

Statements of Course Outcomes (COs) and Mapping with Program Outcomes (POs) and Program Specific Outcomes (PSOs) : Dept. of Biotechnology : 2023-24 (Session-wise; First Year to Final Year) BKL # K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create																				
S. No.	Sub Code	Sem	COx	Statement of Course Outcomes (COs)	Kx	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	
				Statement of Course Outcomes (COs) Upon completion of topic concerned, students will be able to :	Bloom s Knowledge Level	Engine ering knowle dge	Proble m Analys is	Design/d evelopm ent of solutions	uct invest igatio ns of compl ex proble	Moder n tool usage	The Engin eer and Societ y	Environ ment & sustain ability	Ethics	Individ ual and team work	Com munic ations	Project manag ement and finance	Life Long Learnin g			
1	BAS 304	III	CO-1	Understand the concept of Fourier Transform and Z- Transform to apply for solving with the help of transform problems	K2,K3	3	2	3										3	3.00	
			CO-2	Remember the concept of probability to evaluate Probability Distribution.	K1,K3	3	3	2											3	3.00
			CO-3	Apply the concept of numerical techniques to evaluate the zero's of the function interpolation.	K4,K5	3	3												3	3.00
			CO-4	Apply the concept of hypothesis to evaluate various hypothesis testings.	K3,K5	3													3	3.00
			CO-5	Remember the concept of design and statistical quality control to create control chart.	K1,K6	3													3	3.00
			BAS304				K3	3.00	2.67	2.50										3.00
2	BVE 301	III	CO-1	Get clarity and illustrate about the need, basic guidelines, content, and process of value education; get the clarity of basic human aspirations and the program of its fulfillment and do a critical appraisal of current scenario in society regarding happiness and prosperity.	K2, K4						2	3	3	3		1		2.00		
			CO-2	Get clarity about human being as co-existence of self and body ; apply the clarity of the content of value education to initiate a process of dialog within themselves so as to know what they ‘really want to be’ in their life and profession, and also to ensure harmony at all the four levels of living and lead an ethical life.	2, K3, K4							2	2	3	2				2.00	
			CO-3	Get clarity of values necessary for harmonious relationship, undivided human society and universal human order; analyze about feelings in relationship in family, society and relevance of nature.	K2, K4						2	2					1		2.00	
			CO-4	Get clarity of provision of harmony in nature and existence; workout and evaluate their mutual fulfilling participation at all the four levels of living.	K2, K3, K5							2	3	2			1		2.00	
			CO-5	Get clarity of ethical and unethical practices in profession; develop their emotional, social and professional competence and start working out the strategy to actualize a harmonious environment wherever they work.	K2, K3, K6							2	2	2	2				2.00	
			BVE301				K3	3.00	3.00						3.00	3.00			3.00	
	BBT 301	III	CO-1	Acquire knowledge on types of microscope and its applications in Biotechnology.	K2	3	2		2	2						2	3	2.00		
			CO-2	Learn working principle of chromatographic techniques for qualitative and quantitative analysis of biomolecules.	K3	2	2		2	2						2	2	2.00		
			CO-3	Employ various spectroscopic techniques for qualitative and quantitative analysis of Bio-Molecules/Bio-Analytes.	K3	3	2		2							3	2	2.00		
			CO-4	Employ various electrophoresis and centrifugation techniques for analysis of Bio-Molecules/Bio-Analytes.	K3	2	2		2	2							2	2.00		

3			CO-5	Acquire knowledge on 3 D printing and bioprinting as well as biosensors.	K2	3	2	3	2		2					3	2	2.00		
			KBT 301				K3	2.60	2.00	3.00	2.00	2.00	2.00	#DIV/0!	#####	#####	#####	#DIV/0!	2.50	2.20
4	BBT 302	III	CO-1	Apply the basic principles of microbial techniques for the culturing, identification of	K2	2	2		2							2	2	2	2.00	
			CO-2	Discern the strategies of bacterial processes and virus replication.	K2	2		2									2	2	2.00	
			CO-3	Illustrate the cellular and molecular components of immune system.	K2	2			2								2	3	3	3.00
			CO-4	Illustrate the processes of immune system and principles of immunotechniques.	K2				2								2	2	3	3.00
			CO-5	Apply microorganisms for bioremediation and immunotechniques for disease diagnosis.	K2		3	2											3	3.00
			BBT302				K2	2.00	2.50	2.00	2.00							2.00	2.30	2.6
5	BBT 303	III	CO-1	To understand unique property of water as a universal solvent and its importance in biochemistry.	K2	3	2	3	2			3					2	3	2.00	
			CO-2	Able to understand the structure and properties of Carbohydrates and their metabolic events.	K3	2		3	3									3	2	3.00
			CO-3	To understand the importance of lipids as energy currency, storage molecules and their classification.	K2	3		2	3									3	3	3.00
			CO-4	Able to describe the classification and structural organization of proteins/amino acids.	K3	3	3	3										3	3	2.00
			CO-5	Describe the structure and properties of nucleic acids and ability to relate various interrelated metabolic events	K3		3											3	3	3.00
			BBT303				K3	2.75	2.67	2.75	2.67	####	####	3.00	####	#####	####	#DIV/0!	2.80	2.80
6	BBT 351	III	CO-1	To understand concept of precision,accuracy for principle and working of laboratory microscope.	K2		3		3	3			3	3		3	3	3	3.00	
			CO-2	To learn and apply the spectrophotometric techniques for identification or quantification of biomolecules.	K2				3	3	3								3	
			CO-3	Understand the principle and execute the different chromatographic techniques for separation of biomolecules.	K3	3	3	3	3	3			3	3		3	3	3	3	3.00
			CO-4	To apply the electrophoresis for quantitative and qualitative analysis of biomolecules	K3	3	3	3	3	3			3	3		3	3	3	3	3.00
			CO-5	To lerarn and execute the extraction and separation of biomolecules.	K2	3			3	3			3	3		3	3	3	3	3.00
			BBT351				K3	3.00	3.00	3.00	3.00	3.00	3.00	####	3.00	3.00	#####	3.00	3.00	3
7	BBT 352	III	CO-1	Prepare the different culture medium and inoculate the microorganisms into it.	K2		3	3		3				3			3	3.00	3.00	
			CO-2	Culture microorganisms using various techniques and perform different staining procedures to identify the microorganisms	K2			3		3				3				3	3.00	3.00
			CO-3	Isolate and enumerate the micro-organisms	K2			3	3									3	3.00	3.00
			CO-4	Perform and apply different types of immunodiffusion techniques	K2		3	3	3									3	3.00	3.00
			CO-5	Perform and apply different types of ELISA techniques	K2	3		3		3				3				3	3	3.00
			BBT352				K2	3.00	3.00	3.00	3.00	3.00	#####	#DIV/0!	#####	3.00	#####	#DIV/0!	3.00	3.00
8	BBT 353	III	CO-1	Understand the basic concepts behind the preparation different types of solutions and Buffers.	K2	3											3	3.00	3.00	
			CO-2	Apply analytical techniques to identification bio-molecules.	K3	3	3		3	3				3				3	3.00	3.00
			CO-3	Determine the concentration of different bio-molecules by different assay.	K3	3	3		3					3				3	3.00	3.00
			CO-4	Perform the extraction of lipids by solvent extraction methods.	K2	3	3		3	3				3				3	3.00	3.00
			CO-5	Perform chromatographic techniques for identification and separation of amino acids.	K4	3	3		3	3				3				3	3	3.00
			BBT353				K2	3.00	3.00		3.00	3.00				3.00			3.00	3.00

9	BCC 301	III	CO-1	Understand the software bugs that pose cybersecurity threats and how to fix the bugs to mitigate such threats.	K2	3	3	3	2	3	3		2	1	3	2	3		1.00
			CO-2	Understand the attack scenarios to web browsers, web servers and how to mitigate such threats.	K2	3	3	3	3	3	3		3	2	3	2	3		2.00
			CO-3	Understand the cyber security holes in standard networking protocols such as TCP/IP, ARP, DNS, Ethernet, BGP etc and how to mitigate such Security hole.	K2, K4	3	3	3	3	3	3		3	3	3	2	3		3.00
			CO-4	Understand the difference between System Security, Network Security and Cryptography, Crypto- Protocol etc.	K2, K5	3	1		1	3	3		3	3	3	1	3	1	3.00
			CO-5	Analyze the cyber threats to Critical Infrastructures.	K4	3	3	3	3	2	3		3	3	3	1	3	1	3.00
			BCC301		K3	3.00	2.60	3.00	2.40	2.80	3.00		2.80	2.40	3.00	1.60	3.00	1.00	2.40
10	BBT 354	III	CO-1	Understand the basic concepts of solution preparation and basic principle of different instruments.	K2	3	3	2			1		3	3			1	3	2.00
			CO-2	Prepare the solutions and handle the instruments like centrifuge, spectrophotometer, pH meter etc.	K3	3	3	2			2		3	3		1	2	3	2.00
			CO-3	Perform the analytical experiments.	K3	3	3	3	2	2	3		3	3		1	3	3	2.00
			CO-4	Distinguish different types of microscopes and its applications.	K5	3	3	3	2	3	3		3	3	2	1	3	3	2.00
			CO-5	Perform microscopic experiments.	K4	3	3	3	3	3	3		3	3	2	1	3	3	3.00
			BBT354		K3	3.00	3.00	2.60	2.33	2.67	2.40		3.00	3.00	2.00	1.00	2.40	3.00	2.20
11	BOE 043	IV	CO-1	Understand the basic of concept of different types of energies, energy conversion and energy storage	K2	3	3	2					3	3				3	2.00
			CO-2	Express the basic of concept of Nuclear Energy	K2	3	3	2			2		3	3			2	3	3.00
			CO-3	Express the basic concept about Solar energy	K2	3	3	3	2	2	3		3	3			3	3	3.00
			CO-4	Compare the concept of conventional and non-conventional energy sources	K2	3	3	3	2	3	3		3	3	2		3	3	2.00
			CO-5	Understand about the world and India energy scenario and energy audit	K2	3	3	3	3	3	3		3	3	2		3	3	3.00
			BOE043		K3	3.00	3.00	2.60	2.33	2.67	2.75		3.00	3.00	2.00		2.75	3.00	2.60
12	BVE 401	IV	CO-1	Get clarity and illustrate about the need, basic guidelines, content, and process of value education; get the clarity of basic human aspirations and the program of its fulfillment and do a critical appraisal of current scenario in society regarding	K2, K4						2	3	3	3					2
			CO-2	the content of value education to initiate a process of dialog within themselves so as to know what they 'really want to be' in their life and profession, and also to ensure harmony at all the four levels of living and lead an ethical life.	2, K3, K4						2	2	3	2					2
			CO-3	Get clarity of values necessary for harmonious relationship, undivided human society and universal human order; analyze about feelings in relationship in family, society and relevance of nature.	K2, K4						2	2					2		2
			CO-4	Get clarity of provision of harmony in nature and existence; workout and evaluate their mutual fulfilling participation at all the four levels of living.	K2, K3, K5							2	3	2			2		2
			CO-5	Get clarity of ethical and unethical practices in profession; develop their emotional, social and professional competence and start working out the strategy to actualize a harmonious environment wherever they work.	K2, K3, K6						2	2	2	2					2
			BVE 401								2.0	2.2	2.8	2.3			2.0		2.0
	BAS 401	IV	CO-1	Students will be enabled to <b>understand</b> the nature and objective of Technical Communication relevant for the work place as Engineers.	K3	2			2						2				3.00
			CO-2	Students will <b>utilize</b> the technical writing for the purposes of Technical Communication and its exposure in various dimensions.	K2	2	2	2											2.00
			CO-3	Students would imbibe inputs by presentation skills to <b>enhance</b> confidence in face of diverse audience.	K2				2	2					3	2			3.00
			CO-4	Technical Communication skills will <b>create</b> a vast know-how of the application of the learning to promote their technical competence.	K3			2	2							2	2		3.00

13			CO-5	It would enable them to <b>evaluate</b> their efficacy as fluent & efficient communicators by learning the voice-dynamics.	K1									2	3				3	
			BAS401				K3	2.00	2.00	2.00	2.00	2.00	#####	####	####	2.00	2.70	2.00	2.00	####
14	BBT 401	IV	CO-1	Familiarize with the properties of fluids and the applications of fluid mechanics in a bioreactor.	K2	3	3	3	3								3	3	3	
			CO-2	Understand the concept of fluid flow measurement, types of flows and dimensional analysis.	K3	3	3										3			
			CO-3	Understand the basic concept of heat transfer modes viz. conduction, convection and radiation.	K2	3		3									3			
			CO-4	Understand the basic mechanism of mass transfer including diffusion and convective mass transfer.	K3	3	3										3			
			CO-5	Understand the mass transfer in fluidized beds and gas-liquid interface in biomedical applications.	K3	3		3	3		3						3	3	3	
			BBT401				K3	3	3	3	3	#	3	####	####	####		3	3	3
15	BBT 402	IV	CO-1	Understand the inheritance of genetic traits across generation under the different inheritance pattern.	K2	3	3		3								3	3		
			CO-2	Understand genome organization, mutations and various types of DNA sequences.	K2	3	3	3										3	3	
			CO-3	Understand the molecular processes of central dogma of molecular biology and the basic concept of gene cloning.	K3	3		3	3								3		3	
			CO-4	Understand the concepts of Linkage and recombination, crossing over and genetic mapping	K3	3		3		3							3	3	3	
			CO-5	Apply the properties of genetic code for protein synthesis.	K2	3	3	3									3	3	3	
			BBT402				K3	3	3	3	3	3							3	3
16	BBT 403	IV	CO-1	On completion of this course, the students will be able to understand the basic concepts, composition and role of enzyme in biochemical process.	K2	3			3			3			3		3	3		
			CO-2	On completion of this course, the students will be able to understand the roles of different physical factors in the stability of enzyme during reaction catalyzed.	K2	3		3	3								3	3		
			CO-3	On completion of this course, the students will be able to extract the crude enzyme from various sources.	K3	3		3	3									3	3	
			CO-4	On completion of this course, the students will be able to differentiate between enzyme immobilization methods and their application in different fields.	K4	3	3	3				3					3	3	3	
			CO-5	On completion of this course, the students will be able to investigate the designing of different enzyme electrodes and their use in industry.	K5		3										3	3	3	
			BBT 403				2.2	3.00	3.00	3.00	3.00			3.00				3.00	3.00	3
17	BBT 451	IV	CO-1	Understand the basic principle of Bernoulli theorem in fluid flow measuring devices like venturi and orifice meter.	K2	3	3		3							3	3	3		
			CO-2	Ability to understand the classification of fluid flow like laminar, transition and turbulent flows.	K2	3											3	3	3	
			CO-3	Ability to understand the mechanism of steady state heat conduction of different materials for plane, cylindrical and spherical geometries.	K2	3	3	3									3	3	3	
			CO-4	Understand the application of radiation to determine the surface emissivity of a test plane surfaces.	K3	3	3	3									3		3	
			CO-5	Ability to analyze the experimental data and validation with theoretical empirical correlations.	K4	3	3	3	3								3		3	3
			BBT451				K3	3	3	3	3	#	#	####	####	####	#	3	3	3

18	BBT 452	IV	CO-1	Perform the isolation of DNA from different cells.	K2		3		3	3						3	3	3.00	
			CO-2	Perform Polyacrylamide gel electrophoresis and PCR amplification of DNA	K3			3		3			3				3	3	3.00
			CO-3	Estimate the DNA content and Tm of DNA	K2			3	3								3	3	3.00
			CO-4	Isolate the polytene chromosome from Drosophila	K1		3		3								3	3	3.00
			CO-5	and allelic frequencies	K2	3				3				3			3	3	3.00
			BBT452				K3	3.00	3.00	3.00	3.00	3.00				3.00			3.00
19	BBT 453	IV	CO-1	On completion of this course, the students will be able to understand the basic concepts behind the production and isolation of enzyme from different sources.	K2	3	3	3				3					3	3	
			CO-2	On completion of this course, the students will be able to check the activity/purity of enzyme and its optimum parameters.	K3	3			3		3					3		3	3
			CO-3	On completion of this course, the students will be able to recover or estimate the enzyme or protein from a solution.	K4	3		3	3	3		3					3	3	3
			CO-4	On completion of this course, the students will be able to able to differentiate the different enzyme immobilization methods.	K4	3	3					3				3		3	3
			CO-5	On completion of this course, the students will be able to differentiate between enzyme and its inhibition.	K4		3		3								3	3	3
			BBT 453				K3	3.00	3.00	3.00	3.00	3.00	3.00	3.00	####	####	#####	3.00	3.00
20	BCC 402	IV	CO-1	To read and write simple Python programs.	K3	3		3									3		
			CO-2	To develop Python programs with conditionals and loops.	K2	3		3	3								3	3	
			CO-3	To define Python functions and to use Python data structures : lists, tuples, dictionaries.	K2	3		3			3						3		3.00
			CO-4	To do input/output with files in Python.	K3		3										3	3	
			CO-5	To do searching ,sorting and merging in Python.	K1	3		3	3		3						3	3	3
			BCC402				K3	3.00	3.00	3.00	3.00	#####	3.00	####	####	####	#####	#####	3.00
21	KNC-501	V	CO-1	On completion of this course, the students will be able to identify and explore the basic features and modalities about Indian constitution.	K1-K2						3		3					3.00	
			CO-2	On completion of this course, the students will be able to differentiate and relate the functioning of Indian parliamentary system at the center and state level.	K2						3		3	3	3		3		3.00
			CO-3	On completion of this course, the student will be able to differentiate different aspects of Indian Legal System and its related bodies.	K3				3		3	3	3	3		3		3.00	
			CO-4	On completion of this course, the student will be able to discover and apply different laws and regulations related to engineering practices.	K4	3	3	3	3	3	3	3	3	3	3	3	3	3	3.00
			CO-5	On completion of this course, the student will be able to correlate role of engineers with different organizations and governance models	K5	3	3	3	3	3	3	3	3	3	3	3	3	3	3.00
			KNC501				K3	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
		V	CO-1	Students will be able to enlist an appropriate use of host and vector for gene cloning.	K2	2	3	3	1					1	1		3	2.00	
			CO-2	Students will be able to analyze the use of gene library for screening of desired gene sequence/protein.	K3	2	2	2	1				2	1	1		2	3	2.00
			CO-3	Students will be able to analyze different types of PCR and DNA sequencing methods.	K2	2	3	2	2					2	1		2	3	2.00
			CO-4	Students will be able to appraise the cloning process of whole organism and its application.	K1	2	1	3	2				3	2	3	2	3	3	2.00
			CO-5	Students will be able to assess the cell signaling and ethical issues related to Gene transfer.	K2	2	1	1	1				3	2	3	2	2	3	2.00



22	KBT- 501		<b>KBT501</b>		<b>K3</b>	2.00	2.00	2.20	1.40				2.70	1.60	1.80	2.00	2.30	3	2.00
23	KBT- 502	V	CO-1	Students will be able to comprehend the concepts of fermentation technology and its industrial applications.	K2	3											3	3	2.00
			CO-2	Students will be able to learn the concepts of inoculum development, types of fermentation and microbial measurment.	K3	3	3	3			2					3	3	3	3.00
			CO-3	Students will be able to familiarize with the concepts of media preparation, regulatory mechanism of microbes, overproduction of metabolites.	K3	3	3	3									3	3	3.00
			CO-4	Students will be able to evaluate the concepts of optimization, sterilization, microbial growth kinetics,death kinetics.	K3		3	3									2	2	3.00
			CO-5	production of metabolites, materials & energy balance concepts apply in solving the Industrial problems.	K3	2		2		3	3	3		3		3		3	3.00
			<b>KBT502</b>		<b>K3</b>	2.80	3.00	2.80		3.00	2.50	3.00		3.00		3.00	2.80	2.80	2.80
24	KBT- 503	V	CO-1	Students will be able to understand concepts and application of Bioinformatics, types of databases, sequence similarity, sequence patterns and profiles	K2	2	3		2						3			3	2.00
			CO-2	Students will be able to use sequence alignment techniques, database searching, pairwise and multiple sequence alignment using various tools.	K2	2	2	3										2	2.00
			CO-3	Students will be able to understand scoring matrices and its types including PAM , BLOSUM series and matrices for nucleic acid and protein sequences.	K2	2	2						2					2	2.00
			CO-4	Students will be able to apply phylogeny and its concepts in molecular evolution and different methods of Phylogenetic tree construction.	K3	2	2	2	2	2	2			3	2			3	2.00
			CO-5	Students will be able to understand and apply the protein structure prediction and application of bioinformatics in drug designing	K1	3	2	2	3	3	3			3	2		3	2	3
			<b>KBT503</b>		<b>K3</b>	2.20	2.20	2.30	2.30	2.50	2.50			2.70	2.30		3.00	2.4	2.2
25	KBT- 052	V	CO-1	Illustrate the fundamental of nanoscience, nanotechnology and biomedical polymers	K3	3	1	1		2						2		3	3.00
			CO-2	Learn the synthesis of carbon nanotubes, metal/metal oxide nanoparticles	K2	2	3	2	1	2		3					2	3	2.00
			CO-3	Demonstrate working principle of advance tools and technique	K2	1	2	2	2	2						2	2	3	3.00
			CO-4	Distinguish different types of nanomaterial's biomedical polymers and uses in medical field	K3	2	2	2	2			2	2					3	3.00
			CO-5	Develop nanomaterial based solution for medical and diagnostic application in health care	K1	2	1	2	2								2	3	3.00
			<b>KBT052</b>		<b>K3</b>	2.00	1.80	1.80	1.80	2.00		2.50	2.00			2.00	2.00	3	2.8
26	KBT- 551	V	CO-1	Demonstrate the isolation of genetic materials and their estimation.	K2	3	3	3			3	3	3				3	3	3.00
			CO-2	Perform experiments related to cloning, ligation, restriction and digestion.	K3	3	3	3			3	3	3				3	3	3.00
			CO-3	Prepare competent cells for transformation.	K2	3	3	3			3	3	3				3	3	3.00
			CO-4	Analyse the competent cell using blue white screening.	K2	3	3	3	3		3	3	3				3	3	3.00
			CO-5	Analyse the Southern Blotting for identification of desired DNA in a pool DNA samples	K2	3		3	3		3	3	3		3		3	3	3.00
			<b>KBT551</b>		<b>K3</b>	3.00	3.00	3.00	3.00		3.00	3.00	3.00		3.00		3.00	3	3.00
27	KBT- 552	V	CO-1	Demonstrate the growth pattern of E.coli.	K2	3					3			3			3	3	3.00
			CO-2	Perform experiments related to production of antibiotics, enzymes and acids through fermentation process.	K2		3	3	3	3	3	3				3	3	3	3.00
			CO-3	Demonstrate the downstream processing of fermentative products.	K3	3		3					3		3			3	3.00
			CO-4	Perform the solid state fermentation and submerged fermentation	K3	3	3	3		3		3		3				3	3.00
			CO-5	Perform the utilization of liquid waste in production of metabolites	K3	3		3	3		3	3				3		3	3.00
			<b>KBT552</b>		<b>K3</b>	3.00	3.00	3.00	3.00	3.00	3.00	3.00		3.00		3.00	3.00	3.00	3.00
			CO-1	Demonstrate the retrieval of sequence data.	K3	3						3			3			3	3.00

28	KBT- 553	V	CO-2	Perform experiments related to locating chromosome and gene expression data.	K2	3	3	3		3	3					3	3	3.00		
			CO-3	Demonstrate the data retrieval system of PubMed.	K2	3						3						3	3.00	
			CO-4	Perform the ORF finding and retrieval of gene information.	K3	3	3	3		3					3		3	3	3.00	
			CO-5	Demonstrate the retrieval of structural data.	K1	3						3					3	3	3	
			KBT553				K3	3.00	3.00	3.00	####	3.00	3.00	3.00	###	###	3.00	#####	3.00	3
29	KBT- 554	V	CO-1	On completion of this course, students are able to explain mole concept and its application in biotechnological research.	K1-K2	3	2						2				3	3.00		
			CO-2	On completion of this course, students are able to calculate the various concentration of solutions such as molar, molal, normal and percent solutions.	K3	3	2	2						2			2	3	3.00	
			CO-3	On completion of this course, student will be able to evaluate the different raw materials for ethanol production.	K5	3	3	2	2	2	2	2		3			3	3	3.00	
			CO-4	On completion of this course, student will be able to implement the active dry yeast for the fermentation process using sugar cane bagasse’s	K3	3	3	3	3	3	3	3	2	3	3	2	3	3	3.00	
			CO-5	On completion of this course, student will be able to explain the analytical methods for purification and estimation of ethanol concentration produced from yeast fermentation of sugarcane bagasse’s.	K4	3	3	3	3	3	3	3	3	3	2	3		3	3.00	
			KBT554				K3	3.00	2.60	2.50	2.67	2.67	2.67	2.70	2.50	2.60	2.50	2.50	2.67	3.00
30	KBT- 055	V	CO-1	On completion of this course, the students will be able to understand the basic concepts of	K1-K2							3				3	3	3.00		
			CO-2	On completion of this course, the students will be able to understand raw material handling and its processing for biofuels and alcohol production.	K2-K3	3						3	3	3	3		3	3	3.00	
			CO-3	On completion of this course, the student will be able to learn the different alcoholic fermentation technology and application of various feedstocks.	K3	3	3	3		3	3			3			3	3	3.00	
			CO-4	On completion of this course, the student will be able to familiarize with the concepts of metabolic pathway, recycling and quality control.	K3-K4	3	3	3	3	3	3			3		3	3	3	3.00	
			CO-5	On completion of this course, the student will be able to analyze the concepts of biomass conversion to bioenergy (heat and power)	K4-K5	3	3	3	3	3	3			3		3		3	3.00	
			KBT055				K3	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
31	KBT- 601	VI	CO-1	Comprehend the concept of media preparation, microbial growth and the associated parameters.	K2	3											3	3.00		
			CO-2	Utilize the concepts of sterilization necessary for proper bioreactor operation.	K2	3	3	3			3		3			3	3	3	3.00	
			CO-3	Discuss the basics of ideal bioreactor operations and the kinetics of microbes.	K3	3	3	3	3					3	3	3	3	3	3.00	
			CO-4	Apply the concept of mass transfer, medium optimization and stoichiometric based calculations in bioprocessing.	K3	3	3	3	3	3							3	3	3.00	
			CO-5	Analyze the concept of bioreactor control mechanism and identify suitable control system.	K4	3	3	3	3	3	3	3		3	3		3	3	3.00	
			KBT601				K3	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3	3.00
		VI	CO-1	Understand the principle and basic requirements for plant tissue culture establishment	K1-K2	3				2	3		3			3	3	3	3.00	
			CO-2	Explain the difference between tissue and organ culture and their applicability	K2				2	2		3	2				2	2		3.00
			CO-3	Understand haploid culture and compare with somaclonal variation and their utility in invitro culture	K2-K3	3	3		3	2	2	2	2	2					3	3.00
			CO-4	Identify suitable cryopreservation and reculture techniques for the cultured tissues	K3	3	2	3	3	2			2	3		2	2	3		3.00

32	KBT- 602		CO-5	Understand the development of transgenic plants through genetic manipulation	K4	3	2	3				2	3	2			2	2	3
			<b>KBT602</b>		<b>K3</b>	<b>3.00</b>	<b>2.30</b>	<b>2.80</b>	<b>2.30</b>	<b>2.30</b>	<b>2.50</b>	<b>2.30</b>	<b>2.30</b>	<b>2.50</b>		<b>2.50</b>	<b>2.30</b>	<b>2.6</b>	<b>3</b>
33	KBT- 603	VI	CO-1	Infer problems and techniques for molecular biology.	K3	3		3	2	3	3			3			3	2	3.00
			CO-2	Speculate RNA Structure by different methods and its applications.	K2	3	3			3							3	3	3.00
			CO-3	Apply machine Learning algorithms to provide solution of a biological problem.	K2	3		3	3	3	3			3		3	3	3	3.00
			CO-4	Identify the basic concept of Force field in molecular modelling.	K3	2		3	3	2				3			2	3	3.00
			CO-5	Assess the techniques used for management of large document collection.	K1	3		2	3					3	3			3	3
			<b>KBT603</b>		<b>K3</b>	<b>2.80</b>	<b>3.00</b>	<b>2.80</b>	<b>2.80</b>	<b>2.80</b>	<b>3.00</b>			<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>2.80</b>	<b>2.8</b>	<b>3</b>
34	KBT- 061	VI	CO-1	Understand basics of animal tissue culture and its importance	K1	3					3		3				3	3	3.00
			CO-2	Understand the methods of cell line development, common contaminants and their application for cloned protein over production	K2	3		3	3	3			3					3	3.00
			CO-3	culture techniques for drug development, toxicity study and its application in vaccine .	K3	3		3	3	3			3				3	3	3.00
			CO-4	Apply the different types of reactors used for scale-up and their working in association with animal cell culture.	K3	3	3				3		3	3			3	3	3.00
			CO-5	Explain method of transgenic animal and the process of stem cell differentiation and their applications with case studies	K4	2	3				3		3					3	3.00
			<b>KBT061</b>		<b>K3</b>	<b>2.80</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>		<b>3.00</b>	<b>3.00</b>			<b>3.00</b>	<b>3</b>	<b>3.00</b>
35	KBT- 063	VI	CO-1	Explain the concept of role and significance of microorganisms in food.	K2	3	3											3	3.00
			CO-2	Compare between various fermentation process in food biotechnology	K2	3	3	3	3	3		3		3	3			3	3.00
			CO-3	Apply the knowledge of food biotechnology for Determining Microorganisms and/or their Products in Foods	K3	3	3	3					3	3	3			3	3.00
			CO-4	Discuss the various food preservation methods and techniques for destroy toxicity microorganisms in food	K4	3	3	3	3							3	3	3	3.00
			CO-5	Describe the Indicators of Food Safety and Quality and HACCP system	K5	2											3	2	3.00
			<b>KBT063</b>		<b>K3</b>	<b>2.80</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>		<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>2.80</b>	<b>3.00</b>
36	KOE 066	VI	CO-1	Understand about the principles of Remote Sensing and its advantages and limitations.	K2	3		1		2	3				3		3	2	2.00
			CO-2	Retrieve the information content of remotely sensed data.	K3	2	2	3		2		2			3		3	2	1.00
			CO-3	Apply problem specific remote sensing data for engineering applications.	K4	2				2	3				3		3	2	
			CO-4	Analyze spatial and attribute data for solving spatial problems.	K4	3		1		2	3				3		3	2	2.00
			CO-5	Create GIS and cartographic outputs for presentation	K5	2	2	3		2		2			3		3	2	1.00
			<b>KOE 066</b>		<b>K3</b>	<b>2.40</b>	<b>0.80</b>	<b>1.60</b>		<b>2.00</b>	<b>1.80</b>	<b>0.80</b>			<b>3.00</b>		<b>3.00</b>	<b>2.00</b>	<b>1.20</b>
37	KOE- 069	VI	CO-1	ILLUSTRATE the basic human aspirations and their fulfillment in the light of resolution on the basis of the clarity of this content.	K2	3	3											3	3.00
			CO-2	APPLY the understanding of co-existence to make right use of self, body and wealth in terms of enrichment, protection and right utilization and to fulfill comprehensive	K2, K3	3	3	3	3	3		3		3	3	3	3	3	3.00
			CO-3	ANALYZE reasons for harmony and contradiction in the self on the bases of their state comparing and tasting on the basis of the clarity of this content.	K2, K4	3	3	3					3	2	3		3		3.00
			CO-4	EVALUATE how different aspects of all encompassing resolution leads to harmony	K2, K5	3	3	3	3							3	3	3	2.00
			CO-5	DEVELOP right understanding, right feeling, right thoughts and competence for	K5, K6	3		2										2	
			<b>KOE069</b>		<b>K3</b>	<b>3.00</b>	<b>3.00</b>	<b>2.80</b>	<b>3.00</b>	<b>3.00</b>		<b>3.00</b>	<b>3.00</b>			<b>3.00</b>	<b>3.00</b>	<b>2.8</b>	<b>2.8</b>
		VI	CO-1	Explain the concept of Engineering and Architecture in Ancient India	K2,		3			3	3	3	3			3		3	3.00
			CO-2	Compare between Harappan Script and Brahmi Script	K2	3			3	3	3	3	3						
			CO-3	Apply the knowledge of Textile Technology in India	K3			3		3	2					3	3		3.00
			CO-4	Discuss the various Northern Indian Languages and Literature	K3				3		3	2	3			3		3	



38	KNC-602		CO-5	Describe the Council of Ministers, Administration and Political Ideals in Ancient India	K4					2		3	2								
			KNC602				K3	3.00	3.00	3.00	3.00	2.80	2.80	2.80	2.80	####	#####	3.00	3.00	3	3
39	KBT- 651	VI	CO-1	Demonstrate the growth pattern and death kinetics of E. coli	K3	3	3		3	3			3	3			3	3	3	3.00	
			CO-2	Discuss the upstream and downstream bioprocessing for product formation	K3	3	3		3	3	3								3		
			CO-3	Analyze the mass transfer concepts in bioprocess	K3	3	3	3	3	3			3	3			3		3		3.00
			CO-4	Perform immobilization of enzymes and microbial cell.	K2	3	3	3	3	3			3	3			3				3.00
			CO-5	Develop computational design for fermentative production	K4	3	3		3	3			3	3			3	3	3	3	3.00
			KBT651				K3	3.00	3.00	3.00	3.00	3.00	3.00	####	3.00	3.00	#####	3.00	3.00	3	3.00
40	KBT- 652	VI	CO-1	Apply the concept of stock solution for preparation of MS/B5 medium and sterilization of plant tissue culture medium.	K1												3	3	3.00		
			CO-2	Select appropriate explant and their culturing and subculturing	K2	3	3	3	3								3	3	3.00		
			CO-3	Perform the callus culture by using different explant	K3	3	3	3									3	3	3.00		
			CO-4	Apply the concept of artificial seed for conservation of germplasm and extraction of DNA/RNA from plants.	K3	3	3	3										3	3.00		
			CO-5	Perform the isolation and characterization of plant secondary metabolites from medicinal plants and extraction of proteins from plants.	K2	3	3	3	3	3							3	3	3.00		
			KBT652				K3	3.00	3.00	3.00	3.00	3.00							3.00	3	3.00
41	KBT- 653	VI	CO-1	Understand the basic software and tools used in identification and structure prediction of biomolecules	K2	2		3			3						3	3	3.00		
			CO-2	Conduct experimental procedure for Ramachandran plot and RMSD calculation of the proteins.	K2	3												3	3.00		
			CO-3	Analyze the best tool for studying genome annotation.	K2	3		3			3						2	3	3.00		
			CO-4	Construct and analyse restriction maps and QSAR model.	K3	3	3			2							3	3	3.00		
			CO-5	Construct phylogenetic tree and design primers.	K3	3		3		3							3	3	3		
			KBT653				K3	2.80	3.00	3.00		2.50	3.00						2.80	3	3
42	KHU 702	VII	CO-1	Explain the concepts and importance of rural development.	k1								3				3	3.00			
			CO-2	Differentiate among various rural development programmes.	k3							3		3		3			3.00		
			CO-3	Outline the emergence and growth of Panchayati Raj Institutions in India.	k1								3					3	3.00		
			CO-4	Interpret the need and elements of human resource development in the rural sector.	k3							3	3	2				2			
			CO-5	Illustrate the scope of entrepreneurship in rural area.	k3							2	2	3			3	3			
			KHU 702					####	####	####	####	#####	#####	3	3	3		3	3	2.8	3.00
43	KOE 074	VII	CO-1	Interpret basics of non conventional energy resources for society	K2, K3	3	3	3		3					3		3	3.00			
			CO-2	Identify the importance of geo thermal energy	K4	3	3	3	3	3						3	3	3.00			
			CO-3	Compare between flat plate and focusing of collectors in solar thermal energy	K3,K4	3	3	3								3	3	3.00			
			CO-4	Design the Thermo-electrical and thermionic Conversions for wind energy	K5	3		3		3			3					3	3.00		
			CO-5	Justify the requirements of fuel cells for energy generation	K5,K6	3		3				3	3				3	2	3		
			KOE074				K3	3.00	3.00	3.00	3.00	3.00		3.00	3.00			3.00	3.00	2.8	3
		VII	CO-1	On completion of this course, the students will be able distinguish the environmental pollution, types, and sources.	K3	3	2						2			3	3	3			
			CO-2	On completion of this course, the students will be able illustrate regulatory mechanisms in the area of environmental compliance laid down by various agencies.	K3	2						3		3			3	2	3		
			CO-3	On completion of this course, the student will be able to examine biological wastewater treatment systems.	K4	3	3		3					3			2	3	3		
			CO-4	On completion of this course, the student will be able to investigate biotechnology core principles for value added products.	K5	3	3	3	3			3		3			3	3	3		

44	KBT-073		CO-5	On completion of this course, the student will be able to design the various waste treatment systems based on kinetic behavior analysis.	K6	3	3	3	3	3		3		3		3	3	3	3			
			KBT 073					2.80	2.75	3.00	3.00	3.00	3.00	3.00	2.75		3.00	2.80	2.8	3.00		
45	KBT-075	VII	CO-1	Student will be able to get an adequate knowledge on biosafety-regulatory framework for GMO's in India.	K3		3		3					2			3	3	3	3		
			CO-2	Student will be able to understand biosafety-regulatory framework for GMOS at international level	K2		3		3		3			3				3			3	
			CO-3	Students will be able to identify the role bioethics in IPR	K2		3			2		3			3			3	3	3	3	
			CO-4	Students will be able to disseminate knowledge on different tools of IPR to make students aware about current	K3		3				3	3			3					3	3	
			CO-5	Students will be able to Identify the role of Patent and Patent law	K1		2			3				3	3					2	2	3
			KBT075				K3	2.80	3.00	2.80	3.00	3.00		3.00	2.80			3.00	2.80	2.80	3.00	
46	KBT-751 C	VII	CO-1	On completion of this course, the students will be able describe the techniques to determine physical quality of water and wastewater.	K2		3		3			3		3			3	3	3			
			CO-2	On completion of this course, the students will be able apply techniques to measure chemical parameters of water and wastewater.	K3		3		3		3			3			3	3	3			
			CO-3	On completion of this course, the students will be able determine biochemical oxygen demand (BOD) and chemical oxygen demand (COD) of wastewater.	K3				3		3	3		3				3	3	3		
			CO-4	On completion of this course, the students will be able examine the isolation of microbes isolated from polluted area.	K3		3		3		3	3		3				3	3	3		
			CO-5	On completion of this course, the students will be able demonstrate wastewater and solid waste collection, disposal and treatment methods after field trip.	K4				3			3	3	3	3	3	3	3	3	3		
			KBT-751C					3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3	3.00	
47	KBT-752	VII	CO-1	Apply the knowledge and skills acquired on campus in a real-life work situation.	K2		3.00				3.00	3.00						3	3.00			
			CO-2	Enhance the knowledge or skills by taking the training.	K3		3.00		3.00	3.00	3.00								3	3.00		
			CO-3	Learn work environment, common practices, employment opportunities and work ethics in relevant field.	K2							3.00	3.00	3.00					3	3.00		
			CO-4	Prepare quality document, presentations and can work in team effectively.	k3										3.00	3.00	3.00		3	3.00		
			CO-5	Identify the problems and develop problem solving abilities.	k3			3.00	3.00	3.00								3.00	3	3.00		
			KBT 752					3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3	3.00	
48	KBT-753	VII	CO-1	Perform literature review, identify state of the art in that field and be able define the problem.	K3		3		3						3	3	3	3	3	3		
			CO-2	Establish a methodology using advanced tools / techniques for solving the problem.	K3			3		3		3	3	3	3	3	3	3	3	3	3	
			CO-3	Design, Develop Analytical models, Perform Numerical Analysis and interpret the results.	K3			3		3		3	3		2			3	3	3		
			CO-4	Prepare quality document of project work,Develop the skill of Viva Voce – Presentation, individual and teamwork.	K3									3	3	3		3	3	3		
			CO-5	Write paper and may be publish or patent from final thesis(Prototype, Publications, Patents).	K1							3			3	3		3	3	3	3	
			KBT 753				K3	3	3	3	3	3	3	3	3	3	2.8	3	3	3	3	
		VIII	CO-1	Enhancing his entrepreneurial motivation and acquiring the skills and capabilities required to play his entrepreneurial role effectively.	K2		3		1		1		2				2		3	3.00		
			CO-2	Learn about set-up relating to small industries and large businesses.	K3		2		1		2		1						2	3	2.00	
			CO-3	Design project for manufacturing a product and increase the supply of entrepreneurs for quick industrial development.	K2		1		1		2		1		2			1	1	3	3.00	
			CO-4	Develop skills in the preparation of balance sheets and the assessment of economic viability, business strategies, and so on.	K1		2		1		2		1		1					3	3.00	

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