

A MINORITY RUN COLLEGE. AFFILIATED TO UNIVERSITY OF CALCUTTA RECOGNISED UNDER SECTION 2(F) & 12 (B) OF THE UGC ACT, 1956

Program Outcome (PO) of Graduation Degree Course of

Electronics Honours (CBCS)

	Program Outcome	Description	
PO1	Subject Knowledge	Knowing the fundamentals of the different areas of discussion within the subject which will enable the students to consider applying the theoretical principles in practical situations that they are likely to find themselves in as professionals after having completed the course.	
	Method of Measurement:	Assessment (Internal & Final)	
PO2	Communication Skills	Encouraging the students to apply the principles learned in their own fields, both professional and personal, thus, honing their communication skills and leading them towards becoming better communicators serving the society and nation as expected in the ICT age.	
	Method of Measurement:	Regular Communication Activity Internal Assessment	
PO3	Technical Skill Development	Knowing and developing the technical skills expected from the students in the professional arena, thus, becoming successful professional communicators/educators after finishing the program.	
	Method of Measurement:	Assessment (Internal & Final)	
PO4	Personality Development	Imparting personality development skills to the students that are likely to help them in their professional and personal lives, thus making them responsible and sincere citizens.	
	Method of Measurement:	Regular Personality Development Internal Assessment	



PO5	Higher Study Foundation	Encouraging the students to pursue higher studies in the subject and enhance their knowledge on the same.
	Method of Measurement:	Regular Teacher-Student Interactive Sessions
PO6	Research Orientation and Aptitude	Encouraging the students to pursue research avenues related to the subject either in the academic or in the professional sphere that may lead to a vibrant knowledge economy.
	Method of Measurement:	Regular Teacher-Student Interactive Sessions
PO7	Spirit of Team Work	Encouraging the students to coordinate with one another in a team environment and perform well as a team rather than trying to excel individually at the cost of group performance efficiency.
Method of Measurement:		Group Activity Assignments Assessment



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Program Specific Outcomes (PSO) of Graduation Degree Course of

Electronics Honours (CBCS)

- 1. The students learn the fundamentals of Electronics theory and practice.
- 2. The students will appreciate the theoretical foundations related to different paradigms such as electromagnetism, quantum mechanics, communication and semiconductor devices etc.
- **3.** The students learn the practicalities and techniques of professional communication practices such as in colleges, symposiums, conferences and seminars and in international platforms.
- **4.** The students become effective and ethical practitioners contributing to social and national development.



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Course Outcomes (COs) of Graduation Degree Course of

Electronics Honours (CBCS) for the session, 2018-2021

Semester – I		
Paper	Course Outcomes	
ELT-A-CC-1-01-TH: Basic Circuit Theory and Network Analysis Basic circuit concepts, basic circuit analysis, DC and AC circuit analysis, network theorems, two port networks and network graph theorems.	Students learn how to apply physical laws and theorems to real circuits.	
ELT-A-CC-1-01-P: Basic Circuit Theory and Network Analysis Lab		
Familiarization with: (a) Resistance in Series, Parallel and Series-Parallel; (b) Capacitors and Inductors in Series and Parallel; (c) Multimeter - Checking of Components; (d) Voltage Sources in Series, Parallel and Series-Parallel; (e) Voltage and Current Dividers. 2. Measurement of Amplitude, Frequency and Phase Difference using CRO. 3. Verification of Kirchoff's Law. 4. Verification of Norton's Theorem. 5. Verification of Thevenin's Theorem. 6. Verification of Superposition Theorem. 7. Verification of the Maximum Power Transfer Theorem. 8. RC Circuits: Time Constant, Differentiator, Integrator. 9. Designing of a Low Pass RC Filter and study of its Frequency Response. 10. Designing of a High Pass RC Filter and study of its Frequency Response. 11. Study of the Frequency Response of a Series LCR Circuit and determination of its (a) Resonant Frequency; (b) Impedance at Resonance; (c) Quality Factor Q; (d) Band Width.	Critical analysis of circuit parameters in view of scientific principles, so that it leads to synthesis of elements (passive and active) for innovative outcomes.	
ELT-A-CC-1-02-TH: Mathematics Foundation		
for Electronics Ordinary differential equations, series solution to ODEs and special functions, matrices, sequences and series, complex variables and functions, Laplace's transforms.	Students understand and appreciate the various mathematical methods to solve pertinent problems.	
ELT-A-CC-1-02-P: Mathematics Foundation for Electronics Lab		



Mathematics Foundation for Electronics using simulation software like MATLAB/Scilab	Students understand and appreciate the various mathematical methods to solve pertinent
Solution of First Order Differential Equations. 2. Solution of Second Order Homogeneous Differential Equations. 3. Solution of Second Order Non-Homogeneous Differential Equations. 4. Convergence of a given Series. 5. Divergence of a given Series. 6. Solution of Linear System of Equations using Gauss Elimination Method. 7. Solution of Linear System of Equations using Gauss-Seidel Method. 8. Solution of Linear System of Equations using L-U Decomposition Method.	problems.
Semeste	er - II
ELT-A-CC-2-03-TH: Applied Physics	
Physics of crystalline solids, Quantum mechanics, mechanical properties of solids, thermal properties, electrical properties, magnetic properties and statistical mechanics.	Knowledge and understanding of various physical processes governing the structures of materials.
ELT-A-CC-2-03-P: Applied Physics Lab	
To Measure the Resistivity of a Si Crystal with Temperature by Four-Probe Method from Room Temperature to 200 OC). 2. To Determine the Value of Boltzmann Constant by Studying Forward Characteristics of Diode. 3. To Determine the Value of Planck's Constant by using LEDs of Different Wavelengths. 4. Simulation Studies: (a) Find Lowest Energy Eigenvalues for 1-D Schrodinger Equation. (b) Plotting Tunneling Probability as a Function of Barrier Width. (c) Plot Energy Band-Diagram corresponding to Different Potential Profile.	Analysis of various material properties to appreciate the nature of things.
FIT_A_CC_2_04_TH: C Programming and Data	
Structures	
C Programming language, decision making, branching and looping, structures, introduction to C++, data structures, searching and sorting	Programming language is studied to facilitate the computation and simulation abilities of the students.
ELT-A-CC-2-04-P: C Programming and Data Structures Lab	



THE BHAWANIPUR EDUCATION SOCIETY COLLEGE A MINORITY RUN COLLEGE. AFFILIATED TO UNIVERSITY OF CALCUTTA

RECOGNISED UNDER SECTION 2(F) & 12 (B) OF THE UGC ACT, 1956

1.Generate the Fibonacci Series up to the given Limit N and also Print the Number of Elements in the Series. 2. Find Minimum and Maximum of N Numbers. 3. Find the GCD of Two Integer Numbers. 4. Calculate Factorial of a given Number. 5. Find all the Roots of a Quadratic Equation $Ax2 +$ Bx + C = 0 for Non -Zero Coefficients A, B and C. Else Report Error. 6. Calculate the Value of sin(x) and cos(x) using the Series. Also Print sin(x) and cos(x) Value using Library Function. 7. Generate and Print Prime Numbers up to an Integer N. 8. Sort given N Numbers in Ascending Order. 9. Find the Sum and Difference of Two Matrices of Order M×N and P×Q. 10. Find the Product of Two Matrices of Order M×N and P×Q. 11. Find the Transpose of given M×N Matrix. 12. Find the Sum of Principle and Secondary Diagonal Elements of the given M×N Matrix. 13. Calculate the Subject wise and Student wise Totals and Store them as a Part of the Structure. 14. Implement Linear and Circular Linked Lists using Single and Double Pointers. 15. Create a Stack and Perform Pop, Push, Traverse Operations on the Stack using Linear Linked List. 16. Create Circular Linked List having Information about a College and Perform	Programming language is implemented to facilitate the computation and simulation abilities of the students.	
Linear Linked List. 16. Create Circular Linked List having Information about a College and Perform Insertion at Front, Deletion at End. 17. Create a Linear Queue using Linked List and Implement Different Operations such as Insert, Delete, and Display the Queue Elements. 18. Implement Polynomial Addition and Subtraction using Linked Lists. 19. Implement Sparse Matrices using Arrays and Linked Lists. 20. Create a Binary Tree to Perform Tree Traversals (Preorder, Post-order, In- order) using the Concept of Recursion. 21. Implement Binary Search Tree using Linked Lists.		
Search. 22. Implement Insertion Sort, Merge Sort, Bubble Sort, and Selection Sort.		
Semeste	r - III	
ELT-A-CC-3-05-TH: Semiconductor Devices		



ELT-A-CC-3-05-P: Semiconductor Devices Lab Study of the I-V Characteristics of PN Junction Dide and Zener Diode. 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r ₁ , r ₁₀ , β. 3. Study of the I-V Characteristics of the Common Base Configuration of BJT and obtain r ₁ , r ₁₀ , a. 4. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the Triac. Page-211 7. Study of the I-V Characteristics of Solar Cell. 9. Study of Hall Effect. ELT-A-CC-3-06-TH: Electronic Circuits Diode circuits, BJT circuits, feedback amplifiers, amplifiers, single tuned amplifiers. MOSFET circuits, power amplifiers, single tuned amplifiers. Hardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full-Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Study of Clipping and Testing of SV/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Testing of SV/9V DC Regulated Power Supply using Two Transistors and Bindi it's Load Regulation. 4. Study of Tixed Bias, Voltage Prized Bias, Voltage	Semiconductor basics, carrier transport phenomena, physics of junctions, semiconductor-semiconductor homo-junction, PN junction diode, application of junction properties, bipolar junction transistors, field effect transistors, JFETs, MOSFETs, power devices.	Students learn the fundamentals of semiconductor devices which are the basic components of electronic equipment.
Study of the I-V Characteristics of PN Junction Diode and Zener Diode. 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r., r., β. 3. Study of the I-V Characteristics of the CCR. 5. Study of the I-V Characteristics of the Diae. 6. Study of the I-V Characteristics of the Diae. 6. Study of the I-V Characteristics of the Triac. Page/11 7. Study of the I-V Characteristics of Solar Cell. 9. Study of Hall Effect. ELT-A-CC-3-06-TH: Electronic Circuits Diode circuits, BJT circuits, feedback amplifiers, amplifiers. MOSFET circuits, power amplifiers, single tuned amplifiers. Hardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Celliping and Century of Transistors. 6. Designing of as Single Study of Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpit's Oscillator 8. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier. ELT-A-CC-3-07-TH: Electromagenetics	ELT-A-CC-3-05-P: Semiconductor Devices Lab	
ELT-A-CC-3-06-TH: Electronic CircuitsDiode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers.Students learn about the electronic circuits and their functionalities involving device operation.ELT-A-CC-3-06-P: Electronic Circuits LabHardware and Circuit Simulation Software1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Poscillator 9. Study of the Frequency Response of Common Source FET Amplifier.Students design the working principles of the devices.ELT-A-CC-3-07-TH: ElectromagneticsELT-A-CC-3-07-TH: ElectromagneticsStudents to better understand the the colpit's Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.	Study of the I-V Characteristics of PN Junction Diode and Zener Diode. 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r_i , r_o , β . 3. Study of the I-V Characteristics of the Common Base Configuration of BJT and obtain r_i , r_o , α . 4. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the Diac. 6. Study of the I-V Characteristics of the Triac. Page∠11 7. Study of the I-V Characteristics of JFET/MOSFET. 8. Study of Characteristics of Solar Cell. 9. Study of Hall Effect.	Students appreciate the operational principles of devices to understand their usefulness and viability.
ELT-A-CC-3-06-TH: Electronic CircuitsDiode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers.Students learn about the electronic circuits and their functionalities involving device operation.ELT-A-CC-3-06-P: Electronic Circuits LabHardware and Circuit Simulation Software1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Poscillator 9. Study of the Frequency Response of Common Source FET Amplifier.Students design the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-07-TH: Electromagnetics		
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ELT-A-CC-3-06-P: Electronic Circuits LabHardware and Circuit Simulation Software1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Poscillator 9. Study of the Frequency Response of Common Source FET Amplifier.Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.ELT-A-CC-3-07-TH: ElectromagneticsElectromagnetics	Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers.	Students learn about the electronic circuits and their functionalities involving device operation.
Hardware and Circuit Simulation Software1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Phase Shift 	ELT-A-CC-3-06-P: Electronic Circuits Lab	
ELT-A-CC-3-07-TH: Electromagnetics	Hardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpitt's Oscillator. 8. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.	Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.
	ELT-A-CC-3-07-TH: Electromagnetics	



Vector analysis, Poisson's and Laplace equations, electrostatics, magnetostatics, time-varying fields and Maxwell's equations, EM wave propagation	The basic electromagnetism is appreciated by the students.
ELT-A-CC-3-07-P: Electromagnetics Lab	
Scilab/MATLAB/Any Other Similar Free Software 1. Understanding and Plotting Vectors. 2. Transformation of Vectors into Various Coordinate Systems. 3. 2D and 3D Graphical Plotting with Change of View and Rotation. 4. Representation of the Gradient of a Scalar Field, Divergence and Curl of Vector Fields. 5. Plots of Electric Field and Electric Potential due to Charge Distributions. 6. Plots of Magnetic Flux Density due to Current Carrying Wire. 7. Programs and Contour Plots to Illustrate Method of Images. 8. Solutions of Poisson and Laplace Equations - Contour Plots of Charge and Potential Distributions. 9. Introduction to Computational Electromagnetics - Simple Boundary Value Problems by Finite Difference/Finite Element Methods.	These help to better visualize the electric and magnetic fields and their mathematical manipulations which are the central concepts in EM theory.
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SEC-1: Group-A (SEC-A) Option-1 (SEC-1-A- 1) ELT-A-SEC-3-A-1-HT: Design and Fabrication of Printed Circuit Boards	Hands-on training in circuits development and practical troubleshooting.
PCB Fundamentals, Schematic and Layout Design, Technology of PCB and PCB Technology	
SEC-1: Group-A (SEC-A) Option-2 (SEC-1-A-2) ELT-A-SEC-3-A-2-HT: Circuit Modeling using PSPICE Introduction, basic analysis and circuit modeling	Circuit development using coding knowledge is developed.
Samasta	r – IV
Semeste	1 — 1 V
Core Course (CC) - 8 Theory ELT-A-CC-4-08-TH: Operational Amplifiers and Applications	
Basic Operational Amplifier, Op-Amp Parameters, Op-Amp Circuits and Applications, Comparators, Signal Generators, Timers Circuits, Fixed and	Inderstanding the fundamental analog electronic evices which make up larger electronic equipment.



Variable IC Regulators,	
Signal Conditioning Circuits	
Core Course (CC) - 8 Practical ELT-A-CC-4-08-P: Operational Amplifiers and Applications Lab	
 Applications Lab Hardware and Circuit Simulation Software Study of Op-Amp Characteristics: CMRR and Slew Rate. Designing of an Amplifier of given Gain for an Inverting and Non-Inverting Configuration using an Op- Amp. Designing of Analog Adder and Subtractor Circuit. Designing of an Integrator using Op-Amp for a given Specification and Study its Frequency Response. Designing of a Differentiator using Op-Amp for a given Specification and Study its Frequency Response. Designing of a First Order Low-Pass Filter using Op-Amp. Designing of a RC Phase Shift Oscillator using Op-Amp. Designing of a Wien Bridge Oscillator using Op-Amp. 	The related practical knowledge to understand electronic circuits
 Study of IC 555 as Astable Multivibrator. Study of IC 555 as Monostable Multivibrator. Designing of Fixed Voltage Power Supply using IC Regulators using 78 Series and 79 Series. Core Course (CC) - 9 Theory ELT-A-CC-4-09-TH: Digital Electronics and	
VHDL	
Number System and Codes, Logic Gates and Boolean Algebra, Digital Logic Families, Combinational Logic Analysis and Design, Sequential Logic Design, Programmable Logic Devices, Memory, Introduction to VHDL, Behavioral Modeling, Sequential Processing, Data Types	Understanding the fundamental digital electronic devices which make up larger electronic equipment.
Core Course (CC) - 9 Practical	
 ELT-A-CC-4-9-P: Digital Electronics and VHDL Lab Hardware To Verify and Design AND, OR, NOT and XOR Gates using NANDGates. To Convert a Boolean Expression into Logic Gate Circuit and Assemble it using Logic Gate IC's. Design Half and Full Adder. Design Half and Full Subtractor. Design Seven Segment Display Driver. 	The related practical knowledge to understand electronic circuits.
 Design 4 × 1 Multiplexer using Gates. To Build Flip-Flop Circuits (RS, Clocked RS, 	



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	D-type) using Elementary Gates.	
8.	Design Counters (Ring, Ripple, Johnson and	
	Mod-N) using D/T/JK Flip-Flop.	
9.	Design Shift Register and Study Serial and	
_	Parallel Shifting of Data.	
Experime	ents in VHDL (Circuit Simulation)	
1	Write Code to Realize Basic and Derived Logic	
1.	Gates	
2	Half Adder and Full Adder using Basic and	
2.	Derived Getes	
2	Leff Calder and Fall Calder at a name	
5.	Tail Subtractor and Full Subtractor using Dasic	
	and Derived Gates.	
4.	Clocked D FF, T FF and JK FF (with Reset	
	Inputs).	
5.	Multiplexer $(4 \times 1, 8 \times 1)$ and Demultiplexer	
	using Logic Gates.	
6.	Decoder $(2 \times 4, 3 \times 8)$, Encoders and Priority	
	Encoders.	
7.	Design and Simulation of 4-Bit Adder.	
8.	Code Converters (Binary to Gray and Vice	
	Versa).	
9.	2-bit Magnitude Comparator.	
10	. 3-bit Ripple Counter.	
Core Cou	rse (CC) – 10 Theory	Understanding signals and how systems are built
ELT-A-C	C-4-10-TH: Signals and Systems	based on different signals.
Signals	and Systems, Linear Time Invariant	
Systems	(LTI), Fourier Series, Fourier Transform.	
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Z - I ranst	orm	
Z-Transf	orm,	
Z-Transf Core Cou	orm, rse (CC) - 10Practical	Mathematical coding to understand signals.
Z-Transf Core Cou ELT-A-C	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab	Mathematical coding to understand signals.
Z-Transf Core Cou ELT-A-C Sc	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical	Mathematical coding to understand signals.
Z-Transf Core Cou ELT-A-C Sc Si	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C Sc Sin 1.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals.	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C Sc Sin 1. 2.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals.	Mathematical coding to understand signals.
Z-Transf Core Cou ELT-A-C Sc Sin 1. 2. 3.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals.	Mathematical coding to understand signals.
Z-Transf Core Cou ELT-A-C Sc Sin 1. 2. 3. 4.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals.	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations.	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals.	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals.	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7. 8	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Lanlace Transform of Continuous Time	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7. 8.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7. 8.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xaas/Similar	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Evention and Calculation of	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams.	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams.	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9.	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams.	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. SEC-2: G	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. Troup-B (SEC-B) Option-1 (SEC-2-B-1)	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. SEC-2: G ELT-A-SI	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. Troup-B (SEC-B) Option-1 (SEC-2-B-1) CC-4-B-1-TH: Internet and Java Programming	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. SEC-2: G ELT-A-SI Internet,	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. Troup-B (SEC-B) Option-1 (SEC-2-B-1) CC-4-B-1-TH: Internet and Java Programming Data types, Arrays, Operators, Flow	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. SEC-2: G ELT-A-SI Internet, Control,	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. Troup-B (SEC-B) Option-1 (SEC-2-B-1) CC-4-B-1-TH: Internet and Java Programming Data types, Arrays, Operators, Flow Exception Handling, File Handling	Mathematical coding to understand signals.
Z-1ransf Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. 9. SEC-2: G ELT-A-SI Internet, Control, SEC-2: G	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. roup-B (SEC-B) Option-1 (SEC-2-B-1) C-4-B-1-TH: Internet and Java Programming Data types, Arrays, Operators, Flow Exception Handling, File Handling roup-B (SEC-B) Option-2 (SEC-2-B-2)	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. 9. SEC-2: G ELT-A-SI Internet, Control, SEC-2: G ELT-A-SI	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. roup-B (SEC-B) Option-1 (SEC-2-B-1) C-4-B-1-TH: Internet and Java Programming Data types, Arrays, Operators, Flow Exception Handling, File Handling roup-B (SEC-B) Option-2 (SEC-2-B-2) CC-4-B-2-TH: Programming with	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. 9. SEC-2: G ELT-A-SI Internet, Control, SEC-2: G ELT-A-SI Matlab/Sc	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. roup-B (SEC-B) Option-1 (SEC-2-B-1) <u>CC-4-B-1-TH: Internet and Java Programming</u> Data types, Arrays, Operators, Flow Exception Handling, File Handling roup-B (SEC-B) Option-2 (SEC-2-B-2) <u>CC-4-B-2-TH: Programming with</u> ilab	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C Sci 3. 4. 5. 6. 7. 8. 9. SEC-2: G ELT-A-SI Internet, Control, SEC-2: G ELT-A-SI Matlab/Sc MATLA	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. Foup-B (SEC-B) Option-1 (SEC-2-B-1) C-4-B-1-TH: Internet and Java Programming Data types, Arrays, Operators, Flow Exception Handling, File Handling roup-B (SEC-B) Option-2 (SEC-2-B-2) C-4-B-2-TH: Programming with ilab B Basics. Matrices and Vectors Computer	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. 9. SEC-2: G ELT-A-SI Internet, Control, SEC-2: G ELT-A-SI Matlab/Sc MATLA Programmed	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. Foup-B (SEC-B) Option-1 (SEC-2-B-1) C-4-B-1-TH: Internet and Java Programming Data types, Arrays, Operators, Flow Exception Handling, File Handling roup-B (SEC-B) Option-2 (SEC-2-B-2) C-4-B-2-TH: Programming with ilab B Basics, Matrices and Vectors, Computer	Mathematical coding to understand signals.
Z-1ranst Core Cou ELT-A-C' Sc Sin 1. 2. 3. 4. 5. 6. 7. 8. 9. 9. SEC-2: G ELT-A-SI Internet, Control, SEC-2: G ELT-A-SI Internet, Control, SEC-2: G	orm, rse (CC) - 10 Practical C-4-10-P: Signals and Systems Lab ilab/MATLAB/Any Other Mathematical mulation Software Generation of Continuous Time Signals. Generation of Discrete Time Signals. Time Shifting and Time Scaling of Signals. Convolution of Signals. Solution of Difference Equations. Fourier Series Representation of Continuous Time Signals. Fourier Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Laplace Transform of Continuous Time Signals. Introduction to Xcos/Similar Function and Calculation of Output of Systems Represented by Block Diagrams. Foup-B (SEC-B) Option-1 (SEC-2-B-1) C-4-B-1-TH: Internet and Java Programming Data types, Arrays, Operators, Flow Exception Handling, File Handling roup-B (SEC-B) Option-2 (SEC-2-B-2) C-4-B-2-TH: Programming with ilab B Basics, Matrices and Vectors, Computer ning, MATLAB Programming, Numerical	Mathematical coding to understand signals.



Semester	_	V
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Core Course - 11 Theory	
ELT-A-CC-5-11-TH: Electronic Instrumentation	
Qualities of Measurement, Basic Measurement	Understanding electrical and electronic
Instruments, Connectors and Probes, Measurement	measurement.
of Resistance and Impedance, A-D and D-A	
Conversion, Oscilloscope, Signal Generators,	
Transducers and Sensors	
Core Course - 11 Practical	
ELT-A-CC-5-11-P: Electronic Instrumentation Lab	
1. Design of Multi Range Ammeter and Voltmeter	Related practical
using Galvanometer.	1
2. Measurement of Resistance by Wheatstone	
Bridge and Measurement of Bridge Sensitivity.	
3. Measurement of Capacitance by de' Sautys.	
4. Measure of Low Resistance by Kelvin's Double	
Bridge.	
5. Design and Implementation of Instrumentation	
Ampinier using /41 Op-Amp.	
0. To Determine the Characteristics of Resistance Transducer - Strain	
Gauge (Measurement of Strain using	
Half and Full Bridge).	
7. To Determine the Characteristics of LVDT.	
8. To Determine the Characteristics of Thermistors	
and RTD.	
9. Measurement of Temperature by	
Thermocouples and Study of	
Transducers like AD590 (Two	
Terminal Temperature Sensor),	
PT-100, J- type, K-type.	
10. To Study the Characteristics of LDR,	
Photodiode, and Phototransistor:	
(a) Variable Illumination; (b) Linear	
Displacement.	
Controller	
Controller.	
Core Course - 12 Theory	
ELI-A-CC-5-12-1 II: MICroprocessors and Microcontrollars	
Introduction to Microprocessors Microprocessor	Microprocessors and Microcontrollers
8085 8085 Instructions Introduction to	whereprocessors and wherecontrollers
Microsophallara DIC16E887 Microsophallan	
Interfacing to DIC16E887	
Interfacing to PIC10F887	
CORE COURSE - 12 FRACTICAL	
Microcontrollers Lab	
Assembly Language Programming:	Practicals on coding in microprocessors and
1. Program to Transfer a Block of Data.	microcontrollers
2. Program for Multibyte Addition.	
3. Program for Multibyte Subtraction.	
4. Program to Multiply Two 8 Bit Numbers.	
5. Program to Divide a 16 Bit Number by 8 Bit	
Number.	
6 Program to Search a given Number in a given	



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	List.	
7.	Program to Generate Terms of Fibonacci Series.	
8.	Program to find Minimum and Maximum	
0	among N Numbers.	
9. 10	Program to find the Square Root of an Integer.	
10.	Program to find GCD of I wo Numbers.	
11.	Ascending/Descending Order	
12	Program to Verify the Truth Table of Logic	
12.	Gates.	
PIC Micro	controller Programming:	
1.	LED Blinking with a Delay of 1 second.	
2.	Solid State Relay Interface.	
3.	Interfacing of LCD (2×16) .	
4.	Interfacing of Stepper Motor and	
	Clockwise/Anticlockwise with Speed	
	Control	
5.	To Test all the Gates of a given IC74XX is	
	Good or Bad.	
6.	Generate Sine, Square, Sawtooth, Triangular	
	and Staircase Waveform using DAC Interface.	
7.	Display of 4-Digit Decimal Number using the	
0	Multiplexed 7-Segment Display Interface.	
8.	Analog to Digital Conversion using Internal	
0	ADC and Display the Result on LCD. Implementation of DC Voltmeter $(0.5V)$ using	
9.	Internal ADC and LCD	
10.	Digital to Analog Conversion using PWM	
10.	(Pulse Delay to be Implemented using Timers).	
11.	Speed Control of DC Motor using PWM (Pulse	
	Delay to be Implemented using Timers).	
12.	Interfacing of Matrix Keyboard (4×4).	
13.	Serial Communication between Microcontroller	
	and PC.	
Discipline	Specific Electives (DSE) - 1	
DSE-1: C	Group-A (DSE-A) Option-1 (DSE-1-A-1)	
Theory	ELT-A-DSE-5-A-1-TH: Numerical	
Fechniqu	es	
Numerica	l Methods, Solution of Transcendental	Understanding various mathematical tools to solve
and Poly	vnomial Equations. Interpolation and	complex equations
Polvnomi	al Approximations, Curve Fitting,	
Numerica	l Integration. Numerical Differentiation.	
Numerica	l methods for first order differential	
equations	Numerical Methods in Linear Algebra.	
Matrix Ei	genvalue	
$DSE_1 \cdot G$	Froun-A (DSE-A) Ontion-1 (DSE-1-A-1)	
Practical	FLT.A.DSE.5.A.1.P. Numerical	
r actical Techniqu	es Lah	
<u>i cenniqu</u>		Coding practical to implement such tools
CI	anguage/Scilab/MatLab/Any Other	Coung practical to implement such tools
Ma	thematical Simulation Software	
1.	Program to Implement Bisection Method.	
2.	Program to Implement Secant Method.	
3.	Program to Implement Regula Falsi Method.	
4.	Program to Implement Newton Raphson	



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Method.	
5. Program to Implement Trapezoidal Rule.	
6. Program to Implement Simpson's Rule.	
7. Program to Implement Runge Kutta Method.	
8 Program to Implement Fuler-Cauchy Method	
9 Program to Implement Gauss-Jordon Method	
10 Program to Implement Gauss-soldon Method.	
10. Trogram to Implement Vauss-Scider Iteration.	
Forward/Paakward Internalation	
12 Dragram to Implement Lagrange's	
12. Program to implement Lagrange's	
Interpolation.	
DSE-1: Group-A (DSE-A) Ontion-2 (DSE-1-A-2)	
Theory FLT_A_DSF_5_A_2_TH Control Systems	
Introduction to Control Systems Time Domain	Un denstan din a alastronia santral systems
introduction to Control Systems, Time Domain	Understanding electronic control systems
Analysis, Concept of Stability, Frequency	
Domain Analysis, State Space Analysis,	
Controllers and Compensation Techniques	
DSF-1: Group-A (DSF-A) Option-2 (DSF-1-A-2)	
Dise-1. Of oup-A (DSE-A) Option-2 (DSE-1-A-2)	
racucal EL1-A-DSE-5-A-2-P: Control Systems	
Lab	
Implementation using Hardware and	Related practical
Scilab/MATLAB/Any Other Circuit Simulation	
Software	
1. To Study Characteristics of:	
(a) Synchro Transmitter Receiver; (b) Synchro	
as Error Detector.	
2. To Study Position Control of DC Motor.	
3. To Study Speed Control of DC Motor.	
4. To Find Characteristics of AC Servo Motor.	
5. To Study Time Response of Type 0, 1 and 2	
Systems.	
6. To Study Frequency Response of First and	
Second Order Systems.	
7. To Study Time Response Characteristics of	
Second Order System.	
8. To Study Effect of Damping Factor on	
Performance of Second Order System.	
9. To Study Frequency Response of Lead and Lag	
Networks.	
10. Study of P, PI and PID Controller.	
•	
Discipline Specific Electives (DSE) - 2	
DSE-2: Group-B (DSE-B) Option-1 (DSE-2-B-1)	
Theory	
ELT-A-DSE-5-B-1-TH: Semiconductor	
Fabrication and Characterization	
Introduction of Semiconductor Drocos	Understanding chin fabrication processes
Traduction of Semiconductor Process	Understanding emp fautication processes
Lecnnology, Epitaxy Deposition,	
Characterization, Oxidation, Diffusion,	
Lithographic Processes. Etching. Metallization.	
Process Integration	
$\frac{1}{2} = \frac{1}{2} = \frac{1}$	
DSE-2: Group-B (DSE-B) Option-1 (DSE-2-B-1)	
Practical	
ELT-A-DSE-5-B-1-P: Semiconductor Fabrication	



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and Characterization Lab		
1. To Measure the Resistivity of Semiconductor	Related practical	
Crystal with Temperature by Four-Probe		
Method.		
2. To Determine the Type (n or p) and Mobility of		
Semiconductor Material using Hall-Effect.		
3. Oxidation Process Simulation.		
4. Diffusion Process Simulation.		
5. Process Integration Simulation.		
6. Fabrication of Thin Film using Spin Coating		
System.		
7. Crystallographic Analysis and Particle		
Size Determination by X-Ray		
Diffraction (XRD) (of the given XRD		
Spectra). Introduction to JCPDS Card.		
8. Determination of Optical Bandgap through		
Transmission Spectra from Published		
Literature.		
DSE-2: Group-B (DSE-B) Option-2 (DSE-2-B-2)		
Theory ELT-A-DSE-5-B-2-TH: Power Electronics		
Power Devices Silicon Controlled Rectifier	Understanding power electronics	
(SCD) Diag and Triag Insulated Cate Directory	enderstanding power electronics	
(SCK), Diac and Triac, insulated Gate Bipolar		
[Transistors (IGBT), Application of SCR, Power		
MOSFETs, Power Inverters, Choppers,		
Regulators and Converters, Electromechanical		
Machines		
DSE 2. Crown D (DSE D) Ontion 2 (DSE D 2)		
DSE-2. Gloup-D (DSE-D) Option-2 (DSE-D-2)		
racucal EL1-A-DSE-5-B-2-F: Fower Electronics		
1. Study of I-V Characteristics of DIAC.	Related practical	
2. Study of I-V Characteristics of a TRIAC.		
3. Study of I-V Characteristics of a SCR.		
4. SCR as a Half Wave and Full Wave Rectifiers		
with R and RL Loads.		
5. DC Motor Control using SCR.		
6. DC Motor Control using TRIAC.		
7. AC Voltage Controller using TRIAC with UJT		
Triggering.		
8. Study of Parallel and Bridge Inverter.		
9. Design of Snubber Circuit.		
10. V-I Characteristic of MOSFET and IGBT		
(Both).		
11. Study of Chopper Circuits.		
Samost	or VI	
Core Course - 13 Theory		
ELT-A-CC-6-13-TH: Communication		
Electronics		
Electronic Communication Amplitude	Understanding communication electronics	
Modulation Angle Modulation Dulso Angle	encersations communication electromes	
Madulation, Angle Modulation, Pulse Analog		
production, ruise Code Modulation, Digital		



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Carrier Modulation Techniques	
Core Course - 13 Practical ELT-A-CC-6-13-P: Communication Electronics Lab	Related practical
 Hardware and Circuit Simulation Software Study of Amplitude Modulation. Study of Amplitude Demodulation. Study of Frequency Modulation. Study of Frequency Demodulation. Study of Pulse Amplitude Modulation. Study of Pulse Width Modulation. Study of Pulse Position Modulation. Study of Pulse Code Modulation. Study of Pulse Shift Keying. Study of Frequency Shift Keying. 	
Core Course - 14 Theory ELT-A-CC-6-14-TH: Photonics	
Light as Electromagnetic Wave, Interference, Diffraction, Polarization, Light Emitting Diodes, Lasers, Photodetectors, LCD Displays, Guided Waves and Optical Fiber	Understanding light propagation through guided/unguided media
Core Course - 14 Practical ELT-A-CC-6-14-P: Photonics Lab	
 To Determine Wavelength of Sodium Light using Newton's Rings. To Determine the Resolving Power and Dispersive Power of Diffraction Grating. Diffraction Experiments using a Laser. To Determine the Specific Rotation of Scan Sugar using Polarimeter. To Determine Characteristics of LEDs and Photo-Detector. To Measure the Numerical Aperture of an Optical Fiber. 	Related practical
Discipline Specific Electives (DSE) - 3 DSE-3: Group-A (DSE-A) Option-1 (DSE-3-A-1) Theory ELT-A-DSE-6-A-1-TH: Basic VLSI Design	
Metal Oxide Semiconductor (MOS), MOS Inverter, Combinational MOS Logic Design, Memory Design	Understanding basic VLSI
DSE-3: Group-A (DSE-A): Option-1 (DSE-3-A- 1) Practical ELT-A-DSE-6-A-1-P: Basic VLSI Design Lab	
Implementation using Hardware and/or any Circuit Simulation Software	Related practical



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1.	To Plot the Output Characteristics and Transfer	
	Characteristics of n-Channel and p-Channel	
2.	To Design and Plot the Static (VIC) and Dynamia Characteristics of Digital CMOS	
	Inverter To Design and Plot the Output	
	Characteristics of 3-Inverter Ring Oscillator.	
3.	To Design and Plot the Dynamic	
	Characteristics of 2-Input NAND,	
	NOR, XOR and XNOR Logic Gates	
	using CMOS Technology.	
4.	To Design and Plot the Characteristics of a 4×1	
	Digital Multiplexer using Pass Transistor Logic.	
5.	To Design and Plot the Characteristics of a	
	Positive and Negative Latch Based on Multiplevers	
6	To Design and Plot the	
0.	Characteristics of a Master-Slave	
	Positive and Negative Edge	
	Triggered registers Based on	
	Multiplexers.	
DSF-3. (Group_A (DSF_A) Ontion_2 (DSF_3_A_2)	
Theory F	TT-A-DSE-6-A-2-TH: Digital Signal	
Processi	10	
Discrete	Time Systems, Network Synthesis	Understanding digital signal processing (DSP)
Discrete	Fourier Transform Digital Filters	Understanding digital signal processing (DSF)
Discrete	Fourier Transform, Digital Filters	
DSE-3: (Froup-A (DSE-A) Option-2 (DSE-3-A-2)	
Practical	ELT-A-DSE-6-A-2-P: Digital Signal	
Processii	ig Lab	
Im	nlementation using Scilab/MATLAB/Anv	Related practical
Ot	her Mathematical Simulation Software	
1.	Generation of Unit Sample Sequence,	
	Unit Step, Ramp Function, Discrete	
	Time Sequence, Real Sinusoidal	
	Sequence.	
2.	Generate and Plot Sequences over an Interval.	
3.	Given x[n], Write Program to Find X[z].	
4.	and East Fourier Transform	
5.	Design of a Butterworth Analog Filter for Low	
	Pass and High Pass.	
6.	Design of Digital Filters.	
Disciplin	e Specific Electives (DSE) - 4	
DSE-4: C	Group-B (DSE-B) Option-1 (DSE-4-B-1)	
Theory E	ELT-A-DSE-6-B-1-TH: Biomedical	
Instrume	entation	
Biomedie	cal Signals and Physiological	Understanding biomedical instrumentation
Transduc	ers, Patient Monitoring Systems and	
Audiome	eters, Modern Imaging Systems, Patients	
Safety ar	nd Computer Applications in Biomedical	
Field, Ph	ysiotherapy	
DSE-4: 0	Froun-B (DSE-B) Ontion-1 (DSE-4-R-1)	
Practical	ELT-A-DSE-6-B-1-P: Biomedical	



Instrum	entation Lab	
1.	Characterization of Bio Potential Amplifier for	Related practical
	ECG Signals.	
2.	Study on ECG Simulator.	
3.	Measurement of Heart Sound using Electronic Stethoscope Study on ECG Heart Pate	
	Monitor/Simulator.	
4.	Study of Pulse Rate Monitor with Alarm	
5	System.	
5.	Spirometer (using Mechanical System)	
6.	Measurement of Respiration Rate using	
	Thermistor/Other Electrodes.	
7.	Study of Respiration Rate Monitor/Apnea	
0	Monitor.	
8.	Study on Ultrasound Transducers Based on Medical System	
9.	Study of Pacemaker.	
10	. Measurement of Pulse Rate using Photoelectric	
	Transducer and Pulse Counting for known	
	Period.	
DSE-4: (Group-B (DSE-B) Option-2 (DSE-4-B-2)	
I heory		
ELI-A-	DSE-6-B-2-1 H: Transmission Lines,	
Tronsmi	and Microwave Devices	Un donaton din a alastronias con don/no soiven avatoma
Transmi Wayaay	idea Antenno Eurodementala and	Understanding electronics sender/receiver systems
wavegu	ides, Antenna Fundamentais and	
Paramet	f Antenna as Transmitter/Receiver,	
Types of	Antennas (Qualitative Study Only),	
Propaga	tion of Radio Waves, Microwave	
Devices	(Qualitative Study Only)	
DSF_4.	Croun-R (DSF-R) Ontion-7 (DSF-4-R-7)	
DSE-4. Practica	отопр-в (взе-в) орноп-2 (взе-4-в-2) Г	
$\mathbf{FI} \mathbf{T}_{-} \mathbf{\Lambda}_{-}$	1 DSF_6_R_7_P· Transmission I inos	
Antenna	and Microwave Devices Lab	
In	interformation with Hardware and/or	Related practical
Sc	iLab/MATLAB/Any Other Mathematical	
Si	mulation Software	
1.	Program to Determine the Phasor of Forward Propagating Field	
2.	Program to Determine the Instantaneous Field	
	of Plane Wave.	
3.	Program to Find the Phase Constant, Phase	
	Velocity, Electric Field Intensity and Intrinsic	
А	Kallo. Brogram to Find Skin Donth Loop Tong and and	
4.	Phase Velocity.	
5.	Program to Determine the Total Voltage as	
	Function of Time and Position in Loss Less	
	Transmission Line.	
6.	Program to Find the Characteristic Impedance,	
7	Program to Find the Output Power and	
1.	riogram to rind the Output rower and	



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- Attenuation Coefficient.8. Program to Find the Power Dissipated in Lossless Transmission Line.
- Program to Find the Total Loss in Lossy Lines.
 Program to Find the Load Impedance of Slotted
- Line.
- 11. Program to Find the Input Impedance of Transmission Line Terminated with Pure CapacitiveImpedance.
- Program to Determine the Operating Range of Frequency for TE₁₀ Mode of Air-Filled Rectangular Waveguide.
- 13. Program to Determine Directivity, Bandwidth, Beamwidth of Antenna.
- 14. Program to Determine Diameter of Parabolic Reflector.
- 15. Program to Find Minimum Distance between Primary and Secondary antenna.
- 16. Simple Problems using Smith Chart.



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Program Outcome (PO) of Graduation Degree Course of

Electronics Honours (CBCS)

	Program Outcome	Description
PO1	Subject Knowledge	Knowing the fundamentals of the different areas of discussion within the subject which will enable the students to consider applying the theoretical principles in practical situations that they are likely to find themselves in as professionals after having completed the course.
	Method of Measurement:	Assessment (Internal & Final)
PO2	Communication Skills	Encouraging the students to apply the principles learned in their own fields, both professional and personal, thus, honing their communication skills and leading them towards becoming better communicators serving the society and nation as expected in the ICT age.
	Method of Measurement:	Regular Communication Activity Internal Assessment
PO3	Technical Skill Development	Knowing and developing the technical skills expected from the students in the professional arena, thus, becoming successful professional communicators/educators after finishing the program.
	Method of Measurement:	Assessment (Internal & Final)
PO4	Personality Development	Imparting personality development skills to the students that are likely to help them in their professional and personal lives, thus making them responsible and sincere citizens.
	Method of Measurement:	Regular Personality Development Internal Assessment



PO5	Higher Study Foundation	Encouraging the students to pursue higher studies in the subject and enhance their knowledge on the same.
	Method of Measurement:	Regular Teacher-Student Interactive Sessions
PO6	Research Orientation and Aptitude	Encouraging the students to pursue research avenues related to the subject either in the academic or in the professional sphere that may lead to a vibrant knowledge economy.
	Method of Measurement:	Regular Teacher-Student Interactive Sessions
PO7	Spirit of Team Work	Encouraging the students to coordinate with one another in a team environment and perform well as a team rather than trying to excel individually at the cost of group performance efficiency.
	Method of Measurement:	Group Activity Assignments Assessment



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Program Specific Outcomes (PSO) of Graduation Degree Course of

Electronics Honours (CBCS)

- 1. The students learn the fundamentals of Electronics theory and practice.
- 2. The students will appreciate the theoretical foundations related to different paradigms such as electromagnetism, quantum mechanics, communication and semiconductor devices etc.
- **3.** The students learn the practicalities and techniques of professional communication practices such as in colleges, symposiums, conferences and seminars and in international platforms.
- **4.** The students become effective and ethical practitioners contributing to social and national development.



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Course Outcomes (COs) of Graduation Degree Course of

Electronics Honours (CBCS) for the session, 2018-2021

Semester – I		
Paper	Course Outcomes	
ELT-A-CC-1-01-TH: Basic Circuit Theory and Network Analysis Basic circuit concepts, basic circuit analysis, DC and AC circuit analysis, network theorems, two port networks and network graph theorems.	1.1.1 Students learn how to apply physical laws and theorems to real circuits.	
ELT-A-CC-1-01-P: Basic Circuit Theory and		
Familiarization with: (a) Resistance in Series, Parallel and Series-Parallel; (b) Capacitors and Inductors in Series and Parallel; (c) Multimeter - Checking of Components; (d) Voltage Sources in Series, Parallel and Series-Parallel; (e) Voltage and Current Dividers. 2. Measurement of Amplitude, Frequency and Phase Difference using CRO. 3. Verification of Kirchoff's Law. 4. Verification of Norton's Theorem. 5. Verification of Thevenin's Theorem. 6. Verification of Superposition Theorem. 7. Verification of the Maximum Power Transfer Theorem. 8. RC Circuits: Time Constant, Differentiator, Integrator. 9. Designing of a Low Pass RC Filter and study of its Frequency Response. 10. Designing of a High Pass RC Filter and study of its Frequency Response. 11. Study of the Frequency Response of a Series LCR Circuit and determination of its (a) Resonant Frequency; (b) Impedance at Resonance; (c) Quality Factor Q; (d) Band Width.	1.1.2 Critical analysis of circuit parameters in view of scientific principles, so that it leads to synthesis of elements (passive and active) for innovative outcomes.	
ELT-A-CC-1-02-TH: Mathematics Foundation		
for Electronics Ordinary differential equations, series solution to ODEs and special functions, matrices, sequences and series, complex variables and functions, Laplace's transforms.	1.2.1 Students understand and appreciate the various mathematical methods to solve pertinent problems.	
ELT-A-CC-1-02-P: Mathematics Foundation for Electronics Lab		



Mathematics Foundation for Electronics using	1.2.2 Students understand and appreciate the
simulation software like MATLAB/Scilab	various mathematical methods to solve
	pertinent problems.
Solution of First Order Differential Equations. 2.	
Solution of Second Order Homogeneous	
Differential Equations. 3. Solution of Second Order	
Non-Homogeneous Differential Equations. 4.	
Convergence of a given Series. 5. Divergence of a	
given Series. 6. Solution of Linear System of	
Equations using Gauss Elimination Method. 7.	
Solution of Linear System of Equations using	
Gauss-Seidel Method. 8. Solution of Linear System	
of Equations using L-U Decomposition Method.	
Semeste	er - II
ELT-A-CC-2-03-TH: Applied Physics	
Physics of crystalline solids, Quantum mechanics,	2.1.1 Knowledge and understanding of various
mechanical properties of solids, thermal properties,	physical processes governing the structures of
electrical properties, magnetic properties and	materials.
statistical mechanics.	
ELT-A-CC-2-03-P: Applied Physics Lab	
To Measure the Resistivity of a Si Crystal with	
Temperature by Four-Probe Method from Room	
Temperature to 200 OC). 2. To Determine the	
Value of Boltzmann Constant by Studying Forward	
Characteristics of Diode. 3. To Determine the	
Value of Planck's Constant by using LEDs of	2.1.2 Analysis of various material
Different Wavelengths. 4. Simulation Studies: (a)	properties to appreciate the nature of
Find Lowest Energy Eigenvalues for 1-D	things.
Schrodinger Equation. (b) Plotting Tunneling	
Probability as a Function of Barrier Width. (c) Plot	
Energy Band-Diagram corresponding to Different	
Potential Profile.	
ELT-A-CC-2-04-TH: C Programming and Data	
Structures	
C Programming language, decision making,	2.2.1 Programming language is studied to
branching and looping, structures, introduction to	facilitate the computation and simulation
C++, data structures, searching and sorting	abilities of the students.
FLT A CC 2 04 P. C Programming and Data	
ELI-A-CC-2-04-I. C Frogramming and Data Structures Lab	
on usual to Lab	



THE BHAWANIPUR EDUCATION SOCIETY COLLEGE A MINORITY RUN COLLEGE. AFFILIATED TO UNIVERSITY OF CALCUTTA RECOGNISED UNDER SECTION 2(F) & 12 (B) OF THE UGC ACT, 1956

Semester - III	1.Generate the Fibonacci Series up to the given Limit N and also Print the Number of Elements in the Series. 2. Find Minimum and Maximum of N Numbers. 3. Find the GCD of Two Integer Numbers. 4. Calculate Factorial of a givenNumber. 5. Find all the Roots of a Quadratic Equation $Ax2 + Bx + C = 0$ for Non -Zero Coefficients A, B and C. Else Report Error. 6. Calculate the Value of $sin(x)$ and $cos(x)$ using the Series. Also Print $sin(x)$ and cos(x) value using Library Function. 7. Generate and Print Prime Numbers up to an Integer N. 8. Sort given N Numbers in Ascending Order. 9. Find the Sum and Difference of Two Matrices of Order M×N and P×Q. 10. Find the Product of Two Matrices of Order M×N and P×Q. 11. Find the Transpose of given M×N Matrix. 12. Find the Sum of Principle and Secondary Diagonal Elements of the given M×N Matrix. 13. Calculate the Subject wise and Student wise Totals and Store them as a Part of the Structure. 14. Implement Linear and Circular Linked Lists using Single and Double Pointers. 15. Create a Stack and Perform Pop, Push, Traverse Operations on the Stack using Linear Linked List. 16. Create Circular Linked List having Information about a College and Perform Insertion at Front, Deletion at End. 17. Create a Linear Queue using Linked List and Implement Different Operations such as Insert, Delete, and Display the Queue Elements. 18. Implement Polynomial Addition and Subtraction using Linked Lists. 19. Implement Sparse Matrices using Arrays and Linked Lists. 20. Create a Binary Tree to Perform Tree Traversals (Preorder, Post-order, In- order) using the Concept of Recursion. 21. Implement Binary Search Tree using Linked Lists. Compare its Time Complexity over that of Linear Search. 22. Implement Insertion Sort, Merge Sort, Bubble Sort, and Selection Sort.	2.2.2 Programming language is implemented to facilitate the computation and simulation abilities of the students.	
	Semester - III		
FLT-A-CC-3-05-TH: Semiconductor Devices	FLT-A-CC-3-05-TH · Semiconductor Devices		



ELT-A-CC-3-05-P: Semiconductor Devices Lab Study of the I-V Characteristics of PN Junction Dide and Zener Diode. 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r., r.g. a. 4. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the Triac. Page/11 7. Sudy of the I-V Characteristics of JFET/MOSFET. 8. Study of Characteristics of Solar Cell. 9. Study of Hall Effect. ELT-A-CC-3-06-TH: Electronic Circuits Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers. ELT-A-CC-3-06-P: Electronic Circuits Lab Hardware and Circuit Simulation Software 1. Study of He Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of SV/9V DC Regulated Power Supply using Two Transistors and find it's Sesigning and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Configuration for Transistors. 6. Designing of a Single Stage CE	Semiconductor basics, carrier transport phenomena, physics of junctions, semiconductor-semiconductor homo-junction, PN junction diode, application of junction properties, bipolar junction transistors, field effect transistors, JFETs, MOSFETs, power devices.	3.1.1 Students learn the fundamentals of semiconductor devices which are the basic components of electronic equipment.
Study of the I-V Characteristics of PN Junction Diode and Zener Diode, 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r ₁ , r ₀ , β , 3. Study of the I-V Characteristics of the Common Base Configuration of BJT and obtain r ₁ , r ₀ , α , 4. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the Diac. 6. Study of the I-V Characteristics of JFET/MOSFET. 8. Study of Characteristics of Solar Cell. 9. Study of Hall Effect. 3.1.2 Students appreciate the operational principles of devices to understand their usefulness and viability. ELT-A-CC-3-06-TH: Electronic Circuits 3.2.1 Students learn about the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-06-P: Electronic Circuits Lab 3.2.1 Students learn about the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-06-P: Electronic Circuits Lab 3.2.2 Students design the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-06-P: Electronic Circuits Lab 3.2.2 Students design the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-06-P: Electronic Circuits Lab 3.2.2 Students design the electronic circuits and their functionalities involving device operation. Istudy of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpitt's Oscillatoro	ELT-A-CC-3-05-P: Semiconductor Devices Lab	
ELT-A-CC-3-06-TH: Electronic CircuitsDiode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers.3.2.1 Students learn about the electronic circuits and their functionalities involving device operation.ELT-A-CC-3-06-P: Electronic Circuits Lab	Study of the I-V Characteristics of PN Junction Diode and Zener Diode. 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r_i , r_o , β . 3. Study of the I-V Characteristics of the Common Base Configuration of BJT and obtain r_i , r_o , α . 4. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the Diac. 6. Study of the I-V Characteristics of the Triac. Page∠11 7. Study of the I-V Characteristics of JFET/MOSFET. 8. Study of Characteristics of Solar Cell. 9. Study of Hall Effect.	3.1.2 Students appreciate the operational principles of devices to understand their usefulness and viability.
ELT-A-CC-3-06-TH: Electronic CircuitsDiode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers.3.2.1 Students learn about the electronic circuits and their functionalities involving device operation.ELT-A-CC-3-06-P: Electronic Circuits Lab Hardware and Circuit Simulation Software3.2.2 Students design the electronic circuits and their functionalities involving device operation.1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpitt's Oscillator. 8. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.3.2.2 Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.		
Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers.3.2.1 Students learn about the electronic circuits and their functionalities involving device operation.ELT-A-CC-3-06-P: Electronic Circuits LabHardware and Circuit Simulation Software1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.3.2.2 Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.	ELT-A-CC-3-06-TH: Electronic Circuits	
ELT-A-CC-3-06-P: Electronic Circuits LabHardware and Circuit Simulation Software1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.3.2.2 Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.	Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers.	3.2.1 Students learn about the electronic circuits and their functionalities involving device operation.
 Hardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full-Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier. 3.2.2 Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices. 	ELT-A-CC-3-06-P: Electronic Circuits Lab	
	Hardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpitt's Oscillator. 8. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.	3.2.2 Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.
ELT-A-CC-3-07-TH: Electromagnetics	ELT-A-CC-3-07-TH: Electromagnetics	



Vector analysis, Poisson's and Laplace equations, electrostatics, magnetostatics, time-varying fields and Maxwell's equations, EM wave propagation	3.3.1 The basic electromagnetism is appreciated by the students.			
ELT-A-CC-3-07-P: Electromagnetics Lab				
Scilab/MATLAB/Any Other Similar Free Software 1. Understanding and Plotting Vectors. 2. Transformation of Vectors into Various Coordinate Systems. 3. 2D and 3D Graphical Plotting with Change of View and Rotation. 4. Representation of the Gradient of a Scalar Field, Divergence and Curl of Vector Fields. 5. Plots of Electric Field and Electric Potential due to Charge Distributions. 6. Plots of Magnetic Flux Density due to Current Carrying Wire. 7. Programs and Contour Plots to Illustrate Method of Images. 8. Solutions of Poisson and Laplace Equations - Contour Plots of Charge and Potential Distributions. 9. Introduction to Computational Electromagnetics - Simple Boundary Value Problems by Finite Difference/Finite Element Methods.	3.3.2 These help to better visualize the electric and magnetic fields and their mathematical manipulations which are the central concepts in EM theory.			
SEC-1: Group-A (SEC-A) Option-1 (SEC-1-A- 1) ELT-A-SEC-3-A-1-HT: Design and Fabrication of Printed Circuit Boards	3.4.1 Hands-on training in circuits development and practical troubleshooting.			
PCB Fundamentals, Schematic and Layout Design, Technology of PCB and PCB Technology				
SEC-1: Group-A (SEC-A) Option-2 (SEC-1-A-2) ELT-A-SEC-3-A-2-HT: Circuit Modeling using PSPICE Introduction, basic analysis and circuit modeling	3.5.1 Circuit development using coding knowledge is developed.			
Semeste	er – IV			
Core Course (CC) - 8 Theory ELT-A-CC-4-08-TH: Operational Amplifiers and Applications				
Basic Operational Amplifier, Op-Amp Parameters, Op-Amp Circuits and Applications, Comparators, Signal Generators, Timers Circuits, Fixed and	4.1.1 Understanding the fundamental analog lectronic devices which make up larger electronic quipment.			



KECOUNDER SECTION 2	$\begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$
variable IC Regulators,	
Signal Conditioning Circuits	
Core Course (CC) - 8 Practical ELT-A-CC-4-08-P: Operational Amplifiers and Applications Lab	
	4.1.2 The related practical knowledge to
Hardware and Circuit Simulation Software 1. Study of Op-Amp Characteristics: CMRR and Slew Rate	understand electronic circuits
 Designing of an Amplifier of given Gain for an Inverting and Non- 	
Inverting Configuration using an Op- Amp.	
 Designing of Analog Adder and Subtractor Circuit. 	
 Designing of an Integrator using Op-Amp fora given Specification and Study its Frequency Response. 	
 Designing of a Differentiator using Op-Amp for a given Specification and Study its Frequency Response 	
 Designing of a First Order Low-Pass Filter using Op-Amp. 	
7. Designing of a First Order High-Pass Filter using Op-Amp.	
8. Designing of a RC Phase Shift Oscillator using Op-Amp.	
 Designing of a Wien Bridge Oscillator using Op-Amp. 	
10. Study of IC 555 as Astable Multivibrator.	
11. Study of IC 555 as Monostable Multivibrator.	
12. Designing of Fixed Voltage Power Supply	
using IC Regulators using 78 Series and 79	
Series.	
Core Course (CC) - 9 Theory	
ELT-A-CC-4-09-TH: Digital Electronics and	
VHDL	
Number System and Codes, Logic Gates and	4.2.1 Understanding the fundamental digital
Boolean Algebra, Digital Logic Families.	electronic devices which make up larger electronic
Combinational Logic Analysis and Design	aguinment
Sequential Logic Design Programmable Logic	equipinent.
Devices Memory Introduction to VHDI	
Devices, Memory, Introduction to VIIDL,	
Denavioral wodening, Sequential Processing, Data	
Types	
Core Course (CC) - 9 Practical ELT-A-CC-4-9-P: Digital Electronics and VHDL Lab	
 Hardware 1. To Verify and Design AND, OR, NOT and XOR Gates using NANDGates 	4.2.2 The related practical knowledge to understand electronic circuits.
 To Convert a Boolean Expression into Logic Gate Circuit and Assemble it using Logic Gate IC's 	
3 Design Half and Full Adder	
4. Design Half and Full Subtractor	
 Design Fran and Full Subtractor. Design Seven Segment Display Driver. 	
 Design 4 × 1 Multiplexer using Gates. To Build Flip-Flop Circuits (RS, Clocked RS, 	



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D-type) using	g Elementary Gates.	
8. Design Coun	ters (Ring, Ripple, Johnson and	
Mod-N) usin	g D/T/JK Flip-Flop.	
9. Design Shift	Register and Study Serial and	
Parallel Shift	ing of Data.	
Experiments in VHDL ((Circuit Simulation)	
1. Write Code to	o Realize Basic and Derived Logic	
Gates.	C C	
2. Half Adder at	nd Full Adder using Basic and	
Derived Gate	es.	
3. Half Subtract	tor and Full Subtractor using Basic	
and Derived	Gates.	
4 Clocked D Fl	F T FF and IK FF (with Reset	
Inputs)		
5 Multiplever ((1×1 8×1) and Demultiplever	
J. Wintiplexer (Fortes	
6 Deceder (2×/	1 2×8) Encodors and Driority	
0. Decoder (2~-	+, 5×8), Elicoders and Fhority	
7 Design and S	imulation of 1 Bit Addar	
7. Design and S	tors (Dinomy to Crow or 1 Vice	
8. Code Conver	ters (Binary to Gray and Vice	
versa).		
9. 2-bit Magnitu	ide Comparator.	
10. 3-bit Ripple (Counter.	
Core Course (CC) – 10	Theory	4.3.1 Understanding signals and how systems
ELT-A-CC-4-10-TH: Sig	gnals and Systems	and havilt haged on different signals
Signals and System	ns Linear Time Invariant	are built based on different signals.
Systems (I TI) Fouri	er Series Fourier Transform	
Z Transform	er series, rourier fransform,	
Z-mansioni,		
Core Course (CC) - 10 P	Practical	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign	Practical als and Systems Lab	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB	Practical als and Systems Lab B/Any Other Mathematical	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw	Practical als and Systems Lab B/Any Other Mathematical vare	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of	Practical als and Systems Lab B/Any Other Mathematical ware f Continuous Time Signals.	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals.	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting	Practical als and Systems Lab B/Any Other Mathematical ware f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals.	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting 4. Convolution	Practical als and Systems Lab B/Any Other Mathematical ware f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals.	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting 4. Convolution 5. Solution of D	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations.	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting 4. Convolution 5. Solution of D 6. Fourier Serie	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous	4.3.2 Mathematical coding to understand signals.
2- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 5. Solution of D 6. Fourier Serie Time Signals	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serie Time Signals 7. Fourier Trans	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s.	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serie: Time Signals 7. Fourier Trans 8. Laplace Tran	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous form of Continuous Time Signals. sform of Continuous Time	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serie: Time Signals 7. Fourier Trans 8. Laplace Tran Signals	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals.	4.3.2 Mathematical coding to understand signals.
Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serie: Time Signals 7. Fourier Trans 8. Laplace Tran Signals. 9. Introduction of	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time	4.3.2 Mathematical coding to understand signals.
 Z- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of 5. Solution of D 6. Fourier Seriet Time Signals 7. Fourier Trans 8. Laplace Trans Signals. 9. Introduction of 	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar	4.3.2 Mathematical coding to understand signals.
 Z- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Seriet Time Signals 7. Fourier Transformation 8. Laplace Transformation 9. Introduction of Generation and Output of S 	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. form of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of	4.3.2 Mathematical coding to understand signals.
 Z- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of 5. Solution of D 6. Fourier Seriet Time Signals 7. Fourier Trans 8. Laplace Trans 8. Laplace Trans 9. Introduction and Output of System Plant P St 	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. form of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented	4.3.2 Mathematical coding to understand signals.
 Z- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Seriet Time Signals 7. Fourier Trans 8. Laplace Transignals. 9. Introduction and Output of System by Block Dia 	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams.	4.3.2 Mathematical coding to understand signals.
 Z- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serie: Time Signals 7. Fourier Trans 8. Laplace Transignals. 9. Introduction of Function and Output of System by Block Dia 	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams.	4.3.2 Mathematical coding to understand signals.
 Z- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Seriet Time Signals 7. Fourier Trans 8. Laplace Trans Signals. 9. Introduction and Output of System by Block Dia 	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-R-1)	4.3.2 Mathematical coding to understand signals.
 Z- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serie: Time Signals 7. Fourier Trans 8. Laplace Trans Signals. 9. Introduction and Output of System by Block Dia SEC-2: Group-B (SEC-I- ELT-A-SEC-4-B-1-TH: 	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming	4.3.2 Mathematical coding to understand signals.4.4.1 Internet and Java Programming
 Z- Transform, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Seriet Time Signals 7. Fourier Trans 8. Laplace Trans 8. Laplace Trans 8. Signals. 9. Introduction and Output of System By Block Dia SEC-2: Group-B (SEC-1) ELT-A-SEC-4-B-1-TH:	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming Arrays Operators Flow	 4.3.2 Mathematical coding to understand signals. 4.4.1 Internet and Java Programming
 Z- Hanstoffil, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serie: Time Signals 7. Fourier Trans 8. Laplace Tran Signals. 9. Introduction and Output of System by Block Dia SEC-2: Group-B (SEC-I-ELT-A-SEC-4-B-1-TH: Internet, Data types, A Control Exception Herit 	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming Arrays, Operators, Flow	 4.3.2 Mathematical coding to understand signals. 4.4.1 Internet and Java Programming
 Z- Hanstoffit, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serier Time Signals 7. Fourier Trans 8. Laplace Transignals. 9. Introduction of System Signals. 9. Introduction of System Structure Structure SEC-2: Group-B (SEC-I-ELT-A-SEC-4-B-1-TH: Internet, Data types, A Control, Exception Ha 	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming Arrays, Operators, Flow andling, File Handling	 4.3.2 Mathematical coding to understand signals. 4.4.1 Internet and Java Programming
 Z- Hanstoffff, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serier Time Signals 7. Fourier Trans 8. Laplace Trans 8. Laplace Trans 8. Laplace Trans 8. Signals. 9. Introduction and Output of System Block Dia SEC-2: Group-B (SEC-I ELT-A-SEC-4-B-1-TH: Internet, Data types, A Control, Exception Ha SEC-2: Group-B (SEC-I)	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming Arrays, Operators, Flow andling, File Handling B) Option-2 (SEC-2-B-2)	 4.3.2 Mathematical coding to understand signals. 4.4.1 Internet and Java Programming 4.5.1 Programming with Matlab/Scilab
 Z- Hanstoffff, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of D 6. Fourier Serier Time Signals 7. Fourier Trans 8. Laplace Trans 8. Laplace Trans 8. Laplace Trans 8. Signals. 9. Introduction and Output of System Block Dia SEC-2: Group-B (SEC-I ELT-A-SEC-4-B-1-TH: Internet, Data types, A Control, Exception Ha SEC-2: Group-B (SEC-I ELT-A-SEC-4-B-2-TH:	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming Arrays, Operators, Flow andling, File Handling B) Option-2 (SEC-2-B-2) Programming with	 4.3.2 Mathematical coding to understand signals. 4.4.1 Internet and Java Programming 4.5.1 Programming with Matlab/Scilab
 Z- Hanstoffff, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of 5. Solution of D 6. Fourier Serier Time Signals 7. Fourier Trans 8. Laplace Trans 8. Laplace Trans 8. Laplace Trans 9. Introduction and Output of System by Block Dia SEC-2: Group-B (SEC-I ELT-A-SEC-4-B-1-TH: Internet, Data types, A Control, Exception Ha SEC-2: Group-B (SEC-I ELT-A-SEC-4-B-2-TH: Mataba/Scilab	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming Arrays, Operators, Flow andling, File Handling B) Option-2 (SEC-2-B-2) Programming with	 4.3.2 Mathematical coding to understand signals. 4.4.1 Internet and Java Programming 4.5.1 Programming with Matlab/Scilab
 Z- Hanstoffil, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of 5. Solution of D 6. Fourier Serier Time Signals 7. Fourier Trans 8. Laplace Trans 8. Laplace Trans 8. Introduction of Function and Output of System by Block Dia SEC-2: Group-B (SEC-1 ELT-A-SEC-4-B-1-TH: Internet, Data types, A Control, Exception Ha SEC-2: Group-B (SEC-1 ELT-A-SEC-4-B-2-TH: Matlab/Scilab MATLAB Basics, Ma	Practical als and Systems Lab 3/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming Arrays, Operators, Flow andling, File Handling B) Option-2 (SEC-2-B-2) Programming with	 4.3.2 Mathematical coding to understand signals. 4.4.1 Internet and Java Programming 4.5.1 Programming with Matlab/Scilab
 Z- Hanstoffil, Core Course (CC) - 10 P ELT-A-CC-4-10-P: Sign Scilab/MATLAB Simulation Softw 1. Generation of 2. Generation of 2. Generation of 3. Time Shifting 4. Convolution of 5. Solution of D 6. Fourier Serie: Time Signals 7. Fourier Trans 8. Laplace Trans 8. Laplace Trans 8. Introduction and Output of System by Block Dia SEC-2: Group-B (SEC-I ELT-A-SEC-4-B-1-TH: Internet, Data types, A Control, Exception Ha SEC-2: Group-B (SEC-I ELT-A-SEC-4-B-2-TH: MATLAB Basics, Ma Programming, MATL 	Practical als and Systems Lab B/Any Other Mathematical vare f Continuous Time Signals. f Discrete Time Signals. g and Time Scaling of Signals. of Signals. Difference Equations. s Representation of Continuous s. sform of Continuous Time Signals. sform of Continuous Time to Xcos/Similar Calculation of stems Represented grams. B) Option-1 (SEC-2-B-1) Internet and Java Programming Arrays, Operators, Flow andling, File Handling B) Option-2 (SEC-2-B-2) Programming with Intrices and Vectors, Computer AB Programming, Numerical	 4.3.2 Mathematical coding to understand signals. 4.4.1 Internet and Java Programming 4.5.1 Programming with Matlab/Scilab



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Semester – V					
Core Cours ELT-A-CC	se - 11 Theory -5-11-TH: Electronic Instrumentation				
Qualities of	of Measurement, Basic Measurement	5.1.1 Understanding electrical and			
Instrumen	ts, Connectors and Probes, Measurement	electronic measurement.			
of Resista	nce and Impedance, A-D and D-A				
Conversio	n. Oscilloscope, Signal Generators.				
Transduce	ers and Sensors				
Core Cours	se - 11 Practical				
ELT-A-CC	-5-11-P: Electronic Instrumentation Lab				
1.	Design of Multi Range Ammeter and Voltmeter	5.1.2 Related practical			
	using Galvanometer.	I			
2.	Measurement of Resistance by Wheatstone				
	Bridge and Measurement of Bridge Sensitivity.				
3.	Measurement of Capacitance by de' Sautys.				
4.	Measure of Low Resistance by Kelvin's Double				
-	Bridge.				
5.	Design and Implementation of Instrumentation				
(Amplifier using /41 Op-Amp.				
0.	Pagistance Transducer Strain				
	Course (Measurement of Strain using				
	Half and Full Bridge)				
7	To Determine the Characteristics of LVDT				
8.	To Determine the Characteristics of Determistors				
0.	and RTD.				
9.	Measurement of Temperature by				
-	Thermocouples and Study of				
	Transducers like AD590 (Two				
	Terminal Temperature Sensor),				
	PT-100, J- type, K-type.				
10.	To Study the Characteristics of LDR,				
	Photodiode, and Phototransistor:				
	(a) Variable Illumination; (b) Linear				
	Displacement.				
11.	Design and Implementation of Temperature				
	Controller.				
Core Cours	se - 12 Theory				
ELT-A-CC	-5-12-TH: Microprocessors and				
Microcontr	ollers				
Introduction	on to Microprocessors, Microprocessor	5.2.1 Microprocessors and Microcontrollers			
8085,8085	5 Instructions, Introduction to				
Microcont	trollers, PIC16F887 Microcontroller,				
Interfacing	g to PIC16F887				
Core Cours	se - 12 Practical				
ELT-A-CC	-5-12-P: Microprocessors and				
Microcontr	ollers Lab				
Ass	embly Language Programming:	5.2.2 Practicals on coding in microprocessors and			
1.	Program to Transfer a Block of Data.	microcontrollers			
2.	Program for Multibyte Addition.				
3.	Program for Multibyte Subtraction.				
4.	Program to Multiply Two 8 Bit Numbers.				
5.	Program to Divide a 16 Bit Number by 8 Bit				
6	Number. Program to Search a given Number in a given				
0.	rissiani to searen a given raunoei in a given				

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	RECOGNISED UNDER SECTION 2(F) & 12 (B) OF THE UGC ACT. 1956
	List.	
7.	Program to Generate Terms of Fibonacci Series.	
8.	Program to find Minimum and Maximum	
	among N Numbers.	
9.	Program to find the Square Root of an Integer.	
10	Program to find GCD of Two Numbers	
11	Program to Sort Numbers in	
11.	Ascending/Descending Order	
12	Program to Verify the Truth Table of Logic	
12.	Gates	
	Guies.	
PIC Micro	controller Programming:	
1	LED Blinking with a Delay of 1 second	
2	Solid State Relay Interface	
2.	Interfacing of $I(D(2\times 16))$	
5.	Interfacing of Stopper Motor and	
4.	Deteting Stepper Motor hy N Stepp	
	Clashering (Auticlashering with Sugar	
	Clockwise/Anticlockwise with Speed	
5		
5.	To Test all the Gates of a given IC/4XX is	
(Good of Bad.	
6.	Generate Sine, Square, Sawtooth, Iriangular	
7	and Staircase Waveform using DAC Interface.	
7.	Display of 4-Digit Decimal Number using the	
0	Multiplexed /-Segment Display Interface.	
8.	Analog to Digital Conversion using Internal	
	ADC and Display the Result on LCD.	
9.	Implementation of DC Voltmeter (0-5V) using	
	Internal ADC and LCD.	
10.	Digital to Analog Conversion using PWM	
	(Pulse Delayto be Implemented using Timers).	
11.	Speed Control of DC Motor using PWM (Pulse	
	Delay to be Implemented using Timers).	
12.	Interfacing of Matrix Keyboard (4×4).	
13.	Serial Communication between Microcontroller	
	and PC.	
D''.I'	$\mathbf{C} = \mathbf{C} \mathbf{C} \mathbf{C} \mathbf{E} \mathbf{E} \mathbf{C} \mathbf{C} \mathbf{E} \mathbf{E} \mathbf{C} \mathbf{C} \mathbf{E} \mathbf{E} \mathbf{C} \mathbf{C} \mathbf{E} \mathbf{C} \mathbf{C} \mathbf{E} \mathbf{C} \mathbf{C} \mathbf{C} \mathbf{E} \mathbf{C} \mathbf{C} \mathbf{C} \mathbf{C} \mathbf{C} \mathbf{C} \mathbf{C} C$	
Discipline	Specific Electives (DSE) - 1	
DSE-1: G	roup-A (DSE-A) Option-1 (DSE-1-A-1)	
Theory	ELT-A-DSE-5-A-1-TH: Numerical	
Techniqu	es	
Numerica	l Methods Solution of Transcendental	5.3.1 Understanding various mathematical tools to
and Poly	momial Equations Interpolation and	silve complex equations
	-1 Annuarinations, Interpolation and	sorve complex equations.
Polynomi	al Approximations, Curve Fitting,	
Numerica	I Integration, Numerical Differentiation,	
Numerica	l methods for first order differential	
equations,	Numerical Methods in Linear Algebra,	
Matrix Ei	genvalue	
$\overline{DSF}_{1} \cdot \mathcal{O}$	Froun-A (DSF-A) Ontion 1 (DSF 1 A 1)	
Fractical	ELI-A-DSE-5-A-I-P: Numerical	
I echniqu	es Lab	
~ -		5.3.2 Coding practical to implement such tools
CI	anguage/Scilab/MatLab/Any Other	*
Ma	thematical Simulation Software	
1.	Program to Implement Bisection Method.	
2.	Program to Implement Secant Method.	
3.	Program to Implement Regula Falsi Method.	
4.	Program to Implement Newton Raphson	



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Method. 5. Program to Implement Trapezoidal Rule. 6. Program to Implement Simpson's Rule. 7. Program to Implement Runge Kutta Method. 8. Program to Implement Euler-Cauchy Method. 9. Program to Implement Gauss-Jordon Method.	
 Program to Implement Gauss-Seidel Iteration. Program to Implement Newton Forward/Backward Interpolation. Program to Implement Lagrange's Interpolation. 	
DSE-1: Group-A (DSE-A) Option-2 (DSE-1-A-2) Theory ELT-A-DSE-5-A-2-TH: Control Systems	
Introduction to Control Systems, Time Domain	5.4.1 Understanding electronic control systems
Analysis, Concept of Stability, Frequency	
Domain Analysis, State Space Analysis,	
Controllers and Compensation Techniques	
DSE-1: Group-A (DSE-A) Option-2 (DSE-1-A-2)	
Practical ELT-A-DSE-5-A-2-P: Control Systems	
Lab	
Implementation using Hardware and Scilab/MATLAB/Any Other Circuit Simulation	5.4.2 Related practical
Software	
 (a) Synchro Transmitter Receiver; (b) Synchro as Error Detector. 	
2. To Study Position Control of DC Motor.	
3. To Study Speed Control of DC Motor.	
 To Find Characteristics of AC Servo Motor. To Study Time Response of Type 0, 1 and 2 Systems 	
 To Study Frequency Response of First and Second Order Systems. 	
 To Study Time Response Characteristics of Second Order System. To Study Effect of Damping Factor on 	
Performance of Second Order System.	
 To Study Frequency Response of Lead and Lag Networks. 	
10. Study of P, PI and PID Controller.	
Discipline Specific Electives (DSE) - 2 DSE-2: Group-B (DSE-B) Option-1 (DSE-2-B-1) Theory ELT A DSE 5 B 1 TH:	
ELI-A-DSE-3-D-1-IN: Semiconductor	
radication of Semiconductor Process	5.5.1 Understanding chin fabrication processes
Tashnalagy Emitany Danasitian	5.5.1 Understanding chip faorication processes
Characterization Ovidation Difference	
Lithographic Drocosco Etching Motallistics	
Drogoss Integration	
riocess integration	
изе-2; Group-в (изе-в) Uption-1 (изе-2-В-1) Practical	
ELT-A-DSE-5-B-1-P: Semiconductor Fabrication	



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RECOGNISED UNDER SECTION 2(F) & 12 (B) OF THE UGC ACT, 1956

and Characterization Lab	· · · · · · · · · · · · · · · · · · ·
1 To Mangura the Registryity of Semiconductor	5.5.2 Deleted and sticel
Crystal with Temperature by Four-Probe	5.5.2 Related practical
Method	
2. To Determine the Type (n or p) and Mobility of	
Semiconductor Material using Hall-Effect.	
3. Oxidation Process Simulation.	
4. Diffusion Process Simulation.	
5. Process Integration Simulation.	
6. Fabrication of Thin Film using Spin Coating	
System.	
7. Crystallographic Analysis and Particle	
Size Determination by X-Ray	
Diffraction (XRD) (of the given XRD	
Spectra). Introduction to JCPDS Card.	
8. Determination of Optical Bandgap through	
Transmission Spectra from Published	
Literature.	
DSF_2. Group_R (DSF_R) Option 2 (DSF 2 P 2)	
Theory ELT-A-DSE-5-B-2-TH: Power Electronics	
Power Devices Silicon Controllad Destifice	5.6.1 Understanding power electronics
rower Devices, Sincon Controlled Recurren	5.0.1 Onderstanding power electronics
(SCR), Diac and Iriac, Insulated Gate Bipolar	
Transistors (IGBT), Application of SCR, Power	
MOSFETs, Power Inverters, Choppers,	
Regulators and Converters, Electromechanical	
Machines	
DSE 2. Crown B (DSE B) Ontion 2 (DSE B 2)	
DSE-2. Gloup-D ($DSE-D$) Option-2 ($DSE-D-2$)	
Practical EL1-A-DSE-5-B-2-P: Power Electronics	
1. Study of I-V Characteristics of DIAC.	5.6.2 Related practical
2. Study of I-V Characteristics of a TRIAC.	
3. Study of I-V Characteristics of a SCR.	
4. SCK as a Half wave and Full wave Rectifiers	
With K and KL Loads.	
5. DC Motor Control using SCR.	
6. DC Motor Control using TRIAC.	
7. AC voltage Controller using TRIAC with UJT	
8 Study of Darollal and Bridge Inverter	
9 Design of Snubber Circuit	
10 V-I Characteristic of MOSEET and IGBT	
(Both)	
11 Study of Chopper Circuits	
11. Study of chopper chounts.	
Semest	er – VI
Core Course - 13 Theory	
FIT- $\Lambda_{-}CC_{-6-13}$ -TH· Communication	
ELI-A-CC-0-13-111, Communication	
Electronic Communication, Amplitude	6.1.1 Understanding communication electronics
Modulation, Angle Modulation, Pulse Analog	
Modulation, Pulse Code Modulation, Digital	



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Carrier Modulation Techniques	<u>F) & 12 (B) OF THE UGC ACT, 1950</u>
Core Course - 13 Practical ELT-A-CC-6-13-P: Communication Electronics Lab Hardware and Circuit Simulation Software 1. Study of Amplitude Modulation. 2. Study of Amplitude Demodulation. 3. Study of Frequency Modulation. 4. Study of Frequency Demodulation. 5. Study of Pulse Amplitude Modulation. 6. Study of Pulse Amplitude Modulation. 7. Study of Pulse Width Modulation. 8. Study of Pulse Position Modulation. 8. Study of Pulse CodeModulation. 9. Study of Pulse CodeModulation. 9. Study of Phase Shift Keying. 10. Study of Frequency Shift Keying.	6.1.2 Related practical
Core Course - 14 Theory ELT-A-CC-6-14-TH: Photonics Light as Electromagnetic Wave, Interference, Diffraction, Polarization, Light Emitting Diodes Lasers. Photodetectors, LCD Displays, Guided	6.2.1 Understanding light propagation through guided/unguided media
Waves and Optical Fiber Core Course - 14 Practical ELT-A-CC-6-14-P: Photonics Lab	
 To Determine Wavelength of Sodium Light using Newton's Rings. To Determine the Resolving Power and Dispersive Power of Diffraction Grating. Diffraction Experiments using a Laser. To Determine the Specific Rotation of Scan Sugar using Polarimeter. To Determine Characteristics of LEDs and Photo-Detector. To Measure the Numerical Aperture of an Optical Fiber. 	6.2.2 Related practical
Discipline Specific Electives (DSE) - 3 DSE-3: Group-A (DSE-A) Option-1 (DSE-3-A-1) Theory ELT-A-DSE-6-A-1-TH: Basic VLSI Design	
Metal Oxide Semiconductor (MOS), MOS Inverter, Combinational MOS Logic Design, Memory Design DSE-3: Group-A (DSE-A): Option-1 (DSE-3-A- 1) Practical ELT-A-DSE-6-A-1-P: Basic VLSI Design Lab	6.3.1 Understanding basic VLSI
Implementation using Hardware and/or any Circuit Simulation Software	6.3.2 Related practical



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	RECOGNISED UNDER SECTION 2(<u>F) & 12 (B) OF THE UGC ACT, 1956</u>
1.	To Plot the Output Characteristics and Transfer	
	Characteristics of n-Channel and p-Channel	
	MOSFEI.	
2.	To Design and Plot the Static (VTC) and	
	Dynamic Characteristics of Digital CMOS	
	Inverter To Design and Plot the Output	
2	Characteristics of 3-inverter RingOscillator.	
5.	Characteristics of 2 Input NAND	
	NOP VOP and VNOP Logia Gates	
	using CMOS Technology	
1	To Design and Plot the Characteristics of a 4×1	
т.	Digital Multiplexer using Pass Transistor Logic.	
5.	To Design and Plot the Characteristics of a	
-	Positive and Negative Latch Based on	
	Multiplexers.	
6.	To Design and Plot the	
	Characteristics of a Master-Slave	
	Positive and Negative Edge	
	Triggered registers Based on	
	Multiplexers.	
DSE-3: (Group-A (DSE-A) Option-2 (DSE-3-A-2)	
Theory E	CLT-A-DSE-6-A-2-TH: Digital Signal	
Processir	ıg	
Discrete	Time Systems, Network Synthesis,	6.4.1 Understanding digital signal processing
Discrete	Fourier Transform, Digital Filters	(DSP)
DSE-3: (Froup-A (DSE-A) Option-2 (DSE-3-A-2)	
Practical	ELT-A-DSE-6-A-2-P: Digital Signal	
Processir	ng Lah	
		6.4.2 Related practical
Im	plementation using Scilab/MATLAB/Any	or hiz itelated platetied
Ot	her Mathematical Simulation Software	
1.	Generation of Unit Sample Sequence,	
	Unit Step, Ramp Function, Discrete	
	Time Sequence, Real Sinusoidal	
2	Generate and Plot Sequences over an Interval	
2.	Given $v[n]$ Write Program to Find $V[z]$	
3. 4	Fourier Transform Discrete Fourier Transform	
	and Fast Fourier Transform.	
5.	Design of a Butterworth Analog Filter for Low	
	Pass and High Pass.	
6.	Design of Digital Filters.	
Dissimilia	o Spacific Flooting (DSF) 4	
DISCIPIII	e specific Electives (DSE) - 4	
DSE-4: (Froup-D (DSE-D) Option-1 (DSE-4-D-1)	
I neory P	LLI-A-DSE-0-D-1-1H: Blomedical	
		651 Understanding his westiged in the
Biomedic	cal Signals and Physiological	0.3.1 Understanding biomedical instrumentation
Iransduc	ers, Patient Monitoring Systems and	
Audiome	eters, Modern Imaging Systems, Patients	
Safety ar	nd Computer Applications in Biomedical	
Field, Ph	ysiotherapy	
DSE-4: (Group-B (DSE-B) Option-1 (DSE-4-B-1)	
Practical	FLT_A_DSF_6_B_1_P. Biomedical	



Instrume	<u>ntation Lab</u>	T) & 12 (B) OF THE OOC ACT, 1950
insti unic		
1.	Characterization of Bio Potential Amplifier for ECG Signals.	6.5.2 Related practical
2.	Study on ECG Simulator.	
3.	Measurement of Heart Sound using Electronic Stethoscope. Study on ECG Heart Rate Monitor/Simulator.	
4.	Study of Pulse Rate Monitor with Alarm System.	
5.	Determination Pulmonary Function using Spirometer (using Mechanical System).	
6.	Measurement of Respiration Rateusing Thermistor/Other Electrodes.	
7.	Study of Respiration Rate Monitor/Apnea Monitor.	
8.	Study on Ultrasound Transducers Based on Medical System.	
9.	Study of Pacemaker.	
10.	Measurement of Pulse Rate using Photoelectric Transducer and Pulse Counting for known Period.	
DSE-4: G Theory ELT-A-D Antenna	roup-B (DSE-B) Option-2 (DSE-4-B-2) SE-6-B-2-TH: Transmission Lines, and Microwave Devices	
Transmis	sion Lines, Guided Waves and	6.6.1 Understanding electronics sender/receiver
Waveouid	les Antenna Fundamentals and	systems
Daramete	rs Antenna as Transmitter/Receiver	
Turned of	Antonnog (Qualitativa Study Only)	
Types of Antennas (Quantative Study Only),		
Propagati	on of Radio Waves, Microwave	
Devices (Qualitative Study Only)	
DSE-4: G Practical	croup-B (DSE-B) Option-2 (DSE-4-B-2)	
ELT-A-D	SE-6-B-2-P: Transmission Lines,	
Antenna	and Microwave Devices Lab	
Imj Sci Sin	plementation with Hardware and/or Lab/MATLAB/Any Other Mathematical sulation Software	6.6.2 Related practical
1.	Program to Determine the Phasor of Forward Propagating Field.	
2.	Program to Determine the Instantaneous Field of Plane Wave.	
3.	Program to Find the Phase Constant, Phase Velocity, Electric Field Intensity and Intrinsic Ratio.	
4.	Program to Find Skin Depth, Loss Tangent and Phase Velocity.	
5.	Program to Determine the Total Voltage as Function of Time and Position in Loss Less	
	Transmission Line.	
6.	Program to Find the Characteristic Impedance,	
_	Phase Constant and Phase Velocity.	
1.	Program to Find the Output Power and	



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- Attenuation Coefficient. 8. Program to Find the Power Dissipated in Lossless Transmission Line.
- Program to Find the Total Loss in Lossy Lines.
 Program to Find the Load Impedance of Slotted
- Frogram to Find the Load Impedance of Stot Line.
 Program to Find the Input Impedance of Tregenizien Line Tregenized with Page
- Transmission Line Terminated with Pure CapacitiveImpedance. 12. Program to Determine the
- Operating Range of Frequency for TE_{10} Mode of Air-Filled Rectangular Waveguide.
- 13. Program to Determine Directivity, Bandwidth, Beamwidth of Antenna.
- Program to Determine Diameter of Parabolic Reflector.
- 15. Program to Find Minimum Distance between Primary and Secondaryantenna.
- 16. Simple Problems using Smith Chart.



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Course Outcomes (CO)	Program Outcomes (PO)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
1.1.1					1	 √	
1.1.2							
1.2.1							
1.2.2			\checkmark				
2.1.1							
2.1.2							
2.2.1							
2.2.2							
3.1.1							
3.1.2			\checkmark				
3.2.1							
3.2.2			\checkmark				
3.3.1						\checkmark	
3.3.2							
3.4.1							
3.5.1							
4.1.1							
4.1.2			\checkmark				
4.2.1							
4.2.2							
4.3.1							
4.3.2							
4.4.1							
4.5.1							
5.1.1							
5.1.2							
5.2.1							
5.2.2							
5.3.1	N		,				
5.3.2	N		\checkmark				
5.4.1	N	N	,		V		
5.4.2	N		\checkmark				
5.5.1			,				,
5.5.2							
5.6.1	√		,				,
5.6.2						1	\checkmark
6.1.1			,				,
6.1.2						,	
6.2.1			ļ,				,
6.2.2			\checkmark				

PO CO mapping for Graduation Degree Course of Electronics Honours (CBCS)



RECOMBED ONDER SECTION $2(1) \times 12(D)$ of the observes, 1990						
6.3.1						
6.3.2			\checkmark			\checkmark
6.4.1						
6.4.2						
6.5.1						
6.5.2						
6.6.1						
6.6.2						



A MINORITY RUN COLLEGE. AFFILIATED TO UNIVERSITY OF CALCUTTA RECOGNISED UNDER SECTION 2(F) & 12 (B) OF THE UGC ACT, 1956

Program Outcome (PO) of Graduation Degree Course of

Electronics Honours (CBCS)

	Program Outcome	Description
PO1	Subject Knowledge	Knowing the fundamentals of the different areas of discussion within the subject which will enable the students to consider applying the theoretical principles in practical situations that they are likely to find themselves in as professionals after having completed the course.
	Method of Measurement:	Assessment (Internal & Final)
PO2	Communication Skills	Encouraging the students to apply the principles learned in their own fields, bothprofessionaland personal, thus, honing their communication skills and leading them towards becoming better communicators serving the society and nation as expected in the ICT age.
	Method of Measurement:	Regular Communication Activity Internal Assessment
PO3	Technical Skill Development	Knowing and developing the technical skills expected from the students in the professional arena, thus, becoming successful professional communicators/educators after finishing the program.
	Method of Measurement:	Assessment (Internal & Final)
PO4	Personality Development	Imparting personality development skills to the students that are likely to help them in their professional and personal lives, thus making them responsible and sincere citizens.
	Method of Measurement:	Regular Personality Development Internal Assessment



PO5	Higher Study Foundation	Encouraging the students to pursue higher studies in the subject and enhance their knowledge on the same.
	Method of Measurement:	Regular Teacher-Student Interactive Sessions
PO6	Research Orientation and Aptitude	Encouraging the students to pursue research avenues related to the subject either in theacademic or in the professional sphere that may lead to a vibrant knowledge economy.
	Method of Measurement:	Regular Teacher-Student Interactive Sessions
PO7	Spirit of Team Work	Encouraging the students to coordinate with one another in a team environment and perform well as a team rather than trying to excel individually at the cost of group performance efficiency.
	Method of Measurement:	Group Activity Assignments Assessment



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Program Specific Outcomes (PSO)of Graduation Degree Course of

Electronics Honours (CBCS)

- 1. The students learn the fundamentals of Electronics theory and practice.
- 2. The students will appreciate the theoretical foundations related to different paradigms such as electromagnetism, quantum mechanics, communication and semiconductor devices etc.
- **3.** The students learn the practicalities and techniques of professional communication practices such as in colleges, symposiums, conferences and seminars and in international platforms.
- **4.** The students become effective and ethical practitioners contributing to social and national development.



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Course Outcomes (COs) of Graduation Degree Course of

Electronics Honours (CBCS) for the session, 2018-2019

Semester – I		
Paper	Course Outcomes	
ELT-A-CC-1-01-TH: Basic Circuit Theory and Network Analysis Basic circuit concepts, basic circuit analysis, DC and AC circuit analysis, network theorems, two port networks and network graph theorems.	Students learn how to apply physical laws and theorems to real circuits.	
ELT-A-CC-1-01-P: Basic Circuit Theory and		
Network Analysis Lab Familiarization with: (a) Resistance in Series, Parallel and Series-Parallel; (b) Capacitors and Inductors in Series and Parallel; (c) Multimeter - Checking of Components; (d) Voltage Sources in Series, Parallel and Series-Parallel; (e) Voltage and Current Dividers. 2. Measurement of Amplitude, Frequency and Phase Difference using CRO. 3. Verification of Kirchoff's Law. 4. Verification of Norton's Theorem. 5. Verification of Thevenin's Theorem. 6. Verification of Superposition Theorem. 7. Verification of the Maximum Power Transfer Theorem. 8. RC Circuits: Time Constant, Differentiator, Integrator. 9. Designing of a Low Pass RC Filter and study of its Frequency Response. 10. Designing of a High Pass RC Filter and study of its Frequency Response. 11. Study of the Frequency Response of a Series LCR Circuit and determination of its (a) Resonant Frequency; (b) Impedance at Resonance; (c) Quality Factor Q; (d) Band Width.	Critical analysis of circuit parameters in view of scientific principles, so that it leads to synthesis of elements (passive and active) for innovative outcomes.	
FIT A CC 1.02 TH: Mathematics Foundation		
for Electronics Ordinary differential equations, series solution to ODEs and special functions, matrices, sequences and series, complex variables and functions, Laplace's transforms.	Students understand and appreciate the various mathematical methods to solve pertinent problems.	
ELT-A-CC-1-02-P: Mathematics Foundation for Electronics Lab		



Mathematics Foundation for Electronics using simulation software like MATLAB/Scilab	Students understand and appreciate the various mathematical methods to solve pertinent			
Solution of First Order Differential Equations. 2. Solution of Second Order Homogeneous Differential Equations. 3. Solution of Second Order Non-Homogeneous Differential Equations. 4. Convergence of a given Series. 5. Divergence of a given Series. 6. Solution of Linear System of Equations using Gauss Elimination Method. 7. Solution of Linear System of Equations using Gauss-Seidel Method. 8. Solution of Linear System of Equations using L-U Decomposition Method.	problems.			
Semester - II				
ELT-A-CC-2-03-TH: Applied Physics				
Physics of crystalline solids, Quantum mechanics, mechanical properties of solids, thermal properties, electrical properties, magnetic properties and statistical mechanics.	Knowledge and understanding of various physical processes governing the structures of materials.			
ELT-A-CC-2-03-P: Applied Physics Lab				
To Measure the Resistivity of a Si Crystal with Temperature by Four-Probe Method from Room Temperature to 200 OC). 2. To Determine the Value of Boltzmann Constant by Studying Forward Characteristics of Diode. 3. To Determine the Value of Planck's Constant by using LEDs of Different Wavelengths. 4. Simulation Studies: (a) Find Lowest Energy Eigenvalues for 1-D Schrodinger Equation. (b) Plotting Tunneling Probability as a Function of Barrier Width. (c) Plot Energy Band-Diagram corresponding to Different Potential Profile.	Analysis of various material properties to appreciate the nature of things.			
FLT.A.CC.2.04.TH. C Programming and Data				
Structures				
C Programming language, decision making, branching and looping, structures, introduction to C++, data structures, searching and sorting	Programming language is studied to facilitate the computation and simulation abilities of the students.			
ELT-A-CC-2-04-P: C Programming and Data Structures Lab				



THE BHAWANIPUR EDUCATION SOCIETY COLLEGE A MINORITY RUN COLLEGE. AFFILIATED TO UNIVERSITY OF CALCUTTA RECOGNISED UNDER SECTION 2(F) & 12 (B) OF THE UGC ACT, 1956

1 Commente the Filemanni Series and to the sime				
1.Generate the Fibonacci Series up to the given Limit N and also Print the Number of Elements in the Series. 2. Find Minimum and Maximum of N Numbers. 3. Find the GCD of Two Integer Numbers. 4. Calculate Factorial of a given Number. 5. Find all the Roots of a Quadratic Equation $Ax2 + Bx + C = 0$ for Non -Zero Coefficients A, B and C. Else Report Error. 6. Calculate the Value of $sin(x)$ and $cos(x)$ using the Series. Also Print $sin(x)$ and cos(x) value using Library Function. 7. Generate and Print Prime Numbers up to an Integer N. 8. Sort given N Numbers in Ascending Order. 9. Find the Sum and Difference of Two Matrices of Order M×N and P×Q. 10. Find the Product of Two Matrices of Order M×N and P×Q. 11. Find the Transpose of given M×N Matrix. 12. Find the Sum of Principle and Secondary Diagonal Elements of the given M×N Matrix. 13. Calculate the Subject wise and Student wise Totals and Store them as a Part of the Structure. 14. Implement Linear and Circular Linked Lists using Single and Double Pointers. 15. Create a Stack and Perform Pop, Push, Traverse Operations on the Stack using Linear Linked List. 16. Create Circular Linked List having Information about a College and Perform Insertion at Front, Deletion at End. 17. Create a Linear Queue using Linked List and Implement Different Operations such as Insert, Delete, and Display the Queue Elements. 18. Implement Different Operations such as Insert, Delete, and Display the Queue Elements. 18. Implement Polynomial Addition and Subtraction using Linked Lists. 19. Implement Sparse Matrices using Arrays and Linked Lists. 20. Create a Binary Tree to Perform Tree Traversals (Preorder, Post-order, In- order) using the Concept of Recursion. 21. Implement Binary Search Tree using Linked Lists. Compare its Time Complexity over that of Linear Search. 22. Implement Insertion Sort, Merge Sort, Bubble Sort, and Selection Sort.	Programming language is implemented to facilitate the computation and simulation abilities of the students.			
Semester - III				
ELT-A-CC-3-05-TH: Semiconductor Devices				



ELT-A-CC-3-05-P: Semiconductor Devices Lab Study of the I-V Characteristics of PN Junction Dide and Zener Diode. 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r _i , r _o , β. 3. Study of the I-V Characteristics of the Common Emitter Onfiguration of BJT and obtain r _i , r _o , β. 3. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of FET/MOSFET. 8. Study of Characteristics of Solar Cell. 9. Study of Hall Effect. ELT-A-CC-3-06-TH: Electronic Circuits Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers. MOSFET circuits Stimulation Software 1. Study of the Half-Wave Rectifier and Full-Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the clamping Circuits. 5. Study of Clipping and Calmping Circuits. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Phase Shith Oscillator. 8. Study of the Phase Shith	Semiconductor basics, carrier transport phenomena, physics of junctions, semiconductor-semiconductor homo-junction, PN junction diode, application of junction properties, bipolar junction transistors, field effect transistors, JFETs, MOSFETs, power devices.	Students learn the fundamentals of semiconductor devices which are the basic components of electronic equipment.
Study of the I-V Characteristics of PN Junction Diode and Zener Diode. 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r ₁ , r ₀ , β. 3. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the Triae. Page 11 7. Study of the I-V Characteristics of Solar Cell. 9. Study of Hall Effect. Students appreciate the operational principles of devices to understand their usefulness and viability. ELT-A-CC-3-06-TH: Electronic Circuits Students learn about the electronic circuits and their functionalities involving device operation. Biode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers. Students learn about the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-06-P: Electronic Circuits Lab Students design the electronic circuits and their functionalities involving device operation. Hardware and Circuit Simulation Software 1. 1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Cipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.	ELT-A-CC-3-05-P: Semiconductor Devices Lab	
ELT-A-CC-3-06-TH: Electronic Circuits Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers. Students learn about the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-06-P: Electronic Circuits Lab Mardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier. Students design the working principles of the devices.	Study of the I-V Characteristics of PN Junction Diode and Zener Diode. 2. Study of the I-V Characteristics of the Common Emitter Configuration of BJT and obtain r_i , r_o , β . 3. Study of the I-V Characteristics of the Common Base Configuration of BJT and obtain r_i , r_o , α . 4. Study of the I-V Characteristics of the SCR. 5. Study of the I-V Characteristics of the Diac. 6. Study of the I-V Characteristics of the Triac. Page 11 7. Study of the I-V Characteristics of Solar Cell. 9. Study of Hall Effect.	Students appreciate the operational principles of devices to understand their usefulness and viability.
Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers. Students learn about the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-06-P: Electronic Circuits Lab Hardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpitt's Oscillator. 8. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier. Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.	FLT A CC 3.06 TH: Flastronic Circuits	
Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers. Students learn about the electronic circuits and their functionalities involving device operation. ELT-A-CC-3-06-P: Electronic Circuits Lab Hardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Students design the electronic circuits and their functionalities involving device operation. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpitt's Oscillator. 8. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier. Heat A CC 3 07 TH: Electromegnetics	ELT-A-CC-5-00-TH. Electronic Circuits	
ELT-A-CC-3-06-P: Electronic Circuits LabHardware and Circuit Simulation Software1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpitt's Oscillator 8. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.	Diode circuits, BJT circuits, feedback amplifiers, MOSFET circuits, power amplifiers, single tuned amplifiers.	Students learn about the electronic circuits and their functionalities involving device operation.
Hardware and Circuit Simulation Software1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.	ELT-A-CC-3-06-P: Electronic Circuits Lab	
ELT A CC 3 07 TH: Electromagnetics	Hardware and Circuit Simulation Software 1. Study of the Half-Wave Rectifier and Full- Wave (Center-tap and Bridge) Rectifier. 2. Study of Power Supply using C Filter and Zener Diode. 3. Designing and Testing of 5V/9V DC Regulated Power Supply using Two Transistors and find it's Load Regulation. 4. Study of Clipping and Clamping Circuits. 5. Study of Fixed Bias, Voltage Divider Bias and Collector-to-Base Bias Feedback Configuration for Transistors. 6. Designing of a Single Stage CE Amplifier. 7. Study of the Colpitt's Oscillator. 8. Study of the Phase Shift Oscillator 9. Study of the Frequency Response of Common Source FET Amplifier.	Students design the electronic circuits and their functionalities involving device operation. Experimentation facilitates the students to better understand the working principles of the devices.
PALAL-A-VA-J-J-V/-LET: PACULOHIAPHELICS	ELT-A-CC-3-07-TH: Electromagnetics	



Vector analysis, Poisson's and Laplace equations, electrostatics, magnetostatics, time-varying fields and Maxwell's equations, EM wave propagation	The basic electromagnetism is appreciated by the students.
ELT-A-CC-3-07-P: Electromagnetics Lab	
Scilab/MATLAB/Any Other Similar Free Software 1. Understanding and Plotting Vectors. 2. Transformation of Vectors into Various Coordinate Systems. 3. 2D and 3D Graphical Plotting with Change of View and Rotation. 4. Representation of the Gradient of a Scalar Field, Divergence and Curl of Vector Fields. 5. Plots of Electric Field and Electric Potential due to Charge Distributions. 6. Plots of Magnetic Flux Density due to Current Carrying Wire. 7. Programs and Contour Plots to Illustrate Method of Images. 8. Solutions of Poisson and Laplace Equations - Contour Plots of Charge and Potential Distributions. 9. Introduction to Computational Electromagnetics - Simple Boundary Value Problems by Finite Difference/Finite Element Methods.	These help to better visualize the electric and magnetic fields and their mathematical manipulations which are the central concepts in EM theory.
	Γ
SEC-1: Group-A (SEC-A) Option-1 (SEC-1-A- 1) ELT-A-SEC-3-A-1-HT: Design and Fabrication of Printed Circuit Boards	
PCB Fundamentals, Schematic and Layout Design, Technology of PCB and PCB Technology	