



**Hindustan College of Science and Technology  
Farah-Mathura  
(AICTE approved & affiliated to AKTU)**

**NAAC  
CRITERIA-2**

**Metric No.- 2.6.1 (Q<sub>1</sub>M)**

**Programme Outcomes (POs) and Course  
Outcomes (COs) for First Year**

**(Common to All Branches)**

**(2021-25)**

Revised Structure B. Tech 1st Year  
**B.Tech. I Semester**  
 (All branches except Bio Technology and Agriculture Engg.)


S. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KAS101T/ KAS102T	Engineering Physics/ Engineering Chemistry	3	1	0	30	20	50		100		150	4
2	KAS103T	Engineering Mathematics-I	3	1	0	30	20	50		100		150	4
3	KEE101T/ KEC101T	Basic Electrical Engineering/ Emerging Domain in Electronics Engineering	3	0	0	30	20	50		100		150	3
4	KCS101T/ KME101T	Programming for Problem Solving / Fundamentals of Mechanical Engineering & Mechatronics	3	0	0	30	20	50		100		150	3
5	KAS151P/ KAS152P	Engineering Physics Lab/ Engineering Chemistry Lab	0	0	2				25		25	50	1
6	KEE151P/ KEC151P	Basic Electrical Engineering Lab/ Electronics Engineering Lab	0	0	2				25		25	50	1
7	KCS151P/ KAS154P	Programming for Problem Solving / English Language Lab	0	1	2				25		25	50	1
8	KCE151P/ KWS151P	Engineering Graphics & Design Lab/ Mechanical Workshop Lab	0	1	2				50		50	100	1
9	KMC101/ KMC102	AI For Engineering/ Emerging Technology for Engineering	2	0	0	15	10	25		25		50	2
10	KNC101	Soft Skill I											
11	MOOCs	(For B.Tech. Hons. Degree)*	2	0	0	15	10	25		25			NC
		<b>Total</b>										900	20

  
 Director  
 Hindustan College of  
 Science & Technology  
 FARAH (MATHURA)

**B.Tech. II Semester**  
(All branches except Bio Technology and Agriculture Engg.)

S. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits	
			L	T	P	CT	TA	Total	PS	TE	PE			
1	KAS201T/ KAS202T	Engineering Physics/ Engineering Chemistry	3	1	0	30	20	50			100		150	4
2	KAS203T	Engineering Mathematics-II	3	1	0	30	20	50			100		150	4
3	KEE201T/ KEC201T	Basic Electrical Engineering/ Emerging Domain in Electronics Engineering	3	0	0	30	20	50			100		150	3
4	KCS201T/ KME201T	Programming for Problem Solving / Fundamentals of Mechanical Engineering & Mechatronics	3	0	0	30	20	50			100		150	3
5	KAS251P/ KAS252P	Engineering Physics Lab/ Engineering Chemistry Lab	0	0	2					25		25	50	1
6	KEE251P/ KEC251P	Basic Electrical Engineering Lab/ Electronics Engineering Lab	0	0	2					25		25	50	1
7	KCS251P/ KAS254P	Programming for Problem Solving / English Language Lab	0	1	2					25		25	50	1
8	KCE251P/ KWS251P	Engineering Graphics & Design Lab/ Mechanical Workshop Lab	0	1	2					50		50	100	1
9	KMC201/ KMC202	AI For Engineering/ Emerging Technology for Engineering	2	0	0	15	10	25		25			50	2
10	KNC201	Soft Skill II	2	0	0	15	10	25		25				NC
	MOOCs	(For B.Tech. Hons. Degree)*												
		<b>Total</b>											900	20

Mini Project or Internship (3-4 weeks) shall be conducted during summer break after II semester and will be assessed during III semester

  
 Director  
 Hindustan College of  
 Science & Technology  
 FARAH (MATHURA)

# Program Outcomes

## Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

  
Director  
Hindustan College of  
Science & Technology  
FARAH (MATHURA)

## COs-B.Tech I Year(I/II Semester)

ENGINEERING PHYSICS	KAS-102T KAS-202T	CO1	Use of different analytical instruments. To solve the classical and wave mechanics problems
		CO2	To develop the understanding of laws of thermodynamics and their application in various processes
		CO3	To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory
		CO4	To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
		CO5	To know the properties and applications of superconducting materials and nano materials
ENGINEERING CHEMISTRY	KAS-102T KAS-202T	CO1	Get an understanding of the theoretical principles of chemistry of molecular structure, bonding and properties, Chemistry of advanced materials (liquid crystals, Nanomaterials, Graphite & Fullerene) as well as the Principles of Green Chemistry.
		CO2	Apply the fundamental concepts of determination of structure with various spectral techniques and stereochemistry
		CO3	Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion and develop understanding of Chemistry of Engineering materials (Cement).
		CO4	Develop understanding of the sources, impurities and hardness of water, apply the concepts of determination of calorific values and analyze the coal.
		CO5	Develop the understanding of Chemical structure of polymers and its effect on their various properties when used as engineering materials. Understanding the applications of specific polymers and Chemistry applicable in industrial process.
ENGINEERING MATHEMATIC S-I	KAS 103T	CO1	Remember the concept of matrices and apply for solving linear simultaneous equations.
		CO2	Understand the concept of limit , continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems
		CO3	Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.
		CO4	Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.
		CO5	Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals
	KAS 203T	CO1	Understand the concept of differentiation and apply for solving differential equations.
		CO2	Remember the concept of definite integral and apply for evaluating surface areas and volumes
		CO3	Understand the concept of convergence of sequence and series. Also evaluate Fourier series
		CO4	Illustrate the working methods of complex functions and apply for finding analytic functions.
		CO5	Apply the concept of complex functions for finding Taylor's series, Laurent's series

  
 Director  
 Hindustan College of  
 Science & Technology  
 FARAH (MATHURA)

FUNDAMENTALS OF ELECTRICAL ENGINEERING	KEE-101T KEE-201T		and evaluation of definite integrals
		CO1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
		CO2	Analyze the steady state behavior of single phase and three phase AC electrical circuits.
		CO3	Identify the application areas of a single phase two winding transformer as well as an auto transformer.
		CO4	Illustrate the working principles of induction motor, synchronous machine as well as DC
		CO5	Describe the components of low voltage electrical installations and perform elementary
PROGRAMMING FOR PROBLEM SOLVING	KCS-101T KCS-201T	CO1	To Develop Simple Algorithms for Arithmetic and Logical Problems.
		CO2	To Translate the Algorithms to Programs & Execution (in C Language).
		CO3	To Implement Conditional Branching, Iteration and Recursion.
		CO4	To Decompose a Problem into Functions and Synthesize a Complete Program Using Divide and Conquer Approach.
		CO5	To Use Arrays, Pointers and Structures to Develop Algorithms and Programs.
FUNDAMENTALS OF MECHANICAL ENGINEERING	KME-101T KME-201T	CO1	Apply the concept of force resolution and stress and strain to solve basic problems
		CO2	Understand the construction details and working of internal combustion engines, electric vehicle and hybrid vehicles.
		CO3	Explain the construction detail and working of refrigerator, heat pump and airconditioner.
		CO4	Understand fluid properties, conservation laws and hydraulic machinery used in real life.
		CO5	Understand the working principle of different measuring instrument and mechatronics with their advantages, scope and Industrial application.
EMERGING TECHNOLOGY FOR ENGINEERING	KMC102/202	CO1	Understand the concepts of internet of things, smart cities and industrial internet of things
		CO2	Understand the concepts of cloud computing
		CO3	Understand the concepts of block chain, cryptocurrencies, smart contracts
		CO4	Understand design principles, tools, trends in 3 D printing and drones
		CO5	Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain
ARTIFICIAL INTELLIGENCE FOR ENGINEERS	KMC 101/201	CO1	Understand the evolution and various approaches of AI.
		CO2	Understand data storage, processing, visualization, and its use in regression, clustering etc.
		CO3	Understand natural language processing and chatbots.
		CO4	Understand the concepts of neural networks
		CO5	Understand the concepts of face, object, speech recognition and robots
ELEMENTARY MATHEMATICS-I	KBT 101T	CO1	Illustrate the concept of equation and apply for solving quadratic equations and systems of linear inequality in two variables.
		CO2	Apply the concept of arithmetic, and geometric progressions for finding the sum to n terms and infinite number of terms
		CO3	Remember the concept of coordinate system and apply for finding distance of a point from a line and conics.
		CO4	Understand the concept of differentiation and apply for finding rate of change, slope.
		CO5	Remember the concept of differentiation and apply for finding the derivative of

  
 Director  
 Hindustan College of  
 Science & Technology  
 FARAH (MATHURA)

			different types of functions and maxima and minima.
ELEMENTARY MATHEMATIC S-II	KBT201	CO1	Apply the concept of integration to evaluate integrals and apply for finding
		CO2	Understand the concept of differentiation and apply for finding the solution of
		CO3	Understand the concept of vector and apply for finding direction cosines,
		CO4	Apply the concept of three dimensional geometry to find the shortest distance equation of a line.
FUNDAMENTALS OF ELECTRONICS ENGINEERING	KEC-101T KEC-201T	CO1	Describe the concept of PN Junction and devices.
		CO2	Explain the concept of BJT, FET and MOFET.
		CO3	Apply the concept of Operational amplifier to design linear and non
		CO4	Perform number systems conversions, binary arithmetic and minimize logic functions
		CO5	Describe the fundamentals of communication technologies.
ENGINEERING PHYSICS LAB	KAS-151P KAS-251P	CO1	Apply the principle of interference and diffraction to find the wavelength of monochromatic and polychromatic light..
		CO2	Compute and analyze various electrical and electronic properties of a given material by using various experiments.
		CO3	Verify different established laws with the help of optical and electrical experiments
		CO4	Determine and calculate various physical properties of a given material by using various experiments.
		CO5	Study and estimate the performance and parameter of given equipment by using graphical and computational analysis.
ENGINEERING CHEMISTRY LAB	KAS-152P KAS-252P	CO1	To enable the students to understand about the fundamental concepts of analytical instruments
		CO2	To enable the students to understand about the analysis of chloride content, hardness, alkalinity of water..
		CO3	To enable the students to understand about the measure of pH, surface tension and viscosity of a liquid..
		CO4	To enable the students to understand about the preparation of different resins
		CO5	To enable the students to understand about the synthesis of organic compounds such as adipic acid and paracetamol by conventional and green route
BASIC ELECTRICAL ENGINEERING LAB	KEE-151P KEE-251P	CO1	Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.
		CO2	Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.
		CO3	Perform experiment illustrating BH curve of magnetic materials.
		CO4	Calculate efficiency of a single phase transformer and DC machine
		CO5	Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.
BASIC ELECTRONICS ENGINEERING LAB	KEC-151P KEC-251P	CO1	Students will be able to identify various electronics components, cables, connectors and their symbols
		CO2	Students will be able to perform measurement related tasks using multimeter and CRO etc.
		CO3	Students will be able to practically demonstrate the characteristics of semiconductor devices and ICs like diodes, transistors and op-amp.
		CO4	Students will be able to interpret the basics of communication systems
		CO5	Students will be able to perform measurements of displacement, force, temperature

			and pressure using various transducers.
PROGRAMMING FOR PROBLEM SOLVING LAB	KCS-151P KCS-251P	CO1	Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems
		CO2	Demonstrate an understanding of computer programming language concepts.
		CO3	Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage
		CO4	Able to define data types and use them in simple data processing applications he/she must be able to use the concept of array of structures.
		CO5	Develop confidence for self-education and ability for life-long learning needed for Computer language.
ENGLISH LANGUAGE LAB	KAS- 154P KAS-254P	CO1	To facilitate software based learning to provide the required English Language proficiency to students
		CO2	To acquaint students with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.
		CO3	To train students to use the correct and error-free writing by being well versed in rules of English grammar.
		CO4	To cultivate relevant technical style of communication and presentation at their work place and also for academic uses.
		CO5	To enable students to apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics.
ENGINEERING GRAPHICS & DESIGN LAB	KCE-151P KCE-151P	CO1	Use scales and draw projections of objects
		CO2	Explain views of solids and their sectional surfaces.
		CO3	Analyze and draw isometric projections of objects.
		CO4	Demonstrate orthographic representation of perspective views using modern tools.
		CO5	Apply AutoCAD software for creation of engineering drawing and models
WORKSHOP PRACTICE LAB	KWS-151P KWS-251P	CO1	Use various engineering materials, tools, machines and measuring equipments. n
		CO2	Perform machine operations in lathe and CNC machine.
		CO3	Perform manufacturing operations on components in fitting and carpentry shop.
		CO4	Perform operations in welding, moulding, casting and gas cutting.
		CO5	Fabricate a job by 3D printing manufacturing technique

  
 Director  
 Hindustan College of  
 Science & Technology  
 FARAH (MATHURA)