

Course Title: Mathematics –IA	Code:BS-M101
Type of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M101.CO1	Introduce the concepts of differential calculus including mean value theorems and Taylor/Maclaurin series to deal with the problems of engineering and optimization problems.	Introduce	K2
BS-M101.CO2	Understand definite and improper integrals, surface areas and volumes of solids of revolution.	Understand	K2
BS-M101.CO3	Apply concepts of matrices, including operations, rank, and inversion to the systems of linear equations.	Apply	K3
BS-M101.CO4	Analyze vector spaces, basis, dimension, and linear transformations, Rank-Nullity theorem.	Analyze	K4
BS-M101.CO5	Evaluate eigen values and eigenvectors for square matrices and Develop the concept of diagonalization and inner product spaces for practical applications in engineering.	Evaluate, Develop	K5,k6

Course Name: Physics-I (BS-PH101) Year of Study: 2024-25;

Course Title: Physics-I	Code:BS-PH101
Type of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-PH101.CO1	State and apply the basic concepts of mechanics	State, Apply	K1, K3
BS-PH101.CO2	Discuss Physical optics and Explain principles of lasers with applications	Discuss, Explain	K2
BS-PH101.CO3	Describe and classify Dielectric and Magnetic properties of materials, Evaluate Maxwell's equations .	Describe, Evaluate	K2,K5
BS-PH101.CO4	Differentiate Classical Physics and Quantum Physics by Introducing Planck's law	Differentiate	K4
BS-PH101.CO5	Explain wave particle duality , Davisson-Germer experiment and Compare different statistics for particles.	Explain, Compare	K2,K4

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

Course Name: Basic Electrical Engineering (ES-EE101)Year of Study: 2024-25;

Course Title: Basic Electrical Engineering	Code:ES-EE101
Type Of Course: Theory	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE101.CO1	Understand and apply basic laws and theorems in DC and AC circuits.	Understand, apply	K2, K3
ES-EE101.CO2	Analyze AC circuits using phasor; evaluate power and resonance conditions.	Analyze	K4
ES-EE101.CO3	Explain and analyze the working principles and characteristics of transformers.	Explain, analyze	K2, K4
ES-EE101.CO4	Evaluate and describe construction, operation, and control of electrical machines.	Discover, Determine	K4, K5
ES-EE101.CO5	Apply power electronics basics for converters and inverters and Estimate energy consumption and design simple electrical installations with safety.	Apply, Design	K3,k6

Course Name: Physics-I Laboratory (BS-PH191)Year of Study: 2024-25;

Course Title: Physics-I Laboratory	Code:BS-PH191
Type of Course: Practical	Course Designation: Compulsory
Semester: 1st	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-PH191.CO1	Recall facts and read data in slide calliper's, screw gauge.Calculate different modulus of elasticity and coefficient of viscosity of water by applying basic knowledge of Physic.	Recall	K1
BS-PH191.CO2	Implement sequential connection in electrical experiment to verify Kirchhoff's law and related phenomena.	Implement	K3
BS-PH191.CO3	Organize optical instruments to illustrate physical properties of light and to observe spectral lines of light. Examine Hydrogen spectrum and calculate Rydberg constant by studying Hydrogen spectrum .	Organize, Examine	K4, K3

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

BS-PH191.CO4	Evaluate Band Gap and Hall coefficient of a given intrinsic semiconductor and distinguish between different intrinsic semiconductors. Determine the dielectric constant of different dielectric materials and their usage in capacitors.	Evaluate, Distinguish	K5, K4
BS-PH191.CO5	Investigate the values of Planck's const and stefan's constant applying modern Physics	Investigate	k6

Course Name: Basic Electrical Engineering Lab (ES-EE191)Year of Study: 2024-25;

Course Title: Basic Electrical Engineering Lab	Code: ES-EE191
Type of Course: Practical	Course Designation: Compulsory
Semester: 1st	Contact Hours: 2P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-EE191.CO1	Understand basic electrical safety, and correctly handle lab instruments.	K2	Understand
ES-EE191.CO2	Identify and operate electrical components (resistors, capacitors, inductors, machines, etc.).	K3	Apply
ES-EE191.CO3	Calibrate instruments and perform measurements on electrical circuits.	K4	Analyze
ES-EE191.CO4	Evaluate performance of single-phase and three-phase transformers.	K5	Evaluate
ES-EE191.CO5	Interpret torque-speed characteristics of DC and Induction motors. And Demonstrate the application of converters and LT switchgear components.	K4,K2	Analyze, Demonstrate

Course Name: Workshop (ES-ME192) Year of Study: 2024-25;

Course Title: Workshop	Code:ES-ME192
Type Of Course: Practical	Course Designation: Compulsory
Semester: 1st	Contact Hours: 1L+4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME192.CO1	Build through knowledge of various tools, machines, devices used in engineering practice.	Understand	K2
ES-ME192.CO2	Acquire thorough knowledge of carrying out various operations in mechanical engineering workshop.	Apply	K3
ES-ME192.CO3	Utilize measuring skills gained in workshop practice	Create	K6
ES-ME192.CO4	Students are able to demonstrate the various hand tools used in the basic mechanical engineering workshop sections-smithy, carpentry, assembling, welding etc.	Understand	K2

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

ES-ME192.CO5	Practical knowledge of the dimensional accuracies and dimensional tolerances possible with different Manufacturing processes and Produce small devices of their interest, by assembling different components.	Evaluate	K5
---------------------	---	----------	----

Course Title: Chemistry-I	Code: BS-CH 201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-CH 201.CO1	Explain fundamental principles of atomic and molecular structure, including Schrödinger's equation, molecular orbital theory, and crystal field theory.	Understand	K2
BS-CH 201.CO2	Apply spectroscopic techniques such as electronic, vibrational, and NMR spectroscopy to analyze molecular structure and chemical properties.	Apply	K3
BS-CH 201.CO3	Analyze intermolecular forces and predict physical properties of substances.	Analyze	K4
BS-CH 201.CO4	Evaluate chemical equilibria using thermodynamic principles and apply the Nernst equation to electrochemical systems.	Evaluate	K5
BS-CH 201.CO5	Compare periodic properties of elements and predict their physical and chemical behaviour.	Compare	K4

Course Title: Mathematics –IIA	Code: BS-M201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-M201.CO1	Recall and explain fundamental concepts of probability, random variables, and standard distributions such as Binomial, Poisson, and Normal.	Remember	K1
BS-M201.CO2	Interpret and compute probabilities for discrete and continuous random variables using appropriate probability distributions.	Apply	K3
BS-M201.CO3	Analyze concepts of joint, marginal, and conditional distributions to solve problems involving multiple random variables.	Analyze	K4
BS-M201.CO4	Evaluate data using statistical measures such as mean, variance, skewness, and kurtosis, and evaluate the fit of data to theoretical distributions.	Evaluate	K5

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

BS-M201.CO5	Relate appropriate statistical tests (e.g., t-test, chi-square test, F-test) to draw conclusions from sample data, and design basic hypothesis testing models.	Analyze	K4
--------------------	--	---------	----

Course Title: Programming for Problem Solving	Code: ES-CS201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS201.CO1	Understand simple algorithms for arithmetic and logical problems, Translate the algorithms to programs in C language.	Understand	K2
ES-CS201.CO2	Execute, test and interpret correct syntax and logical errors in conditional branching and looping, with iteration Vs recursion.	Execute	K3
ES-CS201.CO3	Define array, string and functions to synthesize problem formulation.	Define	K1
ES-CS201.CO4	Differentiate between different programming tools and techniques in (control structures ,recursions ,allocations array types ,structures and union).	Differentiate	K4
ES-CS201.CO5	Assemble the knowledge of different programming tools and problem solving techniques in complex program.	Assemble	K6

Course Title: English	Code: HM-HU201
Type of Course: Theory	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 2L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU201.CO1	Recognize vocabulary building techniques, classify the word origins. Memorize prefixes, suffixes, antonyms, synonyms, acronyms.	Recognize	K2
HM-HU201.CO2	Apply correct sentence structure implementing correct syntax and punctuation. To organize ideas with precision.	Apply	K3
HM-HU201.CO3	Judge the common errors in writing through in-depth knowledge of grammar and practice to enhance linguistic efficacy.	Judge	K5
HM-HU201.CO4	Select requisite data to demonstrate professional writing.	Demonstrate	K3
HM-HU201.CO5	Develop overall language competency to cater to the linguistic requisites of the current industry trends.	Develop	K6

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

Course Title:Chemistry-I Laboratory	Code: BS-CH291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 3P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BS-CH291.CO1	Perform conductometric, potentiometric, and pH-metric titrations to determine the strength of acid and base solutions.	Apply	K3
BS-CH291.CO2	Analyze the composition of water samples by determining dissolved oxygen, chloride ions, and hardness using appropriate analytical techniques.	Analyze	K4
BS-CH291.CO3	Evaluate physicochemical properties such as surface tension, viscosity, and conductance of various substances and solutions.	Evaluate	K5
BS-CH291.CO4	Carry out experiments to determine kinetic parameters like reaction rate constants and understand reaction mechanisms.	Apply	K3
BS-CH291.CO5	Determine partition coefficient of a compound and perform synthesis-based and qualitative analysis experiments, such as polymer synthesis and salt analysis.	Determine	K5

Course Title:Programming for ProblemSolving	Code: ES-CS291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS291.CO1	Choose appropriate data type for implementing programs in C language.	Choose	K2
ES-CS291.CO2	Write code to perform various mathematical calculations.	Write	K6
ES-CS291.CO3	Analyze modular program involving input output operations, decision making and looping constructs.	Analyze	K4
ES-CS291.CO4	Implement Arrays and functions and recursion. Apply pointers with arrays ,structures and functions.	Implement	K3
ES-CS291.CO5	Select tools for effective handling of files.	Evaluate	K5

Course Title:Engineering Graphics & Design	Code: ES-ME291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 1L+4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-ME291.CO1	Understand the applications of hand tools and machinetools.	Understand	K2
ES-ME291.CO2	Analyze the safety measures required to be takenwhile using the tools.	Analyze	K4
ES-ME291.CO3	Select the appropriate tools required to manufacture anobject of predetermined shape and size considering least wastage and cost.	Evaluate	K5
ES-ME291.CO4	Fabricate components with their own hands & Produce small devices of their interest by assemblingdifferent components.	Create	K6
ES-ME291.CO5	Confident on practical knowledge of the dimensional accuracies and dimensional tolerances possible withdifferent manufacturing processes.	Understand	K2

Course Title:Language Laboratory	Code: HM-HU291
Type of Course: Practical	Course Designation: Compulsory
Semester: 2nd	Contact Hours: 2P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HM-HU291.CO1	List the linguistic/paralinguistic features (pronunciation/phonetics/voice modulation/stress/intonation/pitch and accent) of connected speech.	List	K1
HM-HU291.CO2	Understand and select data for effective professional communication.	Understand Select	K2
HM-HU291.CO3	Apply English language presentation skill in academic and professional communication.	Apply	K3
HM-HU291.CO4	Analyze ideas, viewpoints to enhance critical thinking skills and evaluate individual thought process through the productive skills (writing, speaking) of English.	Analyze & Evaluate	K4/K5
HM-HU291.CO5	Creating an integration of the four language skills. Developing grammar skills for error –free communicative competence. Apply receptive skills(reading and listening) of English in academics and in Engineering profession.	Apply Develop	K3, K6

Course Name: Analog and Digital Electronics (ESC 301) Year of Study: 2024-25;

Course Title: Analog and Digital Electronics	Code: ESC 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ESC 301.CO1	Understand the operations of different types of power amplifier as well as oscillator and multivibrator, Schmitt Trigger circuits, 555 Timer.	Understand	K2
ESC 301.CO2	Implement number system and Boolean algebra, as well as all the combinational circuits (Adder and Subtractor circuits, Encoder, Decoder, Comparator, Multiplexer, De-Multiplexer and Parity Generator.).	Illustrate	K3
ESC 301.CO3	Analyze latch and all the Sequential circuits (SR, JK, D, T and JK Master-slave Flip Flops).	Analyze	K4
ESC 301.CO4	Distinguish the basic concept of Registers (SISO, SIPO, PIPO, PISO) and Counters (Ring counter, Johnson counter, Synchronous and Asynchronous counters, Mod N Counter).	Distinguish	K4
ESC 301.CO5	Evaluate the basic concepts of logic families (TTL, ECL, MOS, CMOS) and illustrate A/D and D/A conversion techniques	Evaluate	K5

Course Name: Mathematics-III (BSC 301) Year of Study: 2024-25;

Course Title: Mathematics-III	Code: BSC 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 2L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BSC 301.CO1	Recall and explain the fundamental concepts of sequences, series convergence test & Taylor's series for various function.	Remember, Understand	K1, K2
BSC 301.CO2	Apply the techniques of multivariable differentiation, including partial derivatives, Jacobians & gradients to determine maxima, minima & saddle points of multi variable functions.	Apply	K3
BSC 301.CO3	Analyze multivariable integrals using Cartesian & polar coordinates & apply fundamental theorems such as Green's, Gauss's & Stoke's Theorems to solve related problems.	Analyze	K4
BSC 301.CO4	Evaluate first-order & second-order ordinary differential equations using appropriate methods including variation of parameter, D-operator & Cauchy-Euler's methods	Evaluate	K5

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

BSC 301.CO5	Apply concepts of graph theory and mathematical techniques to develop solutions for engineering problems.	Apply	K3
--------------------	---	-------	----

Course Name: Economics for Engineers (Humanities-II) (HSMC 301) Year of Study: 2024-25;

Course Title: Economics for Engineers (Humanities-II)	Code: HSMC 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
HSMC 301.CO1	Understand major principles of economic analysis for decision making among alternative courses of action in engineering.	Understand	K2
HSMC 301.CO2	Apply economic principles to prices and quantities in competitive supply and demand for goods and for money	Apply	K3
HSMC 301.CO3	Describe various cost concepts and maintenance of break even scenario for a business	Remember	K1
HSMC 301.CO4	Evaluate the overall functions of Demand, Supply, Price, Income of the firms.	Create	K5
HSMC 301.CO5	Analyze the impact of LPG on the Indian economy and solve economic problems using analytical techniques	Analyze	K4

Course Name: PCC-CS 301 (Data Structure & Algorithm) Year of Study: 2024 – 25;

Course Title: Data Structure & Algorithms	Code: PCC-CS 301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCCCS301.CO1	Define and explain basic data structures and algorithm analysis techniques	Define	K1
PCCCS301.CO2	Implement and analyze searching and sorting algorithms in terms of	Implement, Analyze	K3,k4

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

	time and space complexity		
PCCCS301.CO3	Apply stack and queue data structures in solving expression-related problems	Apply	K3
PCCCS301.CO4	Analyze operations on different types of linked lists	Analyze	k4
PCCCS301.CO5	Design trees, graphs, and hashing techniques with their associated algorithms.	Design	K6

Course Name: PCC- CS 302 (Computer Organization) Year of Study: 2024 –25;

Course Title: Computer Organization	Code: PCC-CS302
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS302.CO1	Understand basics of Computer Organization, concepts of computers and the Von Neumann architecture as sequences and operation of computers.	Understand	K2
PCC-CS302.CO2	Design arithmetic and logical operations with integer Binary numbers, representation of signed and unsigned numbers and floating-point operands.	Design	K6
PCC-CS302.CO3	To describe the function of the instruction execution cycle, instruction formats, addressing modes, instruction set.	Describe	K1
PCC-CS302.CO4	Distinguish the organization of various part of a system memory hierarchy.	Distinguish	K4
PCC-CS302.CO5	Explain computer architectures and I/O communication with standard interfaces.	Explain	K2

Course Name: PCC- DS 301 (Introduction to Data Science) Year of Study: 2024 –25;

Course Title: Introduction to Data Science	Code: PCC-DS301
Type of Course: Theory	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
------------------------	----------------	--------------------	------------------------

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

PCC-CS302.CO1	Understand basics of Data Science, Demonstrate a solid grasp of data science fundamentals, including data manipulation, statistical inference, and algorithmic thinking.	Understand	K2
PCC-CS302.CO2	Design and implement supervised, unsupervised, and deep learning models tailored to specific business or research problems, considering accuracy, interpretability, and scalability.	Design	K6
PCC-CS302.CO3	Effective data visualizations and dashboards using tools like Matplotlib, Seaborn, Plotly, or Tableau to communicate insights clearly to both technical and non-technical stakeholders.	Describe	K1
PCC-CS302.CO4	Scalable data processing pipelines using frameworks such as Hadoop, Spark, or cloud services (AWS, Azure, GCP) to handle large volumes of structured and unstructured data..	Distinguish	K4
PCC-CS302.CO5	To test hypotheses, validate models, and evaluate performance using metrics such as accuracy, precision, recall, F1-score, and AUC-ROC, ensuring robust and reproducible results.	Explain	K2

Course Name: Analog and Digital Electronics (ESC 391) Year of Study: 2024-25;

Course Title: Analog and Digital Electronics	Code: ESC 391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ESC 391.CO1	Understand of the fundamental concepts and techniques used in digital electronics.	Understand	K2
ESC 391.CO2	Understand and examine the structure of various number systems and its application in digital design.	Understand	K2
ESC 391.CO3	Apply the basic requirements for a design application and propose a cost effective solution of various combinational circuits.	Apply	K3
ESC 391.CO4	Analyze basic requirements for a design application and propose a cost effective solution of various sequentialcircuits.	Analyze	K4
ESC 391.CO5	Design and verify analog circuits and troubleshoot digital circuit hazards.	Design	K6

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

Course Name: Data Structure & Algorithm Lab (PCC-CS391) Year of Study: 2024-25;

Course Title: Data Structure & Algorithm Lab	Code: PCC-CS391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCCCS391.CO1	Implement linear data structures like arrays, stacks, queues, and circular queues	Implement	K3
PCCCS391.CO2	Develop and perform operations on linked lists, including inversion and using them for stack and queue implementation	Develop, Perform	K4
PCCCS391.CO3	Evaluate polynomial addition and multiplication using appropriate data structures	Evaluate	K5
PCCCS391.CO4	Construct recursive and non-recursive tree traversals and perform AVL tree operations	Construct	K6
PCCCS391.CO5	Apply threaded tree traversal, hashing, and sorting/searching algorithms in data processing	Apply	K3

Course Name: Computer Organization Lab (PCC-CS392) Year of Study: 2024-25;

Course Title: Computer Organization Lab	Code: PCC-CS392
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS392.CO1	Examine and verify the functionality of basic combinational circuits such as multiplexers, decoders, encoders, and comparators.	Examine	K4
PCC-CS392.CO2	Design and implement arithmetic circuits such as adders, subtractors, and BCD adders.	Design	K6
PCC-CS392.CO3	Explain the concept of carry-look-ahead logic in designing high-speed adders.	Explain	K2
PCC-CS392.CO4	Implement Arithmetic and Logic Units (ALU) using multiplexer-based circuits for single-bit and multi-bit operations.	Implement	K3
PCC-CS392.CO5	Apply RAM operations and hardware description methods for computer organization.	Evaluate	K5

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

Course Name: Data Science Lab using Python (PCC-DS391) Year of Study: 2024-25;

Course Title: Data Science Lab using Python	Code: PCC-DS391
Type of Course: Practical	Course Designation: Compulsory
Semester: 3rd	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS393.CO1	Understand the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.	Understand	K2
PCC-CS393.CO2	Develop the concept of Conditionals iteration (Loops, if –else statement) and Conditional Control (Break, Continue statement) in Python Programming to deal with real world simulation.	Develop	K6
PCC-CS393.CO3	Discover the strategy to deal with “String Manipulation” “Strategy formation” and “Method Handling”. Design effective data visualizations and dashboards using tools like Matplotlib, Seaborn, Plotly, or Tableau to communicate insights clearly to both technical and non-technical stakeholders	Discover	K4
PCC-CS393.CO4	Differentiate the different data-structure (List, Tuple, and Dictionary) for complete automation and bulk data handling. Work in teams to design and present data science projects, integrating knowledge from multiple domains and effectively communicating results to diverse audiences.	Differentiate	K5
PCC-CS393.CO5	Apply modular programming with functions, file handling, exception handling, and library packages for robust programs Apply creative thinking to design innovative data science applications in areas such as healthcare, finance, marketing, and social media, addressing real-world challenges.	Interpret	K2

Course Title:Discrete Mathematics	Code: PCC-CS401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS401.CO1	Define fundamental mathematical concepts such as sets, relations, functions,and integers.	Define	K1
PCC-CS401.CO2	Explain the concept of finite set,infinite set, countable and uncountable set.	Explain	K2
PCC-CS401.CO3	Apply inclusion-exclusion and Pigeon-hole principle to a real-life problem.	Apply	K3
PCC-CS401.CO4	Determine conjunctive normal form and disjunctive normal form of a logical problem.	Determine	K5
PCC-CS401.CO5	Analyze group homomorphism, integral domain and field .	Analyze	K4

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

Course Title: Database Management Systems	Code: PCC- DS401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC- CS601.CO1	Explain the architecture of database systems, data abstraction, data independence, data models, and data manipulation operations.	Explain	K2
PCC- CS601.CO2	Apply relational query languages (Relational Algebra, Relational Calculus, SQL) and analyze relational database design using normalization, functional dependencies, and dependency preservation.	Apply / Analyze	K3 / K4
PCC- CS601.CO3	Demonstrate storage and indexing strategies such as B-trees and hashing for efficient data retrieval.	Demonstrate	K3
PCC- CS601.CO4	Analyze transaction processing concepts including concurrency control, recovery techniques, and ACID properties to ensure reliable database operations.	Analyze	K4
PCC- CS601.CO5	Evaluate database security mechanisms, advanced database models (object-oriented, distributed, web databases), and concepts of data warehousing and data mining.	Evaluate	K5

Course Title:Data Mining	Code: PCC-DS402
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS402.CO1	Data preprocessing, data warehousing, and data mining tasks (classification, clustering, association rule mining). Define key data mining terminology such as patterns, models, training data, test data, and evaluation metrics. identify decision trees, k-means clustering, Apriori algorithm, and neural networks. Recall the steps of the data mining process, including data cleaning, data integration, data selection, data transformation, data mining, pattern evaluation, and knowledge presentation. Name popular data mining tools and software (e.g., WEKA, RapidMiner, Orange, KNIME).	Remember	K1
PCC-CS402.CO2	Explain the key concepts of data mining, including data pre-processing, data warehousing, and common data mining tasks such as classification, clustering, and association	Understand	K2

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

	rule mining. Describe the data mining process, including steps like data cleaning, integration, selection, transformation, mining, pattern evaluation, and knowledge presentation.		
PCC-CS402.CO3	data preprocessing techniques such as data cleaning, normalization, and transformation on real-world datasets to prepare them for mining. Implement classification algorithms like decision trees, Naive Bayes, and k-nearest neighbors on given datasets to predict outcomes. Use clustering methods such as k-means and hierarchical clustering to segment data into meaningful groups.	Apply	K3
PCC-CS402.CO4	Describe the differences between supervised learning and unsupervised learning in data mining, with examples. how data mining techniques are applied in various domains, such as marketing, healthcare, finance, and social media.	Describe	K2
PCC-CS402.CO5	Analyze the results of data mining models by interpreting confusion matrices, ROC curves, and other performance metrics to identify areas for improvement. Evaluate the effectiveness of different data mining models (e.g., classification, clustering) by comparing evaluation metrics such as accuracy, precision, recall, F1-score, and silhouette score.	Analyze, Evaluate	K4,k5

Course Title: Formal Language & Automata Theory	Code: PCC-CS403
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC CS403.CO1	Understand the concept of abstract machines and their power to recognize the languages.	Understand	K2
PCC-CS403.CO2	Demonstrate finites machines for modeling and solving computing problems.	Apply	K3
PCC-CS403.CO3	Analyze Finite automata, Regular expression and regular grammars to describe regular languages.	Analyze	K4
PCC-CS403.CO4	Develop context free grammars to generate strings from a context free language.	Create	K6
PCC-CS403.CO5	Describe equivalence of languages accepted by Push Down Automata and languages generated by context free grammars and Distinguish an understanding of	Understand, Analyse	K2,K4

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

	decidability and undecidability.		
--	----------------------------------	--	--

Course Title: Design and Analysis of Algorithms	Code: PCC-CS404
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 3L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS404.CO1	Analyze running time of Algorithms using asymptotic methods.	Analyze	K4
PCC-CS404.CO2	Illustrate the techniques of Greedy paradigm, Branch and Bound, Backtracking etc and compare and contrast them.	Illustrate	K2
PCC-CS404.CO3	Develop the algorithm techniques (example Divide & Conquer, Dynamic Programming etc) to solve different mathematical models.	Develop	K6
PCC-CS404.CO4	Apply optimization problems using backtracking and branch & Bound techniques.	Apply	K3
PCC-CS404.CO5	Understand the concepts of NP Completeness, Randomized and Approximation Algorithms.	Understand	K2

Course Title: Biology	Code: BSC 401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 2L+1T/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BSC 401.CO1	Describe with examples the biological observations lead to major discoveries	Describe	K1
BSC 401.CO2	Explain the classification of kingdom and building blocks of life, classification at cellular, energy and excretory level, habitat, study of model organisms, explain techniques of biophysics to study biological phenomena, cancer diagnosis and treatment.	Explain	K2
BSC 401.CO3	Identify DNA as genetic material in the molecular basis of information transfer	Identify	K3
BSC 401.CO4	Analyze biological processes at the reductionistic level.	Analyze	K4
BSC 401.CO5	Apply thermodynamic principles to biological systems and	Apply, Identify	K3

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

	Identify microorganism		
--	------------------------	--	--

Course Title: Environmental Sciences	Code: MC-401
Type of Course: Theory	Course Designation: Compulsory
Semester: 4th	Contact Hours: 1L/week
Continuous Assessment: 25 Marks	Final Exam: 70 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
BSC 401.CO1	Resolve different open-ended problems related to air pollution acquiring the detailed knowledge about source, effect and mechanism of the pollution.	Resolve	K3
BSC 401CO2	Conceive the basic of the need of natural resource management, environmental protection and population control.	Conceive	K2
BSC 401.CO3	Acquire skills for scientific problem-solving related to air, water, noise & land pollution.	Acquire	K1
BSC 401.CO4	Determine the issues related to noise pollution after studying the existing situation in detail.	Determine	K5
BSC 401.CO5	Develop awareness about the geographical feature of the country considering biodiversity and the variety of ecological systems present in the nature.	Develop	K6

Course Title: Data Mining Lab	Code: PCC-DS492
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS492.CO1	Define the purpose and basic functions of data mining tools such as WEKA, RapidMiner, and Python libraries (e.g., scikit-learn, pandas).	Define	K1
PCC-CS492.CO2	Construct a complete data mining pipeline in the lab, including data acquisition, preprocessing, feature selection, model building, and evaluation using tools like Python (pandas, scikit-learn) or WEKA.	Construct	K6
PCC-CS492.CO3	Analyse raw datasets in the lab to identify data quality issues such as missing values, outliers, and inconsistencies, and determine appropriate preprocessing techniques. the performance of different classification algorithms (e.g., decision trees, Naïve Bayes, k-NN) on lab datasets by	Analyze	K4

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

	comparing metrics like accuracy, precision, recall, and F1-score.		
PCC-CS492.CO4	Describe the process of model evaluation in the lab, including metrics like accuracy, precision, recall, F1-score, and how confusion matrices are interpreted.	Describe	K2
PCC-CS492.CO5	Evaluate the performance of various classification algorithms (e.g., decision tree, Naïve Bayes, k-NN) on lab datasets using metrics such as accuracy, precision, recall, F1-score, and ROC-AUC	Evaluate	K5

Course Title: Design & Analysis Algorithm Lab	Code: PCC-CS494
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Course Coordinator :	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS494.CO1	Analyze different types of applications of Divide & Conquer techniques	Analyze	K4
PCC-CS494.CO2	Understanding to implement Dynamic Programming techniques	Understand	K2
PCC-CS494.CO3	Examine to implement knapsack, Job sequencing with deadlines, Prim's and Kruskal's algorithms by using greedy method	Examine	K4
PCC-CS494.CO4	Discuss the implementation of the N-Queen and Graph Coloring Problem by using Backtracking	Discuss	K6
PCC-CS494.CO5	Apply 15 Puzzle problem by using Branch & Bound and Explain the way of implementation of BFS and DFS by using Graph Traversal Algorithms	Apply Explain	K3, K2

Course Title: Database Management System Lab	Code: PCC-DS491
Type of Course: Practical	Course Designation: Compulsory
Semester: 4th	Contact Hours: 4P/week
Continuous Assessment: 40 Marks	Final Exam: 60 Marks
Writer: Course Coordinator	Approved by HoD (convenor of DAB)

COURSE OUTCOMES (COs)

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
-----------------	---------	-------------	-----------------

Prof. J.K. Mondal
Dept. of CSE
University of Kalyani

Prof. Debasis De
MAKAUT

Mr. Anirban Dutta Chowdhury
Senior Scientist, TCS Research

PCC-CS691.CO1	Design relational schemas and create tables, constraints, and indexes using SQL.	Apply	K3
PCC-CS691.CO2	Manipulate and manage data using SQL DML and schema-alteration commands such as INSERT, UPDATE, DELETE, TRUNCATE, ALTER, and DROP	Apply	K3
PCC-CS691.CO3	Retrieve and analyze data using advanced SQL queries with WHERE conditions, aggregate functions, GROUP BY/HAVING, joins, and sub queries.	Analyze	K4
PCC-CS691.CO4	Administer database objects and security by creating views, managing users, and implementing privilege control through GRANT and REVOKE	Apply	K3
PCC-CS691.CO5	Develop modular database applications by writing PL/SQL programs using cursors, exception handling, and stored procedures.	Create	K6

Prof. J.K. Mondal
 Dept. of CSE
 University of Kalyani

Prof. Debasis De
 MAKAUT

Mr. Anirban Dutta Chowdhury
 Senior Scientist, TCS Research