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

NAAC
CRITERIA-2

Metric No.- 2.6.1 (Q_iM)

Programme Outcomes (POs) and Course Outcomes (COs) for Civil Engineering

SEMESTER –III

SN	Subject Code	Subject	Type	Category	Periods			Sessional Component		Sessional (SW) (TS/PS)	End Semester Examination (ESE)	Total SW+ESE	Credit Cr
					L	T	P	CT	TA	CT+TA	TE/PE		
1	BOE3** / BAS302	Science Based Open Elective/BSC (Maths-III/Math IV/ Math V)	T	ES/BS	3	1	0	20	10	30	70	100	4
2	BVE301 / BAS301	Universal Human Value and Professional Ethics/ Technical Communication	T	VA/HS	2	1	0	20	10	30	70	100	3
3	BCE301	Engineering Mechanics	T	PC	3	1	0	20	10	30	70	100	4
4	BCE302	Surveying and Geomatics	T	PC	3	1	0	20	10	30	70	100	4
5	BCE303	Fluid Mechanics	T	PC	2	1	0	20	10	30	70	100	3
6	BCE351	Building Planning & Drawing Lab	P	PC	0	0	2		50	50	50	100	1
7	BCE352	Surveying and Geomatics Lab	P	PC	0	0	2		50	50	50	100	1
8	BCE353	Fluid Mechanics Lab	P	PC	0	0	2		50	50	50	100	1
10	BCC301 / BCC302	Cyber Security/Python programming	T	VA	2	0	0	20	10	30	70	100	2
11	BCC351	Internship Assessment /Mini Project*	P							100		100	2
		Total			15	5	6						25

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

SEMESTER –IV

SN	Subject Code	Subject	Type	Category	Periods			Sessional Component		Sessional (SW) (TS/PS)	End Semester Examination (ESE)	Total SW+ESE	Credit Cr
					L	T	P	CT	TA	CT+TA	TE/PE		
1	BAS402 / BOE4**	BSC(Maths-III/Math IV/ Math V)/Science Based Open Elective	T	BS/ES	3	1	0	20	10	30	70	100	4
2	BAS401 / BVE401	Technical Communication / Universal Human Value and Professional Ethics	T	HS/VA	2	1	0	20	10	30	70	100	3
3	BCE401	Materials, Testing & Construction Practices	T	PC	3	1	0	20	10	30	70	100	4
4	BCE402	Introduction to Solid Mechanics	T	PC	3	1	0	20	10	30	70	100	4
5	BCE403	Hydraulic Engineering and Machines	T	PC	2	1	0	20	10	30	70	100	3
6	BCE451	Material Testing Lab	P	PC	0	0	2		50	50	50	100	1
7	BCE452	Solid Mechanics Lab	P	PC	0	0	2		50	50	50	100	1
8	BCE453	Hydraulics & Hydraulic Machine Lab	P	PC	0	0	2		50	50	50	100	1
9	BCC402 / BCC401	Python Programming/Cyber Security	P	VA	2	0	0	20	10	30	70	100	2
10	BVE451 / BVE452	Sports and Yoga - II / NSS-II	P	VA	0	0	3			100		100	0
		Total			**15**	**5**	**9**						**23**
		Minor Degree/ Honors Degree MT-1/HT-1											

*The Mini Project or internship (4 weeks) will be done during summer break after 4th Semester and will be assessed during V semester.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

FIFTH SEMESTER **CIVIL ENGINEERING** **SESSION 2020-21**

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KCE 501	Geotechnical Engineering	3	1	0	30	20	50		100		150	4
2	KCE 502	Structural Analysis	3	1	0	30	20	50		100		150	4
3	KCE 503	Quantity Estimation and Construction Management	3	1	0	30	20	50		100		150	4
4		Departmental Elective-I	3	0	0	30	20	50		100		150	3
	KCE 051	Concrete Technology											
	KCE 052	Modern Construction Materials											
	KCE 053	Open Channel Flow											
	KCE 054	Engineering Geology											
5		Departmental Elective-II	3	0	0	30	20	50		100		150	3
	KCE-055	Engineering Hydrology											
	KCE-056	Sensor and Instrumentation Technologies for Civil Engineering Applications											
	KCE-057	Air and Noise Pollution Control											
	KCE-058	GIS and Advance Remote Sensing											
6	KCE-551	CAD Lab	0	0	2				25		25	50	1
7	KCE-552	Geotechnical Engineering Lab	0	0	2				25		25	50	1
8	KCE-553	Quantity Estimation and Management Lab	0	0	2				25		25	50	1
9	KCE-554	Mini Project or Internship Assessment*	0	0	2				50			50	1
10	KNC501/ KNC502	Constitution of India, Law and Engineering / Indian Tradition, Culture and Society	2	0	0								
11		MOOCs (Essential for Hons. Degree)											
		Total	17	3	8							950	22

* The Mini Project or Internship (4 weeks) conducted during semester break after IV semester and will be assessed during V semester.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

SIXTH SEMESTER **CIVIL ENGINEERING** **SESSION 2020-21**

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KCE 601	Design of Concrete Structures	3	1	0	30	20	50		100		150	4
2	KCE 602	Transportation Engineering	3	1	0	30	20	50		100		150	4
3	KCE 603	Environmental Engineering	3	1	0	30	20	50		100		150	4
4		Departmental Elective-III	3	0	0	30	20	50		100		150	3
	KCE 061	Advance Structural Analysis											
	KCE 062	River Engineering											
	KCE 063	Repair and Rehabilitation of Structures											
	KCE 064	Foundation Design											
5		Open Elective-I	3	0	0	30	20	50		100		150	3
6	KCE 651	Transportation Engineering Lab	0	0	2				25		25	50	1
7	KCE 652	Environmental Engineering Lab	0	0	2				25		25	50	1
8	KCE 653	Structural Detailing Lab	0	0	2				25		25	50	1
9	KNC601/ KNC602	Constitution of India, Law and Engineering / Indian Tradition, Culture and Society	2	0	0	15	10	25		50			
10		MOOCs (Essential for Hons. Degree)											
		Total	17	3	6							900	21

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

SEVENTH SEMESTER **CIVIL ENGINEERING** **SESSION 2021-22**

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KHU701/ KHU702	HSMC-1*/HSMC-2*	3	0	0	30	20	50		100		150	3
2		Departmental Elective -IV	3	0	0	30	20	50		100		150	3
	KCE 070	Railway, Waterway and Airway Engineering											
	KCE 071	Sustainable Construction Methods											
	KCE 072	Probability Methods in Civil Engineering											
	KCE 073	Advance Concrete Design											
	KCE 074	Solid Waste Management											
3		Departmental Elective -V	3	0	0	30	20	50		100		150	3
	KCE 075	Design of Steel Structures											
	KCE 076	Urban Transportation Planning											
	KCE 077	Geosynthetics and Reinforced Soil Structures											
	KCE 078	Irrigation and Water Resource Engineering											
	KCE 079	Disaster Preparedness and Management											
4		Open Elective-II	3	0	0	30	20	50		100		150	3
5	KCE751	Concrete Lab	0	0	2				25		25	50	1
6	KCE752	Mini Project or Internship Assessment*	0	0	2				50			50	1
7	KCE753	Project	0	0	8				150			150	4
8		MOOCs (Essential for Hons. Degree)											
		Total	12	0	12							850	18

CIVIL ENGINEERING

S.No	Subject Code	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KHU801/ KHU802	HSMC-1* / HSMC-2*	3	0	0	30	20	50		100		150	3
2		Open Elective-III	3	0	0	30	20	50		100		150	3
3		Open Elective -IV	3	0	0	30	20	50		100		150	3
4	KCE851	Project	0	0	18				100		300	400	9
5		MOOCs (Essential for Hons. Degree)											
		Total	9	0	18							850	18

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 modeling 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.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

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.

PSO:

Graduates are expected to attain Program specific outcome within three to four years after the graduation. Following PSOs of Department of Civil Engineering have been laid down.

1. Inculcating in students technical competencies to design and build civil engineering-based systems in the context of environmental, economical, and societal requirements.
2. The ability to acquire and update knowledge continuously and provide engineering solutions to meet the environmental and societal needs.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

Department of Civil Engineering

Course Outcomes (Cos): B.tech2nd, 3rd and 4th year

Batch: 2020-24

Subject Name	Subject Code	CO	3rd Semester
Engineering Mechanics (EM)	BCE301	CO1	Use scalar and vector analytical techniques for analyzing forces in statically determinate structures.
		CO2	Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.
		CO3	Apply basic knowledge of mathematics and physics to solve real-world problems.
		CO4	Understand basic dynamics concepts- force, momentum, work and energy;
		CO5	Understand and be able to apply Newton's laws of motion;
Surveying and Geomatics	BCE302	CO1	Describe the function of surveying and work with survey instruments, take observations, and prepare plan, profile, and cross-section and perform calculations.
		CO2	Calculate, design and layout horizontal and vertical curves.
		CO3	Operate a total station and GPS to measure distance, angles, and to calculate differences in elevation. Reduce data for application in a geographic information system.
		CO4	Relate and apply principles of photo grammetry for surveying.
		CO5	Apply principles of Remote Sensing and Digital Image Processing for Civil Engineering problems.
Fluid Mechanics	BCE303	CO1	Understand the broad principles of fluid statics, kinematics and dynamics
		CO2	Understand definitions of the basic terms used in fluid mechanics
		CO3	Understand classifications of fluid flow

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

		CO4	Apply the continuity, momentum and energy principles
		CO5	Apply dimensional analysis
Technical Communication	BAS-301	CO1	Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.
		CO2	Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
		CO3	Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.
		CO4	Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence
		CO5	It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.
Computer System Security	BCC301	CO1	The student will be able to discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats
		CO2	The student will be able to discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats
		CO3	The student will be able to discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques.
		CO4	The student will be able to articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios.
		CO5	The student will be able to articulate the well knowncyber attack incidents, explain the attack scenarios, and explain mitigation techniques
Mini Project or Internship	BCC351	CO1	The student gets a general knowledge about how to design and develop a mini project.
		CO2	The student gets an idea on how to work as a team to analyze a given problem definition.
		CO3	The student is able to use modern tools to develop a small database project by working as a team.
		CO4	The student is able to perform database connectivity from front-end applications.
		CO5	The student is made able to design and develop small sized applications using databases in the back-end.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

Energy Science and Engineering	BOE033	CO1	The basics of various forms of energy and its inter-conversion with the help of engines/systems based on thermodynamic cycle and others.
		CO2	To recognize and recall the basics of nuclear reactor terminology, definitions, and concepts associated with reactor physics and theory and technology of nuclear power plant.
		CO3	To explain the principles that underlies the ability of various natural phenomena to deliver solar energy. Outline the technologies that are used to harness the power of solar energy.
		CO4	To understand processing and limitations of fossil fuels (coal, petroleum and natural gas) and identify and explain necessasity of harnessing alternate energy resources.
		CO5	Students may realize the environmental problems directly related to energy production and consumption includes environmental pollution, monitoring and life cycle assessment.
Surveying and Geomatics Lab	BCE352	CO1	Describe the function of surveying and work with survey instruments, take Observations, and prepare plan, profile, and cross-section and perform calculations.
		CO2	Calculate, design and layout horizontal and vertical curves.
		CO3	Operate a total station and GPS to measure distance, angles, and to calculate difference in elevation. Reduce data for application in a geographic information system.
		CO4	Relate and apply principles of photo grammetry for surveying.
		CO5	Apply principles of Remote Sensing and Digital Image Processing for Civil Engineering problems.
Fluid Mechanics Lab	BCE353	CO1	The student will be able to understand the broad principles of fluid statics, kinematics and dynamics
		CO2	The student will be able to understand definitions of the basic terms used in fluid mechanics
		CO3	The student will be able to understand classifications of fluid flow
		CO4	The student will be able to apply the continuity, momentum and energy principles
		CO5	The student will be able to apply dimensional analysis.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

Building Planning & Drawing Lab	BCE351	CO1	Understand scope of CAD software in building planning and drawing.
		CO2	Work on AutoCAD.
4th Semester			
MATERIALS TESTING & CONSTRUCTION PRACTICES	BCE401	CO1	Identify various building materials and to understand their basic properties.
		CO2	Understand the use of non-conventional civil engineering materials.
		CO3	Study suitable type of flooring and roofing in the construction process.
		CO4	Characterize the concept of plastering, pointing and various other building services.
		CO5	Exemplify the various fire protection, sound and thermal insulation techniques, maintenance and repair of buildings.
INTRODUCTION TO SOLID MECHANICS	BCE402	CO1	Describe the concepts and principles of stresses and strains
		CO2	Analyze solid mechanics problems using classical methods and energy methods
		CO3	Analyze structural members subjected to combined stresses
		CO4	Calculate the deflections at any point on a beam subjected to a combination of loads.
		CO5	Understand the behavior of columns, springs and cylinders against loads.
HYDRAULIC ENGINEERING AND MACHINES	BCE403	CO1	Apply their knowledge of fluid mechanics in addressing problems in open channels.
		CO2	Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
		CO3	Have knowledge in hydraulic machineries like pumps and turbines.
Engineering Mathematics-III	BAS403	CO1	The students will be able to get the idea of Laplace transform of functions and their application
		CO2	The students will be able to get the idea of Fourier transform of functions and their applications
		CO3	The students will be able to get the basic ideas of logic and Group and uses
		CO4	The students will be able to get the idea s of sets, relation, function and counting techniques

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

		CO5	The students will be able to get the idea of lattices, Boolean algebra, Tables and Karnaugh maps.
Python	BCC402	CO1	To read and write simple Python programs.
		CO2	To develop Python programs with conditionals and loops.
		CO3	To define Python functions and to use Python data structures —
		CO4	lists, tuples, dictionaries
		CO5	To do input/output with files in Python
			To do searching, sorting and merging in Python
Universal Human Values	BVE401	CO1	Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society and meaning of natural acceptance.
		CO2	Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
		CO3	Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society in family and society.
		CO4	Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature. harmony in nature and existence.
		CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
			harmony of professional ethics.
MATERIAL TESTING LAB	BCE451	CO1	Test the concrete materials as per BIS specifications.
		CO2	Test the different properties of bricks.
SOLID MECHANICS LAB	BCE452	CO1	Design and conduct experiments, acquire data, analyse and interpret data
		CO2	Determine the behaviour of ferrous metals subjected to normal and shear stresses by means of experiments.
		CO3	Determine the behaviour of structural elements, such as bars subjected to tension, compression, shear, bending, and torsion by means of experiments.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

		CO4	Physical insight into the behaviour materials and structural elements, including distribution of stresses and strains, deformations and failure modes.
		CO5	Write individual and group reports: present objectives, describe test procedures and results, synthesize and discuss the test results.
HYDRAULIC ENGINEERING AND MACHINES LAB	BCE453	CO1	Study the flow characteristics in an open channel.
		CO2	Study the characteristics the Pumps and Turbines.
5th Semester			
Geotechnical Engineering	KCE501	CO1	Classify the soil and determine its Index properties.
		CO2	Evaluate permeability and seepage properties of soil.
		CO3	Interpret the compaction and consolidation characteristics & effective stress concept of soil.
		CO4	Determine the vertical and shear stress under different loading conditions and explain the phenomenon of soil liquefaction.
		CO5	Interpret the earth pressure and related slope failures.
Structural Analysis	CE502	CO1	Explain type of structures and method for their analysis.
		CO2	Analyze different types of trusses for member forces.
		CO3	Compute slope and deflection in determinate structures using different methods.
		CO4	Apply the concept of influence lines and moving loads to compute bending moment and shear force at different sections.
		CO5	Analyzedeterminatearches for different loading conditions.
Quantity Estimation and construction Management	KCE503	CO1	Understand the importance of units of measurement and preliminary estimate for administrative approval of projects
		CO2	Understand the contracts and tender documents in construction projects.
		CO3	Analyze and assess the quantity of materials required for civil engineering works as per specifications.
		CO4	Evaluate and estimate the cost of expenditure and prepare a detailed rate analysis report.
		CO5	Analyze and choose cost effective approach for civil

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

			engineering projects.
Concrete Technology	KCE-051	CO1	Understand the properties of constituent material of concrete.
		CO2	Apply admixtures to enhance the properties of concrete.
		CO3	Evaluate the strength and durability parameters of concrete.
		CO4	Design the concrete mix for various strengths using difference methods.
		CO5	Use advanced concrete types in construction industry.
Engineering Hydrology	KCE-055	CO1	Understand the scope of geological studies.
		CO2	Understand the rocks and its engineering properties.
		CO3	Understand the minerals and constituents of rocks.
		CO4	Understand the rock deformations, their causes effects and preventive measures.
		CO5	Understand the ground water reserves, Geophysical exploration methods and site selection for mega projects.
Indian Tradition, Culture and Society	KNC 502	CO1	To identify and understand the roots and details of Society State and Polity in India.
		CO2	To understand the importance of Indian Literature, Culture, Tradition, Practices and to apply in present system
		CO3	To analyze the Indian Religion, Philosophy, Practices and in shadow of Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy and to apply in
		CO4	To analyze the Science, Management and Indian Knowledge System and to apply in present system.
		CO5	To evaluate the Indian Architect, Engineering and Architecture in Ancient India, Indian's Cultural Contribution to the World and to create environment in Arts and
Mini Project and Internship	KCE554	CO1	Identify project planning objectives, along with various cost/effort estimation models.
		CO2	Organize & schedule project activities to compute critical path for risk analysis.
		CO3	Monitor and control project activities.
		CO4	Formulate testing objectives and test plan to ensure good software quality.
		CO5	Configure changes and manage risks using project management tools.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

CAD LAB	KCE551	CO1	To understand scope of GIS in Civil Engineering.
		CO2	Work on GIS in the field of surveying.
Geotechnical Engineering Lab	KCE552	CO1	Examine the grain size distribution of soil.
		CO2	Determine the specific gravity and Atterberg limits of soil.
		CO3	Estimate the field density of soil by core cutter and sand replacement methods.
		CO4	Determine compaction and shear strength parameters of soil.
		CO5	Evaluate the differential free swell index and swelling pressure of soil.
		CO6	Obtain the compressibility, permeability parameters and CBR value of soil.
Quantity Estimation and Management Lab	KCE553	CO1	Study of DSR, CPWD specifications and NBC.
		CO2	Estimation of quantities for any one of the following: Building/ Septic tank/Water supply pipe line/road/bridge.
		CO3	Preparation of Bill of Quantities (BOQ) for above project.
		CO4	Practice on open source project management software / MS Project/Primavera software for same problem.
		CO5	Study of any full set of tender documents (Institute shall provide the set from ongoing/ completed tenders).

6th Semester

Design of Concrete Structures	KCE601	CO1	Analyse and Design RCC beams for flexure by IS methods.
		CO2	Analyse and Design RCC beams for shear by IS methods.
		CO3	Analyse and Design RCC slabs and staircase by IS methods.
		CO4	Design the RCC compression members by IS methods.
		CO5	Design various types of footings and cantilever retaining
TRANSPORTATION ENGINEERING	KCE602	CO1	Understand the history of road development, their alignment & Survey.
		CO2	Design the various geometric parameters of road.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

		CO3	Study the traffic characteristics & design of road intersections & signals.
		CO4	Examine the properties of highway materials & their implementation in design of pavements.
		CO5	Learn methods to construct various types of roads.
Environmental Engineering	KCE603	CO1	Assess water demand and optimal size of water mains.
		CO2	Layout the distribution system & assess the capacity of reservoir.
		CO3	Investigate physical, chemical & biological parameter of water.
		CO4	Design treatment units for water and waste water.
		CO5	Apply emerging technologies for treatment of waste water.
Foundation Design	KCE064	CO1	Understand various methods of Soil Exploration and its importance.
		CO2	Analyze bearing capacity and settlement of soil for shallow foundation.
		CO3	Design the various types of shallow foundation and understand the basics of deep foundation.
		CO4	Understand the characteristics of well foundations and retaining wall.
		CO5	Understand the concept of soil reinforcement.
Idea to Business model	KOE060	CO1	Enhance creative knowledge of students regarding selection of a business idea and it'simplementation process.
		CO2	Acquire knowledge on entrepreneurship development, its Pro's and con's.
		CO3	Acquire basic knowledge on how to become an Entrepreneur.
		CO4	Develop knowledge on Production systems and it's sustainability through production, planning and control (PPC)
		CO5	Develop appropriate business model and apply in a better way.
Constitution of India	KNC602	CO1	Identify and explore the basic features and modalities about Indian constitution
		CO2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level.
		CO3	Demonstrate different aspects of Indian Legal System and its related bodies.
		CO4	Discover and apply different laws and regulations

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

			related to engineering practices.
		CO5	Interpret and evaluate the role of engineers with different organizations and governance models
Transportation Engineering Lab	KCE651	CO1	To conduct different tests to find various properties of pavement materials and soil subgrade.
		CO2	Use different instruments in traffic volume and traffic study.
Environmental Engineering Lab	KCE652	CO1	Gain knowledge in various parameters of water.
		CO2	Identify the significance to conduct experiments on water purity.
		CO3	Explain current environmental issues through laboratory experiments.
		CO4	Develop problem solving and laboratory skills using modern instrumentation
Structural Detailing Lab	KCE653	CO1	To verify Maxwell's Reciprocal theorem
		CO2	Horizontal thrust in a three-hinged arch and to draw influence line diagrams for Horizontal Thrust end bending moment.
		CO3	Classify cast irons and studies their applications.
		CO4	To find horizontal thrust in a two hinged arch and to draw influence line diagrams for horizontal Thrust and bending moment
		CO5	Study of SP34/IS13920/IS456:2000 for detailing of structural elements.
7th Semester			
Railway, Waterway and Airway Engineering	KCE070	CO1	Explain the importance of railway infrastructure.
		CO2	Identify the factors governing design of railway infrastructures.
		CO3	Analysis and design the railway track system.
		CO4	Understand the concepts of airport engineering and design components of airport.
		CO5	Associate with the concepts of water transport system.
Irrigation and Water Resource Engineering	KCE078	CO1	Describe the components of hydrological cycle, evaporation process and consumptive use.
		CO2	Apply the knowledge of stream flow measurement techniques and hydrograph theory for computation of run-off.

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

		CO3	Design different types of irrigation channels and water logging preventive measures.
		CO4	Design the regulatory and control systems of canal and irrigation outlets.
		CO5	Apply the knowledge of ground water hydrology and determination of discharge through wells.
Renewable Energy Resources	KOE074	CO1	Know about the renewable energy sources available at present.
		CO2	Understand the solar energy operation and its characteristics.
		CO3	Learn about the geothermal energy, MHD and Fuel Cell principles and its operation.
		CO4	Get the knowledge of wind energy and Thermo-electric operation and its types.
		CO5	Understand the biomass, Ocean Thermal and Tidal energy generation and its technologies.
Mini Project and Internship	KCE752	CO1	Developing a technical artifact requiring new technical skills and effectively utilizing a new software tool to complete a task
		CO2	Writing requirements documentation, Selecting appropriate technologies, identifying and creating appropriate test cases for systems.
		CO3	Demonstrating understanding of professional customs &practices and working with professional standards.
		CO4	Improving problem-solving, critical thinking skills and report writing.
		CO5	Learning professional skills like exercising leadership, behaving professionally, behaving ethically, listening effectively, participating as a member of a team, developing appropriate workplace attitudes.
Project	KCE753	CO1	Analyze and understand the real life problem and apply their knowledge to get programming solution
		CO2	Engage in the creative design process through the integration and application of diverse technical knowledge and expertise to meet customer needs and address social issues.
		CO3	Use the various tools and techniques, coding practices for developing real life solution to the problem.
		CO4	Find out the errors in software solutions and establishing the process to design maintainable software applications
		CO5	Write the report about what they are doing in project and learning the team working skills

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

Concrete Lab	KCE751	CO1	Determine the various physical properties of cement.
		CO2	Examine the different physical test of coarse and fine aggregate.
		CO3	Analyze the properties of fresh and hardened concrete mix.
		CO4	Design and develop a performance based mix which can fulfill the requirements of ready mix concrete plant
		CO5	Describe and Demonstrate the Non-Destructive test (NDT) of concrete

8th Semester

Project Management and Entrepreneurship	KHU702	CO1	Understanding basic concepts in the area of entrepreneurship
		CO2	adopting of the key steps in the elaboration of business idea generation and innovation
		CO3	understanding the stages of the entrepreneurial project Management
		CO4	Students should aware of project financing and budget details
		CO5	Developing the understanding and aspect of social entrepreneurship among students
Rural Development : Administration and Planning	KHU801	CO1	Students can understand the definitions, concepts and components of Rural Development
		CO2	Students will know the importance, structure, significance, resources of Indian rural economy.
		CO3	Students will have a clear idea about the area development programmes and its impact.
		CO4	Students will be able to acquire knowledge about rural entrepreneurship.
		CO5	Students will be able to understand about the using of different methods for human resource planning.
Quality Management	KOE085	CO1	Identify the contribution of quality gurus in TQM journey and acknowledge the importance of customers in manufacturing.
		CO2	Explain and analyze quality systems and organizational structures to apply quality principles in different processes
		CO3	Design an effective performance measurement system to optimize standard statistical process

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)

			control techniques
		CO4	Describe and analyze various reliability methods / tests and the associated failure analysis methods
		CO5	Apply the concepts of ISO - 9000 and ISO -14000 standards in auditing techniques such as JIT and Taguchi Method.
DIGITAL & SOCIAL MEDIA MARKETING	KOE094	CO1	Students will develop an understanding of digital and social media marketing practices
		CO2	Students will develop understanding of social media platforms
		CO3	Students will acquire the skill to acquire and engage consumers online
		CO4	Students will develop understanding of building organizational competency by way of digital marketing practices and cost considerations
		CO5	Students will develop understanding of the latest digital practices for marketing and promotion
Project	KCE 851	CO1	Analyze and understand the real life problem and apply their knowledge to get programming solution.
		CO2	Engage in the creative design process through the integration and application of diverse technical knowledge and expertise to meet customer needs and address social issues.
		CO3	Use the various tools and techniques, coding practices for developing real life solution to the problem.
		CO4	Find out the errors in software solutions and establishing the process to design maintainable software applications
		CO5	Write the report about what they are doing in project and learning the team working skills

Director
Hindustan College of
Science & Technology
FARAH (MATHURA)