CapeCanaveral/1221/elec1.htm
7. http://101science.com/eleclinks.htm
8. www.electro-tech-online.com/blogs/gayan-soyza/23-useful-electronic-links.html
9. www.discovercircuits.com/resources/tutorials.html
10. www.electronics-lab.com/
11. www.glolab.com/links/links.html etc

EL1B01 – Basic Electronics

Course Number: 4

Contact Hours: 3 T + 2 L

Number of Credits: 2

Number of Contact Hours: 54 Hrs

Aim of the Course

To equip the students with basic components in electronics, identifying and testing them, various measuring and testing instruments, assembling of electronic circuits and basic techniques of troubleshooting.

Objectives of the Course

- To learn the basics of electronic components
- To learn the basics of testing and measuring instruments
- To learn the circuit assembling
- To study circuit troubleshooting

Prerequisites

Background of the basic science at +2 level, The electrical and electronic devices present at students home and their complete specifications.

Course Outline

Module I

Introduction to Electronics – Electricity – Electric Field, potential, potential difference and current – units – conventional and electron current flow – Electrical Resistance – Factors affecting Resistance – Temperature coefficient, Resistivity – Load Resistance and load current – concepts of open and short circuit, DC and AC – Ohm's law Resistance in series and parallel – KCL, KVL – Passive components –Types, construction, symbols, specifications, Identification including colour coding and Testing.

Module 2

Structure of solids – Conductivity properties of solid – Energy bands – Bonding in solids. Semi conductors – Types of semiconductors – P & N Types – charge carriers – charge concentration – Fermi level – Temperature dependence of carrier concentration – mobility – conductivity – Mass action law- Energy gap – Drift and Diffusion current.

Module 3

PN Junction – Depletion layer – Barrier potential - forward and reverse biasing – saturation current. Effect of Barrier potential – Reverse breakdown – junction capacitance – current, voltage relation – characteristics–forward and reverse – Diode current Equation – Ideal diode – static and dynamic Resistance of diode – Types of diodes –construction, characteristics, specifications and applications.

Module 4

Transistor –Types, construction, operation –Terminal currents – configurations – characteristics, Current Transfer ratio, leakage current, comparison – Transistor ratings –Base spreading Resistance – heat sinks – Thermal Run away.

Module 5

FET – introduction, Types, construction, operation, characteristics – FET Parameters– Comparison between FET and BJT– JFET, MOSFET – Types, Characteristics, features and Applications. SCR, UJT – Construction, operation, characteristics and applications.

Text book

1. *R S Sedha," Applied Electronics", S.Chand and Company LTD.*

Ref. Book

1. *V.K. Mehta,"Principles of Electronics", S.Chand and Company LTD.*
2. *N.N. Bhargava and Kulsreshta ,"Basic Electronics and Linear Circuits", Tata McGraw-Hill Publishing LTD.*
3. *B.L. Theraja,"Electrical and Electronic Engineering", S.Chand and Company LTD.*
4. *Barnad Grob, "Basic Electronics", Tata McGraw-Hill Publishing LTD.*
5. *Solid State Physics and Electronics – R K Puri and V K Babbar – S.CHAND*

BASIC ELECTRONICS LAB

1. Introduction to general safety precautions to be kept in mind, while working in the Lab.

2. Familiarization of components: Active & Passive - Identification (colour coding), Specification & Testing.

3. Familiarization of schematic symbols.

4. Familiarization of hand Tools used in the Electronics workshop.

5. Familiarization of Equipments: Voltmeter, Ammeter, Multimeter (Analog & Digital), LCR meter, CRO, Function generator, Power supplies.

6. Soldering practice: Familiarization of soldering materials, wire to wire (single and multi strand), wire to PCB soldering, Features of good soldering joint.

7. Study of component mounting methods.

8. De-soldering practice: Using de-soldering pump & wick.

9. PCB Fabrication.

10. Assembling practice of simple circuits: such as Single Stage Amplifier, Multivibrator, Power supplies etc.

11. Characteristics of PN junction diode.

12. Characteristics of Zener diode.

13. Characteristics of LED.

14. Characteristics of Photo diode.

15. Characteristics of LDR.

16. Common base Transistor characteristics.

17. Common emitter Transistor characteristics

18. Characteristics of UJT.

19. Characteristics of JFET.

20. Characteristics of SCR.

21. Circuit & PCB design using appropriate softwares.

Reference

1. T.D. Kuryachan & Shyam Mohan S. ,"Electronics Lab Manual, Vol. I", Ayodhya publications.

2. Walter C. Bosshart ," Printed Circuits Board Design and manufacturing", Tata McGraw-Hill Publishing LTD.

EL2B02 – Electronic Circuits

Course Number: 10

Contact Hours: 3 T + 2 L

Number of Credits: 2

Number of Contact Hours: 54 Hrs

Aim of the Course

To equip the students with basic components in electronics, identifying and testing them, various measuring and testing instruments, assembling of electronic circuits and basic techniques of troubleshooting.

Objectives of the Course

- To learn fundamentals of electronics
- To learn the circuit assembling
- To study circuit troubleshooting

Prerequisites

Background of the basic electronics studied at I semester. Students should start reading journals in electronics, for eg: Electronics for you etc

Course Outline

Module 1

DC and AC – Types of AC – sinusoidal voltage source – important Terms of AC, definitions – Rectifiers – Half wave, Full wave, bridge – average value, RMS value, PIV, ripple factor, efficiency – comparison of Rectifiers – Filters – C, LC and π – Regulators – Zener diode voltage Regulator, Series voltage Regulator – Regulation– fixed voltage dc power supply circuit.

Module 2

Concept of Amplification –DC and AC Load Line – Transistor Biasing and stabilization – Hybrid Equivalent circuits – RC coupled. Amplifies – Frequency response – Applications and Advantages – Calculation of voltage gain, current gain – input and output resistance – gain bandwidth product – Emitter Follower configuration – Applications.

Module 3

Feedback amplifies – concept of positive and negative feedback – Negative feedback– types and characteristics of negative feedback amplifiers– Applications – Familiarization of Typical feedback amplifier circuits. Concept of power amplification – parameters-class A, class B, class AB and class C – cross over distortion – Tuned Amplifiers. FET amplifiers.

Module 4

Oscillators – Types, Principle of sinusoidal oscillators, Barkhausen criteria RC oscillators– RC phase shift and Wein bridge oscillator, LC oscillators – Colpitts and Hartley oscillator. Crystal oscillator – circuits, Working, comparison and Applications.

Module 5

Sweep circuits – Miller and Bootstrap sweep circuits – differentiating and integrating circuits – clipping and clamping circuits – Multivibrators – Astable, Monostable and Bistable – circuits , operation, waveforms and applications.

Text Book

1. R S Sedha, " Applied Electronics", S.Chand and Company LTD.

Reference Books

1. V.K. Mehta , "Principles of Electronics", S.Chand and Company LTD.

2. Jacob Millman and C. Halkias Mill," Integrated Electronics", Tata McGraw-Hill Publishing LTD.

3. Bhargava, Kurukshetra &Gupta ,"Basic Electronics and Linear Circuits", Tata McGraw-Hill Publishing LTD.

ELECTRONICS CIRCUITS LAB

1. Familiarization of Rectifier Circuits.
2. Study of capacitor filter, inductor filter and π filter.
3. Diode clipper & diode clamper.
4. Zener diode voltage regulator.
5. RC Differentiator & Integrator.
6. Transistor biasing circuits.
7. RC coupled amplifier.
8. Emitter follower.
9. Common source JFET amplifier.
10. Class AB power amplifier.
11. Tuned amplifier
12. RC phase shift oscillator using BJT.
13. Crystal oscillator.
14. UJT Relaxation Oscillator.
15. Astable Multivibrator using BJT.
16. Monostable Multivibrator using BJT.

17. Series Voltage Regulator.

18. Speed control of small dc motor using SCRs.

19. Simulation of experiments using appropriate simulation softwares.

Reference

1. T.D. Kuryachan & Shyam Mohan S.," Electronics Lab Manual Vol-I", Ayodhya publications.

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EL3B03 – Analog Integrated Circuits

Course Number: 15

Contact Hours: 4 T + 2 L

Number of Credits .3

Number of Contact Hours: 54 Hrs

Aim of the Course

To equip the students with detailed knowledge of Analog IC's like OPAMP 741, IC 555 etc.

Objectives of the Course

- To learn the basics of Amplifiers, filters, wave form generators, comparators, multivibrators and voltage regulators

Prerequisites

Background of the topics covered in the previous semesters. Knowledge about the electrical and electronic devices present in the market. By the end of the BSc programme, students should have a thorough knowledge about all the electrical and electronic devices present in the world.

Course Outline

Module 1

Basic Differential Amplifier Circuit – Operation – AC and DC Analysis, Block Diagram of typical operational Amplifiers – Ideal Op-amp characteristics – Op amp Parameters – Inverting and Non-Inverting Amplifier – Voltage Follower- Summing Amplifier-Differential Amplifier- Instrumentation Amplifier – V to I and I to V converter-Integrator – Differentiator – Typical circuits – Applications.

Module 2

Introduction – First order – Butter worth – Low pass, High pass, Band pass, Band Reject, Notch and All pass Filters – Typical circuits- Applications. Wave form generators – Square wave generator- Triangular and Sawtooth wave generators – sine wave oscillators (Phase shift, Wien Bridge and Quadrature Oscillators).

Module 3

Basic comparator – Characteristics – Typical comparator circuits using op amp – zero crossing detector – Schmitt trigger – Typical Circuits – Operation – Application-Window detector-Peak detector-Sample and Hold circuit-Clippers and Clampers-half wave Rectifier – Precision Rectifier.

Module 4

Intoduction to Timer-Monostable and Astale Multivibrator using 555-Application of Monostable and Astable Multivibrator- Voltage controlled oscillator (VCO), PLL – block diagram, Operating principle, parameters, pinout, function, applications and typical circuits.

Module 5

Basic circuit configuration and characteristics of voltage regulators – Basic blocks of linear voltage regulator – three terminal fixed regulators (78XX and 79XX), Adjustable Positive voltage Regulator(LM 317) and Adjustable Negative voltage Regulator(LM 337)-variable voltage Regulators (723) – Typical circuits –Applications.

Text book

1. *Ramakant A. Gayakwad ,"Op-amp and Linear ICs", Prentice-Hall of India Private LTD.*
2. *Botkar," Integrated Circuits",*

Reference

1. *Mottershed," Electronic Devices and circuits",*
2. *Millman & Halkias,"Integrated Electronic", Tata McGraw-Hill Publishing LTD.*
3. *Tobey & Buelsman ,"Op-amp Design and Application",*

ANALOG INTEGRATED CIRCUITS LAB

1. Inverting and non inverting op-amp configuration and its characteristics.
2. Differentiator and integrator circuit characteristics.
3. Summing and difference amplifiers.
4. Voltage follower and instrumentation amplifier.
5. Low pass and High pass filters and frequency response.
6. Band pass filter and Band rejection filter and their frequency response.
7. Schmitt trigger-measurement of UTP and LTP.
8. Triangle wave generator.
9. Symmetrical and asymmetrical square wave generation using 555.
10. Non- Retriggerable and Retriggerable multivibrators.
11. IC fixed voltage regulation and characteristics.
12. IC 723 variable voltage regulator.
13. Frequency Multiplication and FM Demodulation using IC 566 PLL.
14. Frequency Response of IC 566 voltage controller oscillator.
15. Oscillators: 1) Wein bridge 2) RC phase shift.
16. Simulation experiments using suitable softwares :
    - Wein bridge oscillator
    - Instrumentation amplifier
    - Voltage regulator.

17. Students are encourage to do a small Project work using op amp, timers and regulators.

Text book:

1. *T.D. Kuryachan & Shyam Mohan S,"Electronics Lab Manual, Vol.II", Ayodhya publications.*

EL3B04 – Electro Magnetic Theory

Course Number: 16

Contact Hours: 4 T + 0 L

Number of Credits: 3

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students with basic knowledge in E.M.Theory, which is important in the field of communications

Objectives of the Course

- To learn the Electrostatics, Magnetostatics and Electrodynamics

Prerequisites

Background of the Physics learned at +2 level. Students are strongly advised to watch the M.I.T. open course ware 'Electricity and Magnetism' videos by Prof. Walter Lewin to make the concepts more clearer. The videos are available at http://ocw.mit.edu/OcwWeb/Physics/index.htm

Course Outline

I. Fundamental of Electromagnetic Analysis:-

Concepts of circuits and fields – Vector analysis – Physical Interpretation of Gradient, divergent and curl – vector Relation in other co-ordinate systems – Integral Theorems.

II. Electrostatics:-

Introduction – Fundamental relation of Electrostatic field – Gauss law – special Gaussian surface – Potential Function – Divergence Theorem – Capacitance and Dielectrics – Poisson's and Laplace Equations – Method of Images – Boundary Conditions at the interface of two dielectrics – Boundary value problem in dielectrics.

III. Magnetostatics :-

Biot – Savarts Law – Force between two current soils – BHM – Ampere's Circuit Theorem – Lorentz Force – Magneto Vector Potential Hysterisis.

IV. Electrodynamics and Electromagnetic Radiation:-

Farday's Law of Induction – Modified Ampere's Law – Maxwell's Equations – Wave equations – Solution of wave equation in free space – Poynting Vector – Electro Magnetic Energy – boundary conditions – Reflection and Refraction of waves from the non-conducting boundary.

V. Principals of Electromagnetic Radiation

Radiation of Electromagnetic field – Polarization – Isotropic Radiator – Gain Effective area – Effective Length – Dipole Radiation Resistance – Linear Arrays.

Text Book

1. *Electromagnetic waves and Radiating system – Jordan & Balmian – PHI.*

2. ***Reference***

1.Electromagenetics – Edminister

2.Fundamental of Electromagenetics – Miah

3.Engineering Electromagnetics – Haytt

EL4B05 – Digital Electronics

Course Number: 21

Contact Hours: 3 T + 2 L

Number of Credits: 2+2

Number of Contact Hours:54 Hrs

Aim of the Course

To equip the students with detailed knowledge in digital electronics, digital IC's in the 74XX series. Many of the ideas are important to learn microprocessors.

Objectives of the Course

To learn different number systems, logic gates, comparators, flip flops etc

Prerequisites

The knowledge about the origin of numbers, counting etc. Introduction of zero and positional number system etc

Course Outline

Module I

Review of number system and coding - logic gates - different types - logic operations - symbols - truth table and applications - Boolean operation - Boolean expression - laws and rules – Demorgan's theorem - Simplification using variables extend --- SOP and POS expressions.

Module II

Logic families - TTL, ECL gates - comparison - Types of TTL gates - Transfer characteristics - properties.

Module III

Adders - comparators - subtractors - decoders - encoders - code converter - multiplexers - demultiplexers - parity generators and checkers.

Module IV

Latches and its types - flipflops - types - edge triggered - master slave characteristics and applications - counters - design - synchronous, asynchronous – up down counters - sequences generators - applications.

Module V

Shift registers - serial/parallel - data transfers and applicators. Data converters - ADC - DAC - different types and applications.

Text Books

1. *Digital fundamentals - Thomals floyd*
2. *Digital Principles - Malvino*
3. *Digital Integrated circuits - Taub and Schilling*

References

1. *Salivahanan. S. Digital Circuits and Design, Vikas Publishing Hosue.*
2. *Roth CH, Fundamentals of logic design, Jaico.*
3. *Digital Design - Basic concepts and Principles - Mohammed A Karim and Xinghao Chen - CRC Press.*
4. *Digital Logic Design - Elsevier - Brain Holds Worth - dove words.*

DIGITAL ELECTRONICS LAB EXPERIMENTS

I. Familiarization of Logic Gates and Study of Universal Gates

Aim

- To familiarize the different logic gate IC chips and verification of their truth table 7400, 7402, 7404, 7408, 7432, 7486.
- To implement the basic logic gate and, or, and not gates using the universal gate nand and nor gates.

II. Adders, Subtractors and Comparators

Aim

- To implement the half adder, half subtractor and full subtractor circuits.
- To familiarize the 4-bit binary adder 7483 and 4 bit magnitude comparator 7485.

III. Multiplexers and Demultiplexers

Aim

- To implement a 4:1 multiplexer and 1:4 demultiplexer circuits.
- To familiarize the nibble multiplexer IC 74157, 8:1 Multiplexer 74151 and 3:8 Demultiplexer 74138 and 2:4 Demultiplexer 74156.

IV. Decoders, Encoder & Seven Segment Displays

Aim

- To familiarize the BCD 70 decimal Decoder IC7442, BCD to Seven Segment Decoder 7448, Seven Segment Display LT 542, BCD to Binary 74154 and Decimal to Binary priority and 74147.

V. Latches and Flip Flop

Aim

- To implement JK Flip-Flop and SR Flip Flop using Discrete Gates.
- To familiarize the 4 bit latch IC 7475, JK Flip-Flop, IC7476, D Flip Flop IC 7474, Master slave JK Flip Flop IC 74107.

VI. Multivibrators

Aim

- To implement a mono stable and a stable multi-vibrators using Discrete Gates (Contd.)
- To familiarize the Non-Retriggerable Mono stable, Multi-vibrator IC 74121 and Retriggerable Mono-Stable Multi Vibrator IC 74123.

VII. Converters

Aim

- To familiarize the different counter chip asynchronous binary converter 7493 BCD Counter 7490, Binary Up/Down Counter 7493, Presettable Binary Counter 74197.
- To implement a Johnson Counter and Ring Counter.

VIII. Shift Registers

Aim

- To familiarize the different shift register ICs, 7495, 74166, 74195.

IX. TTL and CMOS Characteristics

Aim

- To plot the characteristics of TTL and CMOS ICs.

EL4B06 – Communication Systems - I

Course Number: 22

Contact Hours: 4 T + 0 L

Number of Credits: 3

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students with basic knowledge in Communication systems

Objectives of the Course

- To learn the basics of modulation basics of AM, FM, and PCM
- To learn the Digital modulation techniques

Prerequisites

Knowledge of transmission systems like Radio, TV in our country should be known to the students.

Course Outline

AM & FM

Modulation - need for modulations –Double Side Band Amplitude modulation - AM signals and spectra - product modulator - square wave modulator - balanced modulator - SSB signal and spectra - SSB generation - AM detection circuits - frequency conversion - PM and FM signals - spectra - band width - narrow band FM - wide band FM - generation of FM - direct FM - VCO - phase modulation -

indirect FM - demodulation of FM - balanced discriminator, quadrature detector, zero crossing detector - de emphasis and pre-emphasis filtering - Noise in CW modulation - frequency division multiplexing -

Pulse modulation systems

Sampling - reconstruction - aliasing - PAM, PWM, PPM – time division multiplexing - noise in pulse modulation, Pulse code modulation. Quantization noise - Companding law - The PCM system - Synchronous TDM, Asynchronous TDM - delta modulation.

Digital modulation technique

ASK, FSK, PSK, DPSK

Propagation of waves in free space - Ground wave propagation - surface waves - atmospheric propagation -critical frequency and MUF - skip distance - Radio horizon - space wave propagation - concept duct and tropo scatter propagation. Line of sight - over the horizon system.

Text Books:

1. Communication system – Bruce Carson –PHI

2. Principles of communication system-Taub and schillings-PHI

3. Electronic and radio engineering- Terman M.H

Reference:

1. Electronic communication system – Kennedy-TMH

2. Electronic communication –Roddy and Coolen-PHI

3.Digital Communications – V K Khanna – S.CHAND

EL5B07 – Microwave and Radar Engineering

Course Number: 25

Contact Hours: 4 T + 0 L

Number of Credits: 3

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students with basic understanding of Microwave and Radar Engineering

Objectives of the Course

- To learn the basics of Micro waves and RADAR

Prerequisites

Background of the EM Theory course is essential. The microwave transmission used in our country should be known

Course Outline

Module I: Introduction - Frequency spectrum, Micro wave bands, Applications of microwaves in different fields. Guided waves - wave guides, Introduction, rectangular wave guides, TE and TM waves, Transverse electromagnetic waves.

Module II: Transmission lines and wave guides - Review of transmission lines - Impedance matching, strip transmission lines, microwave guides, propagation through wave guides, cut off frequency, wave and group velocity, cavity resonators.

Module III: Microwave tubes - Introduction, Multicavity Klystron, Velocity modulation and beam bunching, reflex klystron, magnetron, working of magnetron, travelling wave tubes, Other micro wave tubes.

Module IV: Microwave Semiconductor devices - Schottky diodes, Point contact diodes, Varactor diodes, IMPATTT, TRAPATT, Gunn diode, Applications.

Module V: Radar systems - Basic principles, Fundamentals, performance factor, Antennas and scanning, display methods, pulsed radar systems, MTI, Beacons, CW Doppler radar, CW radar.

Text Books

1. *Electronic communication systems - Kennedy*
2. *Electronic communications - Roody and Coolen.*
3. *Principles of communication system - Taub and Schilling.*
4. *Introduction to Radar systems (McGraw Hill, Koga Kusha Ltd).*

Reference:

1. *Fundamentals of microwave engineering –Collins*

2. *Fundamentals of microwave engineering ,Principles,waveguides ,microwave amplifiers and applications- Anoop singh,Seema Verma -PHI*

EL5B08 – Communication Systems - II

Course Number: 26

Contact Hours: 4 T + 2 L

Number of Credits: 3

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students with detailed knowledge in Communication Channels, transmitters and receivers.

Objectives of the Course

To learn the basics of Communication channels, transmitters, receivers

Prerequisites

Background of the communication course -I. The knowledge about all types of transmission in the world.

Course Outline

I. Communication channels

Optical fibers - structure of wave guiding fundamentals - Fibre types - step Index fiber structure - Ray optics representation - wave equation for step index fiber - graded index fiber structure - Modes in graded index fibres - signal degradation in optical fibers - overview of attenuation - Attenuation units - scattering and absorption losses - core & cladding losses - Bending losses - Fibre materials and properties.

II. Radio Transmitters and Receivers

AM Transmitters - classification - low level and high level - SSB transmitter - FM transmitter - FM Stereo transmitter - Radio Receiver - General consideration - AM Receiver - super heterodyne receiver - SSB Receiver - Automatic Gain control - FM receiver - Automatic Frequency controller - FM Stereo Receiver.

Television:- Elements of Television system - scanning, composite video signal - Camera tube - Principle of picture tube – beam deflection - signal transmission and channel band width - vestigial side band - TV standard.

III. Data communication

Modern Multiplexors and concentrators

Communication system interfaces and standards - current loops - RS. 232 standard , communication Equipment - Modem - Modem types and Interfaces - Interfacing Modems - special Modem features and use - Multiplexes and types (voice and data) - Multiplexing by common carriers, intelligent multiplexors, concentrators.

IV. Local area network

Base band of Broad band Networks - classification of base land networks, Distribution techniques, Access protocols, CSMA/CD, Token passing, Polling. Performance, Broad band LAN, Resource and data sharing, Advantages of broad band system, Topologies - star, Ring, Bus, Privacy and security issues, WAN.

Prescribed textbook

1. *Electronic communication system - Kennedy.*
2. *Optical Fibre communication system - Keiser.*
3. *Optical Communication system - John Gower.*
4. *Data Communication - Networks and system - Bartee.*
5. *Monochrome and colour T.V –R.R.Gulathi*
6. *Data and computer communication – Ferauzan*
7. *Data & Computer communication – William Stallings*

COMMUNICATION SYSTEMS - II LAB

I. Analog & Digital Communication Lab

1. AM Generation
2. AM Demodulation
3. Frequency Response of IF Amplifier
4. Mixer
5. Frequency Modulation
6. Frequency Demodulation
7. Pre-emphasis and De-emphasis .....
8. Balanced modulator
9. Pulse Amplitude Modulation
10. Pulse Amplitude Demodulation
11. Pulse width Modulation
12. Pulse width Demodulation
13. PPM
14. Pulse Position Demodulation
15. FSK
16. VCO using 555.

17. PLL Parameters using NE 565.
18. Study of TDM using IC 7475.
19. Frequency Multiplier using PLL.

EL5B09 – Network Theory

Course Number: 27

Contact Hours: 4 T + 0 L

Number of Credits: 3

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students with basic knowledge in the Network theory

Objectives of the Course

- To learn the basics of Networks, Fourier series, Network theorems

Prerequisites

Background of the physics at +2 level

Course Outline

1. Basic circuit elements and waveforms - introduction - circuit components - assumption of circuit analysis - sources of electrical energy - standard input signals - sinusoidal signals - Kirchoff's laws - power and power factor - KVL - KCL series parallel and series parallel networks - source transformation - Mesh and nodal analysis - network equation for RLC network -magnetic coupling.

2. Graph theory and network equations - graph of network - Trees - cotrees and loops - incidence matrix - cutest matrix - tie - setmatrix and loop currents - number of possible trees of a graph.

3. Fourier series - trignometric and exponential fourier series - review of Laplace transform - application of Laplace transform - solution of linear differential equations - Heavide's partial fraction expansion - Kirchoff's laws - solution of network problem.

4. Network theorems - superposition theorem - reciprocity theorem - Thevenin's - Norton's theorems - Millman's theorem - maximum power transfer theorem - substitution theorem - compensation theorem,.

5. Resonance - series resonance - parallel resonance.

Text Books

1.Network and Analysis : Roy Choudhary (New age international publishers).

2.Network theory-Van valkenberg

3.Networks,lines,and fields- Ryder-PHI

EL5B10 – Microprocessors

Course Number: 28

Contact Hours: 4 T + 2 L

Number of Credits: 3

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students with the basic hardware of computers

Objectives of the Course

- To learn the basics of Microprocessors, Microprocessor initiated operations
- To learn Assembly Language Programming techniques

Prerequisites

Background of the digital electronics

Course Outline

Module

Ist :- Introduction to 8085, Microprocessor initiated operations and bus organizations - Memory Organization - Type of I/O addressing - Memory mapped I/O, I/O mapped I/O - 8085 architecture - Instructions and timing - addressing modes. Instruction Set - Interrupts.

IInd :- Programming techniques - looping, Counting and Indexing- delays - Stack and Subroutines - Simple programs - Interfacing - Programmable peripheral devices - 8255A, 8254, 8237, RS 232, USB.

IIIrd :- Introduction to 8086. 8086 architecture - flags -addressing modes - instruction set - introduction to programming of 8086. Bus structure and timing - 8086 Interrupts.

IVth :- Practice with simple sequences - programs Jump and While- Do implementation - Repeat - Until implementation and examples - If - Then - Else . If - then - else programs.

Vth :- RISC Vs CISC Comparison - Intel Family - Super scalar architecture - Pentium processor – Architecture- registers and instruction set.

Text Book:

1. *8085 - Architecture programming and techniques By Ramesh Goanker.*
2. *Microprocessor and interfering programming and Hardware - By Doughles V Hall - Tata Mc Hill.*
3. *Microprocessor and microcomputer - Based system Design - CRC press - M. Rafiquzzman.PHI*
4. *Advanced microprocessor by Himaja and Radhkrishna by Radiant Publishing House.*

Reference Book:

1. *8086/8088 family Design, programming and interfacing by John Utter Bery - PHI.*
2. *Micro computer system - The 8086/8088 family architecture programming and Design - LIU.Y and Gibson - PHI.*
3. *8086/8088 microprocessors - Brey - PHI.*
4. *Microprocessors PC Hardware and interfacing –N.Mathivanan -PHI*

MICROPROCESSOR LAB – 8085 / 8086

1. Addition – 8 bit, 16 bit

2. Subtraction – 8 bit, 16 bit
3. Multiplication
4. Array addition (multibyte)
5. Logical operators – AND, OR NOT
6. Decimal to ASCII and ASCII to Decimal.
7. Decimal to Hexa and Hexa to Decimal.
8. Ascending Order
9. Descending Order
10. Up/down Counter
11. Block data transfer
12. Rotating display – Flashing display
13. Interfacing with LED's.
14. Square wave Generators
15. Interfacing with ADC.
16. Interfacing with DAC.

EL5B11 – Project Work - I

Course Number: 29

Contact Hours: 0 T + 3 L

Number of Credits: 0

Number of Lab. Hours: 54 Hrs

Aim of the Course

To equip the students to do a major project by self intwo semesters consecutively.

Objectives of the Course

To learn the designing and implementing of electronics circuits and trouble shooting

Prerequisites

Before doing this, students are advised to do many simple projects like hobby kits and available in the books.

Course Outline

Students are advised to search for better projects. Mere reproduction of available circuits may invite minimum credits. Projects must include electronic hardware and the demonstration is compulsory.

EL6B12 – Programming Language C++

Course Number: 31

Contact Hours: 4 T + 2 L

Number of Credits: 3

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students with knowledge in High Level Language programming in C++ and train them to write programs

Objectives of the Course

To learn the basics of Programming in C++

Prerequisites

Background of the logics learned during Assembly Language Programming. The programming knowledge learned during complementary course.

Course Outline

PROGRAMMING LANGUAGE C++

I. Introduction to object oriented programming

Need - Comparison of Procedure oriented and object Oriented Languages - Characteristics of oops - C++ Character sets, data types, variables & constants, operators (Arithmatic, relational, logical and increment & decrement operators) - Structure of C++ programs – Branching statements (if , switch) – looping Statements (for,while, do..while)

II. Classes and Objects

Definition of Class - Data Members – Member function & Definition - Access specifiers - Private, Public and Protected, Data hiding & Encapsulation- Scope Resolution operator- Array of objects.

III. Constructors and Destructors

Declaration and Definition, Default constructor, Parameterized constructors, Copy constructor- Destructors - Definition and use.

IV. Polymorphism and Inheritance

Function overloading, operator overloading, Inheritance, Base class and Derived class, visibility Modes, Single Inheritance, Multilevel Inheritance, Multiple Inheritance & hierarchical inheritance (concept only), Containership.

V. Pointers and Files

Dynamic Allocation Operation, Pointers and Arrays - Reference variables and use of alias, self referential structures, Basic file operation, Serial files and sequential files.

Prescribed Text books.

1.Programming in C++ Balaguruswamy

2. Programming in C++ Ravichandran

C++ Lab

1. Program to find the biggest from 3 given numbers (if)
2. program to print odd numbers from 1 to 100 (for)
3. Program to print multiplication tables of numbers from 1 to 20 upto 15 steps (Nested for loop)
4. Program to find the sum of the digits of a given number (while)
5. Program to input a line of text and to find the numbers of vowels in it (switch)
6. Create a class with :

   Data members : Item name, unit price & qty

   Member functions:

   in-data() - to input details

   calc() - to calculate the amount

   out-data() - to print cashbill.

   Write a program to print the cash bill of a given item.

7. Create a class with :

   Data members : regno,mark1,mark2,mark3,tot-mark

   Member functions :

   Public- get-data() - to input details
   Private - process-data() – to calculate total marks & grade
   Public - print-data() - to print marklist

   Write a program to print the Marklist of a student.

8. Create a class with

   data member - NO
   Member functions - input() - to input the number
   is_prime()- to check the number is prime or not
   is-odd() – to check the number is odd or not
   big()- to find the biggest digit.

   Write a program to implement the above program.

9. Write a program to interchange to integer values and two float values. Use overloaded functions "swap" to swap the values.

10. Write a program to find the volume of a cube and cylinder. Use overloaded functions "volume" to find the same.

11. Write a program to add to time objects - operator overloading.

12. write a program to create and to print an array having 10 elements (using pointers)

13. Create a node that stores details about book no, book name, price and author. Write a program to input the details of 'N' books and to print the list of books.

14. Write a program to create a data file and to display its contents.

15. Using the above data file, Write a program to find the no of words and characters in it.

    etc

EL6B13 – Control System Engineering

Course Number: 32

Contact Hours: 4 T + 0 L

Number of Credits: 3

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students to have basic understanding in control systems and its design

Objectives of the Course

To learn the basics of control systems modelling, Analysis of control system, design etc.

Prerequisites

Background of the mathematics at +2 level.

Course Outline

Ist :- **Introduction**
Review of Laplace Transforms - Concept of Complex Variables - poles and Zeros. Solution of Linear differential equation Using Laplace Transform.

IInd :- **Control System**
Basic Components - Open Loop and Closed Loop Systems - examples - Effect of feed back - RTI system - Transfer Function - Impulse Response Function

IIIrd :- **System Modelling**
Block diagram of Control system - BIBI stability Routh Hurwitz Criterion - Nyquist Criterion - Bode Plate stability of discrete data system

IVth :- **Analysis of Control System**
Time domain analysis - Transient and steady response of System - Time domain specification - Transient response of a Second Order System - Steady State error - Frequency domain analysis - Frequency domain specification - Root Locus techniques - Nyquist and Bode plot - Stability analysis.

Vth :- **Design of Control System**
Fundamental principle of System Design - PD, PI & PID Controller - phase lead and lag Compensation - Examples

Book for References

1. *Control systems Anoop K. Jairath.*

EL6B14 – Microcontrollers and Applications

Course Number: 33

Contact Hours: 4 T + 2 L

Number of Credits: 5

Number of Contact Hours: 72 Hrs

Aim of the Course

To equip the students with basic understanding of Microcontrollers and its applications

Objectives of the Course

- To learn the basics of microcontrollers

Prerequisites

Students are advised to learn PHOENIX designed by IUAC, NewDelhi. The complete details are available at www.iuac.res.in/~elab/phoenix/

Course Outline

Module I: MICROPROCESSORS & MICRO CONTROLLER

Comparison between microprocessor and Microcontrollers 8051 Microcontroller - architecture - 8051 oscillator and clocks - Program counter and data pointer - Registers - Flags -PSW. Internal memory - Internal RAM - Stack and Stack pointer special Function Registers - Internal ROM. I/O pins - Ports - external memory.

Module II - PERIPHERALS

Counters of Times : Timer / counter interrupts - Timing Timer - Modes of Operation - Counting - Serial data input of serial data output : Serial data interrupt - Data transmission Data reception - serial data transmission modes.

Interrupts : Times Flag interrupt - Serial port interrupt - External interrupt - Reset - Interrupt concept - interrupt priority - interrupt destination - software generated interrupts.

Module III : ARTHIMETIC & LOGICAL OPERATIONS

Introduction - Addressing modes - Byte level logical operations - bit level logical operations - Rotate and Swap operation - Simple programs.

Arithmetic operations : Introduction - Flags - incrementing and decrementing - addition - substraction - multiplication - division - simple programs.

Module IV: INSTRUCTION SET

Introduction - External data move – Cache memory read only data move - push & pop - Opcodes - Data exchanges - simple programs.

Jump and Call Instruction - Introduction - jump and call program - jumps - calls and subroutine - Interrupt and returns - More details on interrupt - simple programs -

Module V: APPLICATIONS

Key board interfacing - Display interface - 7 segment and LCD display - D/A & A/D interface -Stepper Motor interface.

Tex Books

1. *Kenneth. J. Ayala, "The 8051 Microcontroller Architecture, Programming and Application" II Edition.*

2. *Mohammed Ali Maszidi, "The 8051 Microcontroller and Embedded - system"*

Reference Books:

1.Microprocessors and microcontrollers :Architecture,Programming and system Design,8085,8086,8051,8096. –by Krishna kant PHI

MICROCONTROLLER LAB – 8051

1. Addition – 8 bit, 16 bit.
2. Subtraction – 8 bit, 16 bit.
3. Multiplication
4. Array addition (multibyte)
5. Logical Operations – AND, OR, NOT
6. Decimal to ASCII and ASCII to Decimal.
7. Decimal to Hexa and Hexa to Decimal.
8. Ascending Order.
9. Descending Order
10. Up/down Counter
11. Block data transfer
12. Interfacing with LCD.
13. Interfacing with Matrix Keypad.
14. Square wave generator
15. Interfacing with ADC.
16. Interfacing with DAC.
17. Digital Clock.
18. Interfacing with Stepper Motor.

etc

EL6B15 – Digital Signal Processing

Course Number: 34

Contact Hours: 4 T + 0 L

Number of Credits: 3

Number of Contact Hours:72 Hrs

Aim of the Course

To equip the students with basic knowledge in DSP

Objectives of the Course

To learn the basics signals and analysis, Fourier transform, digital filter design etc

Prerequisites

Communication courses studied earlier

Course Outline

I Module

Introduction

Signals and systems - Analog, discrete and digital signals - concept of signal processing - Applications - comparison of Analog and Digital signal processing.

Fourier representation of analog and digital signals - Review of Laplace transform, Fourier transform, transform and their properties - Discrete time sequences - Time domain and frequency domain representation

II Module

Analysis of Discrete Time System:

Discrete Time systems - linear systems - Time invariant systems - Response of linear time invariant system - convolution - stability and casuality considerations - FIR systems - Frequency response.

III Module

Discrete Fourier transform and Fast Fourier Transform

Introduction - Discrete Fourier series - Discrete Fourier transform of finite duration sequences - properties of DFT - circular convolution - computation of DFT.

Fast Fourier Transform: FFT algorithms - General computational considerations - Decimation in Time and Decimation in Frequency algorithms - Radix -2, FFT algorithms Quantization errors.

IV Module: Realization of Digital Systems

Recursive and non recursive systems - Block diagrams and signal flow graphs - Realization of IIR filters - Direct from realization - cascade and parallel form realization - realization of FIR filters.

V. Module : Digital filter Design:

IIR and FIR filters - Design considerations - Design of IIR fitters - Impulsive invariant transform - Bilinear transformation - Digital butter -worth filters - Design examples - Design of FIR filters - windowing - hamming and and hanning windowing.

Text Book

1. *Digital signal processing - Nagurkani*

2. *Digital signal processing - Salaivahanan*

3. *Digital signal processing - Ramesh Babu.*

References

1. *Signals and systems - Sanjay Sharma - Khotoria sons.*

2. *Digital signal processing - Principles, algorithms and application - John C, Proakis - PHI.*

3. *Digital signal processing - System Analysis and Design by Paulo SR Diniz, Eduardo AB, Dasilva and Seigo L Netto by Ane Books.*

4. *Digital signal processing – V K Khanna, S.CHAND*

EL6B16 – Project Work - 2

Course Number: 35

Contact Hours: 0 T + 3 L

Number of Credits: 4

Number of lab Hours: 54Hrs

Aim of the Course

To equip the students to do a major project by self in two semesters consecutively

Objectives of the Course

To learn to design new circuits according to the need and trouble shooting

Prerequisites

All the theory and Practical knowledge learned earlier

Course Outline

Useful projects should be produced. Projects must include electronic hardware and the demonstration is compulsory.

OPEN COURSE I

EL6D01 – Semiconductor Fabrication Technology and VLSI Devices

Course Number: 36

Contact Hours: 2 T + 0 L

Number of Credits: 2

Number of Contact Hours: 36 Hrs

Aim of the Course

To equip the students with basic understanding in Semiconductor fabrication technology and VLSI devices

Objectives of the Course

- To learn the basics of Integrated circuits
- To learn the basics of Thin film technology and thick film technology
- To learn the basics of VLSI devices

Prerequisites

not essential

Course Outline

Module I

Introduction : General classification of integrated circuits – Scale of integration – Advantages over discrete components.

Module II

Thick film technology : Features of hybrid IC technology – Thick film conductors – Dielectric – Resistors – Thick film processing – Thick film substrate – Design ideas – Advantages and applications.

Module III

Thin film technology : Thin film conductors – resistors – dielectric – substrates – thin film processing – Advantages and applications – Monolithic IC process : Growth and refining of Si crystals – Substrate slicing and polishing – Wafer preparation – Diffusion – Ion implantation – Oxidation – Photolithography – CVD – Epitaxial grown – Metallization – Monolithic resistors and capacitors.

Module IV

Introduction – Modern VLSI devices – High field effect – MOSFET devices – long channel & short channel MOSFET.

Module V

Bipolar devices – n.p.n. transistor – characteristics of typical n.p.n. transistor – Bipolar device design – Design of emitter, base and collector region – concept of HDL.

Text Books

1. *Module (I, II, III) : Integrated Circuits (K.R. Botkar).*

2. *Module (IV and V) : Fundamentals of Modern VLSI Devices by Yuan Taur and Tak H. NING Cambridge Publishers.*

References

1. *Basic VLSI Design Systems and Circuits by Dougles A. Pucknell and Kamran Eshragian, PHI.*

2. *Device Electronics for Integrated Circuits – Richard Maller.*

3. *Integrated Electronics – Millman & Halkars.*

4. *VLSI Technology – S.M. Sze.*

OPEN COURSE I

EL6D02 – Electronic Instrumentation

Course Number: 36

Contact Hours: 2 T + 0 L

Number of Credits: 2

Number of Contact Hours: 36Hrs

Aim of the Course

To equip the students with a basic knowledge in Electronic Instrumentation

Objectives of the Course

- To learn the basics of electronic instruments
- To learn the basics of Transducers
- To learn the fundamentals of signal generators and biomedical instruments

Prerequisites

Knowledge about all types of measuring instruments

Course Outline

Module 1 **9**

Introduction – General measurement system – Characteristics – Definitions – Moving iron and PMMC- construction, characteristics and applications. Converting Ammeter, Voltmeter, loading effect. Ohm meter. Electronic voltmeter –Multimeters – Analog and digital.

Module 2 **10**

Static and Dynamic Transducers – Different types – Resistive transducer – Strain gauge – Capacitive, inductive transducers – LVDT – Piezoelectric transducers – Temperature transducers – Thermo couple, Thermisters – Photo electric transducers – Photo multiplier tube – Photo cell – Photo voltaic cell – Photo diode – Photo transistor– LDR – Applications.

Module 3 **5**

Signal conditioning [concepts only] – Bridges – Amplifiers – Chopper Amplifiers – Carrier amplifiers – Lock in Amplifiers.

Module 4 **8**

signal generators – different type– Audio, Function and RF Generators– cathode ray oscilloscope – Digital storage oscilloscope – frequency counters – logic analyzer – spectrum analyzer – recording instruments – XY recorder.

Module 5 **12**

Biomedical instrumentation: Introduction – origin of bioelectric signals – Resting and action potential – Typical bioelectric signals– Physiological transducer – active and passive transducer for medical application – diagnostic and analytical equipment – ECG, EEG, pH meter, Calorimeter – Therapeutic equipment– ventilators, defibrillators, Pace maker – Modern Imaging systems – X-ray machine, CT, Ultrasound, MRI.

Text book

1. *Electrical Technology Vol. IV by BL Theraja, S Chand(module 1)*

2. *Bio Medical Instrumentation Engineering – Leslee and Chronewell.*

3. *Handbook of Biomedical – RS Khandpur. (Module 5)*

References

Measurement and Instrumentation – Trends and Application, N.K Ghosh, S. Sen, S. Mukhopadhyay, Ane Book Pvt. Ltd.

OPEN COURSE II

EL6D03 – Power Electronics

Course Number: 36

Contact Hours: 2 T + 0 L

Number of Credits: 2

Number of Contact Hours: 36Hrs

Aim of the Course

To equip the students with a basic knowledge in power devices

Objectives of the Course

- To learn the working of power devices
- To learn the basics of inverters and static switches
- To learn the circuits dc choppers and power supplies
- To study the basics of battery charging

Prerequisites

Different types of power generation

Course Outline

(Detailed Analysis not required)

I. Power Devices

Introduction, SCR, DIAC and TRIAC – Construction and operation – SCR triggering methods and circuits – series and parallel connections of SCRs – TRIAC triggering circuits. Protection of Thyristors. PUT, GTO, LASCR. Power diode, Power BJT, IGBT, MOSFET– Construction and operation, switching characteristics, applications, Comparison.

II. Controlled rectifiers and Commutation of SCR 9

Controlled rectifiers – Principles of phase controlled converters – Half controlled-Semi controlled-full controlled-Dual converters, principles of cycloconverters, Single phase series converter. Introduction to commutation, Class A, B, C, D, E & F.

III. Inverters and Static Switches

Single phase bridge inverter –Half bridge- Full Bridge Inverters. Voltage and frequency control of single phase inverters. Concept of PWM . Introduction – Single phase ac switches, Three phase ac switches – 3 phase reversing switches, ac switches for bus transfer – dc switches – solid state relays – AC voltage controller – Principles of ON/OFF control – principle of phase control.

IV. DC Choppers and Power supplies

Introduction to choppers - principles and control techniques–classification. Switching regulator – buck, boost regulator, buck boost regulator – cuk regulator – comparison between switching regulator and linear regulator. SMPS – Fly back, Push pull, half bridge and Full bridge converters. Bidirectional power supply – ac power supply–Inverters, UPS – types.

V. Applications of Power Electronics 7

Battery charging - Illumination control using TRIAC. DC motor drives –single phase drives – half wave, full wave, dual converter. Electric braking-industrial heating –Electrical welding-HVDC.

Text books

1. B R Gupta, V Singhal," Power Electronics", S K Kataria & Sons (Unit 1, 2, 3, 5)

2. M.H. Rashid," Power Electronics Circuit Devices and Application", Pearson

Education (Unit 3)

3. Biswanath Paul," Industrial Power Electronics and control", PHI New Delhi (Unit4)

Reference books

1. PC Sen," Power Electronics",Tata McGraw Hill.

OPEN COURSE II

EL6D04 – Computer Hardware and Networking

Course Number: 36

Contact Hours: 2T + 0 L

Number of Credits: 2

Number of Contact Hours: 36 Hrs

Aim of the Course

To equip the students with a knowledge in computer hard ware and networking

Objectives of the Course

To learn the basics of computer hardware and netwoking

Prerequisites

Knowledge about computer components

Course Outline

I Module

PC Overview, Block diagram, Functional units − Microprocessor families, Latest processors, History of Intel Processors up to Pentium processors–Features of Pentium processors –.Co Processors -BIOS – CMOS Setup – POST – BOOT Process.

Motherboard architecture and layout – BUS Standards,ISA,EISA,MCA,VESA, PCI, PCI EXPRESS, Slots/Sockets Types, Power supply-SMPS,UPS Specifications.

II Module

RAM technologies – Memory Modules – DRAM-SRAM, Parity – DDR RAM, SIMM, DIMM, and RIMM. FLASH ROM, Cache memory, Virtual Memory

PORTS: PS/2 keyboard/mouse, COM and LPT Ports.

Displays: VGA, SVGA, XGA, AGP, LCD Monitors – Working – Specifications.

III Module

HDD, CD ROM, DVD, Thumb Drives – working and specifications – Hard Disk Interface like IDE, SCSI, SATA, Ultra DMA, ATAPI. Hard disk installation, partitioning – formatting–Sectors, Clusters, FAT – Fragmentation.

Computer Virus-Types, Worms– Working,Detection and elimination.

IV Module

Scanners- types. Web and Digital camera. Printers – Dot Matrix – Laser, Inkjet. MODEMS and standards – Lap Top specifications – Power Saving. Bluetooth technology – Wi Fi-WiMax.

Configuration and Assembling of a latest PC System.

V Module

Introduction to Computer Networks, data Communications, Protocols and standards, Topology – Network media – Network components – Cable and wireless media (infrared, laser, microwave), Network Model-ISO-OSI Model, Introduction to TCP / IP,IP Addressing.

Text books

1. *Data Communications and Networkings – Behrouz A Forouzan, TATA McGraw-Hill*
2. *Computer Fundamentals – B.Ram*
3. *IBM Clones – B. Govinda Rajulu, TATA McGrraw Hill*
4. *Trouble shooting maintenance and repairing PC's – Stephen J. Bigelaw, TATA McGraw-Hill*

MODEL QUESTION PAPERS

SEMESTER-I

B.Sc ELECTRONICS

Core course - Basic Electronics

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

Fill in the blanks (Answer all)

1. A Resistor has a colour band sequence: Brown, Black, Green and Gold. Its
   Value is…….

2. An ideal voltage source is one which has…….internal resistance.
3. Two Resistors R1 and R2, 100 ohms and 50 ohms respectively are connected in parallel, find out the total resistance(R_T)……..
4. Find out the value of a ceramic capacitor marked as 102…….
5. An intrinsic semiconductor at the absolute zero of temperature behaves like a……
6. Resistivity is the property of semi conductor that depends on……..
7. Silicon has how many numbers of valance electrons……..
8. The process of adding impurities to a semiconductor material is called…….
9. When the Reverse bias is applied to a junction diode, it…….the potential barrier.
10. The capacitance of a reverse-biased PN-junction…….. as the reverse bias is decreased.
11. An ideal diode acts like a……
12. Zener diode is acts like an…….
13. For impedance matching circuits …… Transistor configuration is preferred.
14. The input and output signals of a common-emitter amplifier are……
15. If the temperature of the collector-base junction increases, the collector leakage current (I_{CBO})……..
16. For high frequency application …….. Transistor configuration is preferred.
17. The operation of a JFET involves a flow of …….carriers.
18. The FET is a……control device.
19. An SCR is a……switch.
20. input impedance of MOSFET is…….than that of FET

Section-B

Answer any 6 questions

1. Define ohms law?
2. Draw the energy band diagram of conductor, insulator and semiconductor.
3. List out the any two characteristics of ideal diode?
4. Draw the circuit diagram of transistor common collector configuration?
5. Define Pinch off voltage?
6. List out any two application of thyristors?
7. Define KVL?
8. Define Dynamic resistance of diode?

Section-C

Answer any 4 questions

1. Explain 'open' and 'short' in series circuits?Define Fermi level? And also draw the Fermi level of intrinsic semiconductor.
2. Differentiate Avalanche and Zener breakdowns.
3. Explain the construction and working of PNP transistor?
4. Compare the FET over BJT.
5. Discuss thermal runaway. How it can be prevented in a high power transistor and heat sink.

Section-C

Answer any 2 questions

1. With the help of suitable sketch explain the behavior of a PN junction under Forward and Reverse biasing and also explain the V-I characteristics of PN junction.
2. Explain Transistor common emitter configuration with necessary diagrams?
3. Describe the construction, operation and characteristics of enhancement MOSFET?

SEMESTER-II

B.Sc ELECTRONICS

Core course - ELECTRONIC CIRCUITS

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

Fill in the blanks (Answer all)

1. The PIV of centre-tapped half wave rectifier is…….
2. The doping level of zener diode is……...
3. An ideal regulated power supply should have…….regulation.
4. ……circuit is used to remove the AC component of rectifier output and allows DC component to reach the load.
5. The point of intersection of DC and AC load line is the …….
6. The load line is represented by a straight line on output characteristics, relationship between…….
7. The DC current gain of a transistor in common-emitter configuration is 100. Find its current gain in common-base configuration……..

8. For voltage amplification, which transistor coupled amplifiers are used……
9. The positive feedback is mostly used in……..circuits.
10. Tuned amplifiers are used for……frequency applications.
11. The maximum collector efficiency of class A power amplifier is…….
12. For push-pull amplifier, how many transformers are required?
13. The phase shift oscillator consists of ……sections of RC network.
14. ……..oscillator is suitable for generating frequency from 10 HZ to 1 MHZ
15. Crystal oscillator is used where the……frequency is required.
16. The minimum amplifier gain required for RC phase shift oscillator is…….
17. If the DC supply is fed to a differentiating circuit, then output will be……
18. The frequency of oscillation of Astable multivibrator depends on…..……
19. A circuit which removes a portion of the applied wave is known as ……
20. For differentiating circuit to be effective, RC product should be many times…….. Than the time period of the input wave.

Section-B

Answer any 6 questions

1. Define PIV of a rectifier?
2. Draw the circuit diagram of a two stage RC coupled Amplifier?
3. Define positive feedback and also list out its application?
4. Draw the equivalent circuit of a Crystal oscillator?
5. Draw the circuit diagram and wave form of a +ve clamper?
6. List out the advantage of Full wave Bridge Rectifier over centre-tapped rectifier?

7. What is the need of Transistor biasing?
8. What is the significance of stability factor?

Section-C

Answer any 4 questions

1. Define the following: i.RMS value ii.Average value.
2. Write a short note on following,
   i.Voltage and current gain ii. Input and output resistance.
3. A power transistor working in Class A operation has Zero signal power dissipation of 25 watts. If the AC output power is % watts, find:
   i.Collector efficiency ii.Power rating of transistor.
4. Define oscillator? List out the conditions for oscillation, and also list out different types of transistor oscillator.
5. Write a short note on differentiator and integrator?
6. Differentiate the voltage and power amplifier.

Section-D

Answer any 2 questions

1. Explian DC and AC load line analysis with suitable diagrams?
2. With the help of suitable sketch explain the working of transistor Wien bridge oscillator? And also give the reasons for using positive and negative feedback on this circuit?
3. What is the basic difference among the three types of multivibrator? And also explain the working of Astable Multivibrator with suitable diagrams?

SEMESTER-III

B.Sc ELECTRONICS

Core course - ANALOG INTEGRATED CIRCUITS

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

Fill in the blanks (Answer all)

1. The 741 is a monolithic IC constructed by a special process called ----------
2. The CMRR of an ideal op-amp is----------
3. The gain of a summing amplifier is----------
4. The positive feedback is mostly used in ---------- circuits.
5. The gain limiting frequency of practical integrator is ----------
6. ---------- is the Figure of Merit of a narrow band pass filter.
7. The procedure used to convert an original cut off frequency to a new one is known as ----------
8. The gain roll of rate for a second order filter is ----------
9. The phase shift oscillator consists of ----------sections of RC network.
10. ----------oscillator is suitable for generating frequency from 10 HZ to 1 MHZ.
11. ---------- is known as sine to square wave converter.
12. The oscillator whose output frequency depends on the amplitude of the input voltage is known as ----------

13. ---------- is known as inverting comparator with positive feedback.
14. The edge triggered phase detector is preferred if the *f*in and *f*out are pulse waveforms with less than ----------% duty cycles.
15. ---------- is the most commonly used general purpose positive adjustable voltage regulator.
16. Reference voltage of IC 723 is ----------
17. If dc supply is fed to a differentiating circuit then output will be ----------
18. An ideal power supply should have ---------- regulation.
19. ---------- is known as non inverting amplifier with unity gain.
20. ---------- is the theoretical value of $R_A$in astable multivibrator in order to obtain a duty cycle of 50%.

Section-B

Answer any 6 questions

1. Define the terms Slew rate and SVRR?
2. Define the terms Lock Range and Capture Range stage of PLL?
3. State the advantages of 555 timers?
4. Define Q factor?
5. Differentiate linear and switching regulators?
6. Define Oscillator? Classify?
7. Draw the circuit diagram of Zero crossing detector?
8. What is the application of Sample and Hold circuit?

Section-B

Answer any 4 questions

1. Explain the importance of instrumentation amplifier with circuit diagram?
2. Explain the principles of switching regulators?
3. Explain Narrow Band Reject Filter with the help of necessary diagrams?
4. Write short note on fixed voltage regulators?

5. Draw and explain the working of a differentiator with neat circuit diagram and waveforms?
6. Briefly explain voltage follower?

Section-D

Answer any 2 questions

1. With the help of neat circuit diagram and waveforms explain the working of 555 timers as an Astable Multivibrator?
2. Draw the circuit diagram of a Dual Input Balanced Output Differential Amplifier and obtain expressions for its voltage gain, input resistance and output resistance?
3. Explain the working of Schmitt trigger with suitable diagram?

The question pattern is the same. The questions given below are model questions from each unit of the course

Core course

ELECTROMANETIC THEORY

UNIT 1

OBJECTIVE TYPE QUESTIONS

1. Gauss theorem relates surface integral to …….. integral.
2. stoke theorem relates line integral to ……integral.
3. The polarization depends on the orientation of the …….field.
4. Energy of a capacitor is given by …….
5. Curl indicates ….vector.

SHORT ANSWER QUESTIONS

1. What is the physical interpretation of gradient.
2. What is the physical interpretation of divergence.
3. What is the physical interpretation of curl.
4. Explain gauss therorem.
5. Explain stokes theorem.

SHORT ESSAYS

1. Derive the divergence of a unit volume in rectangular coordinate system.
2. Derive the curl of a unit volume in cylindrical coordinates
3. Derive the divergence of a unit volume in spherical coordinate system.
4. Derive divergence theorem.

LONG ESSAYS

1. Derive the divergence and curl of a unit volume in spherical and cylindrical coordinate systems.

UNIT 2

OBJECTIVE TYPE QUESTIONS

1. Columbs law equation states the ……. between two charges
2. Electric displacement equal displacement …….
3. Poisson's equation in vaccum is called …… equation.
4. The unit of electric susceptibility is …….

SHORT ANSWER QUESTIONS

1. Prove gauss law.
2. What do you mean by electric field strength.
3. Explain capacitance of a capacitor with equation.
4. Explain method of images.
5. Explain boundary conditions between two dielectrics.

SHORT ESSAY QUESTIONS

1. Explain polarization of a wave.
2. Derive poisson and laplace equations.
3. Explain and derive divergence equation.

LONG ESSAY QUESTIONS

1. Brief potential function.
2. Derive a relation between electric displacement and displacement density.

UNIT 3

OBJECTIVE TYPE QUESTIONS

1. Faradays laws are related with ……induction.
2. Ampere's circuital law is also called …….
3. The value of permeability is given by …….
4. Biot savarts law indicates the …….. strength at any point.
5. Magnetic flux density over a closed path is ……

SHORT ANSWER QUESTIONS

1. Explain the force on a moving charge .
2. Explain the force on a differential current element.
3. Explain B H M.
4. Explain hysterisis.
5. Explain amperes work law.

SHORT ESSAY QUESTIONS

1. Derive the force between two current carrying conductors
2. Derive lorentz force.
3. What is hall effect.explain

LONG ESSAY QUESTI0NS

1. Explain magnetic vector potential. and magnetic flux density.
2. Explain boit savart's law and derive the equation for the same .

UNIT 4

OBJECTIVE TYPE QUESTION

1. B = ……..H
2. Relation between magnetic flux and induced voltage is given as …….

3. Ampere's law involves ……operation.
4. Maxvell's first law is also called…….law.

SHORT ANSWER QUESTIONS

1. What are the different type of currents in a capacitor..
2. Explain maxwell's first law.
3. Explain maxwell's fourth law
4. Explain the wave equations .
5. Explain uniform plane waves.

SHORT ESSAY QUESTIONS .

1. Explain pointing theorem.
2. Explain wave propogation.
3. Derive wave equations
4. Explain polarization.

LONG ESSAY QUESTIONS.

1. Derive the maxwell's equation in integral, derivative forms and in statement forms.
2. derive the relation between E and H for a uniform planar wave

UNIT 5

OBJECTIVE TYPE QUESTION

1. Example of horizontal polarization is ……antennas.
2. Isotropic antenna is a ……antenna.
3. The wavelength of the dipole antennae is ……
4. The current fed to the elements in a broad side array antenna is ……
5. Power radiated per unit area in any direction is given by……..

SHORT ANSWER QUESTIONS

1. Explain isotropic antennae.
2. Explain circular polarization.
3. Explain any two radiation patterns.
4. What do you mean by effective length of an antenna?
5. Explain gain of an antennae.

SHORT ESSAY QUESTIONS

1. Explain end fire arrays.

2. Explain parasitic arrays.
3. Briefly explain dipole antenna.

LONG ESSAY QUESTIONS

1. Explain effective aperture of an antennae.
2. Explain directivity of an antennae.

SEMESTER-IV B.Sc ELECTRONICS

Core course - DIGITAL ELECTRONICS

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A,

MODEL QUESTION PAPER

1.The decimal equivalent of binary number 1101101 is
a)109 b)101 C)6A
2)The octal equivalent of the decimal number 359 is
a)547 b)0111011001 c)359
3)According to the rules of Boolean Algebra A+A=
a)1 b)2A c)A
4)What is the Boolean expression for NAND gate
a)(A+B)' b)(AB)' c)AB

5)Low power TTL gates has a propagation delay around
……
a)35 ns b)36ns c)21ns
6)Bipolar technology is preferred for …….
a)SSI b)MSI c)Both a and b
7)Which is the fastest logic family
a)TTL b)ECL c)DTL
8)A schmitt trigger is a digital circuit that produces a ……output regardless of the input waveform
a)sinewave b)triangular c)rectangular
9)What is the Boolean expression for carry of half adder
a)AB b)A'B c)AB'
10)A full adder is a logic circuit that can add ……bits
a)3 b)4 c)8
11)In the case of signed binary numbers,the leading bit stands for
a)sign b)magnitude c)none of thes
12)What is the expression for borrow in subtractor?
a)A'B b)AB' c)AB
13)What is the output of S-R latch for inputs0,1(active low)
a)1,0 b)0,1 c)1,1
14)A gated latch requires……input
a)clock b)enable c)active
15)With a positive edge triggered D flip flop the data bit is sampled and stored on the……..edge of the clock pulse
a)falling b)rising c)none of these
16)How many states would a seven flip-flop ripple counter have?
a)128 b)7 c)127
17)How many flip-flops are required to construct a serial shift register capable of storing a 9-bit number?
a)10 b)3 c)9
18)How many seconds are required to shift a 12-bit number in to a serial 12-bit shift register if the clock is 1MHz
a)24 microseconds b)2 microseconds c)12 microseconds
19)A 4-bit ADC requires…….number of comparaters
a)14 b)15 c)16
20)The fastest method of analog to digital conversion is the…….. method
a)successive approximation b)ladder c)flash

Section-B,

Short answers(answer any 6 nos)
1)Simplify the expression A+AB+ABC
2)Findout the decimal value of 11101.011
3)Define fanout
4)Define noise margin
5)Explain parity checker

6)Compare multiplexers and demultiplexers
7)Draw the logic circuit of gated D-latch
8)What are edge-triggered flip flops?
9)Explain DAC
10)Draw the diagram of serial in-parallel out shift register

Section-C

lll Short essays(answer any four)

1)Explain DeMorgan's theorem
2)Explain a TTL gate
3)Explain decimal to BCD encoder
4)Explain edge-triggered JK flip flop
5)Explain a four-bit parallel in serial out shift register
6)Explain a two-bit asynchronous binary counter

Section D

lV Essays (answer any one)

1)Explain the concept of SOP and POS with an example
2)Explain four-bit synchronous decade counter
3)Explain up/down counter

CORE COURSE - COMMUNICATION SYSTEMS -I

UNIT 1

OBJECTIVE QUESTIONS

1. The theoretical antennae length for a wave with wave length 'l' is ……..
2. pre emphasis and de emphasis must be used in …….
3. FM can be converted into PM by …….
4. The output of a balanced modulator contains…….
5. TV broadcasting uses which modulation technique……..
6. The side bands in SSB modulations are ……
7. The relation between carrier power ,sideband power and total power is given as …….
8. The most important noise at high frequencies is ……..
9. The relation between transmitted power and modulation index is given by…….
10. The subcarrier frequency in FM stereo multiplex transmission is ……

SHORT ANSWER QUESTIONS

1. What are the different needs for modulation .
2. How can we use a transistor to obtain a amplitude modulated wave.

3. Derive the frequency spectrum of a AM wave.
4. Explain the circuit that can be used to suppress the carrier signal in an AM wave.
5. Explain any one circuit that can be used for unwanted sideband suppression.
6. Explain vestigial side band transmission.
7. Derive the equation for a FM wave modulation index.
8. Explain preemphasis and deemphasis in FM with neat diagrams.
9. Explain the Armstrong method for FM generation.
10. Explain Noise figure.

SHORT ESSAYS

1. Explain with the aid of wave forms , how a grid modulated class C amplifier generates AM .
2. Explain with wave forms how a suitable train of current pulses fed to a tuned amplifier will result in a AM output wave.

LONG ESSAY

1. Explain the different types of SSB methods with relevant diagrams

UNIT 2

OBJECTIVE QUESTIONS

1. The nyquist criterion is ……..
2. PCM uses which method for coding……..
3. PWM can be generated using a ……circuit.
4. PPM can be obtained from PWM by ……..
5. The effect of noise in PCM is …….

SHORT ANSWER QUESTIONS

1. Explain companding.
2. What are the advantages and applications of PCM.
3. Write short notes on DPCM.
4. Write short notes on Delta modulation
5. Name two pulse systems

SHORT ESSAYS

1. Explain PAM with relevant diagrams.
2. Explain PWM with relevant diagrams.
3. Explain PPM with relevant diagrams
4. Define sampling theorem and aliasing.

LONG ESSAY

1. Explain PCM Coding with special reference to quantization and relevant diagrams.

UNIT 3

OBJECTIVE QUESTIONS

1. Equation for Hartley's law is …….
2. Shannon's limit for information capacity is ……..
3. Gated modulator is used to demodulate ……..
4. Modulation index of FSK is given by …….

SHORT ANSWER QUESTIONS

1. Explain square law modulator
2. What are the different types of ASK demodulator.
3. Explain BPSK

SHORT ESSAYS

1. Explain DPSK with relevant diagrams.
2. Explain how carrier recovery takes place in ASK demodulator.

LONGESSAY

1. Explain FSK transmitter and receiver with their bandwidth considerations.

UNIT 4

OBJECTIVE TYPE QUESTIONS

1. Radio waves are also called ……
2. Duct propogation is a special case of …… of RF energy.
3. The value of refractive index in radio horizon is ……
4. The maximum distance upto which direct tropospheric transmission is possible is called…….

SHORT ANSWER QUESTIONS

1. What is critical frequency.
2. What is the distance and range of the ionosphere layer.
3. What is the fundamental equation for free space propogation .
4. What do you mean by phase velocity.

SHORT ESSAYS

1. **Explain the concept of virtual height.**
2. What are the basic properties of ionospheric layers
3. Derive maximum usable frequencies(MUF) and secant law.

LONG ESSAY

1. Derive the equation for characterstic impedance and explain its features.

Core Course

MICFROWAVE AND RADAR SYSTEMS

UNIT 1

OBJECTIVE TYPE QUESTIONS

1. The range of microwave frequencies is ……
2. The wavelength range of micro waves is …….
3. TV signals fall in the range……..
4. …… waves cannot exist in awaveguide.
5. For TE wave the the electric field in the direction of propogation is ……

SHORT ANSWER QUESTIONS

1. Give the band name and the frequency range of the electromagnetic frequency spectrum.
2. What are the advantages of microwaves in communication.
3. Define TEM ,TE,TM waves.
4. Write the general wave equations .
5. Define characterstic impedance.

SHORT ESSAY QUESTIONS

1. Explain modes in reference to TE and TM.
2. Explain group and phase velocity.
3. Explain dominant mode in TE and TM modes.
4. TEM waves do not exist in rectangular waveguides . explain.
5. Give the physical interpretation of phase and group velocity.

LONG ESSAY QUESTIONS

1. Derive the general relationship for field components within a waveguide.

UNIT 2

OBJECTIVE QUESTIONS

1. The dominant mode for a two wire transmission line is the …….. mode
2. Character impedance is defined as the ratio of ……..to……
3. For a lossless line Character impedance is given as ……..,.
4. The maximum value of VSWR is given as ……
5. The quarter wave length shorted at the end behaves like a …….

SHORT ANSWER TYPE QUESTIONS

1. Define cutt off frequency.
2. Define stub matching.
3. Write short notes on microstrip lines
4. Write short notes on impedance matching.
5. What is a magic Tee.Explain.

SHORT ESSAY TYPE QUESTIONS

1. Give the similarities and dissimilarities between a waveguide and a 2 wire transmission line.
2. What are the different transmission lines used at microwave frequencies.
3. Write short notes on the different shapes of waveguides.
4. Derive expression for phase velocity.
5. Derive expression for group velocity.

LONG ESSAY TYPE QUESTIONS

1. What are the advantages , disadvantages and applications of the circular waveguides.
2. Explain the working of cavity resonators with their applications.

UNIT 3

OBJECTIVE TYPE QUESTIONS

1. The most important drawback of the transistors in microwave frequency range is ……..
2. The time taken by the electron to travel from cathode to anode is called ……
3. The losses at higher frequencies at which the current has the tendency to confine to the smaller cross section of the conductor towards its outer end is called……
4. The theoretical efficiency of Klystron is …….%.
5. Bunching process produces ……modulation in a magnetron.
6. Velocity modulation produces ……modulation in a magnetron.

SHORT ANSWER QUESTION

1. Explain applegate diagram of a klystron amplifier.
2. Explain the working of a reflex kystron.
3. Give the application of a TWT.
4. Explain the term bunching in amagnetron.
5. Why do we use strapping in a magnetron.

SHORT ESSAY QUESTIONS

1. Explain the working of the multicavity klystron.
2. Explain the constructional feature of a TWT.
3. Explain the transit time effect and suggest method to overcome it.
4. What are the limitations of conventional type transistors and tubes at microwave.
5. Explain mode jumping in magnetron .

LONG ESSAY QUESTIONS

1. Explain the working of magnetron with relevant diagrams.
2. Explain the methods to sustain oscillations in a magnetron. Explain frequency pushing and pulling in magnetron .What are the applications of Magnetron.

UNIT 4

OBJECTIVE TYPE QUESTIONS

1. The non linearity of capacitance is used to follow microwaves in ……..diodes.
2. ……..resistance is used to produce oscillations in devices like gunn diodes and tunnel diodes
3. …….amplifiers is one that uses a non linear reactance for amplifications.
4. ……..diode has a heavily dopped n and p type material sepearted by a thicker layer of high resistivity material that is intrinsic.
5. ……..diodes have their application in microwave detection and mixing.

SHORT ANSWER TYPE QUESTIONS

1. Explain the VI characterstics of a tunnel diode .
2. What do you mean by transferred electron devices.
3. What is avalanche transit time devices.
4. What are the applications of PIN diodes.

5. What are the applications of varacter diodes.

SHORT ESSAY TYPE QUESTIONS

1. Brief about the working of parametric amplifiers.
2. Explain the construction and working of schottky barrier diode.
3. Explain the working of TRAPATT diodes .
4. Write short notes on negative resistance characterstics.
5. What are the applications of Parametric amplifiers.

LONG ESSAY TYPE QUESTIONS

1. Explain the working of IMPATT diode in detail.
2. Explain the working of GUNN diode in reference to Gunn domains and negative resistance.

UNIT 5

OBJECTIVE TYPE QUESTIONS

1. A radar consisting of a transmitting as well as receiving antenna is called…….
2. The frequencies used for radar falls in the range……..
3. A radar uses ……effect to navigate over land and sea.through aircraft or ship.
4. Velocity of the EM radiations used in radar is ……Km/sec.
5. The most common type of antennae used in radar is……..

Short answer questions

1. What do you mean by the power range equation of a radar.
2. What are the factors influencing maximum range of a radar.
3. Explain the effect of noise on radar functioning.
4. Explain the target properties in a radar.
5. Write short notes on the Antennas and Scanning of targets in a radar system.

SHORT ESSAY QUESTIONS

1. Explain pulsed radar systems
2. Explain the Modulators used in Radar systems.
3. What do you mean byMaximum Unambigous Range.
4. How Doppler effect is used in radar systems.
5. Explain CW Doppler Radar.

LONG ESSAY QUESTIONS

1. Explain briefly about the MTI Radar with neat diagrams.
2. Discuss the various types of displays used in Radars.

SEMESTER-III

B.Sc ELECTRONICS

Network Theory

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

Fill in the blanks (Answer all)

1. A periodic signal f(X) can be equated to……, the time period is given as P

2. The period of cos nx and sin nx is ……..

3. If r(t) is a ramp signal , then for ($t \geq 0$) , r(t)=……..

4. Laplace transform of t^n is given by…….

5. Inverse Laplace transform of $s / (s^2 + a^2)$ is given by……..

6. Two resistors R1 and R2 are connected in series and a voltage V is applied across it. The voltage drop across R2 is given by the formulae……..

7. Thevinin's theorem states that any linear dc circuit can be replaced by an equivalent circuit consisting of one voltage source in …….with one resistance.

8. Opposition to passage of AC due to capacitance and inductance is called……

9. In impedance parameters Z_{11} is termed as ……..

10. In admittance parameters Y_{12} is termed as …….

11. Transmission parameters are otherwise called……..

12. In hybrid parameters Y_{21} is termed as …….

13. The hybrid parameter h_{11} in terms of Z-parameter is given by …….

14. Transmission parameter A in terms of Z-parameter is given by ……

15. Attenuator of constant attenuation is called a ……..

16. Units of attenuation are……. and ……..

17. If the poles are on RHS of the s-plane then the system is……

18. If the poles are on origin of the s-plane then the system is……

19. In the transfer function solutions of numerator give…….and denominator give ……

20. In Routh's stability criterion the system is stable if there are …….. sign changes in the first column of Routh's array

Section-B

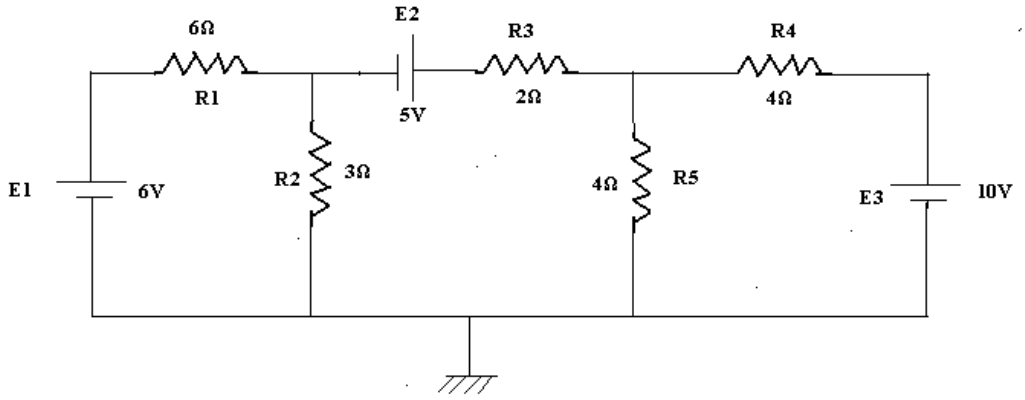
Answer any 6 questions

1. Explain various types of signals.
2. List two properties of Laplace transform.
3. Find the Laplace transform of $\cos^2 2t$
4. Mention various types of dependent sources. Draw the symbols.
5. State Miller's theorem.
6. State maximum power transfer theorem
7. Define bandwidth of filters
8. Draw the equivalent circuit for hybrid parameters

Section-C

Answer any 4 questions

1. Find the Fourier series expression of $(\pi - x^2)/4$, $0 < x < 2\pi$
2. State and explain Norton's Theorem
3. Find the branch currents in the circuit shown in below, using Nodal analysis

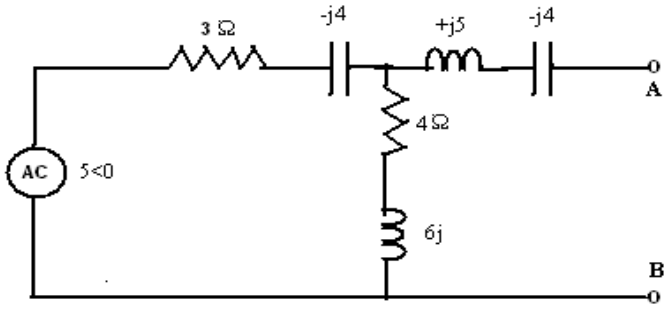


4. Derive the expressions for Y-parameters
5. Derive the expressions for Z-parameters in terms of hybrid and transmission parameters
6. Explain various types of filters

Section-D

Answer any 2 questions

1. Find Thevinin's equivalent circuit across AB in the following circuit,



2. Explain attenuator, its units and classification
3. Determine the stability of a system using Routh's criterion. Its characteristic equation is $s^6+2s^5+8s^4+12s^3+16s+16 = 0$

SEMESTER-V

B.Sc ELECTRONICS

Core course - MICROPROCESSORS

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

MODEL QUESTION PAPER

Section-A,

1.The Adress Bus is
a. Bi directional
b. Uni Directional
c. Omni directional.

2.--------- is a Basic Element of memory
a. Registers
b.Adress lines
c.Flipflops
3.EPROM is
a.Electrical programmable ROM
b.Erasable Programmable ROM
c.External programmable ROM
4.----------is a Logic circuit that amplifies current or power.
a.Latch
b.Flipflop
c.Buffer.
5.Programming technique that used to instruct the microprocessor to repeat task is called
a.Counting
b.Looping
c.Jumping
6.POP is an instruction related with ---------- operation
a.Program counter
b.Accumulator
c.Stack
7.BSR mode is related with
a.8255A
b.8254
c.8237
8.HOLD and HLDA is related
a.Interrupt controller

b. Timer
c.DMA
9.8088 Microprocessor is internally divided into two separate functional unit
a.PC and Accumulator
b.BIU and AU
c.ALU and CPU
10.8086 has ------ one bit flags
a.5
b.6
c.4
11.INTnn is ---------- interrupt
a.User defined Software
b.User defined Hardware
c.Predefined
12.8086 has ---------- multiplexed adress and data bus
a.8 bit
b.16 bit
c.32 bit
13.AAM instruction in 8086 is
a.ASCII adjust after multiplication
b.ASCII accumulator memory
c.ASCII adjust memory
14.SBB instruction in 8086 implies
a.Sutraction with borrow
b.Subtraction of the contents in B register
c.Subtract without borrow
15.The assembler -------- is written by Intel for the 8086 microprocessor
a.ASM-86
b.AVM -88
c.AXN-87
16.The 8086 SCAS instruction can be used to search a string
a.to see whether it contains a specified character
b.to see whether it contains a string of data
c. to see whether it contains any signed value.
17.RISC is
a.Reduced instruction set compiler
b.Reduced interuupt set compare
c.Reduced instruction set computer
18.Intel 80186 has ----- bit data bus
a.8 bit
b.16 bit
c.32 bit
19.The term superscalar refers to the microprocessors architecture that includes
more than -------- execution unit

a.two
b.one
c.three
20.The intel Pentium processor has --------- data bus
a.32 bit
b.64 bit
c.16 bit

Section-B

II Short answers(answer any 6 nos)
1.Explain memory mapped I/O technique with the help of STA instruction?
2.Explain the functions of ALE and IO/M signal of the 8085 microprocessor?
3.What is subroutine explain?
4.Give notes on modes of8254? mention different modes?
5.Give notes on BIU?
6.Give notes on interrupts in 8086?
7.What is string? give an example?
8.Give notes on CALL and RET instruction in 8086?
9.Mention the advanced design features of Intel Pentium processor?
10.Give notes on difference between RISC and CISC processors?

Section-C,

lll Short essays(answer any four)
1.Give notes on interrupts in 8085?
2.Explain the working ofRS232?
3.Discuss in detail the flags used in 8086?
4.With an example discuss the WHILE –DO statement in 8086?
5.Discuss the super scalar architecture?Give example?
6.With neat structure explain the working of USB?

Section-D,

lV Essays (answer any one)
1.With neat sketch explain the architecture of 8085?
2.With neat sketch explain the 8255A?
3.With neat sketch explain the architecture of 8086?

SEMESTER-VI

B.Sc ELECTRONICS

Core course - Programming in c++

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

I Answer the following questions (multiple choice)

1. Local variables are define using the keyword
   a. Auto
   b. static
   c extern
   d register
2. Function which substitutes the function body for each for call is
   a. library
   b. inline
   c. user defined
   d. friend
3. Function which calls itself is called
   a. pass by value
   b. recursion
   c pass by reference
   d none above

4. The process of combining data and function into an independent entity called class is called
   a. data hiding
   b encapsulation
   c polymorphism
   d none above
5. Function which can access the private data of another function is called
   a. Inline function
   b. friend function
   c library function
   d none above
6. The constructor that can be automatically called are called
   a. copy
   b default
   c parameterized
   d none above
7. The process of defining a new class from an existing class
   a. polymorphism
   b inheritance
   c operator overloading
   d none above
8. Internal pointer that point to the current object being operated.
   a. inline
   b. this pointer
   c dynamic pointer
   d none above
9. The process of defining data or function is more than one form is called
   a. inheritance
   b polymorphism
   c encapsulation
   d none above
10 Function and variables that are accessible outside the class are declared as
   a. private
   b. protected
   c. public
   d. none above
11Each pass through a loop is called a/an
   [a] enumeration
   [b] iteration
   [c] culmination
   [d] pass through
12 Which looping process checks the test condition at the end of the loop?
   [a] for
   [b] while
   [c] do-while
   [d] no looping process checks the test condition at the end

13 A continue statement causes execution to skip to
[a] the return 0; statement
[b] the first statement after the loop
[c] the statement following the continue statement
[d] the next iteration of the loop

14 In a group of nested loops, which loop is executed the most number of times?
[a] the outermost loop
[b] the innermost loop
[c] all loops are executed the same number of times
[d] cannot be determined without knowing the size of the loops

15 The statement i++; is equivalent to
[a] i = i + i;
[b] i = i + 1;
[c] i = i - 1;
[d] i --;

16 Which looping process is best used when the number of iterations is known?
[a] for
[b] while
[c] do-while
[d] all looping processes require that the iterations be known

17What's wrong? for (int k = 2, k <=12, k++)
[a] the increment should always be ++k
[b] the variable must always be the letter i when using a for loop
[c] there should be a semicolon at the end of the statement
[d] the commas should be semicolons

18. What's wrong? while ((i < 10) && (i > 24))
[a] the logical operator && cannot be used in a test condition
[b] the while loop is an exit-condition loop
[c] the test condition is always false
[d] the test condition is always true

19. If there is more than one statement in the block of a for loop, which of the following must be placed at the beginning and the ending of the loop block?
[a] parentheses ( )
[b] braces { }
[c] brackets [ ]
[d] arrows < >

20 What's wrong? (x = 4 && y = 5) ? (a = 5) ; (b = 6);
[a] the question mark should be an equal sign
[b] the first semicolon should be a colon
[c] there are too many variables in the statement
[d] the conditional operator is only used with strings

Section-B

I I Answer any six of the following.

1. Distinguish between call by value and call by reference method.
2. Give two operators that can be overloaded and two that cannot be overload
3. What is inheritance?
4. How is dynamic memory allocation different from static memory allocation?
5. If Stud is an array of integers why stud ++ is not legal.
6. Briefly explain any three file management functions
7. What are the advantages of in line function?
8. What is meant by friend function?

Section-C

II Answer any four of the following

1. Discuss the similarities and the differences of a structure as component to an array and a class
2. Write a function that tubes one string argument and return a reversal string
3. Explain the features of friend functions
4. What is the use of "this pointer"?
5. What is polymorphism?
6. Explain the term virtual class with example

Section D

III Answer any of the following

1. Write a c++ program that copies one file to another
2. Explain the advantage of object oriented approach over procedural approach
3. What is inheritance? What are the different types of inheritance? Explain with example

SEMESTER-VI

B.Sc ELECTRONICS

Core course - CONTROL SYSTEM

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

Objective type Questions

1) The difference of the reference input and the actual out put signal is called
   a) Error signal
   b) Controlling signal
   c) Actuating signal
   d) none of these
2) Knowledge of transfer function of a system is necessary for the calculation of
   a) The time constant
   b) The out put for a given input
   c) The steady state gain
   d) The order of the system
3) Gain margin is the reciprocal of the gain at the frequency at which the phase Margin is.
   a) 0o
   b) 90o
   c) -90o
   d) 180o
4) In a critically damped system, the damping factor is of the order of
   a) Zero
   b) Less than unity
   c) Unity
   d) Greater than unity.

5 By increasing the gain ‘ K’ of the system, the steady state error of the system
   a) Increases
   b) Decreases
   c) Remain unaltered
   d) May increase or decrease

6) The ON-OFF Controller is a
   a) Linear device
   b) Non linear device
   c) Discontinuous device
   d) Non of the above
7) Laplace transform of Unit impulse is
   a) S
   b) 1/S
   c) 1/S2
   d) Unity
8) If the poles of a control system lie on the imaginary axis in S-plane, the system will be
   a) Stable
   b) Unstable
   c) Conditionally stable
   d) Marginally stable.
9) Gain margin GM is given by (Where a= |G (jw) H(jw)|)
   a) GM= - 20 log a dB
   b) GM= +20 log a dB
   c) GM= 20 log 1/a dB
   d) GM= -20 log 1/a dB
10) In the characteristic equation [1+k/{s(s+1)(s+2)}]= 0. The centroid of the Asymptotes (in the root locus) is given by.
   a) 1
   b) -1
   c) 2
   d) -2
11) Starting point of a root locus are
   a) Open loop poles
   b) Open loop zeros
   c) Closed loop poles
   d) Closed loop zeros
12) The most suitable method for determining the stability and transient response of a system is
   a) Root locus
   b) Bode plot
   c) Nyquist criteria
   d) Routh Hurwitz criteria
13) Phase cross over frequency is the one at which the phase angle is
   a) 0o
   b) 90o
   c) -90o
   d) 180o
14) The error signal produced in a control system is a constant. The output of action will be
   a) Zero

b) Linear
c) Constant
d) Infinity

15) The Routh criterion tells us the number of roots lying
a) In the left half S-plane
b) In the right half s-plane
c) On the origin of s-plane
d) Non of these

15) The transfer function of a system is defined as the ratio of output to input in
a) Z- transform
b) Fourier transform
c) Lapalace transform
d) Single algebraic equation

16) The following system provides excellent transient as well as steady state response.
a) Proportion action
b) PI
c) PD
d) PID

17) The slope in bode plot is expressed as:
a) -6 dB/octave
b) – 6dB/decade
c) -20 dB/octave
d) -20 dB/decade

18) The ed points of root locii are.
a) Open loop poles
b) open loop zeros
c) Closed loop poles
d) closed loop zeros

19) What is the laplace transform of a step function of magnitude ‘a’.
a) 1/s+a
b) s+a
c) a/s
d) a/s2

Section-B

SHORT ANSWER QUESTIOS

1) Find Laplace transform of following functions
i) e –at sin ?t
ii) t e-at

2) Explain system? Differentiate open loop system and closed loop system.

3) Explain servo mechanism with neat diagram.

4) Determine the transfer function X2(s)/F(s) for the given system.

(Figure)

5) Determine the stability of a system having following characteristic equation.
s4+8s3+18s2+16s+5=0.

.

6) Explain steady state error.
7) Explain phase lead and lag compensation techniques.
8) Derive the expression for Maximum over shoot Mp

Section-C

SHORT ESSAY

1). Find inverse Laplace transform of following functions.
i) 2s2-6s+5/(s3-6s2+11s-6)
ii) 4s+5/(s-1)2(s+2)

2). Determine the transfer function X2(s)/F(s) for the given system.
(Figure)

3) Explain Mason's Gain formula and obtain closed loop transfer function of the following SFG
(Figure)

4) Convert the given Block diagram in to SFG and find out the transfer using mason's Gain formula.
5) The characteristic polynomial of a system is
s6+2s5+8s4+12s3+20s2+16s+16=0.
5) Determine the locations of roots on S-plane and hence the stability of the system using Routh Hurwitz criterion.
7) For a unity feed back control system G(s)= 20/[s(1+0.05s)(1+0.5s)]
Draw the Bode magnitude plot.

Section-D

ESSAY QUESTION

1) Sketch the root locus of the system whose transfer is G(s) =K/(s+2) (s+4).
2) Explain PI and PD Controllers? Write its input and output transfer functions.

3) For open loop transfer function, sketch the Nyquist diagram and determine whether

The system is stable or not.

$$G(s)\,H(s) = k/s(s+2)2$$

SEMESTER-VI

B.Sc ELECTRONICS

Core course

MICROCONTROLLER AND APPLICATIONS

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

I Multiple Choice type: Answer all Questions.

1) 8051 is a _____bit microcontroller

a)16 b)8 c)4 d) 20

2) Clock frequency of 8051 microcontroller

a)11.0592MHz b)12MHz c)10MHz d) 5MHz

3) Width of Data Pointer register is:

a)16 b)8 c)4 d) 20

4) RAM size of 8051 microcontroller is_____

a)128bytes b)64bytes c)4Kbytes d) 256bytes

5) How many timers are in 8051

a)1 b)2 c)3 d) 4

6) Which register is used to hold the data for serial communication

a)SCON b)SBUF c)PCON d)TMOD

7) How many interrupts are in 8051

a)5 b)6 c)8 d)3

8) Which register bank is selected on reset as all bits in PSW are zero

a) bank0 b)bank1 c)bank2 d)bank3

9) _____ bit can enable or disable all of the interrupts

a)EA b)RI c)TI d)GF0

10) Example for register addressing mode

a) MOV A, R0 b) MOV A, @R0 c) MOV A, #05H d)MOV 02, #06H

11) How many arithmetic flags are in 8051

a) 4 b)3 c)5 d)7

12) _____ register is used for division and multiplication only

a) A b)B c)R d) SP

13) MOV R0, A is a _____ byte instruction

a)1 b)2 c)3 d)4

14) Example for byte jump

a) JC b) JNB c) JBC d) DJNZ

15) Which instruction is used to restore the contents of PC from Stack

a) PUSH b) POP c) MOV PC, DPTR d) MOV PC, SP

16) LCALL is a _____ byte instruction

a)3 b)2 c)1 d)4

17) Which of the following IC is used for keyboard/display interface

a) 8279 b)8251 c)8259 d)8255

18) Keyboards are the predominant means of interface to human _____

a) input b)output c)inout d)peripheral

19) Displays are grouped into _____ categories

a)2 b)3 c)4 d)5

20) LCD stands for _____

a) Light Control Display b) Laser Common Display

c) Liquid Crystal Display d) Light Configuration Display

II Short Answers: Answer any Six of the following:-

1) Compare Micro Controller and Micro Processor
2) Briefly explain the concept of flags in 8051
3) What are timers/counters?
4) What are interrupts? Mention its various types.
5) What is meant by register addressing modes? Give one example.

6) Mention the Arithmatic Operators(Opcodes)
7) Briefly explain Jump Instruction.
8) What is meant by Push and Pop instructions.
9) What is meant by Bounce and Key held?
10) Mention and briefly explain Control Lines of LCD.

III Short Essay Type : Answer any four

1) Explain IO Ports in 8051. Draw the PIN Configuration for Port 0 and Port 3.
2) What are Timers? Explain the timer modes of operation.
3) Explain the interrupts in 8051.
4) What is meant by Addressing Modes? Explain different types with one example.
5) Explain Call and Subroutine concepts.
6) Explain ADC and DAC.

IV Long Essay Type: Answer any one

1) With Neat diagram, explain the architecture of 8051.
2) Write a program to find the largest and smallest numbers from an array.
3) What is interfacing? Explain the process of interfacing of Micro Controller and Stepper Motor with Neat Diagram.

SEMESTER-V

B.Sc ELECTRONICS

Core course

DIGITAL SIGNAL PROCESSING

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Time: 3 Hours

1 Signal that are generated by multiple sensors are called -

_____

(A. multiplexed signal B. multi channel signal C. multi dimensional signal) Ans B

2 Folding operation is also known as _____

(A. Transpose B. Down sampling C. Scaling) Ans. A

3 If x(n) is non causal sequence, then ROC is _____

(A. entire Z- plane except at z=∞ B. entire Z- plane except at z=0

C. entire Z-plane except at z=0 and z=∞) Ans. A

4 If the output of a system at any instant do not depends the future inputs then the system is called _____.

A. Causal B. non causal C. static) Ans: B

5 The necessary condition for stability is _____.

6 The response of an LTI system is given by _____ of input and impulse response.

(A. Convolution B. DFT C. FFT) Ans. A

7 In an N point DFT of a finate duration sequence x(n) of length L, the value of N should be such that _____ (A. $N \geq L$ B. $N \leq L$ C. N=L) Ans: A

8 If $DFT\{x_1(n)\}=X_1(K)$ and $DFT\{x_2(n)\}=X_2(k)$, then $DFT\{x_1(n)*X_2(n)\}$=_____

(A. $1/N\ X_1(k) * X_2(k)$ B. $1/N\ X_1(k)X_2(k)$ C. $X_1(k)*X_2(K)$) Ans: A

9 The L-point DFT of a N-point sequence will have a periodicity of _____

(A. N B. N<L C. L) Ans: C

10 The convolution by FFT is called _____

(A. Circular convolution B. fast convolution C. slow convolution) Ans: B

11 The _____ is called aperiodic convolution

(A. Linear B. circular C. none of these) Ans A

12 Number of complex addition in direct DFT is _____

(A. N(N-1) B. N^2 C. $N \log_2 N$) Ans: A

13 The computation of 8 point DFT using using radix -2 DIF FFT involves _____ stages (A. 2 B. 3 C. 4) Ans: B

14 The difference equation governing the IIR system is _____

15 In FIR system for linear phase response the impulse response should be _____

(A. asymmetrical B. symmetrical C. aperiodic) Ans: B

16 The output of a system with zero input is called _____

(A. forced response B. natural response C. zero response) Ans: B

17 The oscillation developed due to truncation of impulse response is called _____

(A. Gibb's oscillation B. windowing C. phase distortion) Ans: A

18 In _____ window spectrum the width of main lobe is double that of rectangular window for same value of N. (A. Blackman B. Kaiser C. Hamming) Ans C

19 In bilinear transformation $sY_a(s)$ is mapped into _____

20 When order N is even, for unit gain filter $H_a(s)$ =_____

Sectin B

1 What is down sampling?
2 Define a signal
3 Define FIR system
4 What is an energy system?
5 Define IDFT.
6 What is phase factor or twiddle factor?
7 What is DIT radix -2 FFT?
8 Define a recursive and non recursive system
9 How will you choose the order N for a butter worth filter.
10 What is bilinear transformation ?

1 Compare analog, discrete and digital signals.
2 Determine the system is linear or not. $y(n)=x(n)+1/x(n-1)$
3 Perfome circular convolution of the two sequences $x_1(n)=\{2,1,2,1\}$ $x_2(n)=\{1,2,3,4\}$
4 Compare the DIT and DIF radix -2 FFT.
5 An LTI system is described by the difference equation $y(n)=a1y(n-1)+x(n)+b1x(n-1)$.
Relize it in direct form – I structure and convert to direct form –II structure.
6 Compare IIR and FIR filters.

Section c

1 Consider a causal and stable system where input x(n) and output y(n) are related through

the second order difference equation y(n)-1/6 y(n-1)-1/6 y(n-2)=x(n). Determine the impulse
response h(n) for the system.

2 An 8 point sequence is given by x(n)={2,2,2,2,1,1,1,1}. Compute 8 point DFT of x(n)
by radix -2 DIF FFT.

3 The specification of desired low pass filter

Design butter worth digital filter using bilinear transformation.

Open Course I

B.Sc ELECTRONICS

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Tme 3 hrs

Section-A

SEMICONDUCTOR FABRICATION TECHNOLOGY AND VLSI

1) The first integrated circuit was developed in
a)1948 b)1958 c)1968
2) VLSI consist of --------- circuits
a)1000 b) 10000 c) 100000
3) ------ have the bandgap of 1.1ev.
a)Ge, b)Al, c)Si
4) Based on------ ICs divided into monolithic and hybrid.
a) materials b) fabrication c) conductivity
5) -------- is a lower cost conductors for thick film conductor manufacturing
a)Ag b)Au c)PdAg

6) The sheet resistivity of PdAg is ------ Ω/square

a) 0.003,b)0.03 c)0.04

7) ----- is used in high power applications because the steel baking act as an excellent heatsink

a)Alumina, b)stealite, c)porcelain,

8) A thick film dielectric should fulfill the break down strength of------ V/mil

a)1400 b)2500 c)250

9) Thin film conductive for hybrid micro circuit is --------

a)nickel b)chromium c)gold

10) --------process is similar to epitaxial process

a)vapor-phase deposition b)vaccum evaporation, c)cathode sputtering

11) ------ charge is located in the oxide within approximately $30A^{o}$ of the $Si\text{-}SiO_2$

a) fixed oxide b)interface trapped c)mobile-ionic

12) A vacancy in the lattice created due to missing atom known as-----

a) Schotteky b)Frenkel c)Area

13) SCE is stands for------

a)short-channel effect b)series channel effect c)source channel effect

14) The major breakthrough in the leel of integration in1963 with the invention of--

a)BJT b)VACCUM TUBES c)CMOS)

15) ----have the characteristics contained the highest component in any chip

a) SRAM b)DRAM c)FLASH MEMORY

16) Practically all high speed bipolar transistors used in digital circuits are of------

a)vertical npn b)lateral npn c)vertical pnp

17) Current gain of BJT is-----

a)I_C/I_B b) I_C/I_E c) I_E/I_C

18) $\alpha=$

a)$\beta/1+\beta$ b)$1/1+\beta$ c) $\beta/1-\beta$

19) VLSI is the acronym of

a)Very Large Scale Integration b)Very Long Scale Integration

c)Very large Scale Insulation

20) An emitter is considered shallow when its width small compared to its---------length

a)minority carrier b)majority carrier c)base

Section-B

II Short answers(answer any 6 nos)

1) What are the characteristics of good photoresist

2) List various methods for thin film processing
3) Advantages of silicon used as a material for solid state device fabrication
4) List out the different levels of integration
5) What are the requirements of good film conductors
6) What is a binder? Where its used
7) What is impact ionization
8) Draw the basic structure of MOSFET
9) What is Webster effect
10) How implanted and diffused emitter is formed

Section-C

lll Short essays(answer any four)

1) Explain the advantages of ICs over discrete components
2) Explain about the advantages and applications of thick film hybrids
3) With neat diagram explain about ion implantation system and properties
4) With neat diagram briefly explain the photolithographic process steps
5) Briefly explain about long channel effect
6) Derive the collector current of BJT

Section-D

lV Essays (answer any one)

1) Give short notes on
   a) Band to band tunneling
   b) Avalanche Break down
   c) Velocity Satuaration

2) Explain the Thin film Processing
3) Explain about the basic features of short channel devices that are important for design

Open CourseII

B.Sc ELECTRONICS

Electronic Instrumentation

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

Answer any six questions (Multiple choice)

1. The strain gage converts a mechanical displacement into a
   a. change of resistance
   b. change of capacitor
   c. change of Inductor
   d. all the three

2. The siteron solar cell converts the radiant energy of the sun into
   a. mechanical power
   b. chemical power
   c. electrical power
   d. all the three

3. The simple sine wave generator consists of two basic block an oscillate
   a. RF amplifier
   b. IF amplifier
   c. an attenuator
   d. mixer
4. The signal that is to be varied in CRO is fed to
   a. Horizontal amplifier
   b. Vertical amplifier

c. Yoke
d. all the three

5. The instrument for administering the electric shock is
   a. ventilator
   b. defibrillator
   c .PH meter
   d all the three
6. The electro cardiogram reflects the rhythmic electrical
   a. depolarization of heart
   b. Repolarisation of heart
   c. depolarization and repolarization
   d. non of the above
7. The common characteristic of signal generator is
   a. frequency stability
   b. Controllable amplitude
   c. Free of distortion
   d all of the above
8. A circuit similar to the Hartley oscillator is
   a Colpitts oscilallator
   b LC oscillator
   c. Phase shift oscillator
   d None of the above

9 Damping torque is independent of.
   a. change of resistance
   b .velocity of spindle
   c. operating current
   d all the three

10. Strip chart recorder is used to measure.
   a. voltage and current
   b. frequency
   c. temperature
   d .all the three
11. Which of the following strain gauge materials has highest gauge factor?
   a. carbon
   b. platinum
   c . nichrome
   d. soft iron
12. Which of the following is not a piezo electric material?
   a Ammonium dihydrogen
   b .Lithium sulphate
   c copper sulphate
   d. all the three
13. Which of the following is a self generating transducer?
   a. Thermopile
   b. photo emissive cell
   c .capacitor microphone

d magnetostriction gauge

14. Instruments measuring values indicate
    a. peak value
    b. RMS value
    c. average value
    d. mean value

15.for getting best result indicating instruments are
    a. damped
    b. undamped
    c. overdamped
    d critically damped

16Which of the following meters is not a current meter.
    a. moving coil meter
    b. Light resistance meter
    c.. both the above
    d. None of the above

17. Sensitivity of a voltmeter is expressed as
    a. volt-ohms
    b. ohms\volt
    c .volt\ohms
    d None of these

18. The phenomenon of creeping occurs in
    a. ammeters
    b. voltmeter
    c. watt hour meters
    d. none of these

19. Moving parts of instruments are supported in ..... bearing
    a roller
    b. bush
    c. spring
    d none above

20. In case of current transformers the burden is expressed in terms of
    a. volt
    b. volt amperes
    c. watt
    d joule

SectionB

Answer ant Six of the following (short answers required)

1. What is a transducer
2. Explain the procedure to select a transducer
3. What is a piezo electric transducer
4. What are the application of wave analyzer
5. What is a chopper amplifier
6. Write short notes on signal generator

7. What is a frequency counter
8. What is a bioelectric signal
9. Explain term polarization and depolarization
10. What are ventilators?

Section-C

Answer any four (short essay)

1. What is a thermo coupler explain
2. Explain Lock in amplifier
3. Write a short essay on signal conditioning
4 What are the applications of x-y recorder?
5. Explain active and passive transducer in detail
6. What is a Pace maker? What are the different types of pacemaker?

Section-D

Answer any two (Essay Question)

1. Draw and explain the working of LVDT
2. Draw and explain the working of ECG
3. Draw the simplified circuit diagram of an oscilloscope and focusing are achieved

Open Course III

B.Sc ELECTRONICS

Power Electronics

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

Answer the following (multiple choice)

1. A Triac is a semi conductor device which acts as a
   a. 3 terminal bidirectional switch
   b. 2 terminal unidirectional switch
   c. 4 terminal multidirectional switch.
   d. None of the above.
2. A U J T is not used as a
   a. Timing device
   b. Transistor amplifier
   c. Switching device.
   d. None of the above.

3. A Triac is like a
   a. Bidirectional S C R
   b. N P N transistor
   c. PNP transistor.
   d. None of the above.
4. Which of the following device has a negative resistance?
   a. Vacuum diode
   b. Tunnel diode
   c. Gas diode
   d. None of the above.
5. The SCR has a very low resistance when serving as
   a. Diode
   b. Diode rectifier
   c. Amplifier
   d. None of the above.
6 Diac is bidirectional between main terminals
   a. 2 and 3
   b. 4 and 5
   c. 3 and 4
   d. None of the above.
7. Most of the sophisticated electronic instruments need regulated
   a. Current
   b. power
   c. power supplies
   d. None of the above.
8. The SCR is used as
   a. Gate switch
   b. Base switch
   c. Automatic switch
   d. None of the above.
9. Regulator can be categorized
   a. Type 2 system
   b. Type 0 system
   c. Type 3 system
   d. Type 1 system
10 Under force Velocity analogy Velocity's analogous to
   a. Capacitance
   b. Current
   c. Charge
   d. Inductance
11. An RCT is also called as
   a. symmetrical thyristor
   b. bidirectional thyristor
   c. asymmetrical thyristor
   d. resister control thyristor

12 The amount of charge which has to be recovered by the turn off process is called as

a. reverse recovery charge
b. forward recovery charge
c. recombination charge
d. all the above

13. When anode voltage is made positive with reference to cathode the junction j1 and J2 are

a. reverse biased
b. same as above
c. either both of (a) and (b)
d. forward biased

14. Thyristor may include

a. Shockley diode
b. silicon controlled rectifier
c. silicon controlled switch
d.. all above

15. The GTO is turned on by applying.

a. short positive pulse
b. long positive pulse
c. either both of (a) and (b)
d. none above

16. The pulse width tg is normally made more than the ..... of the thyristor

a. turn off time
b. recovery time
c. either both of (a) and (b)
d. none above.

17. Tg turn off time depends on the peak value of

a. on state
b. off state
c. either both of (a) and (b)
d. none above

18.The voltage sharing network are required for both reverse and off state condition in

a. series operation of thyristor
b. parallel operation of thyristor
c. both of (a) and (b)
d. none above

19. In series operation of thyristor for equal voltage sharing the off state current

a. remain the same
b. differ
c. both of (a) and (b)
d. none above

20. A power MOSFET is

a. current controlled device
b. voltage controlled device

c. power controlled devices
d. none above

Section-B

Write short answer (any Six)

1. Explain the theory of SCR.
2. Expand and explain IGBT
3. What is self commutation
4. explain the principles of Phone controlled commutation
5. What is solid state relay
6. What is bus transfer
7. Explain step up operative
8. What is buck boost regulator?
9. What do you mean by bidirectional phone supply?
10 Expand and explain UPS

Section-C

Write Short Essay (any Four)

1. Explain how UST is used in SCR trigging circuits
2. What is a phone controlled converter? Explain half controller
3. What are switches? What are different types of switches?
4. Explain step down apertures will KL load
5. Differentiate between switching regulator and Lines regulator
6. Explain switched mode power supply

Section-D

Essay Answer any two

1. What is mutual commutation Explain complimentary and line side commutation?
2. Explain the principle of operation
    a. Single phone bridge inverter
    b. 3 plane inverter
3. Draw and explain switch type regulator in digital circuits

B.Sc ELECTRONICS

OPEN COURSE-IV
COMPUTER HARDWARE AND NETWORKS

Time: 3 Hours

Attempt all Questions from Section-A, 6 Questions from Section-B, 4 Questions from Section-C and 2 Questions from Section-D

Section-A

Fill in the blanks (Answer all)

1. --------- helps main processor in carrying out video or graphic related operations.
2. AMD stands for----------
3. ----------Printers print one character at a time, with print head moving across the line.
4. The ROM contains a short program called------- which reads the boot record from disk and store in main memory.
5. PC/XT is a ------- Computer.
6.The common bus type LAN also known as-------.
7. --------- is the high bus for the display Boards.
8. URL stands ----------.
9. Full form of VIRUS.
10. ---------- permits outside access to internet files by hiding behind a security system.
11. Give an example for a 32 –bit Processor.
12. MMX stands for--------.
13. Name the first 64-bit Processor from intel corporation.
14. CD-ROM is a -------Rom.
15. When a key is pressed an electronic signal is produced which is detected by an electronic circuit called----------.
16.----------is the commonly used bus code in optical scanners.
17.Name the colour system used in colour Inkjet Printer.
18.The processing speed of microprocessor is measured in -----.
19.----------is a set of rules that govern data communication.
20.The ---------addresses uniquely defines a host on the Internet.

Section-B Short answer

Answer any 6 questions

1.Explain the functional Units of a PC.?
2.Write short note on SIMM,DIMM,RIMM?.
3.Explain types of VIRUS?.
4.Explain Bluetooth Technology?.
5.Describe the various communication medias for networks.?
6.State the current System configuration?.
7. Write short notes on SMPS and UPS?.
8.Describe the working of KeyBoard?.

Section-C

Answer any 4 questions Short Essay.

1,Explain the features of Pentium Processors?.
2.Write short note on PCI Bus with a neat diagram?.
3.Explain the working of DVD ROM?.
4.Discuss the different types of Scanners?.
5.Explain the working of any Laser Printers?.
6.Explain the Various Network Topologies?.

Section-D Long Essay

Answer any 2questions

1.With a neat diagram explain the ISO-OSI Reference model?.
2. Describe briefly the procedure involved in the assembly of a computer?.
3.Explain with diagram the concept of cache memory and its various mapping functions?.

UNIVERSITY OF CALICUT

B.Sc Electronics
Syllabi for Complimentary Courses

Course Objective

The main objectives to the B.Sc Electronics complementary course is to

produce electronic specialists, who can be directly employed or start his/her own work as Electronic circuit Designer, Electronic consultant, Testing professional and Service engineers.

On completion of the B.Sc Electronics complimentary course, the student will:

- Have sound knowledge of the theory behind the subjects like, Electronic components, Electronic measuring and testing instruments, Analog and Digital IC's, Electronic circuit design and implementation, Troubleshooting and maintenance of electronic and electrical devices.
- Have sound skills in assembly Language and High Level Language programming, Interfacing of electronic devices with computers, etc

Duration of the complementary course

Duration of the programme shall be 4 semesters. Each semester should have 90 instructional days with 5 hours of instruction per day 5-days a week system. The University will conduct semester-end examinations.

**1C0* – Electronic Devices

Course Number: 0*

Contact Hours: 2T + 2 L

Number of Credits: 2

Number of Contact Hours: 36 Hrs(theory)

Aim of the Course

To equip the students with basic components in electronics, identifying and testing them, various measuring and testing instruments and basic techniques of troubleshooting.

Objectives of the Course

- To learn the basics of electronic components
- To learn the basics of testing and measuring instruments
- To study circuit troubleshooting

Prerequisites

Background of the basic science at +2 level

Course Outline

Module I

Introduction to Electronics – Electricity, ohm's law, Definitions – Potential difference, current, emf, voltage and its units, components, passive and active components – Resistors, capacitor, inductors types – identifications – colour coding.

Module II

Fundamentals of electronics – Band theory, conductors, insulators, semiconductors, Intrinsic and Extrinsic semiconductors, doping, pn junction, majority and minority carriers, reverse breakdown, rectifier diodes, switching diode, zener diode, LED, photodiode, their characteristics and applications.

Module III

Bipolar junction transistor, operations, transistor configurations, characteristics and their comparison, current transfer ratio, transistor as a switch.

Module IV

FET, structure, characteristics, parameter terminal current, transconductance model, comparison between BJT and FET, Applications, MOSFET, types and characteristics,UJT.

Text Book for B.Sc.

1. *Principles of Electronics – V.K. Mehta.*
2. *Basic Electronics and Linear Circuits – N.N. Bhargava, Kurukshetra & Gupta.*
3. *Electronics Engineering (Vol. I), B.L. Theraja.*
4. *Solid State Physics and Electronics – R K Puri and V K Babbar – S.CHAND*

SEMESTER – I

PRACTICAL : List of Experiments

1. Familiarization of electronic components.

2. Familiarization of Equipments like CRO, Signal generator etc

3. Characteristics of P-N junction diode. (Determination of Knee voltage and diode resistance)

4. Characteristics of zener diode.

5. Characteristics of LED

6. FET characteristics

7. Characteristics of BJT in CB and CE configurations

8. RC circuits – Passive filters, differentiator, Integrator circuits.

**2C0* – Electronic Circuits

Course Number: 0*

Contact Hours: 2 T + 2 L

Number of Credits: 2

Number of Contact Hours: 36 Hrs(theory)

Aim of the Course

To equip the students with assembling of electronic circuits and basic techniques of troubleshooting.

Objectives of the Course

- To learn the circuit assembling
- To study circuit troubleshooting

Prerequisites

Background of the electrical and electronic devices present in students home and their complete specifications.

Course Outline

Module I

Fundamentals of basic circuits – Rectifiers, Halfwave rectifier, Full wave rectifier, Bridge rectifier, Average value, General filter consideration, Different types of filters, Comparison, ripple factor – regulators – Zener diode regulator.

Module II

Amplification, biasing circuits, BJT amplifiers, RC-coupled amplifiers, frequency response, voltage gain, current gain, input resistance, and output resistance, comparison table, concept of gain – Applications.

Module III

Feedback amplifier, positive and negative feedback, types of feedback, applications, power amplifier – class A, class B, class C amplifiers.

Module IV

Oscillators – sinusoidal oscillators, Barkhausen criteria, RC-oscillators, L-C oscillators, crystal oscillators, multivibrators, typical oscillator circuits, applications.

Module V

Operational amplifiers – concept of 741 block diagram – inverting and non-inverting amplifiers – Applications, log and exponential amplifiers differentiator – integrator – principle of operation, timer IC 555 concept and applications.

Text book

Principles of Electronics, V.K. Mehta.

Electronic Circuits, M.P.A. Jaleel (Maliakel Publishers).

OP – AM Circuits, Gaykward.

Basic Electronics and Linear Circuits, N.N. Bhargava.

SEMESTER – II

PRACTICAL : List of Experiments

1. Rectifier circuits (Half wave, Full Wave and Bridge rectifiers) and filters

2. Voltage regulator using zener diode.

3. RC coupled amplifier (Determination of voltage gain)

4. Astable multivibrator using BJT

5. RC Phaseshift Oscillator

6. Operational Amplifiers – Inverting and non-inverting amplifiers,integrator, differentiator etc

7. 555 timer –Asatable and Monostable Operation

**3C0* – Communication Systems

Course Number: 0*

Contact Hours: 2 T + 2 L

Number of Credits: 2

Number of Contact Hours: 36 Hrs(theory)

Aim of the Course

To equip the students with a basic knowledge in communication systems

Objectives of the Course

- To learn the basics of Communication systems

Prerequisites

Knowledge of transmission systems like Radio, TV in our country should be known to the students.

Course Outline

Module I

Elements of communication systems – Modulation – Need for modulation – AM –Types – AM modulators and demodulators – Types – PM and FM signals – Bandwidth – Generation and demodulation of FM – Types –De-emphasis and Pre-empasis – Noise in FM – Frequency Division Multiplexing.

Module II

Sampling – Reconstruction – Aliasing – PAM,PDM,PPM – Time Division Multiplexing – Digital Transmission – Digital signals – PCM –Generation and reconstruction – Quantization Noise – Companding Law – ASK,FSK,PSK,DPSK.

Module III

Transmitters – AM transmitter – Types – Low level and High Level – SSB transmitter – FM transmitter –Types – FM stereo transmitter – Receivers – Sensitivity – Selectivity – AM Receiver – TRF Receiver – Superheterodyne Receivers – SSB Receiver – AGC – FM Receiver – AFC – FM stereo Receiver.

Module IV

Propagation of waves in free space – Ground wave propagation – Surface waves – Ionospheric propagation – Critical frequency and MUF – Skip distance – Space wave propagation – Concept of Duct and troposcatter propagation.

Text/*References :*

1. *Taub and Schilling:Principles of communication system,TMH*
2. *B.P.Lathi:Modern communication system (Analog & Digital), Oxford university press*
3. *Simon Hykin:Communication system.*

SEMESTER – III

PRACTICAL : List of Experiments

1. Amplitude Modulation and Demodulation
2. Pulse Amplitude Modulation and Demodulation
3. Pulse Width Modulation and Demodulation
4. Pulse Position Modulation and Demodulation

**4C0* – Microprocessors and Peripherals

Course Number: 0*

Contact Hours: 2 T + 2 L

Number of Credits: 4

Number of Contact Hours: 36 Hrs(theory)

Aim of the Course

To equip the students with a basic knowledge in microprocessors and peripherals

Objectives of the Course

To learn the basics of microprocessors, which is heart of computers

Prerequisites

Digital Electronics

Course Outline

Module I

Microprocessors – Introduction to 8085, bus organization – registers – memory organization – I/O addressing.

Module II

8085 Architecture – functional blocks – instruction and timing – Instruction classifications – Word length – Simple programs – Instruction set of 8085 – Addressing modes.

Module III

Looping– Counting – Indexing – Simple illustrative programs – Logical instruction – Branching instruction.

Module IV

Introduction to programmable peripheral devices (8255A, 8254A, 8259A, 8257, 8279A) – Function of each chip – bus standards (serial and parallel) – RS – 232 and USB – other processors – Features of Intel Pentium processors.

Module V

Data converters: DAC – R-22 ladder – Weighted resistor method – ADC – successive approximation ADC – Dual slope ADC – Interfacing ADC and DAC with microprocessors.

Text book

Microprocessor Architecture, Programming and Application with 8085 . 8089A– Ramesh S. Gaonkar, Introduction to Microprocessor – Aditya P. Mathur (TMH).

SEMESTER – IV

PRACTICAL : List of Experiments

Assembly Language Programming using 8085

1. Sum of 8-bit data
2. 8-bit multiplication and division
3. Count of Odd and Even data
4. Largest and Smallest of numbers
5. Multibyte addition
6. BCD to Binary and Binary to BCD conversion
7. BCD addition and Subtraction
8 .Sorting of numbers
9. Factorial of a numbe**r**

FIRST SEMESTER ELECTRONICS COMPLIMENTARY COURSE

Model Question Paper

I Objective Type
Answer ALL Questions

1. Color band on extreme left in general purpose resistors represents
   a) First digit b) Second Digit c) Tolerance d) the power of ten
2. 104 represents the capacitance of
   a) 10μF b)0.1μF c) 0.01μF d) 104μF
3. The impedence of a capacitor with capacitance C is
   a) equal to C b) directly proportional to C c) indirectly proportional to C
   d) Independent of C
4. The number of electrons/Coulomb is
   a) $6x10^{8}$ b) $9.1x10^{31}$ c)$1.6x10^{19}$ d) one
5. Cut-in voltage of a Si diode is
   a) 0.2V b) 0.6V c) 0.1V d) 5.6V
6. In zener and Avalanche diodes current is due to the flow of
   a) majority charge carriers b) minority charge carriers c) both majority charge carriers and minority charge carriers d) some majority charge carriers and few minority charge carriers
7. The resistance of the forward biased diode is of the order of
   a) Few Ohms b) Kilo Ohms c) Mega Ohms d) Infinity
8. In LED the colour of the light emitted depends on
   a) Material of the Diode b) Voltage applied c) Type of Bias d) All the above
9. In Emitter Follower transistor is in
   a) CB Configuration b) CE Configuration c) CC Configuration
10. The alpha and beta of a transistor are related by
    a) $\alpha=\beta/(1+\beta)$ b) $\beta=\alpha/(1+\alpha)$ c) $\alpha=(1+\beta)$ d) $\alpha=\beta/(1-\beta)$
11. Due to Early effect the width of the base region
    a) Increases b) Decreases c) No change d) Increases or Decreases
12. Heat sinks are used to
    a) Increase current b) Reduce Heat c) To protect device d) Reduce current
13. When the voltage applied to a JFET is higher than Pinch off voltage
    a) Current increases b) Current saturates c) Current reduces d) Current is zero
14. UJT can be used as
    a) As an amplifier b) As a square wave generator c) As a Sawtooth generator
    d) As a switch
15. The input resistance of a BJT is smaller than FET because
    a) Input is forward biased b) Input is reverse biased c) Input voltage is high
16. In Enhancement MOSFET the channel is
    a) Built-in channel b) Induced channel c) Absent

II Short answer questions
Answer ANY SIX Questions

1. What is meant by resistance?
2. Define the dielectric strength of an Inductor.
3. What is diode break diode?
4. What is the use of LED?
5. What is meant by Leakage current?
6. What is the normal biasing for a transistor?
7. Draw the drain characteristics of a JFET.

8. Draw the symbols of enhancement type and depletion type MOSFET.

III Short Essay
Answer any FOUR questions

1. Define electric field intensity , electric potential, potential energy and back emf
2. Explain the operation of LED and Photodiode
3. Define the current gain of BJT in three configurations of a transistor and derive the relation between them
4. Describe the operation of N-channel JFET
5. Compare BJT and JFET
6. Explain the operation of UJT

IV Essay type questions
Answer any TWO questions

1. Explain the operation of a P-N junction diode and explain the switching characteristics of the diode
2. Draw the input and output characteristics of BJT in the three configurations and explain the behaviour of the device
3. Explain the operation of Enhancement type and Depletion type MOSFET

SECOND SEMESTER ELECTRONICS COMPLIMENTARY COURSE

Model Question Paper

I Objective Type
Answer ALL Questions

1. RMS value of out put voltage in full wave rectifier is
   a) $V_m/2$ b) $2\ V_m/\prod$ c) $V_m/\sqrt{2}$ d) $V_m/\prod$

2. The filter circuit that is effective for very large value of load resistance is
   a) Capacitor filter b) Inductor filter c) Pi Section filter d) LC filter
3. In zener diode regulator the input voltage should be
   a) Greater than zener voltage b) Equal to zener voltage c) Less than zener voltage
4. The property of a capacitor is
   a) Blocks AC b) Blocks DC c) Pass DC d) Pass AC and DC
5. The Q – point may shift due to
   a) Temperature b) Beta of the transistor c) Base emitter voltage d) All the above
6. For a good biasing circuit the stability factor should be
   a) High b) Low c) Infinity
7. The voltage gain in RC coupled amplifier reduces at high frequencies because of
   a) Bypass capacitor b) Coupling capacitor c) Wiring capacitance d) All the above
8. The emitter follower got that name since
   a) Output voltage =Emitter voltage b) Emitter voltage = Collector voltage
   c) Emitter voltage = 0
9. Gain is stabilized using
   a) Positive feedback b) Negative feedback c) Positive and Negative feedback
10. Voltage series feedback amplifier configuration is a
    a) True voltage amplifier b) True current amplifier c) Transresistance amplifier
    d) Transconductance amplifier
11. The efficiency of Class B amplifier has a max Value of
    a) 50% b) 78.5% c) 25% d) 100%
12. The cross-over distortion can be eliminated using
    a) Class AB b) Class C c) Class A d) Class B
13. Which type of feedback produce oscillations
    a) Positive feedback b) Negative feedback c) No feedback
14. RC oscillators are used for
    a) RF frequency b) AF frequency c) Microwave frequency d) VLF frequency
15. Crystal Oscillators are highly stable because
    a) High Q-factor b) Low Q-factor c) Circuit is simple
16. The output of an astable multivibrator can be
    a) Square wave b) Sine wave c) Triangular wave d) Sawtooth wave
17. The minimum gain in a closed loop non inverting operational amplifier is
    a) 0 b) Unity c) 2 d) 0.5
18. The differential input voltage to an op-amp is ideally
    a) 0 b) Infinity c) 0.7V d) 1.4V

19. An inverting amplifier can act as an integrator by replacing
    a) Feedback resister by a capacitor b) Input resister by a capacitor
    c) Feedback resister by an inductor coil.
20. The pulse width of the output of 555 timer can be varied by changing the voltage at the
    a) Threshold pin b) Control voltage pin c) Discharge pin d) Reset pin

II Short answer questions
Answer ANY SIX Questions

1. What is rectification and ripple factor?
2. Why a zener diode can be used as a voltage regulator?
3. What is meant by operating point?
4. What is the use of bypass capacitor?

5. What are the Barkhausen criteria for oscillations?
6. Draw the circuit of a Class A push-pull amplifier.
7. Derive the gain of amplifier with feedback.
8. What are the uses of astable multivibrator?
9. What is voltage follower?
10. What are the uses of 555 timer?

III Short Essay
Answer any FOUR questions

1. Draw the circuit and explain bridge rectifier.
2. Explain voltage divider bias.
3. What are the advantages of negative feedback?
4. Explain crystal oscillator circuit.
5. Draw the circuit and explain the differentiator circuit using op-amp.
6. Explain capacitor and inductor filters.

IV Essay type questions
Answer any TWO questions

1. With a neat circuit diagram explain the operation and frequency response of RC coupled amplifier.
2. Explain any one LC and one RC oscillator.
3. How 555 timer can work as an astable multivibrator and monostable multivibrator?

THIRD SEMESTER ELECTRONICS COMPLEMINTARY COURSE

Model Question Paper

I Objective Type
Answer ALL Questions

1. In 100 percent amplitude modulation the power in the upper side band is
   a) 50 Watts b) 100 Watts c) 25 Watts d) None of these
2. The pre – emhasis circuit is used
   a) After modulation b) Prior to modulation c) to increase or emphasis the amplitude of low frequency components of the signal d) None of these
3. Modulation Index in an FM signal

a) Varies inversely as deviation b) varies directly as the modulating frequency c) varies directly as deviation d) varies directly as deviation and varies inversely as the modulating frequency

4. Bandwidth of FM
   a) is greater than that of AM b) Less than that of AM c) Equal to that of AM
   d) can not predict
5. The most commonly used system of communication in radio broadcasting in India is
   a) FM b) AM c) PCM d) PM
6. Pulse communication system that is inherently highly immune to noise is
   a) PWM b) PAM c) PPM d) PCM
7. One of the following communication is digital. It is
   a) AM b) FM c) Delta d) PAM
8. Companding is used
   a) to overcome quantizing noise in PCM b) To protect small signals in PCM from quantizing noise c) To reduce impulse noise in PCM receivers
   d) to increase power content of the modulating signal
9. Which of the following is true
   a) Low level transmitter is more efficient than high level transmitter
   b) Low level transmitter is less efficient than high level transmitter
   c) High level transmitter saves power
   d) Broadcasting is done using Low level transmitter
10. In receivers most of the receiver selectivity is achieved in
    a) RF section b) IF section c) Mixer
11. If the received carrier frequency in an AM broad cast receiver is 1530 kHz , the receiver local oscillator frequency is
    a) 455 kHz b) 1075 kHz c) 1985 kHz
12. A chain of linear amplifiers following the modulator output is a characteristic of
    a) Low Level Modulation b) High Level Modulation
13. VHF waves travel as
    a) Space waves b) Sky waves c) Ground waves d) Surface waves
14. Optimum working frequency is
    a) Slightly less than the MUF
    b) Slightly greater than the MUF
    c) Slightly less than the critical frequency
    d) is a characteristics of the atmosphere
15. Absorption of radio waves by atmosphere depends on
    a) Distance from the transmitter b) Wave polarization c) Frequency of em waves
    d) Velocity of em waves
16. E- Layer is at a height of
    a) 50 km b) 200km c) 110km d) 230km

II Short answer questions
Answer ANY SIX Questions

1. Define amplitude modulation
2. What is meant by the term RF?
3. What is quantizing?
4. Define Companding.
5. What is de-emphasis?
6. What is meant by sensitivity of a receiver?
7. Define MUF.
8. What is Virtual height?.

III Short Essay
Answer any FOUR questions

1. Describe the basic operation of an AM modulator.
2. Explain PAM, PPM,and PDM.
3. Differentate low level and high level transmitters.
4. What is a heterodyne receiver? Explain.
5. Describe space wave propagation.
6. How PCM signals are generated?

IV Essay type questions
Answer any TWO questions

1. Describe the FM transmitter and receiver.
2. Explain the ionospheric characteristics and propagation of em waves through it.
3. Explain the different types of Digital modulation techniques

FOURTH SEMESTER ELECTRONICS COMPLIMENTARY COURSE

Model Question Paper

I Objective Type
Answer ALL Questions

1. Size of data bus in 8085 is
   a) 8-bit b) 16-bit c) 32-bit d) 4-bit
2. The result of any arithmetic operation is stored in
   a) Memory b) Accumulator c) Flags d) Any Register
3. PSW stands for
   a) Accumulator and flags b) H and L Register c) D and E register
   d) Accumulator and Instruction register
4. SID pin is used for
   a) Serial communication b) Interrupts c) DMA d) Reset
5. After executing MOV A,M the content of accumulator is
   a) Not changed b) Content of the Memory c) Sum of A and M
   d) Difference of A and M
6. The accumulator is cleared by the instruction
   a) ORA A b) AND A c) NOT A d) XRA A
7. Carry flag is not affected by the instruction
   a) ADD b) ORA c) INX d) INR

8. Opcode Fetch Cycle takes
   a) Six T-States b) Three T-States c) Ten T-States d) Four T-States
9. CPI 0A instruction compares 0 A with the contents of
   a) Accumulator b) Memory c) Instruction register d) Any register
10. CALL instruction is associated with
    a) IO operation b) Interrupts c) DMA d) Branching
11. The number of T-states required for JNC 8005 if CY=1 is
    a) 10 T-States b) 7 T-States c) 4 T-States
12. ORA A makes the contents of Accumulator
    a) 0 b) Unchanged c) 1 d) Increments
13. 8279 keyboard section has a FIFO RAM of

14. The handshake signals in 8255 are generated using the pins of
    a) Port A b) Port B c) Port C d) Port B and C
15. RS 232 is used for
    a) Serial Communication b) Parallel Communication c) Interfacing with a server
    d) Interfacing with any device.
16. Intel Pentium is
    a) 32-bit b) 16-bit c) 64-bit d) 128 bit
17. The number of comparators needed to build a six bit Simultaneous ADC is
    a) 6 b) 36 c) 64 d) 256
18. Out of the following the fastest ADC is
    a) Counter type ADC b)Successive approximation type ADC c) Dual Slope ADC
19. In a resistor type DAC the resistor used for MSB handles
    a) Less current than that for LSB b) More current than that for LSB c) equal
    current for LSB d) not related to the current for LSB
20. A counter does not exist in
    a) Counter type ADC b)Successive approximation type ADC c) Dual Slope ADC

II Short answer questions
Answer ANY SIX Questions

1. What are flags? Mention their uses
2. How 16 bit data is stored in 8085?
3. What is Immediate addressing mode?
4. What do LHLD and SHLD instructions do?
5. How data is compared in 8085?
6. What are the conditional Jump instructions in 8085?
7. What is BSR mode?
8. What is the function of 8254 IC?
9. what is meant by resolution of ADC?
10. What are the factors affecting the accuracy of ADC?

III Short Essay
Answer any FOUR questions

1. Explain the register structure of 8085.
2. What are the addressing modes in 8085? Explain.
3. Explain the working and uses of Logical instructions?

4. How interrupts are handled using 8259?
5. Explain the operation of successive approximation type ADC.
6. What is instruction cycle? Explain with example.

IV Essay type questions
Answer any TWO questions

1. Explain the internal architecture of 8085.
2. Write a program to sort a list of numbers.
3. Explain the operation of DAC