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

NAAC
CRITERIA-2

Metric No.- 2.6.1 (QlM)

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

B. Tech. First Year, Semester- I

(All Branches except Agriculture Engineering and Biotechnology)

3- WEEKS STUDENT INDUCTION PROGRAMME in the beginning of the session													
								Evaluation Scheme					
SN	Subject Code	Subject Name	Type	Category	Period			Sessional Component		Sessional (SW) (TS/PS)	End Semester Examination (ESE)	Total	Credit
					L	T	P	CT	TA	CT+TA	TE/PE	SW+ESE	Cr
1.	BAS101/ BAS102	Engineering Physics/ Engineering Chemistry	T	BS	3	1	0	20	10	30	70	100	4
2.	BAS103	Engineering Mathematics-I	T	BS	3	1	0	20	10	30	70	100	4
3.	BEE101/ BEC101	Fundamentals of Electrical Engineering/ Fundamentals of Electronics Engineering	T	ES	2	1	0	20	10	30	70	100	3
4.	BCS101/ BME101	Programming for Problem Solving/ Fundamentals of Mechanical Engineering	T	ES	2	1	0	20	10	30	70	100	3
5.	BAS104/ BAS105	Environment and Ecology/ Soft Skills	T	BS/ HS	3	0	0	20	10	30	70	100	3
6.	BAS151/ BAS152	Engineering Physics Lab/ Engineering Chemistry Lab	P	BS	0	0	3	-	50	50	50	100	1
7.	BEE151/ BEC151	Basic Electrical Engineering Lab/ Basic Electronics Engineering Lab	P	ES	0	0	3	-	50	50	50	100	1
8.	BCS151/ BAS155	Programming for Problem Solving Lab/ English Language Lab	P	ES/ HS	0	0	3	-	50	50	50	100	1
9.	BCE151 / BWS151	Engineering Graphics & Design Lab/ Workshop Practice Lab	P	ES	0	1	3	-	50	50	50	100	2
					13	5	12			350	550	900	22

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B. Tech. First Year, Semester- II

(All Branches except Agriculture Engineering and Biotechnology)

SN	Subject Code	Subject Name	Type	Category	Period			Evaluation Scheme					Credit
								Sessional Component		Sessional (SW) (TS/PS)	End Semester Examination (ESE)	Total	
					L	T	P	CT	TA	CT+TA	TE/PE	SW+ESE	Cr
1.	BAS202/ BAS201	Engineering Chemistry / Engineering Physics	T	BS	3	1	0	20	10	30	70	100	4
2.	BAS203	Engineering Mathematics-II	T	BS	3	1	0	20	10	30	70	100	4
3.	BEC201/ BEE201	Fundamentals of Electronics Engineering / Fundamentals of Electrical Engineering	T	ES	2	1	0	20	10	30	70	100	3
4.	BME201/ BCS201	Fundamentals of Mechanical Engineering/ Programming for Problem Solving	T	ES	2	1	0	20	10	30	70	100	3
5.	BAS205/ BAS204	Soft Skills / Environment and Ecology	T	HS/ BS	3	0	0	20	10	30	70	100	3
6.	BAS252/ BAS251	Engineering Chemistry Lab / Engineering Physics Lab	P	BS	0	0	3	-	50	50	50	100	1
7.	BEC251/ BEE251	Basic Electronics Engineering Lab/ Basic Electrical Engineering Lab	P	ES	0	0	3	-	50	50	50	100	1
8.	BAS255/ BCS251	English Language Lab / Programming for Problem Solving Lab	P	HS/ ES	0	0	3	-	50	50	50	100	1
9.	BWS251/ BCE251	Workshop Practice Lab / Engineering Graphics & Design Lab	P	ES	0	1	3	-	50	50	50	100	2
10.	BVA251/ BVA252	Sports and Yoga / NSS	P	VA	0	0	3		100	*100		*100	0
					13	5	12+ 3*			350+ *100	550	900+ *100	22

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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.

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

ENGINEERING PHYSICS	BAS101 / BAS201	CO1	To explain the distribution of energy in black body radiation and to understand the difference in particle and wave nature with explanation of Compton effect and Schrodinger wave equation.
		CO2	To understand the concept of displacement current and consistency of Ampere's law and also the properties of electromagnetic waves in different medium with the use of Maxwell's equations.
		CO3	To understand the behavior of waves through various examples/applications of interference and diffraction phenomenon and the concept of grating and resolving power
		CO4	To know the functioning of optical fiber and its properties and applications. To understand the concept, properties and applications of Laser.
		CO5	To know the properties and applications of superconducting materials and nano materials
ENGINEERING CHEMISTRY	BAS102 / BAS202	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

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			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 MATHEMATICS-I	BAS103	CO1	Understand the concept of complex matrices, Eigen values, Eigen vectors and applythe concept of rank to evaluate linear simultaneous equations
		CO2	Remember the concept of differentiation to find successive differentiation, Leibnitz Theorem, and create curve tracing, and find partial and total derivatives
		CO3	Applying the concept of partial differentiation to evaluate extrema, series expansion, error approximation of functions and Jacobians
		CO4	Remember the concept of Beta and Gamma function; analyze area and volume and Dirichlet's theorem in multiple integral
		CO5	Remember the concept differentiation to evaluate LDE of nth order with constant coefficient and LDE with variable coefficient of 2nd order.
ENGINEERING MATHEMATICS-II	BAS203	CO1	Remember the concept differentiation to evaluate LDE of nth order with constant coefficient and LDE with variable coefficient of 2nd order.
		CO2	Understand and apply the concept of Laplace Transform to evaluate differential equations
		CO3	Understand the concept of convergence to analyze the convergence of series and expansion of the function for Fourier series.
		CO4	Apply the concept of analyticity, Harmonic function and create the image of function applying conformal transformation
		CO5	Apply the concept of Cauchy Integral theorem, Cauchy Integral

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			formula, singularity and calculus of residue to evaluate integrals
FUNDAMENTALS OF ELECTRICAL ENGINEERING	BEE101 / BEE201	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 and calculate their efficiency. Also identify the connections of a three phase transformer.
		CO4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.
		CO5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.
PROGRAMMING FOR PROBLEM SOLVING	BCS101 / BCS201	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	BME101 / BME201	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

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			machinery used in real life.
		CO5	Understand the working principle of different measuring instrument and mechatronics with their advantages, scope and Industrial application.
ENVIRONMENT AND ECOLOGY	BAS104 / BAS204	CO1	Gain in-depth knowledge on natural processes that sustain life, and govern economy.
		CO2	Estimate and Predict the consequences of human actions on the web of life, global economy and quality of human life.
		CO3	Develop critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.
		CO4	Acquire values and attitudes towards understanding complex environmental economic social challenges, and participate actively in solving current environmental problems and preventing the future ones.
		CO5	Adopt sustainability as a practice in life, society and industry.
SOFT SKILLS	BAS105 / BAS205	CO1	Write professionally in simple and correct English.
		CO2	Demonstrate active listening with comprehension, and the ability to write clear and wells tructured emails and proposals.
		CO3	Learn the use of correct body language and tone of voice to enhance communication.
		CO4	Acquire the skills necessary to communicate effectively and deliver presentations with clarity and impact
		CO5	Understand and apply some important aspects of core skills, like Leadership and stress management.
		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

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		CO3	Remember the concept of coordinate system and apply for finding distance of a point from a line and conics.

ELEMENTARY MATHEMATICS-I	BBT101	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 different types of functions and maxima and minima.
ELEMENTARY MATHEMATICS-II	BBT201	CO1	Apply the concept of integration to evaluate integrals and apply for finding definite integrals.
		CO2	Understand the concept of differentiation and apply for finding the solution of differential equations.
		CO3	Understand the concept of vector and apply for finding direction cosines, projection of vector on a line.
		CO4	Apply the concept of three dimensional geometry to find the shortest distance between two lines. Also apply for finding coplanar lines and Cartesian equation of a line.
FUNDAMENTALS OF ELECTRONICS ENGINEERING	BEC101 / BEC201	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.

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ENGINEERING PHYSICS LAB	BAS151 / BAS251	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	BAS152 / BAS252	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	BEE151 / BEE251	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	BEC151 / BEC251	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

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			displacement, force, temperature and pressure using various transducers.
PROGRAMMING FOR PROBLEM SOLVING LAB	BCS151 / BCS251	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	BAS155 / BAS255	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	BCE151/ BCE251	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	BWS151/B WS251	CO1	Use various engineering materials, tools, machines and measuring equipments. n
		CO2	Perform machine operations in lathe and CNC machine.

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		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

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