BACHELOR OF TECHNOLOGY

B. TECH. – All Branches

COURSE OUTCOMES & CO-PO MAPPING

(SESSION 2020-21)

Estd. 2000

DEPARTMENT of

APPLIED SCIENCES & HUMANITIES

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			
	MOOCs	(For B.Tech. Hons. Degree) *											
		Total										900	20

Program Outcome (PO's)

- **PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

- **PO2: 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.

- **PO3: 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.

- **PO4: 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.

- **PO5: 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.

- **PO6: 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.

- **PO7: 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.

- **PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- **PO9**: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **PO10: 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.

- **PO11: 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.

- **PO12: 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.

ABES Engineering College, Ghaziabad
Department of Applied Sciences and Humanities
Session 2020-2021

Semester: II
Subject Code: KAS 201T
Subject Name: Engineering Physics
Pre-requisites of course: 10+2 Physics
Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Apply and relate the concepts of special theory of relativity and Lorentz transformation equations to calculate the mass-energy relation, variation of mass, velocity, time and length.	K3
CO2	Use Maxwell's equations and time varying electric field to show the nature of propagation of electromagnetic waves, radiation pressure and its energy through free space, non-conducting and conducting media.	K3
CO3	Extend the concepts of Planck's black body radiation law & Schrodinger wave equation to calculate the matter waves energy & momentum, probability of finding the particle and wave function of quantum system (particle in a box).	K3
CO4	Determine the thickness of thin films, refractive index and resolving power of grating using principles of interference and diffraction of light.	K3
CO5	Evaluate and categorize among different types of laser and optical fiber, fiber loss and transition probabilities of laser.	K5

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		1	2		1		1	1	2	1
CO2	3	2		1	3		1		2	1	2	1
CO3	3	2		1	2		1		2	1	2	1
CO4	3	2	1	1	2		1		1	1	2	1
CO5	3	2	1	1	3		1		2	1	2	1
Course Average	3	2	1	1	2.4		1		1.6	1	2	1

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KAS 202T
Subject Name: Engineering Chemistry
Pre-requisites of course: Chemistry of 10+ 2 level
Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, Kl
CO1	Understand formation and properties of molecules.	K2
CO2	Achieve knowledge about interaction of electromagnetic radiation and matter and applications in various spectroscopic techniques.	K3
CO3	Able to understand basic concepts of Phase Rule and electrochemistry and apply the science for understanding corrosion and its prevention.	K3
CO4	Achieve knowledge of methods to determine the calorific value of fuels and water softening procedures.	K3
CO5	Understand the basic chemistry of commercially significant materials	K2

KL- Bloom's Knowledge Level ($K_1, K_2, K_3, K_4, K_5, K_6$)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	3	1	1	1					1
CO2	3	3	2	3	2	2	2		2	1	1	1
CO3	3	3	1	2	2	1	1		1		1	2
CO4	3	3	3	3	2	3	2		1		1	2
CO5	2	2	1	2	2	1	2	1	1		1	2
Course Average	2.8	2.6	1.6	2.6	1.8	1.6	1.6	1	1.25	1	1	1.6

3 – High; 2 – Medium; 1 – Low

Semester: II
Session: 2020-21
Subject Code: KAS 203T
Subject Name: Engineering Mathematics-II
Pre-requisites of course: Engineering Mathematics-I & Basic knowledge of Mathematics at class 12th level
Course Outcomes:
 Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Apply the concepts of differentiation and integration for solving differential equations.	K_3
CO2	Remember the concept of definite integral and apply for evaluating surface areas and volumes.	K_3
CO3	Understand the concept of convergence of sequence and series and also expand the function as Fourier series.	K_3
CO4	Illustrate the working methods of complex functions for its application in analytic functions and complex transformation.	K_3
CO5	Apply the concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.	K_3

KL- Bloom's Knowledge Level ($K_1, K_2, K_3, K_4, K_5, K_6$)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	2	2		2		1	2
CO2	3	3	2	2	3	2	2		2		1	2
CO3	3	3	2	2	3	2	2		2		1	2
CO4	3	3	2	2	3	1	2		1		1	1
CO5	3	3	2	2	3	1	2		1		1	1
Course Average	**3**	**3**	**2**	**2**	**3**	**1.6**	**2**		**1.6**		**1**	**1.6**

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KCS201T
Subject Name: Programming for Problem Solving
Pre-requisites of course: Fundamentals of Computer

Course Outcome:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Develop simple algorithms for arithmetic and logical problems.	K_3
CO2	Translate the algorithms to programs & execution (in C language).	K_3
CO3	Implement conditional branching, iteration and recursion.	K_3
CO4	Decompose a problem into functions and synthesize a complete program using divide and conquer approach.	K_3
CO5	Use arrays, pointers and structures to develop algorithms and programs.	K_3

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	1	3	2	2	3	3
CO2	3	3	3	2	2	1	1	3	2	2	3	3
CO3	3	3	3	3	2	1	1	3	2	2	3	3
CO4	3	3	3	3	2	1	1	3	2	2	3	3
CO5	3	3	3	3	2	1	1	3	2	2	3	3
Course Average	3	3	3	2.6	2	1	1	3	2	2	3	3

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KEC-201T
Subject Name: Emerging Domain in Electronics Engineering
Pre-requisites of course: Basics of Semiconductor Physics, KVL & KCL

Course Outcomes:
 Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, K
CO1	Apply P-N Junction diode in the DC regulated power supply, Voltage Multipliers, Clippers and Clampers and also able to use special purpose diodes in voltage regulator circuits, optical source, variable capacitor.	K3
CO2	Use transistors as a switch and an amplifier.	K3
CO3	Implement the Op-amp in linear and non-linear mathematical operations and understand the concept of internet of things.	K3
CO4	Realize the Boolean Algebra using logic gates along with minimization techniques.	K3
CO5	Understand the fundamentals of analog and digital communication systems.	K2

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		1	2						1	2
CO2	3	2		1	2						2	2
CO3	3	3	1	1	2	1	1	1			2	2
CO4	3	2		1	2						1	2
CO5	3	2	1	1	2	2	2	2			2	2
Course Average	3	2.4	1	1	2	1.5	1.5	1.5			1.6	2

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KEE-201T
Subject Name: Basic Electrical Engineering
Pre-requisites of course: Physics and Mathematics at 10+2 level

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits.	K3
CO2	Analyze the steady state behavior of single phase and three phase AC electrical circuits.	K4
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.	K3
CO4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.	K3
CO5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.	K3

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3			1		2		2	3
CO2	3	3	2	3			1	1	2		2	3
CO3	3	3	3	2	2		1		2		2	3
CO4	3	3	3	2	2	2	1	2	2		2	3
CO5	3	3	3	2	2	2	1	2	2		2	3
Course Average	3	3	2.6	2.4	2	2	1	1.66	2		2	3

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KMC 201
Subject Name: Artificial Intelligence for Engineers
Pre-requisites of course: Fundamentals of Artificial Intelligence.

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Understand the evolution and various approaches of AI.	**K2**
CO2	Understand data storage, processing, visualization, and its use in regression, clustering etc.	**K2**
CO3	Understand natural language processing and chatbots.	**K2**
CO4	Understand the concepts of neural networks.	**K2**
CO5	Understand the concepts of face, object, speech recognition and robots.	**K2**

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	1	3	1	2	1	2	1	1	3
CO2	3	3	3	2	3	2	3	1	3	1	2	3
CO3	3	2	3	1	3	3	3	1	3	2	2	3
CO4	3	2	2	1	3	2	2	1	3	1	2	3
CO5	3	1	3	1	3	3	3	1	3	1	2	3
Course Average	3	1.8	2.6	1.2	3	2.2	2.6	1	2.8	1.2	1.8	3

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KME201T
Subject Name: Fundamentals of Mechanical Engineering & Mechatronics
Pre-requisites of course: Basics of stress – strain, fluids, thermodynamics.

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Analyze the concept of stress and strain, factor of safety, beams and apply the concepts of strength of material for safe design	K4
CO2	Explain the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.	K2
CO3	Interpret fluid properties, conservation laws, hydraulic machinery and apply the same in real life systems.	K3
CO4	Explain the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.	K2
CO5	Summarize concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.	K2

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3										
CO2	3	3					2					
CO3	3	3				2						
CO4	2	1										2
CO5	2	2	3									
Course Average	2.6	2.4	3.0			2.0	2.0					2.0

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KMC 202
Subject Name: Emerging Technology for Engineering
Pre-requisites of course: Fundamentals of Computer

 Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Understand the concepts of internet of things, smart cities and industrial internet of things.	K2
CO2	Understand the concepts of cloud computing.	K2
CO3	Understand the concepts of block chain, cryptocurrencies, smart contracts.	K2
CO4	Understand design principles, tools, trends in 3 D printing and drones.	K2
CO5	Understand augmented reality (AR), virtual reality (VR), 5G technology, brain computer interface and human brain.	K2

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4-Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1				1	1					
CO2	3	1				1	1					
CO3	3	1				1	1					
CO4	3	1				1	1					
CO5	3	1				1	1					
Course Average	3	1				1	1					

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KNC201
Subject Name: Soft Skills-II
Pre-requisites of course: Basics of Communication

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Students will be able to converse well with effective LSRW skills in English.	K2
CO2	Students will evaluate the importance of conversation in their personal and professional domain and apply it for extending their professional frontiers.	K5
CO3	Students will learn to apply motivation skills for their individual and professional excellence.	K3
CO4	Students will utilize their teamwork and their interpersonal communication skills to survive and excel at their workplace.	K3
CO5	Students will learn to evaluate creativity for their professional innovation and critical thinking for their competence.	K5

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	2	1	2	1	2	2	3	2	3
CO2	1	1	2	2	1	2	2	2	3	3	2	3
CO3	1	1	1	2	2	2	2	2	3	3	3	3
CO4	1	1	1	2	2	2	2	2	3	3	3	3
CO5	3	2	2	3	2	3	3	2	3	3	3	3
Course Average	1.4	1.2	1.6	2.2	1.6	2.2	2	2	2.8	3	2.6	3

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KAS252P
Subject Name: Engineering Chemistry Lab
Pre-requisites of course: Chemistry of 10+ 2 level

Course Outcomes:

Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Use of different analytical instruments.	K2
CO2	Measure molecular/ system properties such as surface tension, viscosity, conductance of solution.	K3
CO3	Measure hardness of water.	K3
CO4	Estimate the rate constant of reaction and preparation of macromolecules.	K3
CO5	Measure the chloride, iron content and alkalinity of water.	K2

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	2	2	1		1		2	2
CO2	3	2	1	3	2	1	1		1	1	1	2
CO3	3	3	3	3	2	1	1		1		2	2
CO4	2	1	2	2	1	1	1		1		1	1
CO5	3	2	2	2	1	1	2	1	3	1	1	2
Course Average	2.8	2	2	2.6	1.6	1.2	1.2	1	1.4	1	1.4	1.8

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KEC-251P
Subject Name: Electronics Engineering Lab
Pre-requisites of course: Basics of Semiconductor Physics, KVL & KCL

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Recognize various types of Active & Passive Components based on their ratings.	K2
CO2	Identify various types of Printed Circuit Boards (PCB), Soldering Techniques and preparing PCBs	K3
CO3	Wind a Step-down transformer winding of less than 5VA	K3
CO4	Demonstrate the working of Lab Equipment	K2
CO5	Interpret the characteristics and applications of PN junction diode, Zener diode, BJT and op-amp	K4
CO6	Verify the Truth Table of various Logic Gate and implement a Boolean function using logic gates in both SOP and POS forms.	K4

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2		2		1	1		1	1	3
CO2	3	2	2		2		1	1		1	1	3
CO3	3	2			2		1	1		3	2	3
CO4	3	2	3	2	3	2	1	1	2	3	3	3
CO5	3	2	3	2	3	3	1	1	2	3	3	3
CO6	3	3	3	2	2	2			2	3	3	3
Course Average	3.0	2.17	2.6	2.0	2.33	2.33	1.0	1.0	2.0	2.33	2.17	3.0

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KAS251P
Subject Name: Engineering Physics Lab
Pre-requisites of course: 10+2 Physics

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Determine the wavelengths of light emerging from a monochromatic source or polychromatic source and specific rotation of an optically active substance applying the principles of interference, diffraction and polarization phenomenon.	K3
CO2	Measure the variation of magnetic field with the distance along the axis of a current carrying coil and ECE of copper applying Biot-Savart's and Faraday's law.	K3
CO3	Estimate the power radiated by the black body and the energy band gap of the semiconductor by electrical method.	K3
CO4	Measure specific resistance of a wire and rate the ammeter and voltmeter, applying Wheatstone Bridge principle.	K3

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1		3	3		1	1	2	1	2	1
CO2	2	1		3	2		1	1	2	1	2	1
CO3	2	1		3	3		1	1	2	1	2	1
CO4	2	1		3	1		1	1	2	1	2	1
Course Average	2	1		3	2.25		1	1	2	1	2	1

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KCS251P
Subject Name: Programming for Problem Solving Lab
Pre-requisites of course: Fundamentals of Computer

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.	K_3
CO2	Able to define data types and use them in simple data processing applications.	K_3
CO3	Ability to design and develop Computer programs using decision making statements, iteration, function and recursion.	K_3
CO4	Demonstrate an understanding of computer programming language concepts using array and structures.	K_3
CO5	Able to implement Computer programs, analyzes, and interprets the concept of pointers and file handling and their usage.	K_3

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	1	3	2	2	3	3
CO2	3	2	3	2	2	1	1	3	2	2	3	3
CO3	3	3	3	3	2	1	1	3	2	2	3	3
CO4	3	3	3	3	2	1	1	3	2	2	3	3
CO5	3	3	3	3	2	1	1	3	2	2	3	3
Course Average	3	2.8	3	2.6	2	1	1	3	2	2	3	3

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KAS 254P
Subject Name: English Language Lab
Pre-requisites of course: Knowledge of English Language

Course Outcomes:
Upon the Completion of this course, the student will be able:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	To apply software-based learning that can provide the required English Language proficiency.	K3
CO2	To utilize the specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.	K3
CO3	To use correct and error-free writing skills by being well versed in the rules of English grammar.	K3
CO4	To determine relevant technical style of communication and presentation at their workplace and to apply the same for academic uses.	K3
CO5	To justify the use of practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics.	K3

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4-Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2	1	3	3	1	2	1	2	3	2	2
CO2	1	1	2	1	2	2	2	3	3	3	2	2
CO3	1	1	2	2	2	1	1	2	2	3	2	3
CO4	2	2	2	1	2	1	2	2	3	3	3	3
CO5	2	1	2	1	2	3	2	2	3	3	3	3
Course Average	1.5	1.4	1.8	1.6	2.2	1.6	1.8	2	2.6	3	2.4	2.6

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KEE251P
Subject Name: Basic Electrical Engineering Lab
Pre-requisites of course: Elementary Knowledge of DC/AC System

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Illustrate the application of KVL/KCL and network theorems to DC electrical circuits.	K_4
CO2	Analyze the power factor and measure power of single phase and three phase AC electrical circuits.	K_4
CO3	Demonstrate the behavior of a single-phase AC series resonant circuit.	K_4
CO4	Calculate efficiency of a single-phase transformer and DC machine.	K_4
CO5	Demonstrate speed measurement and speed reversal of three phase induction motor and identify the type of DC and AC machines based on their construction.	K_4

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	3	1	1		3		3	3
CO2	3	3	3	3	3	2	1		2		3	3
CO3	3	3	3	3	3	2	1		3		3	3
CO4	3	3	3	3	3	2	1		2		3	3
CO5	3	3	3	3	3	3	1		3	1	3	3
Course Average	3	3	2.8	3	3	2	1		2.6	1	3	3

3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KWS251P
Subject Name: Mechanical Workshop Lab
Pre-requisites of course: Basics of measuring instruments and Materials

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Use various engineering materials, tools, machines and measuring equipment.	K3
CO2	Perform machine operations in lathe and CNC machine.	K3
CO3	Perform manufacturing operations on components in fitting and carpentry shop.	K3
CO4	Perform operations in welding, moulding, casting and gas cutting.	K3
CO5	Fabricate a job by 3D printing manufacturing technique	K3

KL- Bloom's Knowledge Level (K_1, K_2, K_3, K_4, K_5, K_6)
K_1-Remember, K_2- Understand, K_3- Apply, K_4- Analyze, K_5- Evaluate, K_6- Create

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2						2					2
CO2	2		2		3		2					3
CO3	2						2					3
CO4	3		2				2					3
CO5	3		2		3		2					1
Course Average	2.4		2		3		2					2.4

 3 – High; 2 – Medium; 1 – Low

Semester: II
Subject Code: KCE251P
Subject Name: Engineering Graphics & Design Lab
Pre-requisites of course: Basics of Cartesian Coordinate System

Course Outcomes:
Upon the Completion of this course, the student will be able to:

Course Outcome No.	Statement	Knowledge Level, KL
CO1	Understanding of the visual aspects of engineering design	K2
CO2	Understanding of engineering graphics standards and solid modelling	K2
CO3	Effective communication through graphics	K4
CO4	Applying modern engineering tools necessary for engineering practice	K3
CO5	Applying computer-aided geometric design	K3
CO6	Analysis of Isometric views	K4
CO7	Creating working drawings	K6

KL- Bloom's Knowledge Level (K₁, K₂, K₃, K₄, K₅, K₆)
K₁- Remember, K₂- Understand, K₃- Apply, K₄- Analyze, K₅- Evaluate, K₆- Create

CO-PO Mapping:

CO	PO 1	PO 2	PO3	PO4	PO 5	PO6	PO 7	PO8	PO 9	PO10	PO 11	PO12
CO1	1	1	1	2	2				1	3	2	2
CO2	3	1	1	2	2				1	2	1	1
CO3	3		3		2				1	3	1	2
CO4	2	3	2		3				1		2	3
CO5	2	3	2		3				1		1	1
CO6	2	3	3	3	2				1		1	1
CO7	3		1	1	1				1		3	1
Course Average	2.29	2.2	1.86	2	2.14				1	2.67	1.57	1.57

3 – High; 2 – Medium; 1 – Low