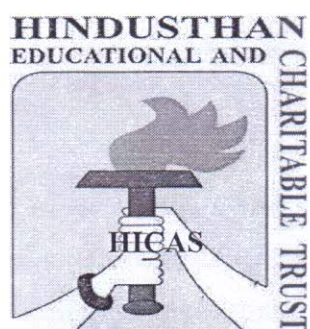


**LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK
(LOCF)**

in the

**UNDERGRADUATE PROGRAMME BACHELOR OF SCIENCE IN
ELECTRONICS AND COMMUNICATION SYSTEMS**

**FOR THE STUDENTS ADMITTED FROM THE
ACADEMIC YEAR 2021 - 2022 AND ONWARDS**



**HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)
(Affiliated to Bharathiar University and Accredited by NAAC)**

COIMBATORE-641028

TAMILNADU, INDIA.

Phone: 0422-4440555

Website: www.hicas.ac.in

INTRODUCTION

The prerequisite for Electronics and Communication course is to have basic sciences at school level. Students on completion of this course will have good knowledge about the basic devices, its operation, and its characteristics in detail. The objective of this course is to impart the knowledge about Electronic Devices and Circuits, Digital Electronics, Communication Systems, Embedded Systems and VLSI design concepts.

PREAMBLE

Learning Outcome Based Curriculum Framework for Undergraduate education in Bachelor of Electronics and Communication Systems is to equip the students with basic components in electronics and to understand the principles of operation of fundamental electronic devices.

VISION

To provide world class education to the students to face global challenges and to inculcate the latest trends in technological advancement. To cater the needs of the environmental and ethical values in the mind of students to become good citizens and entrepreneurs.

MISSION

The Mission of the college is to pursue a philosophy of perpetual acquisition of knowledge. The important policy is to provide value-based education and to bring out the hidden potentials in students that equip them to approach life with optimism.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 1: Ability to relate the knowledge of mathematics & science in solving electronics related problems.

PEO 2: Ability to design and conduct electronics experiments, as well as to analyze and interpret data.

PEO 3: Ability to design and manage electronic systems or processes that conforms to a given specification within ethical and economic constraints.

PEO 4: Ability to function as a member of a multidisciplinary team with sense of ethics, integrity and social responsibility and recognize the need for, and be able to engage in lifelong learning.

PEO 5: Ability to use techniques, skills and modern technological/scientific/engineering software/tools for professional practices.

PROGRAMME OUTCOME (PO)

PO1: Ability to apply knowledge of mathematics, science, and technology fundamentals to solve complex problems in Electronics and Communication.

PO2: Ability to analyze Electronics and Communication real-time application problems, interpret data and arrive at meaningful conclusions involving mathematical inferences.

PO3: Ability to design Electronics and Communication systems to meet the desired needs considering public health and safety, and the cultural, societal, and environmental considerations.

PO4: Ability to apply modern tools and techniques and understand the utilization of resources appropriately to complex Electronics and Communication activities.

PO5: Ability to work as a member of a team, to plan and to integrate the knowledge of various engineering disciplines and to lead teams in multidisciplinary settings.

PO6: Ability to adapt to the changes and advancements in technology and engage in independent and life-long learning.

PO7: Ability to develop and manage research cultures by applying electronics and management principles.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO1: Select and apply cutting-edge of electronics hardware and software tools to solve complex problems.

PSO2: Able to apply the knowledge gained during the course of the program in particular to identify, formulate and solve real life problems faced in industries and/or during the course work.

PSO3: Design, implement and test Electronics and Communication Systems using analytical knowledge and applying modern hardware and software tools.

PSO4: Able to provide socially acceptable technical solutions to complex electronics engineering problems with the application of modern and appropriate techniques for sustainable development.

PSO5: Demonstrate proficiency in use of software and hardware required in real-life applications.

HINDUSTHAN COLLEGE OF ARTS & SCIENCE (AUTONOMOUS),

COIMBATORE-641028

SCHEME OF EXAMINATIONS - CBCS & LOCF PATTERN

(For the Students admitted from the Academic year 2021-2022 and Onwards)

UG PROGRAMME

Programme: B.Sc

Branch: Electronics and Communication Systems

Part	Course Code	Course Type	Course Title	Credit points	Lecture Hours/ Week		Exam Duration (hours)	MAX. MARKS		
					Theory	Practical		I.E.	E.E	Total
Semester – I										
I	21LAT01/ 21LAH01/ 21LAM01/ 21LAF01	MIL	Tamil-I/ Hindi-I/ Malayalam – I/ French-I	4	6		3	30	70	100
II	21ENG01	AECC	English – I	4	6		3	30	70	100
III	21ELU01	DSC	CORE I : Basic Electronics	4	4		3	30	70	100
III	21ELU02	DSC	CORE II : Electric Circuits and Network Analysis	4	4		3	30	70	100
III	21ELU03	GE	Allied-I Mathematics- I	4	5		3	30	70	100
III	21ELU05	DSC	CORE IV: Practical I: Electric Circuit Analysis			2	3	#	#	#
III	21ELU06	DSC	CORE V: Practical II: Semiconductor Devices and Circuits			2	3	#	#	#
IV	21ELUE01	AEE	Open Elective – I	2	3		3	100	-	100
IV	21GSU01	AECC	Environmental Studies	1	2		2	50	-	50
IV	21ELUV01	SEC	VAC – I/Life Skills-I @/-Communicative English	1*	2		2	50	-	50**
IV	-	SEC	SDR-Student Development Report	Assessment will be in the Fifth Semester						
V	-	AECC	Extension Activities NSS/NCC/SPORTS/Y RC/SIS/SA	Assessment will be in the Fourth Semester						
Total				23	32	4		300	350	650
Semester – II										
I	21LAT02/ 21LAH02/ 21LAM02/ 21LAF02	MIL	Tamil-II/ Hindi-II/ Malayalam-II/ French-II	4	6		3	30	70	100
II	21ENG02	AECC	English – II	4	6		3	30	70	100

III	21ELU04	DSC	CORE-III: Semiconductor Devices	4	4		3	30	70	100
III	21ELU05	DSC	CORE IV: Practical I: Electric Circuit Analysis	4		4	3	40	60	100
III	21ELU06	DSC	CORE V: Practical II: Semiconductor Devices and Circuits	4		4	3	40	60	100
III	21ELU07	DSC	CORE VI: Electronic Circuits	3	3		3	30	70	100
III	21ELU08	GE	Allied-Mathematics-II	4	5		3	30	70	100
III	21ELU09	SEC	Internship / Industrial Visit / Mini Project (Summer Course – 1)	1	-	-	-	100		100
IV	21ELUV02	SEC	VAC-II/Life Skills-II @ / Language	1*	2		2	50	-	50**
IV	21ELUJ01	SEC	Aptitude / Placement Training	Grade *	2		2	50		50**
Total				28	28	8		330	470	800
Semester – III										
III	21ELU10	DSC	CORE VII: Principles of Communication System	4	5		3	30	70	100
III	21ELU11	DSC	CORE VIII: Digital Electronics and its Applications	4	5		3	30	70	100
III	21ELU12	DSC	CORE IX: Practical III: Communication Systems	4		5	3	40	60	100
III	21ELU13	DSC	CORE X: Practical IV: Digital Electronics	4		5	3	40	60	100
III	21ELU14	GE	Allied-III C Programming	4	5		3	30	70	100
III	21ELU15	DSE	Elective-I/DSE-I	3	3		3	30	70	100
IV	21ELUE02	AEE	Open Elective-II	2	3		3	100		100
IV	21GSU02	AECC	Human Rights	1	2		2	50		50
IV	21ELUJ02	SEC	Aptitude / Placement Training	Grade *	2		2	50		50**
IV	21ELUJ03	SEC	Online Course	-	1		-	-	-	≠C/NC
Total				26	26	10		350	400	750
Semester – IV										
III	21ELU16	DSC	CORE XI: Microwave and Fiber Optic Communication	5	6		3	30	70	100
III	21ELU17	DSC	CORE XII: Linear Integrated Circuits	5	5		3	30	70	100
III	21ELU18	DSC	CORE XIII: Biomedical Instrumentation	4	5		3	30	70	100
III	21ELU19	DSC	CORE XIV: Practical VI: Linear Integrated Circuits	4		5	3	30	70	100

III	21ELU20	GE	Allied-IV Python programming	4	5		3	30	70	100
III	21ELU21	DSE	Electives – II/DSE-II	3	3		3	30	70	100
IV	21ELU22	SEC	Internship / Institutional Training / Mini-Project (Summer Course-2)	1	-		-	100	-	100
IV	21ELUV03	ACC	VAC – III	1*	2		2	50	-	50**
IV	21ELUJ04	SEC	Aptitude / Placement Training	Grade *	2		2	50		50**
IV	21ELUJ05	SEC	Online Course	-	1		-	-	-	≠C/NC
IV	21GSU03	AECC	Internet Security	1	2		2	50	-	50
V	21GSU04	AECC	Extension Activities NSS/NCC/SPORTS/Y RC/SIS/SA#	-	-		-		-	≠C/NC
Total				27	31	5		340	410	750
Semester – V										
III	21ELU23	DSC	CORE XV: Cellular Communication System	4	4		3	30	70	100
III	21ELU24	DSC	CORE XVI: Industrial and Power Electronics	4	5		3	30	70	100
III	21ELU25	DSC	CORE XVII: Microcontroller	4	5		3	30	70	100
III	21ELU26	DSC	CORE XVIII: Practical VII: Industrial Electronics	4		5	3	40	60	100
III	21ELU27	DSC	CORE XIX: Practical VIII: Microcontroller	4		5	3	40	60	100
III	21ELU28	DSE	Elective – III/DSE-III	3	3		3	30	70	100
IV	21ELUE03	AEE	Open Elective – III	2	3		3	100	-	100
IV	21GSU05	AECC	General Awareness	1	1		2	50	-	50
IV	21GSU06	AECC	Law of Ethics	1	-		2	50	-	50
IV	21ELUV04	ACC	VAC – IV	1*	2		2	50	-	50**
IV	21ELUJ06	SEC	Aptitude / Placement Training	Grade *	2		2	50	-	50**
IV	21ELUJ07	SEC	Online Course	-	1		-	-	-	≠C/NC
IV	21ELUJ08	SEC	SDR- Student Development Report	2*	-	-	-	-	-	-
Total				27	26	10	-	400	400	800
Semester – VI										
III	21ELU29	DSE	Electives – IV/DSE-IV	4	4		3	30	70	100
III	21ELU30	DSE	Electives – V/DSE-V	4	4		3	30	70	100
III	21ELU31	SEC	Project Work /Student Research / Paper	4	4		-	40	60	100
IV	21ELU32	DSC	CORE XX: Self-Study Course	3	-	-	3	30	70	100
Total				15	12			130	270	400

- * denotes Extra credits which are not added with total credits.
- ** denotes Extra marks which are not added with total marks.
- **VAC-Value Added Course (Extra Credit Courses)**
- * Grades depends on the marks obtained
- †C-Completed/ NC- Not Completed

Range of marks	Equivalent remarks
80 and above	Exemplary
70 – 79	Very good
60 – 69	Good
50 – 59	Fair
40 – 49	Satisfactory
Below 40	Not Satisfactory = Not completed

- Part IV & V not included in total marks and CGPA calculation.
- **I.E-Internal Exam**
- **E.E-External Exam**
- **JOC-Job Oriented Course**
- **E-Open Elective Papers**

PASSING MINIMUM

- Passing Minimum for UG 40% and for PG 50%
- For UG:35% (25 Marks) in EE and 40% and in Total Marks
- For PG:35% (30 Marks) in EE and 50% and in Total Marks

ABSTRACT FOR SCHEME OF EXAMINATION

(For the candidates admitted during the academic year 2021 - 2022 and onwards)

Part	Course	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages/(MIL)	2	4	8	100	200
Part II	English/AECC-I	2	4	8	100	200
Part III	Core/DSC	19	3/4	77	100	1900
	Self-Study Course /DSC	1	3	3	100	100
	Allied /GE	4	4	16	100	400
	Electives/DSE	5	3/4	17	100	500
	Project /SEC	1	4	4	100	100
Part IV	Open Electives /AEE	3	2	6	100	300
	AECC-EVS/ HR/IS/GA/LE	5	1	5	50	250
	Value Added Course	2	1	2*	50	100**
	Aptitude/Placement Training/SEC	4	Grade	Grade	50	200**
	Online courses /SEC	3	C/NC	C/NC	-	-
	Life Skills/SEC	2	1	2*	50	100**
	Internship/Institutional Training/Mini-Project (Summer Courses #)	2	1	2	100	200
	SDR- Student Development Report	1	2	2*	-	-
Part V	Extension Activities NSS /NCC/Sports/YRC/SIS/ SA-AECC	1	2	2	-	-
	Total			148 (6Extra Credits)		4150 + (400**)

List of Open Elective Papers & VAC / JOC	
Open Electives	Yoga for Human Excellence
	Human Health & Hygiene
	Indian Culture and Heritage
	Indian Constitution and Political System
	Consumer Awareness and Protection
	Professional Ethics and Human Values
	Human Rights, Women's Rights & Gender Equality
	Disaster Management
	Green Farming
	Campus to Corporate
	Start-up Business
	Research Methodology and IPR
	General Studies for Competitive Examinations
	IIT JAM Examination (for Science only)
CUCET Examination	
Courses offered by the Departments to other Programmes	


Note: VAC / JOC courses can be added along with the above open electives

List of Elective Papers/ DSE (Can choose any one of the paper as electives)		
	Course Code	Title
Electives/ DSE-I	21ELU08A	Electronic Instrumentation
	21ELU08B	PCB Design and Fabrication
Electives/ DSE-II	21ELU14A	Electric Vehicles and Renewable Energy
	21ELU14B	Computer Networks
Electives/ DSE-III	21ELU20A	Basic VLSI Design
	21ELU20B	Cloud Computing
Electives/ DSE-IV	21ELU26A	Embedded Systems
	21ELU26B	IoT and its Applications
Electives/ DSE-V	21ELU27A	Microelectronics
	21ELU27B	Digital Signal Processing


Syllabus Coordinator


Academic Council – Member Secretary
Co-ordinator

Hindusthan College of Arts and Science,
Coimbatore-641 028.


BOS-Chairman/Chairperson
Head of the Department
Department of Electronics
Hindusthan College of Arts & Science
Coimbatore-641 028


PRINCIPAL
PRINCIPAL
Hindusthan College of Arts and Science
Hindusthan Gardens, Behind Nava India
Coimbatore - 641 028.

Regulations

1. Internship / Institutional Training / **Mini-Project** is related to the discipline can be permitted to complete during the end of I and III semesters for minimum seven days each and permitted to submit a report.

Internship / Institutional Training	Not more than seven days
Mini project	Depends on the departments

2. Project work is considered as a special course involving application of knowledge in problem solving / analyzing /exploring a real-life situation. A Project work may be given in lieu of a discipline specific elective paper.
3. **Two core courses DSC- XVIII & DSC- XIX are the subjects which are to be related with NPTEL courses.**
4. **If the students who are all completed the NPTEL courses before semester -V, they can avail exemption from appearing exams of DSC- XVIII & DSC- XIX in Fast track scheme.**
5. NSS / NCC/Sports/YRC / SIS / SA is mandatory for all students as per New Education Policy and the students must attend the allocated hours within two years and complete the programme. They will be evaluated during the end of second year (Fourth Semester) and also a certificate will be issued.
6. SDR – Student Development Report to be received by the department from the students till end of the fifth semester. (Evidences of Curriculum activities and Co-curriculum activities)
7. For online courses minimum of 2 certificates in any of the online platform is mandatory.

Extension Activities

NSS – National Service Scheme, as enrolled member with the College Unit.

NCC – National Credit Corps, as enrolled member with the College Unit.

SPORTS – Sports & Games Participation with College Team

YRC/RRC–Youth Red Cross / Red Ribbon Club, as enrolled member with the College Unit.

Rotaract Club - Rotaract Club, as enrolled member with the College Unit.

SIS – Special Interest Subjects, as approved by the Academic Council

SA – Social Activity for not less than 50 hours with NGGO like Aram Foundation / Shanthi Social Service / Siruthuli / KulangalPathukappuAmaipu /Old age Home / Nature Foundation / etc.

SEC-Skill Enhancement Course (Life Skills/ Aptitude/Placement Training/online course/Internship/SDR)

ECC- Ability Enhancement Compulsory Course (Environmental Studies/ Human Rights/Internet Security/ General Awareness/ Law of Ethics/Extension Activities)

UG Courses- Scheme of Evaluation (Internal & External Components)

(For the students admitted during the academic year 2021-2022 and onwards)

1. Internal Marks for all UG

Components	Marks
Test I	5
Test II	5
Model Exam	10
Assignment	5
Attendance*	5
TOTAL	30

*Split-up of Attendance Marks

- ♣ 75-79 - 1 marks
- ♣ 80-84 - 2 marks
- ♣ 85-89 - 3 marks
- ♣ 90-94 - 4 marks
- ♣ 95-100 - 5 marks

2. a) Components for Practical I.E.

Components	Marks
Test -I	20
Test - II	20
Total	40

b) Components for Practical E.E.

Components	Marks
Experiments	50
Record	5
Viva	5
Total	60

3. Institutional/ Industrial Training, Mini Project and Major Project Work

Institutional / Industrial Training (I.E)		Mini Project (I.E)	Major Project Work		
Component	Marks	Marks	Component	Marks	Total Marks
Work diary	25	-	I.E		
Report	50	50	a)Attendance	10	
Viva-voce	25	50	b)Review/Work diary*	30	40
Total	100	100	E.E**	a) Final report	40
			b)Viva-voce	20	60
			Total		100

*Review is for Individual Project and Work Diary is for Group Projects (group consisting of minimum 3 and maximum 5)

**Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

4. Guidelines for Internet Security/Human Rights/Law of Ethics/Environmental studies (Part IV)

Components	Marks
Two Tests (each 2 hours) of 20 marks each [4 out of 7 descriptive type questions 4 x 5 = 20 Marks]	40
Two assignments (2 x 5)	10
Total	50

5. Guidelines for General Awareness (Part IV)

Components	Marks
Two Tests (each 2 hours) of 25 marks each [50 objective type questions 50 x 1/2 = 25 Marks]	50

6. Guidelines for Open Elective (Part IV)

No of Activities	Marks
Two Tests (each 3 hours) of 50 marks each [5 out of 8 descriptive type questions 5 x 10 = 50 Marks]	100

7. Value Added Courses / Aptitude/Placement courses:

Components	Marks
Two Test (each 1 hour) of 25 marks each QP is objective pattern (25x1=25)	50
Total	50

Guidelines:

1. The passing minimum for these items should be 40%
2. If the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent Semesters
3. Item No's:4,5,6 and 7 are to be treated as 100% Internal papers.
4. For item No.07, Tests conducted through online modules (Google Form/any other)

UG PATTERN
QUESTION PAPER PATTERN FOR CIA I and CIA II EXAM

Reg.No:-----

Q.P.CODE:

HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)
----- DEGREE CIA-I/CIA-II EXAMINATIONS -----20---
(----- SEMESTER)

BRANCH: -----

SUBJECT NAME: -----

Time: Two Hours

Maximum:50 Marks

SECTION - A (6 x 1 = 6 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks

(Q.No: 1 to 6: Multiple choice/Fill up the blanks /True or False questions)

SECTION - B (4x 5 = 20 marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks

(Q.No: 7 to 10 Either Or type)

SECTION - C (2x12 = 24 marks)

Answer any **TWO** Questions out of **THREE** Questions

ALL Questions Carry **EQUAL** Marks

(Q.No: 11 to 13)

QUESTION PAPER PATTERN FOR MODEL/END SEMESTER EXAMINATION

Reg.No:-----

Q.P.CODE:

HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)
----- DEGREE MODEL EXAMINATIONS -----20-----
(-----SEMESTER)

BRANCH : -----

SUBJECT NAME:-----

Duration: Three Hours

Maximum: 70 Marks

SECTION - A (10x1=10 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks

(Q.No 1 to 10 Multiple choice/Fill up the blanks /True or False questions)

(Two questions from each unit)

SECTION - B (5x6=30 Marks)

Answer **ALL** Question

ALL Questions Carry **EQUAL** Marks

(Q.No 11 to 15 Either or type)

(One question from each Unit)

SECTION- C (3x10=30 Marks)

Answer any **THREE** Questions out of **FIVE** Questions

ALL Questions carry **EQUAL** Marks

(Q.No 16 to 20) (One question from each Unit)

For UG (Question paper pattern) (Max. 70 marks)

Sec-A (10x1=10marks)	All Questions will be in K1 Level
Sec-B (5x6=30marks) Either or type	4 Questions will be in K1 Level, 3 Questions will be in K2, K3 each
Sec-C (3x10=30marks) Any 3 out of 5 questions	2 Questions will be in K2, 3 Questions will be in K3 & K4 level

Course Code:	21ELU01	BASIC ELECTRONICS						Batch:	2021-2022 & Onwards
Hrs/Week:								Semester:	
		L	4	T	-	P	-	Credits:	4

COURSE OBJECTIVES:

1. To provide knowledge of some electronic components and circuits.
2. To introduce basics of active and passive components.
3. To understand the workings of resistors, capacitors and inductors.
4. To analyze the working principles of voltage and current sources.
5. To build mathematical and numerical background for design of electronic circuits.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLÓOMS LEVEL
CO1	Remember the principles and basic concepts of electronics and electricity.	K1
CO2	Understand the construction, types, characteristics and working principles of resistors.	K2
CO3	Apply the capacitors laws and principles to determine a quantity that measures their ability to store charges.	K3
CO4	Analyze, compare and demonstrate the characteristics of inductors.	K4
CO5	Evaluate the voltage and current sources, basic operations and its characteristics.	K4

KI- Remember, K2- Understand, K3- Apply, K4- Analyze

SYLLABUS

21ELU01	BASIC ELECTRONICS	Sem: I
Unit No.	Topics	Hours
I	INTRODUCTION TO ELECTRICITY: Negative and positive polarities – Structure of atom – Electric Charge – Voltage – Current–Direct Current (DC)–Alternating Current(AC)–Amplitude -Frequency–Period–Wavelength–Phase angle–Sources of electricity- Difference between active and passive components.	10
II	RESISTORS: Color code resistance designation – Working characteristics/properties–Resistors–Carbon film - metal-film - carbon composition - wire wound and variable type(presets and potentiometers) constructional details - characteristics (size, voltage, tolerance temperature and frequency dependence)–noise consideration specification–Testing–mutual comparison and typical applications–Voltage Dependent Resistor(VDR).	10

III	CAPACITORS: Working characteristics/properties–Capacitors-polyester –Metalized polyester–ceramic paper mica - electrolytic tantalum - solid aluminum types–construction details -testing–specifications–mutual comparison & typical applications.	9
IV	INDUCTORS: Transformers - RF coils- Working characteristics/properties Methods of manufacture of inductors - RF coils - small power - AF transformer and their testing, Properties of cores – type of shielding.	9
V	VOLTAGE AND CURRENT SOURCES: Batteries – Internal Resistance of a Sources – Concept of Voltage Source – Ideal Voltage source- Practical Voltage Source–VI Characteristics of Practical Voltage Source - Procedure for Determining Internal Resistance – Ideal Current Source-Practical Current Source-Equivalent Between Voltage Source and Current Source –Conversion of Voltage, Current Source.	10

Note: Distribution of marks: Problems 10 %, Theory 90%

Teaching Methods: PowerPoint Projection through LCD, Assignment, Discussion and Activity.

TEXT BOOKS

1. *Foundation of Electronics* by D. Chattopadhyaya & P.C. Rakshit (New Age International, New Delhi). (Unit: I-III)
2. R.S.Sedha, "A Text Book of Applied Electronics", S. Chand & Company Ltd, Revised I Edition. (Unit: IV-V)
3. S.P.SHARMA, "Basic Radio and B/W, Colour Television", Tata Mcgraw Hill Publishing, 5th Edition.

REFERENCE BOOKS

1. Bernard Grob, "Basic Electronics" Mc Graw Hill, 10th Edition.
2. S.Salivahanan, N.Sureshkumar, A. Vallavaraj, "Electronic Devices and circuits", Tata Mc Graw Hill, 2nd Edition.

WEB RESOURCES

Web Link:

1. <https://nptel.ac.in/courses/122/106/122106025/>
2. <http://www.nptelvideos.in/2012/12/basic-electronics-drchitralekha-mahanta.html>

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	M	M	M	M	M
CO2	S	S	S	M	S	M	S
CO3	S	M	S	S	M	S	M
CO4	S	S	S	S	L	S	L
CO5	S	S	M	S	L	S	L

ASSESSMENT PATTERN (if deviation from common pattern)

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD,	Approved by CDC Co-ordinator
Mr. M. KUMARESAN <i>MKS</i>	<i>[Signature]</i> Dr. K. THANGAVEL	<i>[Signature]</i> Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028.

Head of the Department
Department of Electronics
Hindusthan College of Arts & Science
Coimbatore-641 028

Course Code:	21ELU02	ELECTRIC CIRCUITS AND NETWORK ANALYSIS						Batch:	2021-2022 & Onwards
								Semester:	I
Hrs/Week:		L	4	T	-	P	-	Credits:	4

COURSE OBJECTIVE:

1. To provide a systematic approach to solving circuit theory problems.
2. To learn circuit analysis techniques such as nodal analysis, mesh analysis, theorems, source transformation and several other methods of simplifying networks.
3. To understand S-Domain analysis and Network analysis
4. To analyze various types of transient and steady state analysis
5. To design Different types of two-port network analysis using network theorems.

COURSE OUTCOME

S.No	COURSE OUTCOME	BLOOMSLEVEL
CO1	Recall the concepts of network theorems and simplify the network laws using reduction techniques.	K1
CO2	Characterize and analyze the RL, RC, and RLC networks.	K2
CO3	Apply the circuit theory concepts using the S-Domain analysis	K3
CO4	Analyze the electric circuit's applications by using network analysis.	K4
CO5	experiment the network concepts in various real-time applications.	K3

KI-Remember, K2-Understand, K3-Apply, K4-Analyse, K5-Evaluate

SYLLABUS

21ELU02	ELECTRIC CIRCUITS AND NETWORK ANALYSIS	Sem: I
Unit No.	Topics	Hours
I	NETWORK THEOREMS: Energy sources– Voltage and current sources – dependent sources and independent sources – Kirchhoff's Laws – KCL and KVL – Node and mesh analysis – Maxwell loop equation-Superposition theorem – Thevenin's Theorem – Thevenins a circuit with two Voltage Source – Thevenins a bridge circuits – Thevenins Norton conversion – Norton's theorems– Maximum power transfer theorem – Millman'sTheorem– Simple problems in DC circuits.	10

II	TRANSIENT AND STEADY STATE ANALYSIS: AC analysis of RC– RL and RLC circuits– time constant – Laplace Transform in the Network Analysis: Initial and Final conditions – Transformed impedance and circuits– Transient analysis of RL, RC, and RLC networks with impulse and step and inputs.	9
III	S-DOMAIN ANALYSIS: The concept of complex frequency – Network functions for the one port and two port – Poles and Zeros of network functions – Significance of Poles and Zeros – properties of driving point and transfer functions– Time domain response from polezero plot – Stability criteria – RouthHurwitz Criteria.	9
IV	NETWORK ANALYSIS: Two por tnetwork– Short circuited admittance– open circuit impedance– hybrid Parameters and transmission parameters– Attenuators–different types: T,pand Lattice type (Basic study). Resonance:Series resonance–bandwidth– Q factor and Selectivity– Parallel resonance.	10
V	AC CIRCUITS: Alternating Current: Resistance circuit – Capacitance circuit (XC) – Inductance circuit (XL) – XL and XCin series and parallel – Analysis of resonance circuits – Series resonance–Parallel resonance. RC Filters: RC low pass filter – RC high pass filter–RC band pass filter–RC band stop filter. Series and parallel resonance – their frequency response AC Circuit with resistance alone – Circuit with XL alone – Circuit with XC alone – Series reactance and resistance – parallel reactance and resistance–Series parallel reactance and resistance–Real power–Series resonance circuit - parallel resonance circuit – Q-factor – Filters: Low pass - Highpass– Bandpass.	10

Note: Distribution of marks: Problems 20 %, Theory 80%

Teaching Methods: PowerPoint Projection through LCD, Assignment, Discussion and Activity.

TEXT BOOKS

1. Roy Choudhary, *Networks and Systems*, New Age International, (Unit: I-III)
2. Sudhakar and Shyam Mohan, *Circuits and Networks-Analysis and Synthesis*, TMH, 3 (Unit: IV-V)

REFERENCE BOOKS

1. Van Valkenburg, *Network Analysis*, PHI, 3/e.
2. Franklin F. Kuo, *Network Analysis and Synthesis*, Wiley India, 2/e.
3. Umesh Sinha, *Network Analysis & Synthesis*, Satya Prakashan, 7/e.
4. Ghosh, *Network Theory–Analysis & Synthesis*, PHI.
5. B. R. Gupta and Vandana Singhal, *Fundamentals of Electrical Networks*, S. Chand.

WEB RESOURCES

Web Link:

1. <https://nptel.ac.in/content/syllabuspdf/108102042.pdf>
2. <https://www.engbookspdf.com/Circuits/Electric-Circuit-Analysis-Kumar>
3. <https://www.electrical4u.com/network-analysis/>


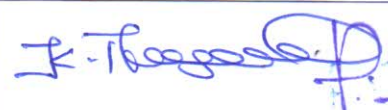

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO7	PO7
CO1	S	M	M	M	M	M	M
CO2	S	M	S	M	S	M	S
CO3	M	M	M	S	M	S	M
CO4	S	S	S	S	S	M	S
CO5	M	S	M	S	M	S	M

ASSESSMENT PATTERN (if deviation from common pattern)

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 MAHITHA MOHAN	 Dr. K. THANGAVEL	 Co-ordinator

Head of the Department
Department of Electronics
Hindusthan College of Arts & Science
Coimbatore-641 028

Curriculum Development Cell
Hindusthan College of Arts & Science,
Coimbatore-641 028.

Course Code:	21ELU04	SEMICONDUCTOR DEVICES					Batch:	2021-2022 & Onwards	
Hrs/Week:		L	4	T	-	P	-	Semester:	II
								Credits:	4

COURSE OBJECTIVE:

1. To equip the students to learn the construction, working and characteristics of semiconductor devices.
2. Acquire the fundamental knowledge of semiconductor theory and devices and their applications.
3. Select and apply the fundamental physical models underlying the operation of semiconductor devices.
4. Calculate the impact on device performance of changes in material composition and/or structure qualitatively.
5. To acquire the switching and amplification application of the semiconductor devices.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMSLEVEL
CO1	Recognize the basic principles, construction and concepts of semiconductor theory.	K1
CO2	Ability to analyze and characterize the PN junction semiconductor diodes under various electrical conditions.	K2
CO3	Acquire the characteristics of Zener, varactor, tunnel diode, photo diode, gun diode and find its operating and breakdown voltages.	K3
CO4	Compare and contrast the common base, common emitter and common collector characteristics.	K4
CO5	Illustrate the FET and MOSFET construction, characteristics and its applications of electronics industry.	K2

KI-Remember, K2-Understand, K3-Apply, K4-Analyse, K5-Evaluate

SYLLABUS

21ELU04	SEMICONDUCTOR DEVICES	Sem: II
Unit No.	Topics	Hours
I	ENERGY BAND STRUCTURE: Fermi level- Valance and Conduction Band -Conduction in solids-Hole Formation and its movement-Conductors-Insulators and Semiconductors Types of Semiconductor: Intrinsic semiconductor-Extrinsic semiconductor N types semiconductor- P type semiconductor-Majority and Minority Charge carriers - Mobile charge carries and in mobile Ions-Drift- Diffusion	9

II	PN JUNCTION CHARACTERISTICS: Formation of depletion layer-Barrier voltage-effect of temperature on barrier voltage- Static and dynamic resistance of diode- VI Characteristics of PN Junction Diode .Applications: Clippers – Clampers.	10
III	SPECIAL DIODES: Zener Diode – Zener diode as a voltage regulator – Light Emitting Diode - Backward diode – Photodiode - Varactor diode - Step recovery diode – Schottky diode-Tunnel diode-Gunn diode-IMPATT diode-PIN diode-LASER diode	9
IV	BIPOLAR JUNCTION TRANSISTOR: Construction – Transistor biasing – Operation of NPN Transistor – Operation of PNP transistor, Types of configuration: CB configuration, CE configuration, CC configuration, Current amplification factor and characteristics of CB,CE & CC-Relation among α , β & γ Applications: Transistor as a switch.	10
V	FET & UJT: Types of FET-Construction of JFET-Operation-Characteristics of JFET- Drain & Transfer Characteristics of JFET-JFET parameters- Comparison of JFET with BJT. MOSFET: Working and Characteristics of Depletion type& Enhancement type MOSFET Construction of UJT-Characteristics of UJT-Relaxation Oscillator.	10

Note: Distribution of marks: Problems 10 %, Theory 90 %

Teaching Methods: Power Point Projection through LCD, Assignment, Discussion and Activity.

TEXT BOOKS

1. S.Sedha, "A TextBook of Applied Electronics", S.Chand & Company Ltd, Revised Edition. (Unit:I-III)
2. Robert F Pierret, Semiconductor Device Fundamentals, Pearson Education. (Unit:IV-V)

REFERENCE BOOKS

1. V.K.Metha, "Principles of Electronics", S.Chand and Company Ltd, 11th Edition.
2. Louis Nashelsky and Robert Boylestad, "Devices discrete and Integrated", PHI, F¹ Edition.

WEBRESOURCES

WebLink:


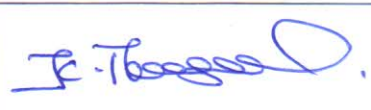

1. <https://nptel.ac.in/courses/108/108/108108122/>
2. <https://nptel.ac.in/courses/117/102/117102061/>
3. <https://www.springer.com/gp/book/9789811502668>

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO7	PO7
CO1	S	M	M	M	M	M	M
CO2	S	M	S	M	S	M	S
CO3	M	M	M	S	M	S	M
CO4	S	S	S	S	S	M	S
CO5	M	S	M	S	M	S	M

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 Mr. M. KUMARESAN	 DR. K. THANGAVEL	 Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science Coimbatore-641 028.

Head of the Department
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Course Code:	21ELU05	PRACTICAL– I:ELECTRIC CIRCUIT ANALYSIS						Batch:	2021-2022 & Onwards
								Semester:	I&II
Hrs/Week:		L	-	T	-	P	6	Credits:	4

COURSE OBJECTIVE:

1. The prime objective is understanding the fundamental circuit theory make use of circuit laws and theorems.
2. To develop the students ability to collect, analyze, and interpret laboratory data in the area of electrical circuit analysis.
3. To teach the basic principles of electric circuit analysis.
4. Ability to identify, formulate and solve electric circuit problems.
5. To enhance design and understand the advanced electric circuit analysis concepts.

COURSE OUTCOME

S. No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Remember the basic operations and usage of analog and digital measuring meters and CRO.	K1
CO2	Understand the circuits using series and parallel equivalent and Thevenins and Nortons equivalent circuits.	K2
CO3	Apply the various network theorem concepts and design various resonance circuits.	K3
CO4	Analyze and display the measurements of signals by using Oscilloscope.	K4
CO5	Interpret the network analysis practical circuits and promote into practical applications.	K3
KI-Remember,K2-Understand,K3-Apply,K4-Analyse,K5-Evaluate		

SYLLABUS

21ELU05	PRACTICAL–I:ELECTRIC CIRCUIT ANALYSIS	Sem: I&II
Any 18 Experiments:		
<ol style="list-style-type: none"> 1. Measurement of Amplitude, Frequency and phase difference using CRO. 2. Resistor in Series, Parallel and Series-parallel. 3. Voltage sources in series, parallel and series-parallel. 4. Voltage and Current divider. 5. Verification of Ohm's law. 6. Verification of Thevenins Theorem. 		

7. Verification of Norton's Theorem.
8. Superposition Theorem.
9. Millmans Theorem.
10. Maximum power Transfer Theorems.
11. Series Resonance Circuit.
12. Parallel Resonance Circuit.
13. RC Low Pass Filter.
14. RC High Pass Filter.
15. RC Band Pass Filter.
16. RC Band Rejection Filter.
17. Transient response of RC Circuit.
18. Transient response of RL Circuit.
19. Frequency response of R, L & C.
20. Wheatstone bridge.
21. LCR Bridge.
22. Simulation and experimental verification of electrical circuit problems using Kirchhoff's laws.
23. Simulation and experimental verification of electrical circuit problems using Thevenin's theorem.
24. Simulation and experimental verification of electrical circuit problems using Norton's theorem.
25. Simulation and experimental verification of electrical circuit problems using Ohm's law.


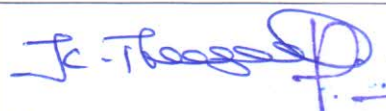

Computer-641 058
Department of Arts & Science
Government Engineering College
Coimbatore

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO7	PO7
CO1	S	M	S	M	S	M	M
CO2	S	S	S	M	S	M	S
CO3	M	M	S	S	M	S	M
CO4	S	M	S	S	M	S	S
CO5	M	S	M	M	S	M	M

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 MS. MAHITHA MOHAN	 DR. K. THANAVEL	 Co-ordinator Curriculum Development Cell

Head of the Department
 Department of Electronics
 Hindusthan College of Arts & Science
 Coimbatore-641 028

Hindusthan College of Arts & Science,
 Coimbatore-641 028.

Course Code:	21ELU06	PRACTICAL II: SEMICONDUCTOR DEVICES AND CIRCUITS						Batch:	2021-2022 & Onwards
								Semester:	I&II
Hrs/Week:		L	-	T	-	P	6	Credits:	4

COURSE OBJECTIVE:

1. To enhance the knowledge of the basic semiconductor devices with hands-on experience, by measuring their basic characteristics.
2. Analyze the characteristics of transistor configurations.
3. To study the voltage and current relationship of Unipolar and bipolar devices.
4. To acquire a hands on knowledge of LDR and its applications.
5. To attain optical circuit design knowledge.

COURSE OUTCOME

S.No	COURSE OUTCOME	BLOOMSLEVEL
CO1	Remember the basic concepts of semiconductor components and its applications.	K1
CO2	Understand the electrical characteristics of Unipolar and bipolar devices with the constructed circuits.	K2
CO3	Apply the electrical properties of semiconductor devices to study the behavior of its applications.	K3
CO4	Analyze simple applications using electronic devices and demonstrate the Characteristics.	K4
CO5	Manipulate the semiconductor devices characteristics and apply the practical skills in design applications.	K3

KI-Remember, K2-Understand, K3-Apply, K4-Analyse, K5-Evaluate

SYLLABUS

21ELU06	PRACTICAL II: SEMICONDUCTOR DEVICES AND CIRCUITS	Sem: I&II
Any 18 Experiments:		
<ol style="list-style-type: none"> 1. Characteristics of PN Junction Diode 2. Characteristics of Zener Diode 3. Characteristics of Light Emitting Diode 4. Common Emitter(CE) Characteristics of Transistor 5. Common Base(CB) Characteristics of Transistor 		



6. Transistor as a Switch
7. Characteristics of JFET
8. Characteristics of SCR
9. Characteristics of TRIAC
10. Characteristics of DIAC
11. Zener Diode as Voltage Regulator
12. Characteristics of LDR.
13. Characteristics of Solar Cell
14. Half Wave Rectifier.
15. Full Wave Rectifier.
16. DC Power Supply Design using IC 78XX and 79XX Series
17. Clipper Circuit.
18. Clamper Circuit.
19. Voltage doubler
20. RC Coupled Amplifier.
21. Class AB Power Amplifier.
22. RC Phase Shift Oscillator using BJT.
23. Wien Bridge Oscillator using BJT.
24. Monostable Multivibrator using BJT.
25. Astable Multivibrator using BJT.

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO7	PO7
CO1	S	M	M	M	M	M	M
CO2	S	S	S	M	S	M	S
CO3	M	S	M	M	M	S	M
CO4	S	S	S	S	S	M	S
CO5	M	S	M	M	S	S	M

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
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Course Code:	21ELU07	ELECTRONIC CIRCUITS					Batch:	2021-2022 & Onwards	
Hrs/Week:							L	3	T
								Credits:	3

COURSE OBJECTIVES:

1. To study the principles, construction and applications of voltage regulators.
2. The capability to use abstractions to analyze and design simple electronic circuits.
3. To understand the working principle of power amplifiers.
4. To aware the students about the different types of feedback amplifiers.
5. To understand about oscillators and multivibrator.

COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Recall the principles and operations of electronic test instruments.	K1
CO2	Understand the basics of single stage and multistage amplifiers.	K2
CO3	Apply the principles and applications of power amplifiers towards real time applications.	K3
CO4	Analyze, compare and contrast the various types of feedback amplifiers.	K4
CO5	Evaluate the oscillators and multivibrator towards technological applications.	K4

K1- Remember, K2- Understand, K3- Apply, K4- Analyze

SYLLABUS

21ELU07	ELECTRONIC CIRCUITS	Sem: I
Unit No.	Topics	Hours
I	RECTIFIERS, FILTERS AND VOLTAGE REGULATORS: Half wave, Full wave and bridge rectifiers – RMS value – Average value -Ripple Factor –Rectification Efficiency –Filters: Inductor Filter– Capacitor Filter – LC Filter – π -Filter – Voltage Regulation –Zener Diode Shunt Regulator–Transistor Shunt and Series Regulator–DC Power Supply–Clipper and Clamper circuits.	8
II	SINGLE AND MULTISTAGE TRANSISTOR AMPLIFIERS: Transistor as an Amplifier - Gain of Multistage Amplifiers – RC Coupled Amplifier–Impedance Coupled Amplifier–Transformer Coupled Amplifier–Direct Coupled Amplifier–Frequency response- Darlington pair Amplifier–Advantages, disadvantages and Applications.	7
III	POWER AMPLIFIERS : Performance parameter and AC load line – Classifications – Class A power Amplifier – Class B Power Amplifier – Class B Push-Pull Amplifier–Cross over Distortion–Class C Amplifiers–Characteristics and overall efficiency of Class A– Class Band Class C Power Amplifiers.	7

IV	FEED BACK AMPLIFIERS: Principle of Feedback amplifiers–Types–Effect of Negative Feedback on gain - Gain stability – Bandwidth– Distortion – Noise -Voltage Series – Voltage Shunt – Current Series and Current Shunt Feedbacks–Comparison of feedback connections–Negative Feedback in transistor amplifier–CE amplifier without emitter bypass capacitor–Emitter Follower–Negative feedback in multi stage amplifiers.	7
V	OSCILLATORS AND MULTIVIBRATOR: Classification - Barkhausen Criterion – Hartley Oscillator – Colpitt’s Oscillator – Clapp Oscillator – Quartz crystal – RC Phase Shift –Wien Bridge Oscillators–Astable, Monostable and Bistable Multivibrator–Schmitt Trigger.	7

Note: Distribution of marks: Problems 15%, Theory 85%

Teaching Methods: Power Point Projection through LCD, Assignment, Discussion and Activity.

TEXT BOOKS

1. Salivahanan, S., Suresh Kumar, N., & Vallavaraj A. *Electronic Devices and Circuits*, Tata Mc Graw Hill publishing Company Limited, 4th Edition. (Unit:I-III)
2. G. K. Mithall, *Electronic Devices and Circuits*, Khanna Publishers, New Delhi. (Unit:IV-V)

REFERENCE BOOKS

1. B.L.Theraja, “Basic Electronics Solid State”, S.Chand Company Ltd.
- 2.R.S. Sedha, “A Text Book of Electronic Circuits”, 3rd Revised Edition, S.Chand.
- 3.S.K. Sahdev, “Electronic Principles”, Dhanpat Rai & Co (P) Ltd, 2nd Edition.

WEB RESOURCES

Web Link:

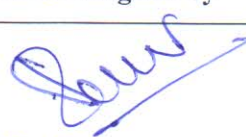
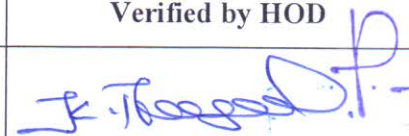
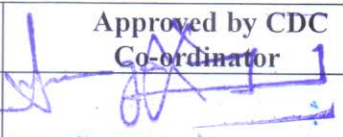
1. <https://nptel.ac.in/courses/108/102/108102112/>
2. <https://nptel.ac.in/courses/108/102/108102095/>

MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	M	M	M	M	M
CO2	S	S	S	M	S	M	S
CO3	S	M	S	S	M	S	M
CO4	S	S	S	S	M	S	M
CO5	S	S	M	S	M	S	M

ASSESSMENT PATTERN (if deviation from common pattern)

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-ordinator
 Dr. R. PREMA	 Dr. K. THANGAVEL	 Co-ordinator Curriculum Development Cell Hindusthan College of Arts & Science, Coimbatore-641 028.

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