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

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	Students learn how to apply physical laws and theorems to real circuits.
Basic circuit concepts, basic circuit analysis, DC and AC circuit analysis, network theorems, two port networks and network graph theorems.	
ELT-A-CC-1-01-P: Basic Circuit Theory and Network Analysis Lab	Critical analysis of circuit parameters in view of scientific principles, so that it leads to synthesis of elements (passive and active) for innovative outcomes.
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.	
ELT-A-CC-1-02-TH: Mathematics Foundation for Electronics	Students understand and appreciate the various mathematical methods to solve pertinent problems.
Ordinary differential equations, series solution to ODEs and special functions, matrices, sequences and series, complex variables and functions, Laplace's transforms.	
ELT-A-CC-1-02-P: Mathematics Foundation for Electronics Lab	

Mathematics Foundation for Electronics using simulation software like MATLAB/Scilab 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.	Students understand and appreciate the various mathematical methods to solve pertinent 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.
ELT-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	

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 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	

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.
ELT-A-CC-3-05-P: Semiconductor Devices 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.	Students appreciate the operational principles of devices to understand their usefulness and viability.
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	
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.
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	