SCHEME & SYLLABUS FOR UNDERGRADUATE PROGRAMME IN ELECTRONICS

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, 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 M.Sc. (Electronics).

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

a) 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.

b) Have sound skills in assembly Language and High Level Language programming, interfacing of electronic devices with computers, etc.

c) Be in a position to develop industrial and entrepreneur applications.

Draft Scheme of Teaching, Evaluation and Examination Credit Based System (CBS)

No. of Paper: **One** Max. Marks : **80**

(Internal Assessment: **20**, End Semester Exam: **80**)

No. of Practical: **One** Max. Marks for Practical: **50**

(Internal Assessment: **20**, End Semester Exam: **30**)

No. of Lectures, Tutorials and Practicals (per week):

a) B. Sc. I : 6Th, 1Tu, 6Pr/Batch,

b) B. Sc. II & III : 6Th, 2Tu, 6Pr/Batch.

(Th.: Theory, Tu.: Tutorial, Pr.: Practical)

Scheme:

Subject	Paper	Internal Assessment (Max.)	End Semester Exam. (Max.)	Total	Min. Passing marks	Credits	No. of Hours	No. of Lectures
Electronics	Theory	20	80	100	40	4	60	80
	Practical	20	30	50	20	2	60	80

Internal Assessment

A. For Theory:

SN	Evaluation type	Marks
1	Assignments	8
2	Class Test(s)	6
3	Instructional deliveries(case studies/ seminars//presentation) Overall conduct as a responsible learner, manners, sincerity, skill in articulation, leadership qualities demonstrated through organizing, co-curricular activities, Active participation in routine class, etc.	6

B. For Practical:

SN	Evaluation type	Marks
1	Additional Practicals, Lab based assignments, Projects, Survey, Case study, etc.	16
2	Viva	4

Grade Awards:

Seven point rating scale is used for the evaluation of the performance of the students to provide letter grade for each course.

Range of percentage of Marks obtained	Grade Points	Grade	Remark (Not to be displayed on the transcripts)
90 - 100	10	O	Outstanding
80 - 89.99	9	A+	Excellent
70 - 79.99	8	A	Very Good
60 - 69.99	7	B+	Good
55 - 59.99	6	B	Fair
50 - 54.99	5	C+	Average
40 - 49.99	4	C	Below Average
Below 40	0	F	Fail
Absent	0	AB	Fail

Computation of Semester Grade Point Average (SGPA) for each semester:

$$\text{SGPA} = \frac{\sum \text{Credits in the subject X Grade points obtained}}{\text{Total credits in the semester}}$$

Computation of Cumulative Grade Point Average (CGPA) after completion of Program:

Sem-I		Sem-II		Sem-III		Sem-IV		Sem-V		Sem-VI	
Credits	SGPA	Credits	SGPA	Credits	SGPA	Credits	SGPA	Credits	SGPA	Credits	SGPA

$$\text{CGPA} = \frac{\sum (\text{Credits X SGPA})}{\text{Total credits in the program}}$$

SYLLABUS FOR B.Sc. PART I (ELECTRONICS)

(SEMESTER I & II)

Aim of the Course

To equip the students with basics of electronic components, network theorems used to solve circuits, familiarize with various measuring, testing instruments, assembling of electronic circuits and basic techniques of troubleshooting, familiarization of semiconductor devices, digital electronics, digital IC's in the 74XX series. Many of the ideas are important to learn microprocessors.

Objectives of the Course

1. To learn the basics of electronic components,
2. To learn the basics of testing and measuring instruments,
3. To learn the circuit assembling,
4. To study circuit troubleshooting and
5. To familiarize with the basic principle of operation of semiconductor devices and power electronic devices.
6. To learn different types of number systems, logic gates, and various combinational and sequential circuits.

B.Sc. PART I - SEMESTER I

(Analogue and Digital Electronics - I)

Course Outline

Unit I

Definition, types, identification and uses of electronic components: Resistors, Capacitors, Inductors, Switches, Transformers and Relays.

Introduction to semiconductors: Concept of energy band diagram (Conductor, Semiconductor, Insulator) , Intrinsic and extrinsic semiconductor (P type, N type), diffusion junction, depletion layer, Barrier potential, Avalanche and Zener effect.

Unit II

Ideal Voltage and Current sources (Internal impedance of battery and its effect on its performance), Kirchoff's current and voltage laws, Voltage and current divider circuits.

Superposition, Thevenin, Norton, Maximum power transfer theorems (Statement and simple numerical based on DC circuits only).

Block diagram of C. R. O.

Unit III

Construction, working, characteristics and applications of PN Junction diode, Zener diode, and Light Emitting diode.

Construction and working of BJT, Modes of B.J.T. (CE, CC, CB), transistor equation; α, β and their relationship, junction biasing, Input, output and transfer characteristics of BJT in CE mode, Transistor Biasing (Voltage divider and emitter biasing only), DC load line, Q point, transistor as switch.

Unit IV

Number Systems: Decimal, Binary, Octal, Hexadecimal, representation of integer, fraction and mixed numbers, Mutual conversions, Binary addition, Complement of binary numbers, Binary subtraction using 1's and 2's complement method, SM representation of binary numbers.

Binary codes- BCD, 8421, Excess 3, Parity and Gray code.

Logic gates: Logic, symbol and truth table of OR, AND, NOT, NAND, NOR, XOR and XNOR gates.

Unit V

Boolean algebra: Boolean Laws, double inversion, Duality and De Morgan's theorems, Use of NAND and NOR gate as universal building blocks.

Karnaugh Maps: Pair, Quads, Octets , minterm, maxterm in K Map, K-map for 2,3 and 4 variables, Concept of SOP and POS, Simplification of SOP and POS logic expressions using K-map, Design of binary to Gray code converter and Gray to binary code converter using K-map.

Unit VI

Combinational Logic Circuits: Half Adder, Full adder, Half subtracter and Full subtracter, Concept of Encoder , Concept of Decoder: BCD to Gray converter, Parity generator and checker, 4-bit Full adder/ subtracter, Concept of multiplexer, 4:1 mux using gate , Concept of demultiplexer, 1:4 demultiplexer using gate.

B.Sc. I (SEM I) ELECTRONICS PRACTICALS

Students are expected to perform at least 5 experiments from section A and 5 experiments from section B.

Section A

1. Study of laws of series resistor and application as voltage divider.
2. Study of laws of parallel resistor and application as current divider.
3. Study of laws of series capacitor and application as voltage divider.
4. Study of laws of parallel capacitor and application as current divider.
5. Verification of Terman's equation for inductance. Reactance characteristics of inductor
6. Study of transformer.
7. Study of battery as practical (i) voltage source (ii) current source.
8. Study of maximum power transfer.
9. Study of Forward Bias characteristics of diode. (PN & LED)
10. Study of Reverse Bias characteristics of Zener diode.
11. Study of Characteristics of BJT. (Input, Output, Transfer)
12. Study of voltage divider biasing of transistor.
13. Verification of Norton's Theorem.
14. Verification of Thevenin's Theorem.

Section B

1. Study of basic logic gates.
2. Study of NAND as universal gate.
3. Study of NOR as universal gate.
4. Verification of Demorgan's Theorem.
5. Simplification of logic expressions using Boolean algebra.
6. Study of binary to gray code converter using K map.
7. Study of gray to binary code converter using K map.
8. Study of Multiplexer using gates.
9. Study of De Multiplexer using gates.
10. Study of Multiplexer using IC.
11. Study of De- Multiplexer using IC

12. Study of BCD to 7 segment decoder.
13. Construction and study of half adder and full adder.
14. Construction and study of half subtracter and full subtracter.
15. Verification of Boolean laws & Verification of duality theorem.

REFERENCE BOOKS

1. Basic Electronics solid state physics B. L. Theraja, S. Chand and company
2. Electronic Devices and circuits Allen Mottershed, Prentice Hall of India Pvt. Ltd.
3. An Introduction to Electronics, R. G. Kale, U. K. Puranik, V. N. Pendse, A . A. Sakale, Kitab Mahal Publications.
4. Basic Electronics, Grob, Tata McGraw Hill
5. Electronic Devices, T. L. Floyd, Pearson Education Asia
6. Electronic Principles, Malvino ,Tata McGraw Hill
7. Electronic components and materials, Madhuri Joshi, Schroff pub. And Distributors
8. Electronic components and materials, S. M. Dhir, TMH
9. Network analysis, Van Valkenburg, PHI
10. Digital principles and applications, A. P. Malvino, D. P. Leach McGraw Hill Book Co.
11. Principles of digital Electronics, M. B. Matsagar, V. S. Kale, Vision publication
12. Modern Digital Electronics, R. P. Jain Tata McGraw Hill publishing co.ltd
13. Digital Fundamentals, Floyd, Jain, Pearson
14. 2000 solved problems in digital Electronics, S. P. Bali, Tata McGraw Hill publishing co. ltd.
15. Electronic circuits and systems: Analog and digital, Y. N. Bapat, Tata McGraw Hill publishing co. ltd.
16. Digital Electronics and Logic Design, B. S. Nair, Prentice hall.
17. Digital Computer Electronics, Malvino, Brown Tata McGraw Hill
18. Fundamentals of Digital Electronics C.V.Dhuley and V.M. Ghodki.

Web Resources

Students are 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 athttp://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://101 science.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

B.Sc. PART I - SEMESTER II

(Analogue and Digital Electronics - II)

Course Outline

Unit I

Amplifier parameters, notations, concept and definition of h-parameters, open circuit and short circuit tests, Introduction to input impedance, output impedance, current, voltage and power gains using h parameters, classification of amplifiers (Descriptive ideas only).

Construction, working, characteristics and applications of FET and MOSFET (depletion and enhancement type), Parameters of JFET and their relationship parameters of MOSFET and their relationship.

Unit II

Introduction to power transistor, difference between Voltage and power amplifiers, transformer coupled class A power amplifier and its efficiency, class B Push-pull amplifier, derivation for efficiency, complementary symmetry power amplifier with two power supplies.

Unit III

Construction, working, characteristics and applications of Silicon Controlled Rectifier (SCR), DIAC, TRIAC , UJT and UJT as relaxation oscillator.

Unit IV

Sequential Logic Circuits- Concepts of Edge and Level Triggering, Propagation Delay, Set up time, Hold time, R-S Flip Flop, Clocked R-S Flip Flop, Limitations of R-S FF, D FF, JK FF, preset and clear , Limitations of JK FF: Race around Condition, JKMS FF.

Unit V

Counters: Asynchronous, Up/down, Decade, Synchronous, Modified counter, Ring Counter, Johnson counter (Truth tables and timing diagrams up to 4 bit).

Registers: Left shift, Right shift, SISO, SIPO, PISO and PIPO Registers.

Unit VI

Introduction to memories, classification, Memory expansion (word size and word capacity).

Logic Families: Characteristics of digital ICs, construction and working of TTL NAND and NOR gates, construction and working of CMOS NAND and NOR gates, Tristate logic, comparison of TTL and CMOS logic families with respect to propagation delay, power consumption, noise immunity, noise margin, fan in and fan out.

B.Sc. I (SEM II) ELECTRONICS PRACTICALS

Students are expected to perform at least 5 experiments from section A and 5 experiments from section B.

Section A

1. Study of JFET characteristics.
2. Study of MOSFET characteristics.
3. Study of SCR characteristics.
4. Study of DIAC characteristics.
5. Study of UJT characteristics.
6. Study of UJT as relaxation oscillator.
7. Study of Transistor as a switch.
8. Study of transistor as voltage amplifier using CRO.
9. Study of class A power amplifier.
10. Study of TRIAC characteristics.
11. Study of Band width in single stage amplifier.
12. Study of complementary symmetry power amplifier.

Section B

1. Switching characteristics of NOR.
2. Switching characteristics of NAND.
3. Study of RS Flip Flop using NAND/NOR gate.
4. Study of clocked RS Flip Flop using NAND/NOR gate.
5. Study of D Flip Flop using NAND/NOR gate.
6. Study of JK MS FF.
7. Construction and study of decade counter.
8. Study of mod-counter.
9. Study of ring counter.
10. Study of Johnson counter.
11. Study of SISO register.
12. Study of SIPO register.
13. Study of PISO register.
14. Study of PIPO register.
15. Construction and study of synchronous counter.

REFERENCE BOOKS

1. Principles of Electronics, V. K. Mehta, Rohit Mehta
2. Functional Circuits in Electronics, S. G. Pimpale, Sushama Pimpale, Mcmillan India ltd.
3. Electronics,Fundamental and applications, Ryder PHI
4. Elements of electronics M. K.Bagde, S. P. Singh, Kamal Singh, S.Chand
5. Op-Amp and Linear Circuits, Gaikwad, PHI
6. Electronic Instrumentation, Khedkar
7. Monograph on electronic design principles, Goel, Khaitan Khanna publisher
8. Basic Electronics and Linear Cicuits, Bhargava, Kulshreshtha, Gupta, Technical education series
9. Electronic Devices & Circuits I & II, A. P. Godse, U. P. Bakshi Technical Publishers Pune.
10. Digital principles and applications A. P. Malvino, D. P. Leach, McGraw Hill Book Co.
11. Principles of Digital Electronics, M. B. Matsagar, V. S.Kale, Vision publication
12. Modern Digital Electronics, R.P.Jain, Tata McGraw Hill publishing co. ltd
13. Digital fundamentals, Floyd, Jain, Pearson
14. 2000 solved problems in digital Electronics, S. P. Bali, Tata McGraw Hill publishing co.ltd.
15. Electronic circuits and systems: Analog and digital,Y. N. Bapat, Tata McGraw Hill publishing co.ltd.
16. Digital Electronics and Logic Design, B. S. Nair, Prentice hall
17. Digital Computer Electronics, Malvino, Brown, Tata McGraw Hill
18. Fundamentals of Digital Electronics, C.V.Dhuley and V.M. Ghodki

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1. M.I.T. open course ware video lectures are available athttp://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://101 science.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

SYLLABUS FOR B.Sc. PART II (ELECTRONICS)

B.Sc. PART II - SEMESTER III

Course Name: **Op-Amp, Power Supply, IC 555 and Circuit Maker**

Subject code: UG-ELE(04)-S3-T

Course Objective and Course Outcome Framework

SN	Course Objectives	Course Outcomes
	Students will try to learn:	***After successful completion of the course student will be able to:***
1.	To understand the concepts, working principles and key parameters of operational amplifier.	Understand the fundamentals and working principles of operational amplifier.
2.	To perform analysis of operational amplifier circuits based on negative and positive feedback applications.	Demonstrate the ability to design practical circuits based on negative and positive feedback applications that perform the desired operations.
3.	To understand operation of rectifier, filter, regulator and various parameters associated with power supply.	Understand the concept and operation of rectifier, filter, regulator and various parameters associated with power supply.
4.	To understand operation of regulated power supply and apply concepts for the design of regulated power supply.	Analyze and assemble regulated power supply using 78XX and 723 IC.
5.	To understand the operation and use of 555 timer IC.	Analyze and assemble various timer circuits using 555 IC.
6.	To study the analysis of circuit design using circuit maker simulation software.	Understand the behavior of the electronic circuits.

B.Sc. PART II - SEMESTER III

Course Name: **Op-Amp, Power Supply, IC 555 and Circuit Maker**

Subject code: UG-ELE(04)-S3-T

Course Outline

Unit I

Introduction to DC amplifier, difference amplifier, Need of two power supplies, working of difference amplifier, differential mode gain, common mode gain, C.M.R.R., IC OP-AMP (block diagram), parameters of OP AMP and characteristics of an ideal OP AMP

Unit II

OP AMP as an inverting amplifier, concept of virtual ground, non-inverting amplifier, unity gain amplifier, adder, subtractor, integrator, differentiator, comparator, zero crossing detector, Schmitt trigger.

Unit III

Half wave rectifier, full wave rectifier, bridge rectifier; concept of filter (capacitive). Unregulated, regulated PS, power supply parameters – ripple factor, efficiency, line regulation, load regulation, Zener regulator, Regulated power supply design using series pass transistor, short circuit protection.

Unit IV

General features of IC regulators, design of fixed and variable power supply, 78xx,79xx , LM 317, design of dual power supply, LM 317 as variable regulator, Limitations of linear regulator, Switching regulator- (SMPS), Concept of Low Drop Out regulator (LDO).

Unit V

Timer IC 555: Pin and functional diagrams of IC 555, description of functional diagram, Monostable multivibrator using IC 555, applications in monostable mode (missing pulse detector, linear ramp generator, frequency divider and pulse width modulation) and Astable multivibrator using IC 555, Applications in astable mode (FSK generator, pulse position modulator), Schmitt trigger using IC 555.

Unit VI

Introduction to circuit maker, basics, accessing tools & features, saving schematic options, file management, drawing a schematic, creating simple RC circuit, setting up the analysis, running the simulation, mix signal simulation example.

Digital logic simulation, setting of parameters, analysis of simple circuits.

B.Sc. II (SEM III) ELECTRONICS PRACTICALS

Subject code: UG-ELE(04)-S3-P

Students are expected to perform at least 5 experiments from section A and 5 experiments from section B**.**

Section A

1. Study of Op-amp as inverting and sign changer amplifier.
2. Study of Op-amp as Non-inverting and unity gain amplifier.
3. Op-amp as adder and averaging amplifier.
4. Op-amp as difference amplifier. (Subtracter)
5. Op-amp as Integrator.
6. Op-amp as Differentiator
7. Op-amp as comparator and zero crossing detector.
8. Op-amp as Schmitt trigger.
9. Study of Half wave rectifier.
10. Study of Full wave rectifier.
11. Study of Full wave Bridge rectifier.
12. Study of Zener regulator.

Section B

1. Study of 78XX series regulators
2. Study of 79XX series regulators
3. Study of LM317 regulator
4. Study of astable multivibrator using IC555
5. Study of monostable multivibrator using IC555
6. Study of linear ramp generator using IC555
7. Frequency divider using IC555
8. Study transient & AC analysis of RC circuit
9. Study transient & AC analysis of different OP-Amp as comparator
10. Study transient & AC analysis of different OP-Amp as inverting amplifier

1. Study CE amplifier parameters
2. Study of MOSFET Characteristics

REFERENCE BOOKS

1. Principles of Electronics, V. K. Mehta, Rohit Mehta
2. Functional Circuits in Electronics, S. G. Pimpale, Sushama Pimpale, Mcmillan India ltd.
3. Elements of electronics M. K.Bagde, S. P. Singh, Kamal Singh, S.Chand
4. Op-Amp and Linear Circuits, Gaikwad, PHI
5. Electronic Instrumentation, Khedkar
6. Basic Electronics and Linear Cicuits, Bhargava, Kulshreshtha, Gupta, Technical education series
7. Electronic Devices & Circuits I & II, A. P. Godse, U. P. Bakshi Technical Publishers, Pune.
8. Analogue and Digital technique, Navneeth, Kale. Gokhale,
9. Instrumentation devices and circuits, Rangan, Mani, Sharma
10. Linear Integrated Circuit by D. Roy Chaudhary
11. Op-Amps and Linear Integrated Circuits by Ramakant Gaikwad
12. Circuit maker mannual.

Web Resources

1. Students are advised to make use of the resources available on the internet. Some useful links related to electronics are given below.
2. M.I.T. open course ware video lectures are available athttp://ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/6-002Spring-2007/VideoLectures/index.htm
3. www.electronics-tutorials.com
4. www.science-ebooks.com/electronics
5. http://computer.howstuffworks.com
6. www.geocities.com/CapeCanaveral/1221/elec1.htm
7. http://101 science.com/eleclinks.htm
8. www.electro-tech-online.com/blogs/gayan-soyza/23-useful-electronic-links.html
9. www.discovercircuits.com/resources/tutorials.html

B.Sc. PART II - SEMESTER IV

Course Name: **OP-AMP Applications & Electronic Instrumentation**

Subject code: UG-ELE(04)-S4-T

Course Objective and Course Outcome Framework

SN	Course Objectives	Course Outcomes
	Students will try to learn:	***After successful completion of the course student will be able to:***
1.	To analyze the different RC and LC oscillator circuits using OPAMP and to determine the frequency of oscillation.	Assemble the different oscillator circuits using OPAMPs for various frequencies.
2.	To understand the operation and design of various multivibrator, S/H and IA circuits using OPAMP for a given specification.	Know and assemble multivibrator circuits using OPAMP in various configuration to determine its frequency.
3.	To understand A/D and D/A converters and analyze their characteristics and classification.	Classify, analyze and assemble A/D and D/A converters.
4.	To provide fundamental concepts of basic electronic and PC based instrumentation system.	Students will be able to describe various functional blocks of basic electronic and PC based instrumentation system.
5.	To provide basic knowledge about the various transducers, sensors, actuators and instrumentation system based on these transducers.	Students will be able to explain principle of operation of various transducers, sensors, actuators and their use in developing electronic instrumentation system.
6.	To provide fundamental knowledge of biomedical instrumentation system and its safety codes.	Students will be able to describe functional blocks of biomedical instrumentation system and its safety codes.

B.Sc. PART II - SEMESTER IV

Course Name: **OP-AMP Applications & Electronic Instrumentation**

Subject code: UG-ELE(04)-S4-T

Course Outline

Unit I

Feedback: Type, positive and negative feedback, Barkhausen criterion,Oscillators, types (AF and RF), basic oscillator action, L-C oscillator: Colpitts oscillator, RC oscillator using OP Amp ,Phase shift oscillator, Wein bridge oscillator, Oscillator stability, Crystal oscillator, NOT gate based crystal oscillator.

Unit II

Study of OP AMP as: Astable multivibrator (asymmetric and symmetric), Monostable multivibrator (simple circuit) , Concept and working of sample and hold circuit, concept of Instrumentation Amplifier (three OP Amp circuit) and working.

Unit III

D/A converter, Parameters: Range,Resolution, Linearity and speed, Weighted type D/A, limitations of weighted type D/A, R-2R D/A using Op Amp, limitations, types of D/A output (voltage , current, differential).

Need for A/D conversion, parameters: Range, Resolution and speed, Single slope A/D converters, Dual slope A/D converter, Counter type, Successive approximation type, Flash type, Sampling theorem.

Unit IV

Block diagram for electronic system, Defining the system characteristics, Analog, Digital, Real, virtual, Dedicated, Versatile, Stand alone, PC based instruments. Concept of calibration, Standards for calibration.

Unit V

Sensors, Actuators, Transducers, Active and passive transducers, characteristics,
Passive : Thermister (NTC & PTC), LM35, L.D.R., Photo-transistor
Active : Piezo-electric transducer
Digital: Pressure sensor (MPXV4006DP).

Block diagram of temperature measurement using thermister, Temperature measurement using LM35, Advantage over thermister, Lux meter using LDR, Colorimeter using LDR, Insect repellent using piezo buzzer .

Unit VI

Man-Instrument system components, Introduction to physiological system, generation of bio potential, Block diagram and working of EEG, ECG and EMG, Electrical shock hazards, Precautions, Safety codes in biomedical instrumentation.

B.Sc. II (SEM IV) ELECTRONICS PRACTICALS

Subject code: UG-ELE(04)-S4-P

Students are expected to perform at least 5 experiments from section A and 5 experiments from section B**.**

Section A

1. Study of OP-amp based Wein bridge oscillator.
2. Study of OP-amp based Phase shift oscillator.
3. Study of Colpitt's oscillator.
4. Study of Op-amp as astable multi vibrator.
5. Study of Op-amp as Mono stable multi vibrator.
6. Study of Instrumentation amplifier.
7. Study of successive approximation ADC.
8. Study of Flash type ADC.
9. Study of Single slope ADC.
10. Study of Dual slope ADC.
11. Study of Binary weighted DAC.
12. Study of ladder type DAC
13. Study of NOT gate based crystal oscillator.
14. Study of Sample and hold circuit.

Section B

1. Study transfer characteristics of NTC type thermister
2. Study resolution in characteristics of NTC type thermister
3. Study transfer characteristics of LM 35
4. Study transfer characteristics of Water heater (around 300W)
5. Study of ON/ OFF type thermo-state using LM 35
6. Study transfer characteristics of LDR

7. Study transfer characteristics of Piezo-electric transducer
8. Comparative study of accuracy in 3 ½ digit, 4 ½ digit, 5 ½ digit Multimeters
9. Directivity study of carbon Mic.
10. "Look up table" based o/p using microcontroller IC interface using R.T.C.

REFERENCE BOOKS

1. Digital and analogue Techniques, G. N. Navaneeth,V. M. Gokhale,R. G. Kale, Kitab Mahal.
2. Digital Principles and Applications, A. P. Malvino, D. P. Leach, McGraw Hill Book Co.
3. Op-Amp and Linear Circuits, Gaikwad, PHI,
4. Principles of Digital Electronics, M. B. Matsagar, V. S. Kale, Vision publication
5. Modern Digital Electronics, R. P. Jain, Tata McGraw Hill publishing co.ltd.
6. Digital Fundamentals, Floyd, Jain, Pearson,
7. 2000 Solved Problems in Digital Electronics, S. P. Bali, Tata McGraw Hill publishing co.ltd.
8. Electronic Circuits and Systems: Analog and Digital, Y.N.Bapat, Tata McGraw Hill Publishing co.ltd.
9. Digital Electronics and Logic Design, B. S. Nair, Prentice Hall
10. Digital Computer Electronics, Malvino, Brown, Tata McGraw Hill
11. Fundamentals of Digital Electronics, C.V.Dhuley and V.M. Ghodki Applied Electronics and Instrumentation, C. M. Dhir, Tata McGraw Hill
12. Digital Instrumentation, Bouwens, Tata McGraw Hill
13. Electronic Instrumentation, Khedkar
14. Modern Electronic Instrumentation and Measurement Techniques, Cooper, Prentice Hall.

Web Resources

Students are 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 athttp://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://101 science.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/