Hooghly Engineering & Technology College

Course Outcome

Civil Engineering Department

Course Outcome (CO) for Civil 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

J. Ghosh
27/7/18

27.7.18

H. O. D.
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COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Mathematics IB	BS-M102	CE (1st year, 1st semester)	1. Apply the concept and techniques of differential and integral calculus to determine curvature and evaluation of different types of improper integrals 2. Understand the domain of applications of mean value theorems to engineering problems 3. Learn the tools of power series and Fourier series to analyse engineering problems and apply the concept of convergence of infinite series in many approximation techniques in engineering disciplines 4. Apply the knowledge for addressing the real-life problems which comprises of several variables or attributes and identify extremum points of different surfaces of higher dimensions 5. Understand different types of matrices, their Eigen values, Eigen vectors, rank and their orthogonal transformations which are essential for understanding physical and engineering problems

25/7/18

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Course Outcome (CO) for Civil Engineering Department

Physics –I Lab (BS PH191/291)	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
	Arrange sequential connection in electrical experiment to verify principles of Kirchhoff's law to verify passive elements of electrical circuit
	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
	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.
	Apply concepts of quantum mechanics to verify Bohr's atomic orbital theory
	Determine Planck's constant and Stefan's constant applying modern Physics

Bhosh
27/7/18

P. Debnath
27.7.18

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HOOGHLY ENGINEERING AND TECHNOLOGY COLLEGE

COURSE (SUB) OUTCOME

Course (Sub)Title : Chemistry – I		
Course (Sub)Code : BS-CH 201	Stream : CE	Semester: 2nd
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.	

25.7.18 25/07/18
Signature of the faculty

P. Debnath 25.7.18
Signature of the HOD

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COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Mathematics IIB	BS-M202	CE (1st year, 2nd semester)	1. Learn the methods for evaluating multiple integrals and their applications to different physical problems 2. Understand different techniques to solve first and second order ordinary differential equations with its formulation to address the modelling of systems and problems of engineering sciences 3. Learn different tools of differentiation and integration of functions of a complex variable that are used with various other techniques for solving engineering problems 4. Apply different types of transformations between two 2- dimensional planes for analysis of physical or engineering problems

Mukherjee 02/01/2019

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2/1/19

2.1.19

COURSE OUTCOMES (COs)

Course Title: Programming for Problem Solving
Department: Civil Engineering
Semester: 2nd
Paper Code: ES-CS201

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS201.CO1	Analyze the problem and formulate algorithms for them.	Analyze	K4
ES-CS201.CO2	Translate the algorithms to programs (in C language).	Understand	K2
ES-CS201.CO3	Understand the correct syntax of logical expression, branch instruction, iteration,	Understand	K2
ES-CS201.CO4	Apply array and pointer to solve problem.	Apply	K3
ES-CS201.CO5	Understand the use of , function, recursion.	Understand	K2
ES-CS201.CO6	Build analytical skill.	Create	K6

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Coordinator
Department of CSE

Assistant Professor, Department of CSE

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COURSE (SUB) OUTCOME

Course (Sub)Title : Chemistry – I		
Course (Sub)Code : BS-CH 201	Stream : CE	Semester: 2nd
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.	

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P. Debnath 25.7.18
Signature of the HOD

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Course Outcome (CO) for Civil 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

J. Ghosh
27/7/18

27.7.18

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COURSE (SUB) OUTCOME

Course (Sub)Title : Chemistry – I Laboratory		
Course (Sub)Code : BS-CH 291	Stream : CE	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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Course Outcome (CO) for Civil Engineering Department

Physics –I Lab (BS PH191/291)	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
	Arrange sequential connection in electrical experiment to verify principles of Kirchhoff's law to verify passive elements of electrical circuit
	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
	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.
	Apply concepts of quantum mechanics to verify Bohr's atomic orbital theory
	Determine Planck's constant and Stefan's constant applying modern Physics

Bhosh
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P. Debnath
27.7.18

H. O. D.
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COURSE OUTCOMES (COs)

Course Title: Programming for Problem Solving Lab
Department: Civil Engineering
Semester: 2nd
Paper Code: ES-CS291

On completion of the course students will be able to

Course Outcomes	Details	Action Verb	Knowledge Level
ES-CS291.CO1	Analyze the problem and formulate algorithms for them.	Analyze	K4
ES-CS291.CO2	Translate the algorithms to programs (in C language).	Understand	K2
ES-CS291.CO3	Understand the correct syntax of logical expression, branchinstruction, iteration,	Understand	K2
ES-CS291.CO4	Apply array and pointer to solve problem.	Apply	K3
ES-CS291.CO5	Understand the use of , function, recursion.	Understand	K2
ES-CS291.CO6	Build analytical skill.	Create	K6

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Department of CSE

Assistant Professor, Department of CSE

Course Outcome (CO) for Civil Engineering Department

Physics – II (PH 301)	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

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27/7/18

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COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Mathematics-III (Transform & Discrete Mathematics)	CE(BS)302	CE (2^{nd} year, 3^{rd} semester)	1. Formulation and solving engineering problems involving transformations of complex-variable 2. Identify problems involving use of integral and Fourier transforms and solving them 3. Formulate and solve engineering problems by applying advanced mathematical principles

R. Patra
04/07/2019

A Mukherjee 04/07/2019

H. O. D.
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Bajaj
4/7/19

B. Debnath
4.7.19

Course Outcome (CO) for Civil Engineering Department

Physics –II Laboratory (PH 391)	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

Ghosh
27/7/18

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Hooghly Engineering & Technology College

Department of Basic Science & Humanities

Department: Civil Engineering
Year: 2nd
Paper Name: Life Science
Name of the Faculty: Dr. Soumya Banerjee

Session: 2019-2020
Semester: 3rd
Paper Code: CE(ES)393
Designation: Assistant Professor

Course Outcome

- To understand the role of transpiration and mode of nutrition in plant
- Conceptualize ecological science and how life of every shape and size are dependent on each other for survival
- Study the role of population dynamics and how it can affect demographical, environmental and economic aspects of a nation
- Understand the concept of environmental management
- Grasp the idea of biotechnology
- Practice and use statistical analysis to study living organisms

13/9/19

Signature of Faculty

Signature of HOD

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)301	Engineering Mechanics	To be acquainted with the concepts of simple stress, strain, elastic limit, ultimate stress and relation between different moduli.
		To gather knowledge about Bending moment & Shear force diagrams for various beams.
		To determine bending stress, shear stress,shear center for regular sections & deflection of determinate beams.
		To be aware of concepts of redundancy and analysing determinate plane trusses.
		To understand the concepts of Principal Stresses and draw Mohr's circle of stresses to suitable scale.
		To study about elastic buckling theory of columns.

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Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)302	Energy Science & Engineering	To discuss the ideas of scientific principles, energy systems and various non-renewable and renewable resources for energy.
		To describe different energy generation systems and their environmental impacts.
		To develop the idea about the role of civil engineering in energy sources.
		To use the concepts about green building LEED ratings, energy audit of facilities and optimization of energy consumption.
		To relate the global policy initiatives and meet the emerging challenges with sustainable technological solutions in the field of energy and environment.
		To relate the ideas of energy, environment and economic system.

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(HS)302	Introduction to Civil Engineering	To study the different types of construction materials
		To identify suitable building materials for a specific purpose
		To be aware of the emerging materials in the field of civil engineering construction
		To select suitable finishes for different types of buildings
		To study different types of stairs and their suitability
		To be aware of the different types of trusses

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Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)391	Basic Electronics	Analyze behaviour of passive electrical components such as resistors, capacitors and inductors and understand carrier transport phenomenon in semiconductors
		Illustrate the principle of operation of measuring insruments such as volt meters, ammeters power supplies, CRO etc used to measure electrical parameters according to the range selected..
		Illustrate the characteristics and working principles of semiconductor diodes and determine their parameters.
		Bias the transistor such as BJT, JFET and MOSFET in the desired operating region using any of the available biasing techniques.
		Analyze the characteristics of Integrated circuits and its use in several applications in electronics circuits particularly the IC Op - Amp and 555 timer, IC voltage regulators etc.
		Design combinational and sequential circuits for a given functions using logic gates.

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)392	Computer-aided Civil Engineering Drawing	Discuss the basic concepts of drawing.
		Differentiate the various signs and symbols used in AUTOCAD.
		Sketch the site plan, floor plan, elevation and section drawing of small residential buildings.
		Illustrate isometric, perspective view of building and fundamentals of Building Information Modelling.
		Describe the types of masonry bonds.
		Construct an Industrial building and roof truss.

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)401	Introduction to Fluid Mechanics	To gather knowledge about hydrostatic pressure on objects with different shapes and determine the stability of floating & submerged bodies
		To study characteristics of turbulent flow in pipes and calculation of major and minor losses in pipe flow.and steady flow in open channel
		To study the conditions for critical, subcritical and supercritical flows and varied flows through open channel
		To perform dimensional analysis and model analysis for various phenomena of Fluid Mechanics.
		To learn about the working principle of impulse and reaction turbines and their applications.
		To know about the working principle of centrifugal pump, reciprocating pump and their applications.

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)402	Introduction to Solid Mechanics	To learn the index properties and soil classification system
		To learn the field identification process related to soil mechanics
		To solve any practical problems related to soil stresses estimation, permeability and seepage
		To estimate the stress distribution properties of soil under various loading conditions
		To solve practical problems related to consolidation settlement and time rate of settlement
		To learn the process of field moisture control of insitu soil

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(PC)401	Soil Mechanics – I	The students will be able to classify soil as per grain size distribution curve and understand the index properties of soil.
		Apply the concept of total stress, effective stress and pore water pressure for solving geotechnical problems.
		Apply the concept of total stress, effective stress and pore water pressure for solving geotechnical problems.
		Assess the permeability of different types of soil and solve flow problems.
		Estimate the seepage loss, factor of safety against piping failure using flow net related to any hydraulic structure.
		Determine vertical stress on a horizontal plane within a soil mass subjected to different types of loading on the ground surface and also the maximum stressed zone or isobar below a loaded area.
		Apply the concept of shear strength to analyze different geotechnical problems and determine the shear strength parameters from lab and field tests.

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Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(PC)402	Environmental Engineering -I	The students will be able to define the basic concepts and terminologies of water supply engineering and solid waste management
		The students will be able to describe different surface and groundwater sources; and composition and characteristics of municipal solid waste
		The students will be able to apply the methods of quantifying water requirement and MSW generation
		The students will be able to solve different mathematical problems regarding different components of water supply systems, distribution networks and MSW management systems
		The students will be able to compare between different water samples based on their physical, chemical and biological characteristics
		The students will be able to design different unit processes and operations involved in water treatment and MSW management

Civil Engineering Department H.E.T.C. Hooghly

Hooghly Engineering & Technology College
Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(PC)403	Surveying & Geomatics	To carry out preliminary survey for any civil engineering or other relevant projects
		To plan a survey to prepare the field book and the corresponding map
		To learn the use of various conventional instruments involved in surveying w.r.t utility and precision
		To plan a survey for measurement of distances and heights of different objects
		To apply a mathematical adjustment for errors involved in surveying measurements
		To invoke advanced surveying techniques over conventional methods in the field of civil engineering

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(PC)404	Concrete Technology	The students will be able to test all the required properties of concrete materials as per IS code.
		The students will be able to compute the properties of concrete at fresh and hardened state.
		The students will be able to design the concrete mix as per latest IS code methods.
		The students will be able to ensure quality control while testing/ sampling.
		The students will be able to design the special type of concrete for specific application purposes.
		The students will be able to use the admixture as per requirement.

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(HS)401	Civil Engineering - Societal & Global Impact	The students will be able to the impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively.
		The students will be able to the extent of Infrastructure, its requirements for energy and how they are met: past, present and future
		The students will be able to the Sustainability of the Environment, including its Aesthetics,
		The students will be able to the potentials of Civil Engineering for Employment creation and its Contribution to the GDP
		The students will be able to the Built Environment and factors impacting the Quality of Life
		The students will be able to the precautions to be taken to ensure that the above-mentioned impacts are not adverse but beneficial.
		The students will be able to Applying professional and responsible judgement and take a leadership role.

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)491	Fluid Mechanics Laboratory	To determinatione Orifice co-efficients
		To calibrate V- Notch
		To determine efficiency of a Centrifugal pump
		To determine efficiency of a Reciprocating pump
		To determine efficiency of a Pelton wheel Turbine
		To determine discharge using Venturimeter and Orificemeter

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)492	Solid Mechanics Lab	To perform tension test on structural materials
		To determine ultimate stress of bricks and concrete cubes
		To carry out torsion test on mild steel circular bar
		To determine hardness of Ferrous Metals by Brinnel and Rockwell methods
		To perform test on closely coiled helical spring
		To carry out impact test using Izod and Charpy methods

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COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Numerical Methods	M(CS) 401	CE (2^{nd} year, 4^{th} semester)	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 02/01/2019

H. O. D.
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R. Patra
02/01/2019

2/1/19

COURSE OUTCOME

Paper Name	Paper Code	Course	Course Outcome
Mathematics	M 402	CE (2^{nd} year, 4^{th} semester)	1. Applicable in the field of physics, EMT, transmission line, instrumentation in order to check accuracy, precision and error 2. Apply the properties of special functions to evaluate integral. Sketch the curve with full justification 3. Apply the knowledge of mathematics to the solution of complex engineering problems 4. Solve higher order linear differential equations and apply to modeling and analyzing mass spring systems 5. Demonstrate a firm understanding of the solution techniques for linear ordinary differential equations of second order

Mukherjee 02/01/2019

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Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(ES)493	Engineering Geology Laboratory	To enable analysis of statically determinate and indeterminate trusses, beams, and frames
		To analyze cable and arch structures
		To obtain the influence lines for statically determinate and indeterminate structures
		To determine deflections of beams and frames
		To analyze structures subjected to horizontal loading
		To have the concept of degree of static and kinematic indeterminacy for beams, frames and trusses

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(PC)493	Surveying & Geomatics	The students will be able to state the interdependency and advancement of different surveying methods
		The students will be able to comprehend the working principles of different surveying and geomatics instruments and experiments
		The students will be able to execute the different methods of surveying and geomatics to measure the eatures of interest
		The students will be able to examine the results obtained from the surveying and geomatics experiments
		The students will be able to critically appraise the different techniques of surveying and geomatics in measuring and assessing the features of interest
		The students will be able to design and construct solutions for real world problems related to surveying and geomatics

Civil Engineering Department H.E.T.C. Hooghly

Hooghly Engineering & Technology College
Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 2nd year

Course Code	Course Name	Course Outcomes
CE(PC)494	Concrete Technology Laboratory	The students will be able to demonstrate the method and findings of tension and compression tests o
		The students will be able to understand the concepts of different test on hardened concrete.
		The students will be able to calculate the specific gravity of concrete ingredients.
		The students will be able to find out the mix proportion of high grade of concrete.
		The students will be able to measure the workability of concrete mix.
		The students will be able to know about the quality of concrete.
		The students will be able to understand the different properties of cement.

Civil Engineering Department H.E.T.C. Hooghly

Hooghly Engineering & Technology College
Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 3rd year

Course Code	Course Name	Course Outcomes
CE(PC)501	Design of RC Structures	Understand material properties and design methodologies for reinforced concrete structures.
		Assess different type of loads and prepare layout for reinforced concrete structures.
		Identify and apply the applicable industrial design codes relevant to the design of reinforced concrete members.
		Analyse and design various structural elements of reinforced concrete building like beam, slab, column, footing, and staircase.
		Assessment of serviceability criteria for reinforced concrete beam and slab.
		Prepare structural drawings and detailing and produce design calculations and drawing in appropriate professional format.

Civil Engineering Department H.E.T.C. Hooghly

Hooghly Engineering & Technology College
Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 3rd year

Course Code	Course Name	Course Outcomes
CE(PC)502	Engineering Hydrology	study the source, occurrence, movement and distribution of water which is a prime resource for development of a nation.
		learn about the functioning of reservoirs and estimation of storage capacities.
		learn about flood hazards, estimation of design floods for various structures and methods of estimating effects of passage of floods through rivers and reservoirs.
		know the basic principles of measurement of flow in rivers

SKB

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 3rd year

Course Code	Course Name	Course Outcomes
CE(PC)503	Structural Analysis – I	Distinguish between stable and unstable and statically determinate and indeterminate structures.
		Apply equations of equilibrium to structures and compute the reactions.
		Calculate the internal forces in cable and arch type structures.
		Evaluate and draw the influence lines for reactions, shears and bending moments in beams due to moving loads.
		Use approximate methods for analysis of statically indeterminate structures.
		Calculate the deflections of truss structures and beams.

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Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 3rd year

Course Code	Course Name	Course Outcomes
CE(PC)504	Soil Mechanics – II	Assess the compaction and consolidation characteristics of soil for solving geotechnical problems.
		Calculate earth pressure on rigid retaining walls on the basis of classical earth pressure theories.
		Analyze and design rigid retaining walls (cantilever types) from geotechnical engineering consideration.
		Evaluate the bearing capacity of shallow foundation by applying established theory.
		Estimate settlement in soils by different methods.
		Compute safety of dams and embankments on the basis of various methods of slope stability analysis.

Civil Engineering Department
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Hooghly Engineering & Technology College
Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 3rd year

Course Code	Course Name	Course Outcomes
CE(PC)505	Environmental Engineering – II	Define the basic concepts and terminologies of waste water engineering and hazardous waste management
		Describe different home plumbing systems for water supply and wastewater disposal
		Apply the methods of quantifying sanitary sewage and storm sewage
		Solve different mathematical problems regarding different components of sewerage system
		Compare between different wastewater samples based on their physical, chemical and biological characteristics
		Design different unit processes and operations involved in wastewater treatment

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Hooghly Engineering & Technology College
Civil Engineering Department
Course Code - 013
Course outcome (2022-23 Session)
Course outcome for 3rd year

Course Code	Course Name	Course Outcomes
CE(PC)506	Transportation Engineering	Understand the knowledge of planning, design and the fundamental properties of highway materials in highway engineering.
		Apply the knowledge of geometric design and draw appropriate conclusion.
		Interpret the concept of different methods in design, construction of the pavement.
		Interpret traffic parameters by applying the knowledge in traffic planning and intersection design.

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Course Code	Course Name	Course Outcomes
CE(PC)591	RC Design Sessional	Understand material properties and design methodologies for reinforced concrete structures.
		Assess different type of loads and prepare layout for reinforced concrete structures.
		Identify and apply the applicable industrial design codes relevant to the design of reinforced concrete members.
		Analyse and design various structural elements of reinforced concrete building like beam, slab, column, footing, and staircase.
		Assessment of serviceability criteria for reinforced concrete beam and slab.
		Prepare structural drawings and detailing and produce design calculations and drawing in appropriate professional format.

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Course Code	Course Name	Course Outcomes
CE(PC)594	Soil Mechanics Laboratory	Identify different types of soil by visual inspection.
		Determine natural moisture content and specific gravity of various types of soil.
		Estimate in-situ density by core cutter method and sand replacement method.
		Analyze grain size distribution and Atterberg limits for soil.
		Perform laboratory tests to determine permeability and compaction characteristics of soil.
		Determine shear strength parameters of soil by unconfined compression test and vane shear test.
		Determine shear strength parameters of soil by direct shear test.
		Perform triaxial test to determine shear strength parameters of soil.
		Determine California Bearing Ratio (CBR) of soil.
		Prepare technical laboratory report

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Course Code	Course Name	Course Outcomes
CE(PC)595	Environmental Engineering Laboratory	Experiment various physical characteristics for a given sample of water and wastewater
		Determine various chemical characteristics for a given sample of water and wastewater
		Examine the bacteriological characteristics for a given sample of water and wastewater
		Examine the suitability of a few treatment options for a given sample of water and wastewater
		Compare the determined quality parameters with standards to decide on the suitability of use for the tested water and disposal of tested wastewater

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Course Code	Course Name	Course Outcomes
CE(PC)596	Transportation Engineering Laboratory	Classify and examine of aggregates through different tests.
		Examine the Specific Gravity test, Penetration test, and Static or Kinematic viscosity test on Bitumen.
		Examine Softening point test, Flash and Fire Point test and Ductility test on Bitumen.
		Calculate the CBR value of sub-grade (Soaked and Unsoaked).
		To design the bituminous mix with Marshall stability test.
		Demonstrate on striping value, Loss on heating, Benkelman beam and Bump integrator test.

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Course Code	Course Name	Course Outcomes
CE(PC)597	Computer Applications in Civil Engineering	Use the computer as a problem-solving tool.
		Identify and formulate Civil Engineering problems solvable by computers.
		Perform linear algebra and matrix operations and their application to solve Civil Engineering problems
		Solve sets of linear equations and determine roots and nonlinear equations
		Construct, interpret and solve simple optimization problems
		Develop programs for Civil Engineering analysis and design problems.
		Use various software used in industries for analysis and design.

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Course Code	Course Name	Course Outcomes
CE(PC)601	Construction Engineering & Management	An idea of how structures are built and projects are developed on the field
		An understanding of modern construction practices
		A good idea of basic construction dynamics- various stakeholders, project objectives, processes, resources required and project economics
		A basic ability to plan, control and monitor construction projects with respect to time and cost
		An idea of how to optimise construction projects based on costs
		An idea how construction projects are administered with respect to contract structures and issues.
		An ability to put forward ideas and understandings to others with effective communication processes

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Course Code	Course Name	Course Outcomes
CE(PC)602	Engineering Economics, Estimation & Costing	Have an idea of Economics in general, Economics of India particularly for public sector agencies and private sector businesses
		Be able to perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
		Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
		Be able to understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure.
		Be able to quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.
		Be able to understand how competitive bidding works and how to submit a competitive bid proposal

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Course Code	Course Name	Course Outcomes
CE(PC)603	Water Resources Engineering	Understand the fundamentals of flow in open channels.
		Understand the concepts of irrigation.
		Estimate the quantity of water required by different crops in different seasons, and accordingly the irrigation water requirement.
		Design channels and other irrigation structures required for irrigation, drainage, soil conservation, flood control and other water-anagement projects.
		Learn about groundwater resources, aquifers and wells.

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Course Code	Course Name	Course Outcomes
CE(PC)604	Design of Steel Structures	Identify the material properties of structural steel. Moreover, the students will identify different bolted and welded connections, analyse and design them for axial and eccentric loads.
		Design different steel sections subjected to axial compression and tension following Indian codes of practices.
		Comprehend the differences between laterally supported and unsupported flexure members.
		Designing of the flexure members using Indian codes of practice.
		Analyse and design rolled and built up compression members along with base connection subjected to axial compression, bending and tension.
		Calculate shear force and bending moment on rolled and built up girders, dimension the section and finally design it following Indian standard design guidelines.
		Identify different components of gantry system, calculate lateral and vertical loads acting on the system, dimension the components and design them.
		Design different components of an industrial building.

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Course Code	Course Name	Course Outcomes
CE(PE)601B	Foundation Engineering	Determine the load carrying capacity of pile foundation.
		Compute the efficiency and settlement of pile group.
		Understand different subsoil exploration methods and interpret field and laboratory test data to obtain design parameters for geotechnical analysis.
		Correlate bearing capacity of shallow foundation from field test data.
		Analyze and design sheet pile structure on the basis of earth pressure theories.
		Understand and apply various types of ground improvement methods for solving complex geotechnical problems.

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Course Code	Course Name	Course Outcomes
CE(PE)602B	Structural Analysis – II	Apply the Slope Deflection and Moment Distribution Method to analyze indeterminate structures.
		Develop and analyze the concept of suspension bridge and stiffness girders
		Apply and analyze the concepts of curved beam analysis in hooks, rings and Bow girders.
		Develop the concept bending in unsymmetrical beams.
		Develop the fundamental concepts of plastic analysis using kinematic method and apply them in frames and continuous beam analysis.
		Develop and analyze the portal frames using Portal and Cantilever method. Develop and analyze the indeterminate structures (continuous beams and frames) using flexibility and stiffness matrix method.

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Course Code	Course Name	Course Outcomes
CE(PC)693	Water Resource Engineering Laboratory	Delineate the watershed of any reservoir using DEM.
		Determine the average rainfall over a catchment.
		Use the raingauge properly for a specified purpose.
		Measure the rate of infiltration of water through the soil.
		Measure the sunshine hours in a particular day.

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Course Code	Course Name	Course Outcomes
CE(PC)694	Steel Structure Design Sessional	Identify the material properties of structural steel. Moreover, the students will identify different bolted and welded connections, analyse and design them for axial and eccentric loads.
		Design different steel sections subjected to axial compression and tension following Indian codes of practices.
		Comprehend the differences between laterally supported and unsupported flexure members.
		Designing of the flexure members using Indian codes of practice.
		Analyse and design rolled and built up compression members along with base connection subjected to axial compression, bending and tension.
		Calculate shear force and bending moment on rolled and built up girders, dimension the section and finally design it following Indian standard design guidelines.
		Identify different components of gantry system, calculate lateral and vertical loads acting on the system, dimension the components and design them.
		Design different components of an industrial building

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Course Code	Course Name	Course Outcomes
CE(PC)695	Quantity Survey Estimation and Valuation Sessional	An introduction to quantity surveying
		The capability to know analysis and schedule of rates
		The ability to know specification of materials
		An understanding about specification of works
		The introduction to valuation

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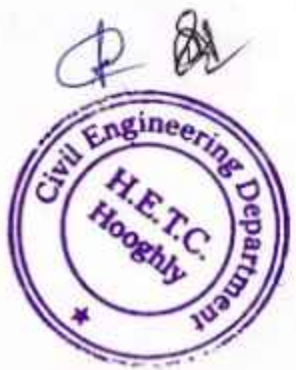
Course Code	Course Name	Course Outcomes
CE(PE)701C	Hydraulic Structures	Identify the characteristics of various types of dams and their selection procedure.
		Perform the reconnaissance survey and, geophysical investigations necessary for selection of suitable dam site
		Estimate forces acting on a gravity dams and perform stability analysis.
		Estimate the seepage loss through embankment dams and suggest necessary remedial measures.
		Calculate the discharge through the overflow section and design the appropriate energy dissipation structures.



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Course Code	Course Name	Course Outcomes
CE(PE)702A	Prestressed Concrete	Learn the introduction of prestressed concrete member and its deflection properties
		Develop the design criteria of prestressed concrete section for flexure and shear properties
		Analyze the anchorage zone stress for post-tensioned members
		Impart knowledge regarding the methods of Analysis of Statically Indeterminate Structures.
		Impart knowledge regarding the composite construction of Prestress and In-situ concrete.
		Impart knowledge regarding Design of Prestressed concrete poles and sleepers and introduction of partial prestressing.

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Course Code	Course Name	Course Outcomes
CE(PE)703A	Air and Noise Pollution and Control	Define the basic concepts and terminologies regarding air pollution and noise pollution
		Describe the physics of air pollution and noise pollution
		Apply the methods of air pollution and noise pollution measurements
		Analyze different concepts of air and noise pollution solving mathematical problems
		Compare air and noise quality with allowable standards and limits
		Choose and design proper techniques for air pollution control and noise pollution control

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Course Code	Course Name	Course Outcomes
CE(PE)704B	Advanced Structural Analysis	Basic Knowledge of the student will increase.
		Student will be able to apply stiffness and flexibility method using system approach.
		Student will understand the yield conditions from their knowledge of stress-strain relations.
		Student will be able to solve simple plate and shell problems

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CE(PE)705A	Railway and Airport Engineering	Explain the basics in planning functional components of Railway and Airport.
		Illustrate the engineering concepts of construction, operation and maintenance of Railway and Airport components.
		Interpret the geometric design parameters of Railway
		Decide the runway orientation of proposed runway on the basis of previous wind data analysis
		Assess the basic runway length parameters.

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Course Code	Course Name	Course Outcomes
CE(IN)791	Industrial Internship (after sixth semester)	Apply fundamental principles of engineering to find solutions based on a systems approach which integrate theory with practice.
		Demonstrate skills to work in a team and understand to work with people from diverse backgrounds.
		Develop the skills required in a profession to become updated with the latest technical advancements and adapt to the changes of the industry.
		Develop communication and interpersonal skills as per the Industry standards.
		Evaluate leadership skills by accomplishing the tasks assigned by the industry.
		Analyze the challenges and future of potential career in an organization in particular and the sector in general.

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Course Code	Course Name	Course Outcomes
CE(PROJ)792	Project-1 (Project work)	To recognize the scope of the problem and conduct a Literature review
		To use existing/new methods to apply the fundamental aspects of civil engineering and their relevance with respect to the societal benefit
		To set up experimentation/design/development of models to analyze and compare the results
		To identify the modern techniques to collect the data & solve the real-life problems
		To Identify the solutions and relate them with the literature with proper analysis of the problem
		To develop the ability of working in the groups and to develop skills related to comprehensive report writing.

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Course Code	Course Name	Course Outcomes
CE(HS)801	Professional Practice, law & Ethics	Recognize the importance of Values and Ethics in their Personal lives and professional careers.
		Discuss the key principles, aspects and purpose of contract management
		Implement the process for tender, bid evaluation, contract documentation, and contract notices
		Discuss Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system
		Identify the role of labour in civil engineering and methods of engaging labour
		Identify the need for intellectual property, main forms of IP, Copyright, Trademarks, and the process of obtaining Patents.

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Course Code	Course Name	Course Outcomes
CE(PE)801D	Pavement Materials and Design	To identify the engineering properties and characteristics of the different materials that concern the pavement engineer
		To use the modern testing techniques of soil, granular and bituminous materials for pavement analysis and design
		To implement the use of different superlative aggregate tests and requirements
		To solve the design mix of rigid pavement
		To discuss the relationship between key materials and their properties along with the behaviour of pavement component systems.
		To select the proper pavement techniques, the deflection of pavements, and methods of maintenance of pavements.

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Course Code	Course Name	Course Outcomes
CE(OE)801C	Deep Foundation	Explain the concept of bearing capacity for deep foundation.
		Differentiate in what circumstances pile is needed and how to estimate pile and pile group capacity under various soil conditions Characterize
		Estimate the safe bearing capacity including settlement consideration for deep foundations.
		Select a suitable deep foundation system for various site conditions and also analysis of that.
		Identify different types and methods of construction for cassion foundation.
		Explain different types and suitable design method of well foundation to check their stability analysis.

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Course Code	Course Name	Course Outcomes
CE(OE)802A	Environmental Impact Assessment and Life cycle Analysis	To understand and evaluate the impact of any activity (large or small scale) on the surrounding environment
		To be able to formulate mitigation strategies to protect the environment leading to sustainability
		To be able to understand the intricacies of Life Cycle Analysis and apply basic knowledge for coherent existence

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Course Code	Course Name	Course Outcomes
CE(CV)881	Comprehensive Viva Voce	To memorize the basic and advanced knowledge in civil engineering
		To develop an idea about the environment of job market and their preparedness to defend the interview after graduation
		To implement their knowledge in civil engineering acquired in the last four years.
		To relate usefulness to the society and assess the impact of civil engineering on the environment.
		To Recognize the properties, uses, advantages and disadvantages of different materials/construction - techniques used in civil engineering
		To identify the usage of the different provisions given in the IS codes & schedules

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Course Code	Course Name	Course Outcomes
CE(PROJ)881	Project-2 (Continued from VII)	To recognize the scope of problem and conduct a Literature review
		To use existing/new methods to apply the fundamental aspects of civil engineering and their relevance with respect to the societal benefit
		To set up experimentation / design / development of models to analyze and compare the results
		To identify the modern techniques to collect the data & solve the real-life problems
		To Identify the solutions and relate them with the literature with proper analysis of the problem
		To develop the ability of working in the groups and to develop skills related to comprehensive report writing

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