

**CSE DEPARTMENT
COURSE OUTCOMES**

COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Mathematics IA	BS-M101	CSE (1 st year, 1 st semester)	<ol style="list-style-type: none">1. Apply the concept and techniques of differential and integral calculus to determine curvature and evaluation of different types of improper integrals2. Understand the domain of applications of mean value theorems to engineering problems3. Learn different types of matrices, concept of rank, methods of matrix inversion and their applications4. Understand linear spaces, its basis and dimension with corresponding applications in the field of computer science5. Learn and apply the concept of Eigen values, Eigen vectors, diagonalisation of matrices and orthogonalization in inner product spaces for understanding physical and engineering problems

P. Jayaraj
25/7/18
P. Subramanian
25.7.18

P. Subramanian 25.7.18
H. O. D.
Basic Science & Humanities Department
H. E. T. C., Hooghly.

Course Outcome (CO) for Computer Sciences and Engineering Department

Physics – I (BS PH 101/201)	Apply basic concepts of mechanics
	Discuss Physical optics and analyze principles of lasers with applications
	Categorize di electric and magnetic properties of materials leading to Electromagnetic laws
	Differentiate between Classical Physics and Quantum Physics by introducing Planck's law
	Apply wave particle duality in real life problems followed by simple quantum mechanics calculations
Classify ensembles and differentiate between classical and Quantumstatistical mechanics	

Blask
27/7/18

A. Debbar
27.7.18

H. O. D.
Basic Science & Humanities Department
M. E. T. C., Hooghly.

Course Outcome (CO) for Computer Sciences and Engineering Department

<p>Physics -1 Lab (BS PH191/291)</p>	<p>Observe and read data in slide calliper's, screw gauge. Calculate different modulus of elasticity to apply basic knowledge Physics of Elasticity and apply viscosity principle of streamline motion of water to calculate its viscosity coefficient required in fluid mechanics</p> <p>Arrange sequential connection in electrical experiment to verify principles of Kirchoff's law to verify passive elements of electrical circuit</p> <p>Operate optical instruments to illustrate physical properties of light and to observe spectral lines of light to verify medium specific characteristics. Calculate Rydberg constant by studying Hydrogen spectrum to visualize visible spectra and to assess this empirical fitting parameter as a fundamental physical constant</p> <p>Determine Band Gap and Hall coefficient of a given intrinsic semiconductor and distinguish between different intrinsic semiconductors. Determine the dielectric constant of different capacitors to correlate their usage like insulator and limitation of their usage as a dielectric material.</p> <p>Apply concepts of quantum mechanics to verify Bohr's atomic orbital theory</p> <p>Determine Planck's constant and Stefan's constant applying modern Physics</p>
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J. Shrestha
27/7/18

A. B. Bhattarai
27.7.18
H. O. D.
Basic Science & Humanities Department
H. E. T. C., Hooqny.

COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Mathematics IIA	BS-M201	CSE (1 st year, 2 nd semester)	<ol style="list-style-type: none"> 1. Learn the ideas of probability and random variables, various discrete and continuous probability distributions with their properties and their applications in physical and engineering environment 2. Understand the basic ideas of statistics with different characterization of a univariate and bivariate data set 3. Apply statistical tools for analyzing data samples and drawing inference on a given data set 4. The students will learn the basic ideas of statistics including measures of central tendency, regression 5. The students will learn the statistical methods of studying data samples

Mukherjee 02/01/2019

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Basic Science & Humanities Department
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R. Patra
02/01/2019

HOOGHLY ENGINEERING AND TECHNOLOGY COLLEGE

COURSE (SUB) OUTCOME

Course (Sub)Title : Chemistry - I	
Course (Sub)Code : BS-CH 201 2nd	Stream : CSE Semester:
Course (Sub) Outcomes	
CO No.	CO
1	Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2	Rationalize bulk properties and processes using thermodynamic considerations.
3	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
4	Rationalize periodic properties such as ionization potential, electronegativity and oxidation states.
5	List of major chemical reactions that are used in synthesis of molecules.

25.07.18
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25/07/18
Signature of the faculty

P. Sebrath 25.7.18
Signature of the HOD

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HOOGHLY ENGINEERING AND TECHNOLOGY COLLEGE

COURSE (SUB) OUTCOME

Course (Sub)Title : Chemistry – I Laboratory		
Course (Sub)Code : BS-CH 291	Stream : CSE	Semester: 2nd
Course (Sub) Outcomes		
CO No.	CO	
1	On completion of this course students will be able to investigate different properties of metals.	
2	On completion of this course students will be able to analyze the different components of soil which is require for understanding soil mechanism.	
3	On completion of this course students will be able to analyze different parameters of drinking and sewage water.	
4	On completion of this course students will be able to handle different types of new gadgets which they normally practice in the laboratory.	
5	On completion of this course students will be able to develop efficiency in data analysis which is normally require for getting desirable result in different experiments.	

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P. Debnath 25.7.18
Signature of the HOD

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COURSE OUTCOMES

Paper Name: PROGRAMMING FOR PROBLEM SOLVING

Department: Computer Science and Engineering

Semester: 2nd

Paper Code: ES CS201

After completion of this course students will be able to

ES CS201.CO1: Understand transform flow chart and algorithms into a programming language.

ES CS201.CO2: Write, compile and debug programs in C language.

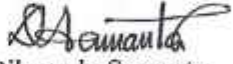
ES CS201.CO3: Design programs involving decision structures, loops and functions

ES CS201.CO4: Use arrays, pointers and structures to formulate algorithms and programs.

ES CS201.CO5: Apply programming to solve matrix addition and multiplication problems and searching and sorting problems.

ES CS201.CO6: Apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.


Coordinator, Department of CSE
**Coordinator
Department of CSE**


Mr. Dibyendu Samanta
Assistant Professor, Department of CSE


Principal in Charge
Hooghly Engineering & Technology College
Vivekananda Road, Pipulpat, Hooghly.

COURSE OUTCOMES

Paper Name: PROGRAMMING FOR PROBLEM SOLVING LABORATORY

Department: Computer Science and Engineering

Semester: 2nd

Paper Code: ES CS291

After completion of this course students will be able to

ES CS291.CO1: Understand the working of different operating systems like DOS, Windows, Linux

ES CS291.CO2: Write, compile and debug programs in C language.


ES CS291.CO3: Design programs connecting decision structures, loops and functions

ES CS291.CO4: Inscribe C programs using Pointers to access arrays, strings, structures and files.

ES CS291.CO5: Solve different searching and sorting problems.

ES CS291.CO6: Write programs for solving Numerical problems


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Assistant Professor, Department of CSE


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Course: Analog & Digital Electronics

Code: ESC 301

Dept: Computer Science and Engineering

Course Outcomes	Details	Action Verb	Knowledge Level
ESC 301.CO1	Explain Different Classes of Amplifiers - (Class-A, B, AB and C, power, efficiency; Summarize the basic concepts of Feedback and Oscillation. Demonstrate Phase Shift, Wein Bridge oscillators Astable & Monostable Multivibrators; Schmitt Trigger circuits, 555 Timer.	Explain	K2
ESC 301.CO2	Define the basic concepts of Boolean algebra, binary number system. 1's and 2's complement methods, Binary arithmetic. Define the representation in SOP and POS forms;	Define	K1
ESC 301.CO3	Demonstrate the concept of Minimization of logic using algebraic and k-map. Build various combinational circuits like Adder and Subtractor circuits, Encoder, Decoder, Comparator, Multiplexer, De-Multiplexer and Parity Generator.	Demonstrate	K2
ESC 301.CO4	Explain Sequential Circuits - Basic Flip-flop & Latch, Flip-flops -SR, JK, D, T and JK Master-slave Flip Flops.	Explain	K2
ESC 301.CO5	Build Registers (SISO, SIPO, PIPO, PISO) Ring counter, Johnson counter, Synchronous and Asynchronous counters, Mod N Counter.	Build	K6
ESC 301.CO6	Explain A/D and D/A conversion techniques - Basic concepts (D/A :R-2-R only A/D: successive approximation). Explain Logic families- TTL, ECL, MOS and CMOS - basic concepts.	Explain	K2



Signature of Course Teacher



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**Computer Science and Engineering
Hooghly Engineering & Technology College**

COURSE OUTCOMES

Paper Name: Data Structure & Algorithm

Department: Computer Science and Engineering

Semester: 3rd

Paper Code: PCC-CS301

After completion of this course students will be able to

PCC CS301.CO1: Explain fundamentals of data structure.

PCC CS301.CO2: Develop algorithm for linear data Structure like stack, queue and linked list.

PCC CS301.CO3: Develop algorithm for non-linear data structure like trees and graphs.

PCC CS301.CO4: Develop sorting, searching and hashing algorithms

PCC CS301.CO5: Identify an appropriate data structure to solve a particular problem.


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Mr. Dibyendu Samanta
Assistant Professor, Department of CSE

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Principal in Charge
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Vivekananda Road, Pipulpali, Hooghly.

COURSE OUTCOMES

Paper Name: COMPUTER ORGANISATION

Department: Computer Science and Engineering

Semester: 3rd

Paper Code: PCC-CS302

After completion of this course students will be able to

PCC CS691.CO1: Understand basic structure of digital computer, stored program concept and different arithmetic and control unit operations.

PCC CS691.CO2: Understand basic structure of different combinational circuits multiplexer, decoder, encoder etc.

PCC CS691.CO3: Perform different operations with sequential circuits.

PCC CS691.CO4: Understand memory and I/O operations.



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COURSE OUTCOMES

Paper Name: ECONOMICS FOR ENGINEERS

Department: Computer Science and Engineering

Semester: 3rd

Paper Code: HSMC301

Course Outcomes:

On completion of the course students will be able to

HSMC-301.1 Make different economic decisions and estimate engineering costs by applying different cost estimation models.

HSMC-301.2 Create cash flow diagrams for different situations and use different interest formulae to solve associated problems.

HSMC-301.3 Take decisions regarding different engineering projects by using various criteria like rate of return analysis, present worth analysis, cost-benefit analysis etc.

HSMC-301.4 Incorporate the effect of uncertainty in economic analysis by using various concepts like expected value, estimates and simulation.

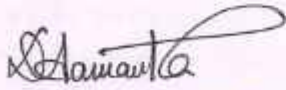
HSMC-301.5 Understand the concepts of depreciation and replacement analysis and solve associated problems.

HSMC-301.6 Understand the process of inflation and use different price indices to adjust for its effect.

HSMC-301.7 Apply the various concepts of Accounting like balance sheet and ratio analysis.

HSMC-301.8 Understand the scope of Finance and the role of financial planning and management.

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Department of CSE

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Course: Analog & Digital Electronics Lab

Code: ESC 391

Dept: Computer Science and Engineering

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 sequential circuits.	Analyze	K4
ESC 391.CO5	Identify and prevent various hazards and timing problems in a digital design for developing skill to build, and troubleshoot in digital circuits.	Identify	K3
ESC 391.CO6	Design and examine the structure of analog circuits and verify its operations.	Design	K6



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COURSE OUTCOMES

Paper Name: DATA STRUCTURE & ALGORITHM LABORATORY

Department: Computer Science and Engineering

Semester: 3rd

Paper Code: PCC-CS391

After completion of this course students will be able to

PCC CS391.CO1: Explain and define the basic static and dynamic data structure and relevant standard algorithms

PCC CS391.CO2: Implement different operations on simple linear data structures algorithms such as array, stacks and queue and linked list

PCC CS391.CO3: Solve problems involving nonlinear data structures like graphs, trees and heaps.

PCC CS391.CO4: Implement different time efficient algorithms for solving problems like sorting, searching and hashing.

PCC CS391.CO5: Identify an appropriate data structure to solve a particular problem.


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Course: Computer Organization Lab

Code: PCC CS 392

Dept: Computer Science and Engineering

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS392.CO1	Understand the behaviour of logic gates.	Understand	K2
PCC-CS392.CO2	Design combinational circuits for basic components of computer system and Applications.	Design	K6
PCC-CS392.CO3	Analyze the operational behaviour and applications of various flip-flop.	Analyze	K4
PCC-CS392.CO4	Implement Arithmetic logic units and different types of memory blocks.	Implement	K3
PCC-CS392.CO5	Design to cascade multiple RAM chips for vertical and horizontal expansion.	Design	K6
PCC-CS392.CO6	Implement Carry-Look-Ahead Adder and BCD adder circuit .	Implement	K3



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Course Title : IT Workshop (Sci Lab/MATLAB/Python/R)

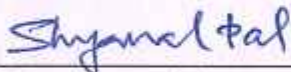
Course Code: PCC-CS393

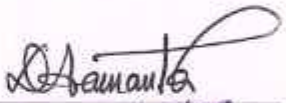
Department: Computer Science & Engineering

Semester: 3rd

Course Outcomes: After completion of the subject students will be able to

1	To master an understanding of scripting & the contributions of scripting languages
2	Design real life problems and think creatively about solutions
3	Apply a solution in a program using R/Matlab/Python.
4	To be exposed to advanced applications of mathematics, engineering and natural sciences to program real life problems.


Signature of the Faculty


Signature of the Coordinator
Department of CSE

COURSE OUTCOMES

Paper Name: DATA STRUCTURE & ALGORITHM

Department: Computer Science and Engineering

Semester: 3rd

Paper Code: CS302

After completion of this course students will be able to

CS302.CO1: Explain fundamentals of data structure.

CS302.CO2: Develop algorithm for linear data Structure like stack, queue and linked list.

CS302.CO3: Develop algorithm for non-linear data structure like trees and graphs.

CS302.CO4: Develop sorting, searching and hashing algorithms

CS302.CO5: Identify an appropriate data structure to solve a particular problem.



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COURSE OUTCOMES

Paper Name: DATA STRUCTURE & ALGORITHM LABORATORY

Department: Computer Science and Engineering

Semester: 3rd

Paper Code: CS392

After completion of this course students will be able to

CS392.CO1: Able to explain and define the basic static and dynamic data structure and relevant standard algorithms

CS392.CO2: Able to implement different operations on simple linear data structures algorithms such as array, stacks and queue and linked list

CS392.CO3: Able to solve problems involving nonlinear data structures like graphs, trees and heaps.

CS392.CO4: Able to implement different time efficient algorithms for solving problems like sorting, searching and hashing.

CS392.CO5: Able to apply an appropriate data structure to solve a given computing problem.




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Course outcomes

Paper Name : Discrete Mathematics

Department : Computer Science and Engineering

Semester: 4th

Course Code : PCC-CS401

On completion of the course students will be able to

PCC-CS401.1 Express a logic sentence in terms of predicates, quantifiers, and logical connectives

PCC-CS401.2 Derive the solution for a given problem using deductive logic and prove the solution based on logical inference

PCC-CS401.3 Classify its algebraic structure for a given a mathematical problem,

PCC-CS401.4 Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra

PCC-CS401.5 Develop the given problem as graph networks and solve with techniques of graph theory


H.O.D.
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Manipal Engineering & Technology College


Housumi Biswal
Assistant Professor, CSE

Course: Computer Architecture

Code: PCC CS 402

Dept: Computer Science and Engineering

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS402.CO1	Understand The basic of Computer architecture	Understand	K2
PCC-CS402.CO2	Discuss the Pipelining technique of Computer architecture	Discuss	K6
PCC-CS402.CO3	Illustrate Different memory management technology	Illustrate	K2
PCC-CS402.CO4	Develop The Instruction level parallelism	Develop	K3
PCC-CS402.CO5	Analyze array and vector processors.	Analyze	K4
PCC-CS402.CO6	Explain the multiprocessor architecture and different taxonomy	Explain	K5



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COURSE OUTCOMES

Paper Name: FORMAL LANGUAGE & AUTOMATA THEORY

Department: Computer Science and Engineering

Semester: 4th

Paper Code: PCC-CS403

After completion of this course students will be able to

PCC CS403.CO1: Understand and apply formal notations via regular expressions and grammars, as well as their recognizers.

PCC CS403.CO2: Design recognizer and grammars for different formal languages and identify the language accepted by an automaton or a grammar.

PCC CS403.CO3: Transform between equivalent deterministic and nondeterministic finite automata, and regular expressions.

PCC CS403.CO4: Construct pushdown automata and the equivalent context free grammars prove the equivalence of languages described by pushdown automata and context free grammars.

PCC CS403.CO5: Design Turing Machine for simple computable functions and knows the fundamental concepts of tractability and decidability of computational problems.



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COURSE OUTCOMES

Paper Name: DESIGN & ANALYSIS OF ALGORITHM

Department: Computer Science and Engineering

Semester: 4th

Paper Code: PCC-CS404

After completion of this course students will be able to

PCC CS404.CO1: Identify the types of problem, formulate, analyze and compare the efficiency of algorithms.

PCC CS404.CO2: Understand different algorithmic design paradigms such as dynamic-programming, greedy, branch & bound and backtracking

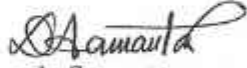
PCC CS404.CO3: Understand graph traversal algorithms shortest path algorithms and Network flow Algorithm

PCC CS404.CO4: Choose the appropriate data structure and algorithm design method for a specified application

PCC CS404.CO5: Categorize the problem as P, NP and NP complete problems

PCC CS404.CO6: Understand Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE


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Department of CSE


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Principal in Charge
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Vivekananda Road, Pipulpati, Hooghly.

Course: Computer Architecture Lab

Code: PCC CS 492

Dept: Computer Science and Engineering

Course Outcomes	Details	Action Verb	Knowledge Level
PCC-CS492.CO1	Discuss the various logic gates using the VHDL programming language.	Discuss	K6
PCC-CS492.CO2	Understanding the arithmetic operations of n- bit numbers using VHDL.	Understand	K2
PCC-CS492.CO3	Analyzing the synthesis of different combinational circuits using VHDL.	Analyze	K4
PCC-CS492.CO4	Illustrate the synthesis of the different sequential circuits using VHDL.	Illustrate	K2
PCC-CS492.CO5	Explain the construction of different memory elements using VHDL.	Explain	K5
PCC-CS492.CO6	Develop different processing elements using VHDL.	Develop	K3



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Computer Science and Engineering
Hooghly Engineering & Technology College

COURSE OUTCOMES

Paper Name: DESIGN & ANALYSIS OF ALGORITHM LABORATORY

Department: Computer Science and Engineering

Semester: 4th

Paper Code: PCC-CS494

After completion of this course students will be able to

PCC-CS494.CO1: Analyse different types of applications of Divide & Conquer techniques.

PCC-CS494.CO2: Understand how to implement Dynamic Programming techniques.

PCC-CS494.CO3: Examine to implement knapsack, Job sequencing with deadlines, Prim's and Kruskal's algorithms by using greedy method.

PCC-CS494.CO4: Discuss the implementation of the N-Queen and Graph Coloring Problem by using Backtracking

PCC-CS494.CO5: Develop 15 Puzzle problem by using Branch & Bound

PCC-CS494.CO6: Explain the way of implementation of BFS and DFS by using Graph Traversal Algorithms



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Signature of Subject Teacher

Name of the Course: Biology

Course Code: BSC-401

Semester: IV

On completion of the course students will be able to:

BSC-401.1 Describe how biological observations of 18th Century that lead to major discoveries.

BSC-401.2 Convey that classification per se is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological

BSC-401.3 Highlight the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring

BSC-401.4 Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine

BSC-401.5 Classify enzymes and distinguish between different mechanisms of enzyme action.

BSC-401.6 Identify DNA as a genetic material in the molecular basis of information transfer.

BSC-401.7 Analyse biological processes at the reductionistic level

BSC-401.8 Apply thermodynamic principles to biological systems.

BSC-401.9 Identify and classify microorganisms.


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Environmental Sciences

Code: MC-401

Semester: IV

Course Outcomes:

On completion of the course students will be able to

MC-401.1 To understand the natural environment and its relationships with human activities.

MC-401.2 To apply the fundamental knowledge of science and engineering to assess environmental and health risk.

MC-401.3 To develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations.

MC-401.4 Acquire skills for scientific problem-solving related to air, water, noise & land pollution.



H.O.D.

Computer Science and Engineering
Hooghly Engineering & Technology College

COURSE OUTCOMES

Paper Name: FORMAL LANGUAGE & AUTOMATA THEORY

Department: Computer Science and Engineering

Semester: 4th

Paper Code: CS402

After completion of this course students will be able to

CS402.CO1: Understand and apply formal notations via regular expressions and grammars, as well as their recognizers.


CS402.CO2: Design recognizer and grammars for different formal languages and identify the language accepted by an automaton or a grammar.

CS402.CO3: Transform between equivalent deterministic and nondeterministic finite automata, and regular expressions.

CS402.CO4: Construct pushdown automata and the equivalent context free grammars prove the equivalence of languages described by pushdown automata and context free grammars.

CS402.CO5: Design Turing Machine for simple computable functions and knows the fundamental concepts of tractability and decidability of computational problems.


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Course Outcome (CO) for Computer Science and Engineering Department

Physics – II (PH 301/401)	Apply knowledge of quantum mechanics to analyze and interpret data of nanoscale electronic devices
	Apply knowledge on crystal structure gives enormous information about the active material of different electronic devices
	Apply knowledge of optics which is very useful to characterize the surface, to identify the inner structure of atoms for the fabrication of high-performance devices
	Apply the principles of Acoustics to design a system, component, or process to meet desired needs within realistic constraints

Shrestha
27/8/18

P. S. Sankar
P. S. Sankar
27.8.18

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Basic Science & Humanities Department
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Course Outcome (CO) for Computer Science and Engineering Department

Physics –II Laboratory (PH 391/491)	Convert units by using conversion factors, unit analysis and calculate instrumental error analysis.
	Explain the difference between tensile stress and shear stress
	Find the modulus of elasticity of a material
	Apply the basic laws of physics in different aspects of physical world.
Classify different characteristics of light	

J. Prasad
28/7/18

A. S. Lakshmi
27.7.18

COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Mathematics-III (Differential Calculus)	BSC301	CSE (2 nd year, 3 rd semester)	<ol style="list-style-type: none">1. Express a logic sentence in terms of predicates, quantifiers and logical connectives2. Apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction3. Formulate and solve engineering problems by applying advanced mathematical principles4. Use tree and graph algorithms to solve problems5. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra

Mukherjee 04/07/2019

H. O. D.
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R. Patra
04/07/2019

Sanyal
4/7/19

P. Debata
4.7.19

COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Numerical Methods	M(CS) 401	CSE (2 nd year, 4 th semester)	<ol style="list-style-type: none">1. Ability to tackle problems where analytical methods are difficult or fail2. Competency to use numerical methods where analytical solutions are not amenable to numerical interpretation3. Efficiency in formulation of numerical algorithms in iteration problems4. Competency to tackle transcendental equations and boundary value differential equations with variable coefficients5. Excellence use of numerical methods for approximate value of integration and forecasting of data

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02/01/2019

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2/1/19

COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Numerical Methods	OEC-IT601A	CSE (3 rd year, 6 th semester)	<ol style="list-style-type: none"> 1. Ability to tackle problems where analytical methods are difficult or fail 2. Competency to use numerical methods where analytical solutions are not amenable to numerical interpretation 3. Efficiency in formulation of numerical algorithms in iteration problems 4. Competency to tackle transcendental equations and boundary value differential equations with variable coefficients. 5. Excellence use of numerical methods for approximate value of integration and forecasting of data

Mukherjee 12/04/2021
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R. Patra
 12/04/2021

COURSE OUTCOMES (COs)

Course Title: Software Engineering
Department: Computer Science and Engineering
Semester: 5th
Paper Code: ESC501

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ESC501.CO1	Identify and define the various phases of lifecycle for a given project and the appropriate process model depending on the user requirements in order to develop a cost-effective software product.	Identify	K1
ESC501.CO2	Distinguish between a structure chart and a flow chart and identify the activities carried out during transform.	Distinguish	K4
ESC501.CO3	Choose between the coding style (structured or OO) and Perform Code review, Code analysis, build process	Choose	K3
ESC501.CO4	Judge appropriate software testing techniques to the quality of a software product at modules, integration, and system granularity levels.	Judge	K5
ESC501.CO5	Apply the principles, processes and main knowledge areas for Software Project Management	Apply	K3
ESC501.CO6	Design different types of UML diagram with knowledge when and why use a particular type of diagram based on the software product requirements	Design	K6



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COURSE OUTCOMES

Paper Name: COMPILER DESIGN

Department: Computer Science and Engineering

Semester: 5th

Paper Code: PCC-CS501

After completion of this course students will be able to

PCC CS501.CO1: Explain the concepts and different phases in the phases of compilation and design lexical analyzer for a language and represent language tokens using regular expressions and finite automata.

PCC CS501.CO2: Design top down with bottom up parsers and develop appropriate parser to produce parse tree representation of the input.

PCC CS501.CO3: Explain the role of a semantic analyzer and type checking; create a syntax-directed definition and an annotated parse tree; describe the purpose of a syntax tree

PCC CS501.CO4: Explain the role of different types of runtime environments and describe the purpose of translating to intermediate code in the compilation process.

PCC CS501.CO5: Apply optimization techniques to intermediate code and generate machine code for high level language program.


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Assistant Professor, Department of CSE


Principal in Charge
Hooghly Engineering & Technology College
Vivekananda Road, Pipulpati, Hooghly.

Course Outcomes

Course Title: Operating System

Course Code: PCC-CS 502

Department: Computer Science & Engineering

Semester: 5th

Course Outcomes:

PCC-CS 502 CO1: Demonstrate the concepts of Operating System Services, System calls, structure, and types.


PCC-CS 502 CO2: Discuss processes and threads for multiprogramming and multi-threading.

PCC-CS 502 CO3: Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response.

PCC-CS 502 CO4: Explain algorithmic solutions to process synchronization problems for Inter-Process communication.

PCC-CS 502 CO5: Analyse the necessary conditions for Deadlock avoidance and prevention to solve them.

PCC-CS 502 CO6: Explain Memory management, Virtual Memory, I/O Hardware, File and Disk Management system.


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Object Oriented Programming

Code: PCC-CS503

Course Outcomes:

On completion of the course students will be able to

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognise features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.



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COURSE OUTCOMES

Paper Name: Introduction to Industrial Management (Humanities III)

Department: Computer Science and Engineering

Semester: 5th

Paper Code: HSMC-501

Course Outcomes:

On completion of the course students will be able to

1. Interpret given organization structure, culture, climate and major provisions of factory acts and laws.
2. Explain material requirement planning and store keeping procedure.
3. Plot and analyze inventory control models and techniques.
4. Prepare and analyze CPM and PERT for given activities.
5. List and explain PPC function.


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Course Title : Artificial Intelligence

Course Code: PEC-IT501B

Department: Computer Science & Engineering

Semester: 5th

Course Outcomes: After completion of the subject students will be able to

- understand the modern view of AI as the study of agents that receive percepts from the environment and perform actions
- demonstrate awareness of the major challenges facing AI and the complex of typical problems within the field
- exhibit strong familiarity with a number of important AI techniques, including in particular search, knowledge representation, planning and constraint management
- asses critically the techniques presented and to apply them to real world problems

Shyamal Pal
Signature of the Faculty

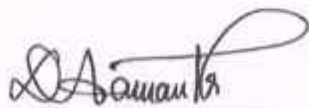
A. Ananta
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Coordinator
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COURSE OUTCOMES (COs)

Course Title: Software Engineering Lab
Department: Computer Science and Engineering
Semester: 5th
Paper Code: ESC591

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ESC591.CO1	Understand the software engineering methodologies involved in the phases for project development.	Understand	K2
ESC591.CO2	Extract functional and non-functional requirement for given problem statement.	Extract	K2
ESC591.CO3	Choose between different design strategies for real life problem	Choose	K3
ESC591.CO4	Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.	Develop	K6
ESC591.CO5	Design Test Script/Test Plan using Black box and White Box approach.	Design	K6
ESC591.CO6	Evaluate Process and Product Metrics using different models.	Evaluate	K5



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Course Outcomes

Course Title: Operating System Lab

Course Code: PCC-CS 592

Department: Computer Science & Engineering

Semester: 5th

Course Outcomes:

PCC-CS 592 CO1: Understanding of different Unix/Linux commands and shell programming.

PCC-CS 592 CO2: Demonstrate the creation of processes and POSIX threads.

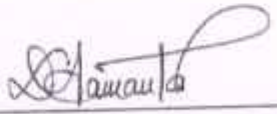
PCC-CS 592 CO3: Develop the problems of process scheduling and process synchronization (Signal and Semaphore).

PCC-CS 592 CO4: Determine the deadlock avoidance and detection algorithms.

PCC-CS 592 CO5: Analyse different Memory allocation and File accessing techniques.

PCC-CS 592 CO6: Illustrate Inter-Process Communication through system calls.

Sumanta Das
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COURSE OUTCOMES

Paper Name: OBJECT ORIENTED PROGRAMMING LAB

Department: Computer Science and Engineering

Semester: 5TH

Paper Code: PCC-CS593

After completion of this course students will be able to

PCC CS593.CO1: Setup the environment for application development


PCC CS593.CO2: Design program model suitable for specific application based on OOP methodology.

PCC CS593.CO3: Develop suitable Object oriented application

PCC CS593.CO4: Develop application promoting reusability, dynamism , and parallel processing

PCC CS593.CO5: Develop GUI and Web based application


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COURSE OUTCOMES

Paper Name: DESIGN & ANALYSIS OF ALGORITHM

Department: Computer Science and Engineering

Semester: 5th

Paper Code: CS501

After completion of this course students will be able to

CS501.CO1: Identify the types of problem, formulate, analyze and compare the efficiency of algorithms.

CS501.CO2: Understand different algorithmic design paradigms such as divide-and-conquer, dynamic-programming, greedy and backtracking.

CS501.CO3: Understand graph traversal algorithms and understand different string matching algorithms

CS501.CO4: Choose the appropriate data structure and algorithm design method for a specified application

CS501.CO5: Categorize the problem as P, NP and NP complete problems

CS501.CO6: Perform Amortized analysis for data structures like Hash Tables, Disjoint Sets and Splay Trees


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COURSE OUTCOMES

Paper Name: DATABASE MANAGEMENT SYSTEM

Department: Computer Science and Engineering

Semester: 6th

Paper Code: PCC-CS601

After completion of this course students will be able to

PCC CS601.CO1: For a given query write relational algebra expressions for that query and optimize the developed expressions

PCC CS601.CO2: For a given specification of the requirement design the databases using E R method and normalization

PCC CS601.CO3: For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2

PCC CS601.CO4: For a given query optimize its execution using Query optimization algorithms

PCC CS601.CO5: For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability

PCC CS601.CO6: Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.


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Course Outcomes

Course Title: Computer Network

Course Code: PCC-CS 602

Department: Computer Science and Engineering

Semester: 6th

Course Outcomes: After Completion of the subject student should be able to

PCC-CS 602 CO1: Identify the features of computer networks, protocol, and network design models.

PCC-CS 602 CO2: Describe the fundamental characteristics of the physical layer and identify the usage in network communication.

PCC-CS 602 CO3: Explain the design issues of data link layer, link layer protocols, bridges, and switches.

PCC-CS 602 CO4: Illustrate wired LAN protocols (IEEE 802.3) and wireless LAN protocols (IEEE 802.11).

PCC-CS 602 CO5: Apply appropriate routing algorithms, congestion control techniques, and Quality of Service requirements for a network.

PCC-CS 602 CO6: Illustrate the functions and protocols of the network layer, transport layer and application layer in networking.



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Data Warehousing and Data Mining

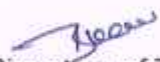
Code: PEC-IT602B

Semester: VI

Course Outcomes:

After completion of course, students would be:

1. Study of different sequential pattern algorithms
2. Study the technique to extract patterns from time series data and its application in real world.
3. Can extend the Graph mining algorithms to Web mining
4. Help in identifying the computing framework for Big Data


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Course Outcomes(Cos)

Course Title: Distributed Systems

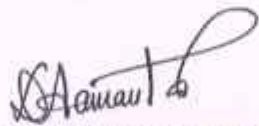
Department: Computer Science & Engineering

Semester: 6th

Paper Code: PEC-IT 601B

On completion of the course students will be able to

1. For a given query write relational algebra expressions for that query and optimize the developed expressions
2. For a given specification of the requirement design the databases using E R method and normalization.
3. For a given specification construct the SQL queries for Open source and Commercial DBMS - MYSQL, ORACLE, and DB2.
4. For a given query optimize its execution using Query optimization algorithms
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.



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Course Outcomes (COs)

Course Title: Image Processing

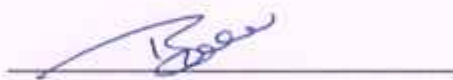
Department: CSE

Semester: 8th 6th

Code: PEC-IT601D

On Completion of the course students will be able to :

Course Outcomes	Details	Action Verb	Knowledge Level
PEC-IT601D.CO1	Understand the fundamental concepts of a digital image processing (DIP) system.	Understand	K2
PEC-IT601D.CO2	Remember different techniques employed for the enhancement of images.	Remember	K1
PEC-IT601D.CO3	Apply the Frequency domain Techniques to real life image Processing	Apply	K3
PEC-IT601D.CO4	Analyse image segmentation and representation techniques	Analyse	K4
PEC-IT601D.CO5	Analyse image restoration procedures	Analyse	K4
PEC-IT601D.CO6	Understand the rapid advances of (DIP) in Machine vision	Understand	K2



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COURSE OUTCOMES

Paper Name: DATABASE MANAGEMENT SYSTEM LABORATORY

Department: Computer Science and Engineering

Semester: 6th

Paper Code: PCC-CS691

After completion of this course students will be able to

PCC CS691.CO1: Configure the Database environment.

PCC CS691.CO2: Design the database system coupled with suitable security and access management.

PCC CS691.CO3: Develop module to manage database with optimize response

PCC CS691.CO4: Create the database corresponding to any real-life system.


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Course Outcomes

Course Title: Research Methodology

Course Code: PROJ-CS 601

Department: Computer Science and Engineering

Semester: 6th

Course Outcomes: After Completion of the subject student should be able to understand

PROJ-CS 601 CO1: Criteria of good research.

PROJ-CS 601 CO2: How to formulate and design a good research problem

PROJ-CS 601 CO3: How to collect the data for research and analyse it

PROJ-CS 601 CO4: The research ethics.

PROJ-CS 601 CO5: The idea of interpretation and report writing.



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Course Outcomes

Course Title: Computer Network Lab

Course Code: PCC-CS 692

Department: Computer Science and Engineering

Semester: 6th

Course Outcomes: After Completion of the subject student should be able to

PCC-CS 692 CO1: Implement various protocols and routing using network simulator.

PCC-CS 692 CO2: Analyse various Congestion control mechanism.

PCC-CS 692 CO3: Have a good understanding of the network layer including IP Addressing, routing and transport layer using C and Java programming.

PCC-CS 692 CO4: Have a basic knowledge of the server client paradigm and demonstrate the socket programming using TCP and UDP.



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Course Outcomes

Course Title: Computer Network

Course Code: CS 602

Department: Computer Science and Engineering

Semester: 6th

Course Outcomes: After Completion of the subject student should be able to

CS-602 CO1: Identify the features of computer networks, protocol, and network design models.

CS-602 CO2: Describe the fundamental characteristics of the physical layer and identify the usage in network communication.

CS-602 CO3: Explain the design issues of data link layer, link layer protocols, bridges, and switches.

CS-602 CO4: Illustrate wired LAN protocols (IEEE 802.3) and wireless LAN protocols (IEEE 802.11).

CS-602 CO5: Apply appropriate routing algorithms, congestion control techniques, and Quality of Service requirements for a network.

CS-602 CO6: Illustrate the functions and protocols of the network layer, transport layer and application layer in networking.



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Course Outcomes

Course Title: Computer Network Lab

Course Code: CS 692

Department: Computer Science and Engineering

Semester: 6th

Course Outcomes: After Completion of the subject student should be able to

CS-692 CO1: Implement various protocols and routing using network simulator.

CS-692 CO2: Analyse various Congestion control mechanism.

CS-692 CO3: Have a good understanding of the network layer including IP Addressing, routing and transport layer using C and Java programming.

CS-692 CO4: Have a basic knowledge of the server client paradigm and demonstrate the socket programming using TCP and UDP.



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Course Outcomes

Course Title: Operating System

Course Code: CS-603

Department: Computer Science & Engineering

Semester: 6th

Course Outcomes:

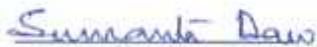
CS-603 CO1: History and concept of Operating System and Thread.

CS-603 CO2: Able to learn the concept of process, Process scheduling for a given specification of CPU utilization, concept of process synchronization and deadlock.

CS-603 CO3: Able to learn the concept of process memory organization and utilization.

CS-603 CO4: Able to learn the concept of file and disk management system and the organization of file and disk structure.

CS-603 CO5: Able to learn the various IO device organizations, task of IO controllers, the built-in security and protection concept by Operating System.


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Course Outcomes

Course Title: Operating System Lab

Course Code: CS-693

Department: Computer Science & Engineering

Semester: 6th

Course Outcomes:

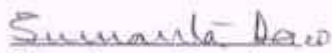
CS-693 CO1: Able to learn the UNIX/LINUX admin commands and operation.

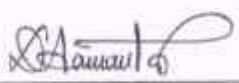
CS-693 CO2: Able to create and work with process and thread.

CS-693 CO3: Able to deal with various operating system signals.

CS-693 CO4: Able to learn the concept of process synchronization and implement the concept of semaphore.

CS-693 CO5: Able to work with the concept of inter-process communication.


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COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Mathematics	M 401	CSE (2 nd year, 4 th semester)	<p>1. Learn the ideas of probability and random variables, various discrete and continuous probability distributions with their properties and their applications in physical and engineering environment</p> <p>2. Understand the basic ideas of statistics with different characterization of a univariate and bivariate data set</p> <p>3. Apply statistical tools for analyzing data samples and drawing inference on a given data set</p> <p>4. Students will be able to model and solve real-world problems using graphs and trees, both quantitatively and qualitatively</p> <p>5. Assess properties implied by the definitions of groups and rings, analyze and demonstrate examples of subgroups, normal subgroups and quotient groups, use the concepts of isomorphism and homomorphism for groups and rings, and produce rigorous proofs of propositions arising in the context of abstract algebra</p>

Mukherjee 02/01/2019
H. O. D.
 Basic Science & Humanities Department
 H. E. T. C., Hooghly.

R. Patra
 02/01/2019

Course Title : Multimedia Systems

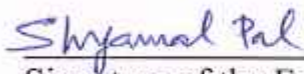
Course Code: OEC-CS701B

Department: Computer Science & Engineering

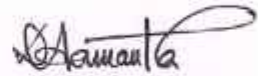
Semester: 7th

Course Outcomes: After completion of the subject students will be able to

- Explain the impact of multimedia and inner details of the different media components
- Understand and apply the various compression techniques
- Understand and apply the concept of synchronization in content development and the concept of document architecture in content management
- Understand and apply different data structure in multimedia database and multimedia file system



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Course Outcomes

Course Title: Cloud Computing

Course Code: PEC-CS 701B

Department: Computer Science and Engineering

Semester: 7th

Course Outcomes: After Completion of the subject student should be able

PEC-CS 701B CO1: To understand the Cloud Computing models.

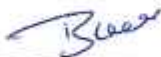
PEC-CS 701B CO2: To understand the various platforms used in Cloud computing.

PEC-CS 701B CO3: To understand the use of Google Toolkit and Windows Azure Platform for Cloud Computing.

PEC-CS 701B CO4: To understand the Infrastructure of Cloud Computing.

PEC-CS 701B CO5: To understand the concept of services and applications of Cloud Computing.

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Hooghly Engineering & Technology College

Course Outcomes

Course Title: Cyber Security

Course Code: PEC-CS 702E

Department: Computer Science and Engineering

Semester: 7th

Course Outcomes: After Completion of the subject student should be able

PEC-CS 702E CO1: To develop an understanding of modern network architectures from a design and performance perspective.

PEC-CS 702E CO2: To introduce the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).

PEC-CS 702E CO3: To provide a WLAN measurement idea.

PEC-CS 702E CO4: To understand the types of Hackers and Cyber Crimes.

PEC-CS 702E CO5: To understand the Cyber Ethics and Law for secure data transaction.

Sumanta Das

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Sumanta Das

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Course Outcomes

Course Title: Compiler Design

Course Code: CS-702

Department: Computer Science & Engineering

Semester: 7th

Course Outcomes:

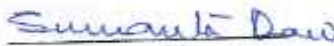
CS-702 CO1: Understanding the concepts and different phases of compilation with compile time error handling.

CS-702 CO2: Identify the core part such as regular expressions, context free grammar and finite automata and design lexical analyser in context of a language.

CS-702 CO3: Design parsers and develop appropriate parser to produce parse tree representation of the input.

CS-702 CO4: Develop intermediate code for statements in high level language.

CS-702 CO5: Apply optimization techniques to intermediate code and generate machine code for high level language program.


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Course Outcomes

Course Title: Internet Technology

Course Code: CS-705A

Department: Computer Science & Engineering

Semester: 7th

Course Outcomes:

CS-705A CO1: Able to learn the concept of internetworking.

CS-705A CO2: Able to learn the concept of scripting languages such as HTML, DHTML, XML, CGI.

CS-705A CO3: Able to learn the concept of J2EE technology for modern development.

CS-705A CO4: Able to learn the concept of Network security through JAVA programming.

CS-705A CO5: Able to learn the modern concept of search engine, search engine optimization and use of multimedia application on internet.

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Course Outcomes

Course Title: Internet Technology Lab

Course Code: CS-795A

Department: Computer Science & Engineering

Semester: 7th

Course Outcomes:

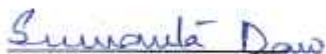
CS-795A CO1: Able to learn HTML, DHTML and the CSS concept to design a web site along with Java Script as the client-side validation language.

CS-795A CO2: Able to learn the data design concept with XML.

CS-795A CO3: Able to learn the concept of server-side validation language Perl.

CS-795A CO4: Able to learn the concept of Java Applet.

CS-795A CO5: Able to learn the concept of Client Server programming concept through internetworking.


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Course Outcomes

Course Title: E-Commerce & ERP

Course Code: OEC-CS 802A

Department: Computer Science & Engineering

Semester: 8th

Course Outcomes: After Completion of the subject student should be able to

OEC-CS 802A CO1: Understand and identify the component parts of e-commerce.

OEC-CS 802A CO2: Understand how to optimise and stay safe when selling online.

OEC-CS 802A CO3: Understand the Supply Chain Planning Tools.

OEC-CS 802A CO4: Understand the concept of Electronic Data Interchange and different EDI facts.

OEC-CS 802A CO1: Understand the concept of Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales & Distribution of ERP Packages.

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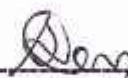
Sumanth Dero
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COURSE OUTCOMES (COs)**Course Title: Mobile Computing****Department: Computer Science and Engineering****Semester: 8th****Paper Code: OEC-CS801C**

On completion of the course students will be able to

CourseOutcomes	Details	Action Verb	Knowledge Level
OEC-CS801C.CO1	Analyze the Personal Communication service and GSM architecture	Analyze	K4
OEC-CS801C.CO2	Develop the concept of GPRS architecture and WLAN standard	Develop	K3
OEC-CS801C.CO3	Illustrate the WLL structure and the concept of WAP protocol.	Illustrate	K2
OEC-CS801C.CO4	Discuss the 3G mobile services	Discuss	K1
OEC-CS801C.CO5	Underst and the concept of Global Mobile Satellite Systems and its case studies	Understand	K2
OEC-CS801C.CO6	Explain the Server-side programming in Java and Pervasive web application architecture	Explain	K2



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Department of CSE**

Assistant Professor, Department of CSE

Course outcomes

Paper Name : Web and Internet Technology


Department : Computer Science and Engineering

Semester: 8th

Course Code : PEC-CS801D


After completion of the course students will be able to

1. Describe the concepts of WWW including browser and HTTP protocol.
2. List the various HTML tags and use them to develop the user friendly web pages.
3. Define the CSS with its types and use them to provide the styles to the web pages at various levels.
4. Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.
5. Use the JavaScript to develop the dynamic web pages.
6. Understand Perl syntax and basic programming concepts to write simple Perl scripts effectively
7. Use of Java Socket programming for communication between the applications running on different JRE.
8. Figure out the various security hazards on the Internet and need of security measures.



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Computer Science and Engineering
Hooghly Engineering & Technology College



Assistant Professor, CSE

Course Title: Cryptography and Network Security

Code: PEC-CS801B

Department: Computer Science and Engineering

Semester: 8th

COURSE OUTCOMES : On completion of the course students will be able to

PEC-CS801B CO1 : Describe conceptual understanding of network security issues, challenges and mechanisms common network vulnerabilities and attacks and basic concept of cryptography.

PEC-CS801B CO2 : Evaluate various techniques of cryptography.

PEC-CS801B CO3 : Illustrate the algorithms of different symmetric key cryptography.

PEC-CS801B CO4 : Apply the public key algorithms, digital signature and message digest. Apply

PEC-CS801B CO5 : Analyze the approaches of security protocol and authentication.

PEC-CS801B CO6 : Explain the concept of electronic mail security and types of firewall and its configurations.



Signature of Teacher



H.O.D.

Signature of DIC/Coordinator/In-charge
Computer Science and Engineering
Hooghly Engineering & Technology College

COURSE OUTCOMES (COs)

Course Title: Software Engineering
Department: Computer Science and Engineering
Semester: 7th
Paper Code: CS 701

On completion of the course students will be able to

CO	STATEMENT
1	Identify software Engineering problem specification, performance, maintenance and quality requirements
2	Select modern engineering tools necessary for software project management, time management and software reuse.
3	Analyze, elicit and specify software requirements through a productive working relationship with various stakeholders of the project.
4	Distinguish different testing strategies and it's working.
5	Design applicable solutions in one or more application domains using software engineering approaches that integrates ethical, social, legal and economic concerns.
6	Develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice.



Coordinator, Department of CSE

Coordinator
Department of CSE



Assistant Professor, Department of CSE

COURSE OUTCOMES (COs)

Course Title: Software Engineering Lab
Department: Computer Science and Engineering
Semester: 7th
Paper Code: CS 791


On completion of the course students will be able to

CO	STATEMENT
1	To handle software development models through rational method.
2	To prepare SRS document, design document, test cases and software configuration management and risk management related document
3	To Develop function oriented and object oriented software design using tools like rational rose.
4	To perform unit testing and integration testing.
5	To apply various white box and black box testing techniques.
6	Able to Plan a software engineering process life cycle.



Coordinator, Department of CSE

Coordinator
Department of CSE



Assistant Professor, Department of CSE

Course Outcomes

Course Title: E-Commerce

Course Code: CS-802E

Department: Computer Science & Engineering

Semester: 8th

Course Outcomes: After Completion of the subject student should be able to

CS-802E CO1: Understand and identify the component parts of e-commerce.

CS-802E CO2: Understand how to optimise and stay safe when selling online.

CS-802E CO3: Understand the Supply Chain Planning Tools.

CS-802E CO4: Understand the concept of Electronic Data Interchange and different EDI facts.

CS-802E CO5: Understand the security measure of Implementing E-Commerce business.

Sumanika Das
Signature of Teacher

Sumanika
Signature of DIC/Coordinator/HOD
Coordinator
Department of CSE