BENGALURU CITY UNIVERSITY

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BENGALURU CITY UNIVERSITY

Curriculum for B.Sc. (ELECTRONICS)
(*According to SEP – 2024 Regulations*)

Subject: ELECTRONICS
(2024 – 25 *Onwards)*

Bengaluru City University
Bengaluru – 560009

June / July – 2024

CONTENTS

Proceedings of the BoS in Electronics (UG).

Proceedings of the Board of studies (BoS) in Electronics (UG) meeting held on June 21st and 22nd 2024 in the Department of Electronic Science, Jnana Bharathi Campus, Bangalore University, Bengaluru-560056.

The Members were present for the meeting are:

Sl.No.	Name	Designation	Signature
1.	Dr. J T Devaraju, Professor, Department of Electronic Science, Bangalore University, Bengaluru–560056	Chairman	
2.	Sri. K M Thipperudra Swamy, Associate Professor, Department of Electronics, Vivekananda Degree College, Bengaluru– 560055	Member	
3.	Sri. S M Mruthunjaya Swamy, Associate Professor, Department of Electronics, Vijaya College, R V Road, Bengaluru– 560004	Member	
4.	Sri. S Sanjeev, Associate Professor, Department of Electronics, Vijaya College, Jayanagar, Bengaluru– 560011	Member	
5.	Dr. H J Thontadharya, Associate Professor, Department of Electronics, Vijaya College, R V Road, Bengaluru– 560004	Member	
6.	Sri. K G Lakshminarayana, Associate Professor, Department of Electronics, Vijaya College, Jayanagar, Bengaluru– 560011	Member	
7.	Smt. Rajashri Padaki, Associate Professor, Department of Electronics, Seshadripuram First Grade College, Yelahanka New town, Bengalure-560064	Member	
8.	Dr. Mohana H K, Associate Professor, Department of Electronics, Seshadripuram First Grade College, Yelahanka New town,Bengaluru -560064	Member	
9.	Dr. Ravi Kolarkar G, Associate Professor, Department of Electronics, Nrupathunga University, Bengaluru -560001	Member	
10	Dr. Bharathi , Assistant Professor, Department of Electronics, Maharani Cluster University, Bengaluru -560001	Member	
11	Sri. Vijaya Kumar A Patil, Associate Professor, Department of Electronics, Basaveshwara College of Commerce, Arts and Science, Bengaluru -560010	Co-opted Member	
12	Dr. M Subramanya Bhat, Associate Professor, Department of Electronics, Vijaya College, R V Road, Bengaluru– 560004	Member Convener	

The Chairman extended warm welcome to all the BoS Members and thanked them for accepting the assignment.

The main agenda of the meeting i.e., framing of syllabus for the B.Sc. Degree in Electronics under SEP, was taken for discussion. After thorough discussions the following resolutions were made.

Resolutions:

1. The suggested model course structure for the UG degree of the Bengaluru City University under SEP Programme for the academic year 2024-25 was discussed and approved.

2. Scheme and Syllabus for the First and Second semester B.Sc. degree program in Electronics was prepared and discussed. The board resolved to approve First and Second semester syllabus for Electronics to be implemented effective from academic year 2024-25 and onwards.

3. Eligibility criteria for admission to B.Sc. degree program in Electronics were discussed and resolved to approve as follows:
   "Who have passed PUC/10+2/ITI/ Diploma (Electronics / Electrical / Medical Electronics/Computer Science/Telecommunications) or equivalent".

4. Question paper pattern for theory and scheme of evaluation/ assessment for Practical and award of Internal Assessment marks were prepared, discussed and approved.

5. The panel of Examiners (B.Sc. in Electronics) for the academic year 2024-25 was prepared and approved.

The Chairman expressed gratitude to all members for their participation in the meeting.

Chairman

Dr. J.T. Devaraju
Professor
Dept. of Electronic Science
Bangalore University
Bangalore-560056

Preamble

This model curriculum content for B.Sc. Electronics as per SEP-2024 is intended to enable the graduates to respond to the current needs of the industry and equip them with skills relevant for national and global standards. The framework encourages innovation in teaching-learning process and appropriate assessment of student learning levels.

Introduction

B.Sc. Electronics is a program which needs to develop a specialized skill set among the stake holders to cater to the need of industries. The curriculum is designed to help students to analyse, appreciate, understand and critically engage with learning of the subject and also to provide better learning experience to the stake holders. Apart from imparting disciplinary knowledge, the curriculum is aimed to equip the students with competencies like problem solving and analytical reasoning which provide them high professional competence. The University is expected to encourage its faculty concerned to make suitable pedagogical innovations, in addition to teaching learning processes suggested in the model curriculum, so that the Course/Programme learning outcomes can be achieved.

Significance of Electronics

Nowadays, Electronics has made unprecedented growth in terms of new technologies, new ideas and principles. The research organizations and industries that work in this frontier area are in need of highly knowledgeable, skilled and scientifically oriented manpower. This manpower can be available only with flexible, adaptive and progressive training programs and a cohesive interaction among the institutions, universities and industries.

The key areas of study within Electronics subject comprise: Semiconductor devices and its application, Analog and digital circuit design, Microprocessors & Microcontroller systems, Computer coding / Programming in high level languages etc. and also modern applied fields such as Embedded systems, Data communication, Robotics, Control systems, IoTs, etc,.

Eligibility criteria

Students who have passed PUC/ 10+2 / ITI / Diploma (Electronics / Electrical / Information Science / Medical Electronics/ Computer Science/ Telecommunications) or equivalent are eligible for opting Electronics in UG program.

Program Objectives

The overall objectives of the B.Sc. Electronics program are to:

- Provide students with learning experiences that develop broad knowledge and understanding of key concepts of electronics and equip students with advanced scientific / technological capabilities for analyzing and tackling the issues and problems in the field of Electronics.
- Develop ability in students to apply knowledge and skills acquired to solve specific problems in Electronics.
- Develop abilities in students to design and develop innovative solutions for the benefit of society.
- Provide students with skills that enable them to get employment in various organisations, industries, pursue higher studies, research assignments and turn as entrepreneurs.

Program outcomes

- Ability to apply knowledge of logical thinking and basic science for solving Electronics related problems.
- Ability to perform Electronics experiments, as well as to analyse and interpret data.
- Ability to design and manage Electronic systems or processes that conforms to a given specification within ethical and economic constraints.
- Ability to identify, formulate, analyse and solve the problems in various sub disciplines of Electronics.
- Ability to use Modern Tools / Techniques.

Bengaluru City University

Program Structure

(Discipline: ELECTRONICS) - Semesters 1 – 2

Semester	Title of the Paper	Credits
1	Analog and Digital Electronics- I	3 + 2
2	Analog and Digital Electronics- II	3 + 2

Program Pattern and Scheme of Examination for B.Sc. in Electronics

Sl. No.	Semester	Title of the Paper	Teaching Hours	Hours / week		Examination Pattern Max. & Min. Marks /Paper						Duration of Exam (Hours)		Total Marks / paper	Credits	
						Theory			Practical							
				Theory	Practical	Max.	Min.	IA	Max.	Min.	IA	Theory	Practical		Theory	Practical
1	I	**ELE-CT1:** *Analog and Digital Electronics- I*	60	4	3	80	32	20	40	16	10	3	3	150	3	2
2	II	**ELE-CT2:** *Analog and Digital Electronics- II*	60	4	3	80	32	20	40	16	10	3	3	150	3	2

Scheme of Internal Assessment Marks: **THEORY**

Sl. No.	Particulars	IA marks
1	Internal Tests (Minimum of Two)	10
2	Assignments /Seminar / Case Study / Project work / Reports on - visits to industries/exhibitions/science centre's / active participation in Electronics competitions, etc.	10
	TOTAL Theory IA Marks	20

Scheme of Internal Assessment Marks: **PRACTICAL**

Sl. No.	Particulars	IA marks
1	Practical Tests	05
2	Report on datasheet of electronic devices / Seminar on electronics experiments/ Active participation in practical classes	05
	TOTAL Practical IA Marks	10

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Syllabus for Core Subjects

Course Title: Electronics	Course Credits: 3
Total Contact Hours: 60 Hrs	Duration of ESA: 4 Hrs
Formative Assessment Marks: 20 marks	Summative Assessment Marks :80 marks

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Aptitude to apply Logic thinking and Basic Science knowledge for problem solving in various fields of electronics both in industries and research.
2. Acquire experimental skills, analysing the results and interpret data.
3. Ability to design / develop / manage / operation and maintenance of sophisticated electronic gadgets/ systems / processes that conforms to a given specification within ethical and economic constraints.
4. Capacity to identify and implementation of the formulae to solve the electronic related issues and analyse the problems in various sub disciplines of electronics.
5. Capability to understand the working principles of the electronic devices and their applications.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6
Aptitude to apply Logic thinking and Basic Science knowledge forproblem solving in various fields of electronics both in industries and research	x					
To acquire experimental skills, analysing the results and interpret data.						
Ability to design / develop / manage / operation and maintenance ofsophisticated electronic gadgets / systems / processes that conforms to a given specification within ethical and economic constraints.						
Capacity to identify and implementation of the formulae to solve the electronic related issues and analyse the problems in various sub disciplines of electronics.						
Capability to understand the working principles of the electronic devicesand their applications.	x					

ELE - CT1: Analog and Digital Electronics - I — 60 Hrs

Content

UNIT – 1 — 15 Hrs

Network Theorems: KCL & KVL, Superposition, Thevenin's, Norton's, Maximum Power Transfer and Reciprocity Theorems. DC analysis of RC circuits, AC analysis of RLC series and parallel Resonant Circuits.

PN junction diode, Zener diode: Working, characteristics and applications.

Rectifiers: Half wave and Full wave rectifiers, expressions for output voltage, ripple factor and efficiency (bridge rectifier), Shunt capacitor filter.

Voltage regulator: Line and Load regulation, Zener diode as voltage regulator – circuit diagram, load and line regulation, disadvantages. Fixed and Variable IC Voltage Regulators (78xx, 79xx, LM317), Clippers and Clampers, Voltage Multipliers. SMPS block diagram.

UNIT – 2 — 15 Hrs

Bipolar Junction Transistor: Types, Construction, working and configurations, characteristics in CE mode, leakage currents, Current gains α, ß and γ and their inter-relations, dc load line and Q point. Transistor as a switch.

Transistor biasing: Thermal runaway, stability and stability factor. Types of biasing, Voltage Divider Bias.

Amplifier: classification, parameters, derivation for voltage and current gain of CE amplifier using r_e- model. Advantages of CC amplifier. Two stage RC Coupled Amplifier – circuit, working and its Frequency Response. Concept of feedback- positive and negative- advantages and disadvantages.

UNIT – 3 — 15 Hrs

Number System: Decimal, Binary and Hexadecimal number systems, base conversions, representation of signed and unsigned numbers. Addition, subtraction, BCD code (8421), Gray code, error checking and correction codes, ASCII codes.

Positive and negative logic, Boolean laws, Duality Theorem, De Morgan's Theorems, logic gates- AND, OR, NOT,NAND, NOR, XOR & XNOR. Universal property of NOR and NAND gates. SOP and POS, Minterm, Maxterm, SSOP, SPOS, Simplification of Boolean expressions, K-Map for 3 and 4 variables.

UNIT – 4 15Hrs

Half Adder, Full Adder, Half Subtractor, Full Subtractor. 4-bit parallel binary adder, 2-bit magnitude comparator. Encoder: 4:2 encoder, decimal to BCD priority encoder (74147). Decoder: 2:4 decoder using AND gates, 3:8 decoder using NAND gates, BCD to decimal decoder(7445), BCD to 7- Segment decoder(7446), Multiplexer: 4:1 multiplexer, 1:4-De-multiplexer (logic diagram and truth table of each).

Suggested References

1. *Robert L Boylestad, "Introductory circuit analysis", 5th edition., Universal Book 2003.*
2. *R S Sedha, "A Text book of Applied Electronics", 7th edition., S. Chand and Company Ltd. 2011.*
3. *A.P. Malvino, "Principles of Electronics", 7th edition, TMH, 2011.*
4. *Electronic devices and circuit theory by Boylestad, Robert Nashelsky, 11th Edn., Pearson, 2013.*
5. *David A. Bell "Electronic Devices and Circuits", 5th Edition, Oxford University Press, 2015.*
6. *Thomas L. Floyd, Digital Fundamentals, Pearson Education Asia, (1994)*
7. *Digital Principles and Applications, A.P. Malvino, D.P.Leach and Saha, 7th Edn., TMH, 2011.*
8. *Fundamentals of Digital Circuits, Anand Kumar, 2ndEdn, PHI Learning Pvt. Ltd. 2009.*
9. *Digital Circuits and Systems, K R Venugopal and K Shyla, Tata McGraw Hill, 2011*
10. *Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer,PHI Learning, 2001.*
6. *M. Nahvi & J. Edminister, "Electrical Circuits", Schaum's Outline Series, TMH, 2005*
7. *S. A. Nasar," Electrical Circuits", Schaum's outline series, Tata McGraw Hill, 2004*
8. *J. Millman and C. C. Halkias, "Integrated Electronics", Tata McGraw Hill, 2001*
9. *A.S. Sedra, K.C. Smith, A.N. Chandorkar "Microelectronic circuits", 6th Edn., Oxford University Press, 2014*
10. *J. J. Cathey, "2000 Solved Problems in Electronics", Schaum's outline Series, TMG, 1991.*

Course Title: ELE-CP1: Analog and Digital Electronics –I Lab	Course Credits: 2
Total Contact Hours: 60 Hrs	Duration of ESA: 3 Hrs
Formative Assessment Marks: 10 marks	Summative Assessment Marks: 40 marks

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Aptitude to apply Logic thinking and Basic Science knowledge for problem solving in various fieldsof electronics both in industries and research.
2. To acquire experimental skills, analysing the results and interpret data.
3. Ability to design / develop / manage / operation and maintenance of sophisticated electronic gadgets/ systems / processes that conforms to a given specification within ethical and economic constraints.
4. Capacity to identify and implementation of the formulae to solve the electronic related issues and analyse the problems in various sub disciplines of electronics.
5. Capability to use the Modern Tools / Techniques.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with ProgramOutcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6
Aptitude to apply Logic thinking and Basic Science knowledge forproblem solving in various fields of electronics both in industries and research						
To acquire experimental skills, analysing the results and interpret data.	x					
Ability to design / develop / manage / operation and maintenance of sophisticated electronic gadgets / systems / processes that conforms to a given specification within ethical and economic constraints.						
Capacity to identify and implementation of the formulate to solve the electronic related issues and analyze the problems in various subdisciplines of electronics.						
Capability to use the Modern Tools / Techniques.						

ELE-CP1: ANALOG AND DIGITAL ELECTRONICS-I Lab
(Hardware implementation and Analysis of Circuit using Simulation Software)

1. Demonstration Experiments: Hands on Experimental Skills and Familiarization with
   a) Electronic components
   b) Resistance in series, parallel and series-parallel
   c) Capacitors and inductors in series and parallel
   d) Multimeter and LCR meter – checking of components / measurements.
   e) Voltage sources in series, parallel and series-parallel
   f) Voltage and current dividers
   g) Measurement of Amplitude, Frequency & Phase difference using Oscilloscope
2. Verification of Thevenin's Theorem.
3. Verification of Maximum Power Transfer.
4. Verification of Superposition Theorem.
5. Study of the I-V Characteristics of a P-n junction diode.
6. Study of the I-V Characteristics of a Zener diode
7. Study of half wave rectifier without and with shunt capacitor filter.
8. Study of full wave bridge rectifier without and with shunt capacitor filter.
9. Study of Zener diode as a Voltage Regulator.
10. Study of Clipping, Clamping and Voltage Multiplier circuits.
11. Designing and testing of fixed positive and negative voltage regulators using 78xx and 79xx series ICs.
12. Designing and testing of variable voltage regulator using IC LM317.
13. Study of Transistor characteristics in CE configuration.
14. Study of Voltage divider bias circuit.
15. Study of single stage CE amplifier.
16. Study of two-stage RC-coupled CE amplifier.
17. Study of Series and Parallel Resonance circuits.
18. Verification of truth tables of OR, AND, NOT, NAND, NOR, XOR and XNOR gates using respective ICs.
19. Universal property of NAND and NOR gates.
20. Binary to Gray and Gray to Binary code conversion and parity checker using XOR gates IC 7486.
21. 2-bit Comparator using logic gates.
22. Multiplexer & Demultiplexer Circuits.
23. Encoder & Decoder circuits.

Using analog simulator (LT spice, Circuit Logix, NI Multisim, Circuitmake, EasyEDA, Every Circuit, PSpice, Docircuits, etc.,) at least Five experiments are to be performed.

SECOND SEMESTER

Course Title: ELE - CT2: **ANALOG AND DIGITAL ELECTRONICS-II**	Course Credits: 3
Total Contact Hours: 60 Hrs	Duration of ESA: 4 Hrs
Formative Assessment Marks: 20 marks	Summative Assessment Marks: 80 marks

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Understand and study the behaviour of the semiconductor devices ie., I-V characteristics of various MOSFET devices the knowledge can be extended for understanding the behaviour /characteristics/ response of unknown / novel devices.
2. Applying the standard device models to explain/calculate critical internal parameters ofsemiconductor devices.
3. Understanding and characterizing the behaviour of known/unknown/novel power electronic devicessuch as UJT, SCR, Diac, Triac etc.
4. Understanding and operation and applications of linear integrating circuit – Op-amp and using it for various applications.
5. Understanding the working of basic logic gates, concepts of Boolean algebra and techniques toreduce/simplify Boolean expressions and their applications.
6. Synthesizing and Analyzing combinatorial and sequential circuits and their applications inelectronics, designing the registers and counters.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with ProgramOutcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**
Understand and study the behaviour of JFET device.	x					
Understanding and characterizing the behaviour of known/unknown/novel power electronic devices such as UJT, SCR, Diac, Triac etc.	x					
Acquainting and familiarization of the experimental skills to determine the behaviour of semiconductor devices.	x					
Capable of analyzing the device characteristics and responses.	x					
Understanding the working of basic logic gates, concepts of Boolean algebra and techniques to reduce/simplify Boolean expressions and their applications.	x					
Synthesizing and Analyzing combinatorial and sequential circuits and their applications in electronics	x					

ELE - CT2: ANALOG AND DIGITAL ELECTRONICS-II 60 Hrs

Content

UNIT – 1 15 Hrs

Varactor diode, Schottky diode, Tunnel diode - LED, LCD, Solar Cell: working and applications for each.

JFET: Types, working, characteristics of n-channel JFET, parameters and their relationships, Comparison of BJT and JFET.

MOSFET: Types, CMOS – inverter, circuit and working, IGBT construction and working.

UJT: working, equivalent circuit and characteristics, intrinsic stand-off ratio, Relaxation oscillator.

SCR: working, characteristics, equivalent circuit, applications.

Diac and Triac: characteristics, equivalent circuit, working and applications for each.

UNIT – 2 15 Hrs

Op-Amp: Differential Amplifier, Block diagram of Op-Amp, Characteristics of an Ideal and Practical Op-Amp, Open and closed loop configuration, Frequency Response, CMRR, Slew Rate and concept of Virtual Ground.

Applications of Op-Amps: Inverting and non- inverting amplifiers, Summing amplifier, Differentiator, Integrator, Logarithmic amplifier, Comparator.

Filters: First order active Low pass, High pass and Band pass Butterworth filters.

Oscillators: Barkhausen criterion for sustained oscillations, crystal oscillators, Phase Shift oscillator, Wien-bridge oscillator using Op-amp.

IC 555Timer: Astable and Mono stable multivibrator circuits.

UNIT – 3 15 Hrs

Logic Families: Pulse characteristics, Logic Families-classification of digital ICs. Characteristics of logic families, circuit description of TTL NAND gate with totem pole and open collector. TTL IC terminology. CMOS NAND, Comparison of TTL and CMOS families.

Digital to Analog Converter: DAC with binary weighted resistor and R-2R resistor ladder network. Analog to Digital converter: Successive approximation method-performance characteristics.

Sequential Logic Circuits: Flip-Flops - SR Latch, Level and Edge Triggered concept, Clocked RS, D, JK and T Flip-Flops. Preset and Clear operations. Race-around conditions in JK Flip-Flop. Master- Slave JK Flip-Flops. Applications of Flip-Flops in semiconductor memories, RAM, ROM and types.

UNIT – 4 15 Hrs

Registers and Counters: Types of Shift Registers (up to 4-bits), its applications. Ring counter, Johnson counter applications. Asynchronous Counters: Logic diagram, Truth table and timing diagrams of 4-bit ripple counter, modulo-n counters, 4-bit Up-Down counter, Synchronous Counter: 4-bit counter, Design of Mod 3, Mod 5 and decade Counters using K-maps.

Basic computer system: Block diagram, Input and output devices, interfacing techniques, expansion of memory, programming techniques, flowchart, types of languages.

Suggested References:

1. Robert L Boylestad, "Introductory circuit analysis", 5th edition., Universal Book 2003.
2. Electronic Devices Conventional Current Version by Thomas L. Floyd, 10th edition, Pearson, 2018
3. David A. Bell "Electronic Devices and Circuits", 5th Edition, Oxford Univesity Press, 2015
4. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edn., Prentice Hall., 2000
5. Operational Amplifiers and Linear ICs, David A. Bell, 3rd Edition, Oxford University Press. 2011,
6. R S Sedha, "A Text book of Applied Electronics", 7th edn., S Chand and Company Ltd., 2011
7. Thomas L. Floyd, Digital Fundamentals, Pearson Education Asia, 1994
8. Digital Principles and Applications, A.P. Malvino, D P Leach and Saha, 7th Edition, TMH, 2011.
9. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, PHI Learning Pvt. Ltd. 2009
10. Digital Circuits and Systems, K R Venugopal and K Shyla, Tata McGraw Hill, 2011
11. Digital Circuits and systems, Venugopal, Tata McGraw Hill. 2011
12. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, PHI Learning. 2001
13. Digital Principles, Schaum's Outline Series, R. L. Tokheim, TMH., 1994
14. Digital Electronics, S.K. Mandal, 1st Edition, McGraw Hill., 2010.

Course Title: ELE-CP2: **ANALOG AND DIGITAL ELECTRONICS - II Lab**	Course Credits: 2
Total Contact Hours: 60 Hrs	Duration of ESA: 3 Hrs
Formative Assessment Marks: 10 marks	Summative AssessmentMarks: 40 marks

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Aptitude to apply Logic thinking and Basic Science knowledge for problem solving in various fields of electronics both in industries and research.
2. To acquire experimental skills, analysing the results and interpret data.
3. Ability to design / develop / manage / operation and maintenance of sophisticated electronic gadgets / systems / processes that conforms to a given specification within ethical and economic constraints.
4. Capacity to identify and implementation of the formulae to solve the electronic related issues and analyse the problems in various sub disciplines of electronics.
5. Capability to use the Modern Tools / Techniques.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with ProgramOutcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6
Aptitude to apply Logic thinking and Basic Science knowledge for problem solving in various fields of electronics both in industries and research						
To acquire experimental skills, analysing the results and interpret data.	x					
Ability to design / develop / manage / operation and maintenance of sophisticated electronic gadgets / systems / processes that conforms to a given specification within ethical and economic constraints.	x					
Capacity to identify and implementation of the formulate to solve the electronic related issues and analyze the problems in various sub disciplines of electronics.						
Capability to use the Modern Tools / Techniques.	x					

ELE-CP2: ANALOG AND DIGITAL ELECTRONICS –II Lab
(Hardware and Circuit Simulation Software)

1. Study of JFET characteristics – determination of parameters.
2. Study of single stage JFET amplifier.
3. UJT characteristics and relaxation oscillator
4. SCR characteristics.
5. Design of inverting and non-inverting amplifier using Op-amp & study of frequency response.
6. Op-amp inverting and non-inverting adder, subtractor and averaging amplifier.
7. Design and study of differentiator and integrator using op-amp for different input waveforms.
8. Design and study of Wien bridge oscillator using op-amp.
9. Design and study of RC phase shift oscillator using op-amp.
10. Design and study of first order high-pass and low-pass filters using op-amp.
11. Study of Crystal oscillator using op-amp.
12. Astable multivibrator using IC-555 timer.
13. Monostable multivibrator using IC-555 timer.
14. Digital to Analog Converter using binary weighted resistor method.
15. Study of Clocked RS and D Flip-Flops using NAND gates.
16. Study of Clocked JK and T Flip-Flops using NAND gates.
17. Study of mod-16 asynchronous counter using JK Flip-Flop.
18. Study of decade counter using JK Flip-Flop.
19. Study of 4-bit Shift Register – SISO.

Using analog simulator (LT spice, Circuit Logix, NI Multisim, Circuitmake, EasyEDA, Every Circuit, PSpice, Docircuits, etc.,) at least Five experiments are to be performed.

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Question Paper Pattern for B.Sc. Electronics Theory and Practical. Paper: Electronics (UG) as per SEP Curriculum 2024 for all Semesters

Theory Paper Electronics(UG) as per SEP Curriculum 2024 for all Semesters

Subject: ELECTRONICS

Paper Title:

Instructions: Answer ALL the questions from Part–A, any FIVE questions from Part–B and any FOUR questions from Part–C.

Note: It is required to answer all the questions of Part–A in any one page and to be answered only once. *In this Part, answering the same question multiple times will not be considered for Evaluation.*

PART – A

1. Answer **ALL** the subdivisions **(Multiple Choice Questions)** $20 \times 1 = 20$

PART – B

Answer any FIVE questions. (5/8) $8 \times 5 = 40$

PART – C

Answer any FOUR questions. (4/6) $4 \times 5 = 20$

Part	Type	Questions	Marks Each	Total
A	Multiple Choice Questions	**20**	**1**	**20**
B	Descriptive Questions in (Single/Multiple Questions)	**5/8**	**8**	**40**
C	Problems /Analysis	**4/6**	**5**	**20**

Internal Assessment marks allotment for Theory: **20 Marks**

Sl. No.	Particulars	IA Marks
1.	Assignments/Seminars/ Reports/Exhibitions/ Active participation in Electronics Competitions, etc	**10**
2.	Internal Tests (Minimum of Two)	**10**
	Total Theory IA Marks	**20**

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Question Paper Pattern for B.Sc. Electronics Theory and Practical.
Paper: Electronics (UG) as per SEP Curriculum 2024 for all Semesters

Practical Paper Electronics(UG) as per SEP Curriculum 2024 for all Semesters

Subject: ELECTRONICS

Paper Title:

1. In each Semester/ Paper **Minimum of 8 Experiments** to be performed
2. Practical Examination : **40 Marks**

Scheme for Practical Examination:

Sl. No.	Particulars	Marks
1.	Write up:- Circuit diagram, Tabular column, Formulae	12
2.	Conduction, Tabulation and results	18
3.	Viva Voce	05
	Total	**35**
4.	Practical Record Book	05
	Grand Total Marks	**40**

Internal Assessment Marks Allotment for Practical: **10 Marks**

Scheme for Practical IA Marks

Sl. No.	Particulars	IA Marks
1.	Attendance/ Active participation	**05**
2.	Practical Tests	**05**
	Total Practical IA Marks	**10**

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