



BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI-620024
B.SC. ELECTRONICS

**CHOICE BASED CREDIT SYSTEM–LEARNING OUTCOMES BASED CURRICULUM FRAME
WORK (CBCS - LOCF)**

(Applicable to the candidates admitted from the academic year 2026-2027 onwards)

Sem	Part	Courses	Title	Ins. Hrs.	Credits	Exam	Maximum Marks		
							Int.	Ext.	Total
I	I	Ability Enhancement Course – I (AEC - I)	(Tamil \$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –II (AEC - II)	English Course - I	6	3	3	30	70	100
	III	Core Course -1 (CC - 1)	Electric Circuits & Electronic Devices	4	4	3	30	70	100
		Core Practical - 1 (CP - 1)	Electric Circuits & Electronic Devices Lab	4	4	3	40	60	100
		Allied Course - 1 (AC - 1)	Any one from the list	4	4	3	30	70	100
		Allied Course Practical - 1 (AP-1)	Any one from the list	2	**	**	**	**	**
	IV	Value Education		2	2	3	30	70	100
		Interdisciplinary Course - 1 (IDC - 1) #	One Course from Outside Department	2	2	3	30	70	100
	Total			30	22	--	--	--	700
II	I	Ability Enhancement Course –III (AEC - III)	(Tamil \$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –IV (AEC - IV)	English Course - II	6	3	3	30	70	100
	III	Core Course- 2(CC - 2)	Analog Electronic Circuits	4	4	3	30	70	100
		Core Practical - 2(CP - 2)	Analog Electronic Circuits Lab	4	4	3	40	60	100
		Allied Course – 2 (AC - 2)	Any one from the list	4	4	3	30	70	100
		Allied Course Practical - 1 (AP-1)	Any one from the list	2	4	3	40	60	100
	IV	Skill Enhancement Course - 1(SEC - 1) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Interdisciplinary Course – 2 (IDC - 2) #	One Course from Outside Department	2	2	3	30	70	100
	Total			30	26	--	--	--	800

III	I	Ability Enhancement Course – V (AEC - V)	(Tamil \$ / Other Languages+, #)	6	3	3	30	70	100	
	II	Ability Enhancement Course – VI (AEC - VI)	English Course - III	6	3	3	30	70	100	
	III	Core Course- 3(CC - 3)	Digital Electronics	4	4	3	30	70	100	
		Core Practical - 3 (CP - 3)	Digital Electronics Lab	4	4	3	40	60	100	
		Allied Course - 3 (AC - 3)	1. Computer Science I (or) 2. AI & ML I	4	4	3	30	70	100	
		Allied Course Practical - 2 AP-2)	1. Computer Science I Lab (or) 2. AI & ML I Lab	2	**	**	**	**	**	
	IV	Skill Enhancement Course - 2 (SEC - 2) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100	
		Interdisciplinary Course – 3 (IDC - 3) \$\$	One Course from Outside Department	2	2	3	30	70	100	
		Health & Wellness @		–	1	–			100	
	Total			30	23	–	--	--	800	
I	Ability Enhancement Course – VII (AEC - VII)	(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100		
IV	II	Ability Enhancement Course – VIII (AEC - VIII)	English Course - IV	6	3	3	30	70	100	
	III	Core Course- 4(CC - 4)	Linear Integrated circuits	4	4	3	30	70	100	
		Core Practical - 4(CP - 4)	Linear Integrated circuits Lab	4	4	3	40	60	100	
		Allied Course – 4 (AC - 4)	1. Computer Science II (or) 2. AI & ML II	4	4	3	30	70	100	
		Allied Course Practical - II (AP-II)	1. Computer Science II Lab (or) 2. AI & ML II Lab	2	4	3	40	60	100	
	IV	Skill Enhancement Course - 3 (SEC - 3) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100	
		Interdisciplinary Course – 4 (IDC - 4) \$\$	One Course from Outside Department	2	2	3	30	70	100	
	Total			30	26	–	--	--	800	
	Summer Internship / Industrial Activity during the Summer Vacation after II Year									

V	III	Core Course - 5 (CC - 5)	Electronic Communication Systems	4	4	3	30	70	100
		Core Course - 6 (CC - 6)	Microprocessor & Micro Controllers	5	4	3	30	70	100
		Core Course - 7 (CC - 7)	Instrumentation System	5	4	3	30	70	100
		Core Course - 8 (CC - 8)	Internet of Things	5	4	3	30	70	100
		Core Practical - 5 (CP - 5)	Controller & Communication	5	4	3	40	60	100
	IV	Skill Enhancement Course - 4 (SEC - 4)	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Skill Enhancement Course - 5 (SEC - 5) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Introduction to Disaster Management		2	2	3	30	70	100
		Summer Internship / Industrial Activity @@	(with Viva-Voce)	--	2	--	20	80	100
		Total		30	28	--	--	--	900
VI	III	Core Course - 9 (CC - 9)	Power Electronics	4	4	3	30	70	100
		Core Course - 10 (CC - 10)	VLSI Design	5	4	3	30	70	100
		Core Course - 11 (CC - 11)	Biomedical Electronics	5	4	3	30	70	100
		Core Project Work (CPW) @@	Project Work (with Viva-Voce)	6	4	3	20	80	100
	IV	Value Added Course	General Studies for Competitive Examinations	2	1	--	30	70	100
		Skill Enhancement Course - 6 (SEC - 6)	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Skill Enhancement Course - 7 (SEC - 7) ##	Naan Mudhalvan Course/SEC (List enclosed)	2	2	3	30	70	100
		Environmental Studies		2	2	3	30	70	100
		Gender Studies		2	1	3	30	70	100
		Extension Activities *		--	1	--	--	--	--
	Total			30	25	--	--	--	900
	Grand Total			180	150	--	--	--	4900

ALLIED COURSE

First Year	Second Year
Mathematics	1. Computer Science (or) 2. AI & ML

SKILL ENHANCEMENT COURSE (SEC) (for other Department Students only)

Sl. No.	Title of paper	Sl. No.	MANDATORY Naan Mudhalvan Scheme##
1.	Python Programming	1.	2 nd Semester:
2.	Cyber Security	2.	3 rd Semester:
3.	Sensor and its applications	3.	4 th Semester:
4.	CCTV Systems	4.	5 th Semester:
5.	Arduino Programming		
6.	Raspberry Pi Programming	5.	6 th Semester:
	LCD TV Servicing		

INTERDISCIPLINARY COURSE (IDC) FOR WHO HAVE OPT TAMIL AS PART-I

1 st Semester	Electrical House Wiring
2 nd Semester	Consumer Electronics
3 rd Semester	Automotive Electronics
4 th Semester	Mobile Phone Servicing

INTERDISCIPLINARY COURSE (IDC)# FOR WHO HAVE NOT OPT TAMIL AS PART - I

Those who have studied Tamil upto 10 th +2 but opt to for other languages in degree	1 st Semester	Special Tamil - I
	2 nd Semester	Special Tamil - II
Those who have not studied Tamil in school level	1 st Semester	Basic Tamil - I
	2 nd Semester	Basic Tamil – II
Those students who opt for either special Tamil (or) Basic Tamil as IDCs, have to choose 2 more IDCs courses in their 3 rd and 4 th Semester from Outside his/her department.		

INTERDISCIPLINARY COURSE (IDC) \$\$ FOR NCCADETS ONLY	
NCC Course is a Compulsory Course for the NCC Cadets in the 3rd Semester:	NCC Course is a Compulsory Course for the NCC Cadets in the 4th Semester:
Introduction to NCC	1. Special Subject Army (or) 2. Special Subject Navy (or) 3. Special Subject Air force
Those students who opt for NCC Courses as IDCs, have to choose 2 more IDCs courses in their 1st and 2nd Semester from Outside his/her department.	

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES

Sl. No.	Part	Types of the Courses	No. of Courses	Credits for each Course	Total Credits	Marks
1.	I	Ability Enhancement Course	4	3	12	400
2.	II	Ability Enhancement Course	4	3	12	400
3.	III	Core Course	11	4	44	1100
4.		Core Practical	5	4	20	500
5.		Allied Course (MC)	4	4	16	400
6.		Allied Course Practical (ACP)	2	4	8	200
7.		Core Project Work (CPW)	1	4	4	100
8.	IV	Skill Enhancement Course (SEC)	7	2	14	700
9.		Interdisciplinary Course (IDC)	4	2	8	400
10.		Value Education	1	2	2	100
11.		Health and Wellness	1	1	1	100
12.		Introduction to Disaster Management	1	2	2	100
13.		Summer Internship / Industrial Activity	1	2	2	100
14.		Value Added Course	1	1	1	100
15.		Environmental Studies	1	2	2	100
16.		Gender Studies	1	1	1	100
17.		EXTENSION ACTIVITIES (NCC / NSS / SPORTS / ANTI DRUG CELL / YRC & Any Other Activities)	--	1	1	--
Total			49	-	150	4900

- \$ For those who have studied Tamil upto 10th +2 (Regular Stream)
- + Syllabus for other Languages should be on par with Tamil at degree level
- # Those who have studied Tamil upto 10th +2 but opt for other languages in degree level under Part - I should study special Tamil and those who have not studied Tamil in the school level should study Basic Tamil in Part – IV under the Interdisciplinary Course.
- ** Examination at the end of the next semester
- ## Naan Mudhalvan Scheme: As per the Naan Mudhalvan Scheme instructions, 5 courses from 2nd to 6th semester should be studied under Skill Enhancement Course.
- \$\$ NCC Course is one of the Choices in the Interdisciplinary Course. Only the NCC Cadets are eligible to choose this course. However, NCC Course is a Compulsory Course for the NCC Cadets.
- @ **Health and Wellness: Assessments:**

- Use self-reflective worksheets to assess their understanding
- submit the worksheets to internal audit / external audit
- Every student's activity report should be documented and the same have to be assessed by the Physical Director with Mentor. The evaluation should be for 100 marks. No examination is required.

Scheme of Evaluation:

Part	Description	Marks
A	Report	40
B	Attendance	20
C	Activities (Observation During Practice)	40
Total		100

@@ **Summer Internship / Industrial Activity**

Internship will be carried out during the summer vacation after the second year. Viva-Voce will be conducted by the college and Marks shall be sent to the University and the same will be included in the 5th semester Mark Statement.

**Summer Internship / Industrial Activity & Project Work
Scheme of Evaluation:**

Description	Marks
Report	80
Viva-Voce	20
Total	100

- * Extension Activities shall be outside instruction hours.

PROGRAM OBJECTIVES

1. To provide high quality education to the students of B.Sc., Electronics course, so that they acquire thorough knowledge in Electronics and be successful in their professional career.
2. To develop the skills of the students to analyze real problems in designing of Electronics circuits with cost-effective solutions for humanity.
3. To impart training to the students to develop their professional knowledge for creating human resource of global standards for the Industry, Research, & Development and Education.
4. To familiarize students with the professional issues in innovation, ethics, issues related to global economy and emerging technology in Electronics field.
5. To promote students' awareness of lifelong learning through an excellent academic environment, prepare them for higher education and provide them opportunity to work in teams on multidisciplinary also.
6. To improve the communication skills of students, prepare them to acquire good leadership skills to lead a team and a good interpersonal relationship for working in a company.

PROGRAM OUTCOMES

B.Sc., Graduates in Electronics will be able to:

1. Apply the knowledge of Mathematics and Science, necessary to solve complex design problems.
2. They can Identify, formulate, and analyze real problems in circuit design and provide solutions which are cost effective to meet the needs of society.
3. Design electronic circuits & systems, conducts experiment, analyze & interpret the data to find new innovative ideas.
4. Use modern engineering tools, software & equipment's to analyze problems and design components.
5. Demonstrate knowledge of professional & ethical responsibilities.
6. Apply knowledge of professional & ethical responsibilities.
7. Exhibit good communication skills in writing reports and documenting complex activities.
8. Understand the contemporary issues involving health, safety and environmental issues.
9. Undertake lifelong learning and pursue higher education and career.
10. Apply leadership skills and develop as an entrepreneur.

Code: **ELECTRIC CIRCUITS & ELECTRONIC
DEVICES
(Theory)**

Credits: 4

COURSE OBJECTIVES:

1. To introduce basic concepts of Electric circuits and Electronic Devices.
2. To Practice the students with electrical circuits, different laws and circuit analysis.
3. To familiarize AC fundamentals to the students.
4. To develop a construction and characteristics idea of electronic components.
5. To create a thorough understanding of applications of all electronic devices.

UNIT I: INTRODUCTION TO ELECTRICAL COMPONENTS

Resistance: Factors governing the resistivity of a resistor- resistors in series and parallel. Capacitance: Factors affecting the capacity of a capacitor-capacitance in series and parallel-Inductance: Inductance of an inductor -inductors in series and parallel-ohm's law - Transformers: Construction and operation-types-Simple problems.

UNIT II: NETWORK THEOREMS AND ANALYSIS

Kirchhoff's law- mesh current method and node voltage analysis of circuits – short circuit and open circuit analysis.

Thevenin's theorem- Norton's theorem- Super Position theorem – Maximum Power transfer theorem – Milliman's theorem.

UNIT III: FUNDAMENTALS OF AC

Average value-RMS value- RL circuit- RC circuit- RLC circuit analysis. Transient response - Reactance and impedance concepts - single phase and three phase circuit - power factor- real power and reactive power.

UNIT IV: SEMICONDUCTOR THEORY

Classification of solids-conductors, insulators and semiconductors- intrinsic semiconductors - Extrinsic semiconductors: P - type – N- type - PN junction diode- V-I characteristics of diode. Breakdown mechanism – Zener diode – V-I characteristics of Zener diode – Zener diode as a voltage regulator.

UNIT V: CONSTRUCTION AND CHARACTERISTICS OF ELECTRONIC DEVICES

Transistor (BJT) - CB, CE and CC characteristics of a transistor- transistor as an amplifier- construction and characteristics of FET, MOSFET, UJT, SCR and TRIAC.

UNIT VI: EMERGING TRENDS IN ELECTRONIC DEVICES

Applications of Wide-Bandgap (WBG) semiconductors - quantum devices. Advanced Semiconductor Materials & Nanotechnology Wide-Bandgap (WBG) Semiconductors: Moving beyond Silicon to focus heavily on Gallium Nitride (GaN) and Silicon Carbide (SiC) devices. This includes exploring their use in high-power, high-frequency, and RF applications. The study of electron spin instead of just its charge, alongside

fundamental quantum well and quantum dot devices. Emerging Transistor Architectures Fin FET- planar devices- nanosheet transistors -Tunnel FETs -Exploring ultra-low power devices-power constraints and thermal dissipation- organic semiconductors and printable electronics for foldable displays.

COURSE OUTCOMES:

On completion of this course, students will be able to:

CO1: Understand the fundamentals of Electrical components and its necessity.

CO2: Analyze basic electrical circuits with theorems.

CO3: Familiarize with AC and its importance.

CO4: Structure of semiconductor and its usage.

CO5: Apply semiconductor devices for various purposes.

Text Books:

1. "Basic Electronics Engineering" by S.Jayalalitha, D.Susan, Cengage Publications , 1st Edition, 2023, ISBN 97893 55735119.
2. "Basic Electronics" by Dr.S.R. Bhagyashree,1st Edition, Notion Press Media, private limited -2021 - ISBN 10 16 4290405.
3. "Principles of Electronics" by V.K.Mehta, Rohit Mehta, 2nd Edition, S.Chand Publications,2020,ISBN-978935 28383 63.

Reference Books:

1. "Grob's Basic Electronics" by Mitchell E Scultz, 10th Edition – 2017, ISBN-13: 97807 063 4329.
2. "Electronic devices and circuits" by David A Bell, 5th Edition, Oxford Publications, ISBN-10: 01 956 9348.

e- book Links:

1. <https://www.gacbe.ac.in/images/E%20books/Bird%20-%20Electrical%20Circuit%20Theory%20and%20Technology%202nd%20Rev.pdf>
2. <https://irdtuttarakhand.org.in/Upload/concepts-in-electric-circuits.pdf>
3. https://books.google.co.in/books?id=8686A5TLsjAC&printsec=copyright&redir_esc=y#v=onepage&q&f=fal.

Semester	Course Code			Title of the Paper						
I	CC-1			ELECTRIC CIRCUITS & ELECTRONIC DEVICES						
Course Outcomes↓	Programme Outcomes (PO)									
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1	3	3	3	2	3	2	2	3	3	2
CO-2	3	3	3	2	2	1	2	3	3	3
CO-3	3	3	3	2	1	3	2	2	2	3
CO-4	3	3	3	3	2	2	2	2	2	3
CO-5	3	3	3	1	1	2	1	2	3	3

*3-Strong; 2-Medium; 1-Low

Code: CP-1**ELECTRIC CIRCUITS & ELECTRONIC
DEVICES LAB
(Practical)****Credits: 4****COURSE OBJECTIVES:**

1. To impart the practical skills to test the circuits
2. To familiarize the basic characteristics of electronic components.

(Any twelve (12) Experiments)

1. Verification of Ohm's law.
2. Verification of Kirchhoff's law.
3. Verification of Super position theorem.
4. Verification of Millman's theorem.
5. Verification of Thevenin's theorem.
6. Verification of Norton's theorem.
7. Find the Transient response of RL circuit.
8. Find the Transient response of RC circuit.
9. Construct Series resonance circuit.
10. Construct Parallel resonance circuit.
11. Study the V-I characteristics of PN junction diode.
12. Study the V-I characteristics of a Zener diode.
13. Study the CB characteristics using BJT
14. Study the CE characteristics using BJT.
15. Study the FET characteristics.
16. Study the UJT and SCR characteristics.

REFERENCES:

1. "H. W Jackson, D. Temple, B. Kelly, K. Craigs and L. Fuentes", Introduction to Electric Circuits: Lab Manual, 10th Ed. (OBU Publishers, 2019).

COURSE OUTCOMES:

On completion of this course, students will be able to:

1. Verify all the basic laws and theorems
2. Characterize the BJT, FET, UJT, etc.

Code: IDC-1

**ELECTRICAL HOUSE WIRING
(Theory)**

Credits: 2

COURSE OBJECTIVES:

1. To introduce the fundamental concepts of electricity and electrical systems.
2. To familiarize students with electrical circuits, wiring systems and distribution methods.
3. To provide practical knowledge of domestic wiring and electrical accessories.
4. To develop awareness of electrical safety practices and testing procedures.
5. To impart hands-on experience in electrical installation and maintenance

UNIT I: FUNDAMENTALS OF ELECTRICITY AND POWER GENERATION

Fundamentals of electricity – Electric current, voltage and resistance – Ohm's Law – Electric power and energy – Kilowatt hour – Wattmeter – Electrical measurements – Methods of electric power generation: Thermal, Hydro and Nuclear power generation – Batteries and DC power sources – Construction and working principle of generators – Experimental study of generator.

UNIT II: ELECTRIC CIRCUITS AND POWER DISTRIBUTION

Electrical symbols and parameters – Series and parallel circuits – AC and DC circuits – Conductors, resistors, inductors and capacitors – Transformer basics – Distribution methods – Single-phase and three-phase systems – Star and delta connections – Basic wiring rules and electrical standards – Standard Wire Gauge (SWG) – Introduction to motors – Experimental study of motors, series and parallel circuits.

UNIT III: BASICS OF ELECTRICAL WIRING SYSTEMS

Introduction to electrical wiring – Types of wiring systems – Wiring accessories – Tools used in electrical wiring – Safety precautions in electrical installations – Color coding of wires as per Indian standards – Introduction to basic wiring diagrams – Reading simple electrical layouts.

UNIT IV: HOUSE WIRING METHODS AND ELECTRICAL ACCESSORIES

Tools used in house wiring – Methods of joining conductors – House wiring methods: Cleat wiring, Wood casing wiring, Tough Rubber Sheathed (TRS) wiring, Conduit wiring, PVC pipe wiring and concealed wiring – Switches – Ceiling rose – Lamp holders – Sockets – Fuse base – Distribution box – MCB and trip switches – Earthing and earth connections – Experimental study of house wiring.

UNIT V: ELECTRICAL DISTRIBUTION BOARDS, PROTECTION AND TESTING

Main board preparation – Distribution boards – Service cut-out and protection devices – Switchboard preparation – Power factor basics – Indian Electricity Rules and IEC/IS standards – Safety precautions – Testing of insulation – Experimental study of main boards, distribution boards and switchboard.

UNIT VI (Optional): ELECTRICAL INSTALLATION, MAINTENANCE AND ENERGY MANAGEMENT

Electrical installation practices – Preventive and corrective maintenance –

Identification and rectification of common electrical faults – Energy-efficient electrical systems – Energy conservation techniques – Load calculation and balancing – Introduction to renewable energy integration in domestic systems – Practical maintenance and fault diagnosis exercises

COURSE OUTCOMES:

On completion of this course, students will be able to:

CO1: Understand the fundamentals of electricity and electrical power generation.

CO2: Analyze basic electrical circuits and distribution systems.

CO3: Identify and use electrical wiring tools and accessories.

CO4: Perform simple domestic wiring and electrical installation work safely.

CO5: Apply electrical safety standards and testing procedures in practical applications.

CO6: Demonstrate the ability to perform basic electrical maintenance, identify faults, apply energy conservation techniques, and ensure efficient operation of electrical systems.

Text Books:

1. "B. L. Theraja, and A K Theraja", A Textbook of Electrical Technology – S. Chand Publications.
2. "V K Mehta & Rohit Mehta", Principles of Electrical Engineering – S. Chand Publications.

Reference Books:

1. Electrical Wiring and Estimating – "Khanna Publishers".
2. Basic Electrical Engineering – McGraw Hill Education.

Semester	Course Code			Title of the Paper						
I	IDC-1			ELECTRICAL HOUSE WIRING						
Course Outcomes↓	Programme Outcomes (PO)									
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10
CO-1	3	3	3	2	3	2	1	3	3	2
CO-2	3	3	3	2	1	2	1	3	2	3
CO-3	3	3	3	2	1	3	1	2	2	3
CO-4	3	3	3	3	2	2	1	3	2	3
CO-5	3	3	3	1	1	2	1	2	3	3

*3-Strong; 2-Medium; 1-Low