Madhav Institute of Technology & Science Gwalior-5

				Departm	ent of Ele	ctrical En	gine	erin	g											
			2016-2020	со	Attainm	ent						со	-PO	Mat	trix					
			Course Outcome	Direct % Attainm ent	Indirect % Attainm ent	Total % Attainm ent	101	P02	PO3	PO4	PO5	90d	704	PO8	60d	P010	P011	P012	PSO 1	PSO 2
	rials	CO1	Elaborate the concept of conducting materials, their properties and applications	2.1	2.0	2.09	2	2	3	2	2		2					2	2	
	ing Mate	CO2	Explain concept of semiconductor materials, their classification and applications	2.2	2.0	2.16	2	2	2	2	2		3					2	2	
	gineeri	CO3	Apply various types of materials in the field of Electrical Engineering	2.6	2.1	2.51	2	2	3	3	2							2	2	
	Electrical Engineering Materials	CO4	Explain dielectric materials, their behavior in different fields, polarization and dielectric loss	2.3	1.9	2.23	2	2	3	3	2								2	
semester 3	EEL301:	CO5	Recognize the insulating materials, various properties of solid, liquid and gaseous insulating materials, testing of transformer oil	2.3	2.0	2.24	2	2	2	2	2								2	
	B	CO6	Apply various types of materials in the field of Electrical Engineering	1.8	1.9	1.81	2	2	2	2	2								2	
											E	BEELS	301:	Elect	rical	Engi	neeri	ng N	later	ials
	2:	CO1	Explain the basic concepts of electrical and electronic measurement and measuring instruments.	2.7	2.0	2.6	3	3	3					1	1	1	2		2	
	BEEL302:	CO2	Determine errors in a measurement system.	2.7	2.0	2.6	3	3		2		2		2	1	1	2	1		
	BI	СОЗ	Describe the construction and working of AC and DC bridges and their applications	2.6	2.1	2.5	3	3						1	1	1				

	CO4	Select suitable measuring instrument, signal Generator, frequency counter, CRO and digital IC tester for appropriate measurement	2.7	1.9	2.5	3		3	3	2			1	1	1				
	CO5	Select appropriate passive, active transducers and A/D & D/A converters for measurement of physical quantity.	3.0	2.0	2.8	3	3		3	2			1	1	1	1	1		2
	CO 6	Describe working principle of CT & PT and their applications	1.8	1.9	1.8	3		3	3	2			1	2	1	1			
]	BEE	L302	: Me	asur	eme	nt &	Inst	rum	entat	ion
ion	CO1	Handle an instrument and perform basic calibration	3.0	2.3	2.9	1	1	1	1		3	3	3	3	3				2
Instrumentation	CO2	Estimate the deviations in measurements due to possible errors and measures to minimize them based on their characteristics.	3.0	2.2	2.8	1	1	1	1		3	3	3	3	3				2
ent &	CO3	Measure unknown resistance, inductance and capacitance	3.0	1.5	2.7	1	1	1	1		3	3	3	3	3				2
02: Measurement &	CO4	Teamwork skills for working effectively in groups and develop analytical skills to compare experimental results with theoretical concepts	3.0	1.8	2.8	1	1	1	1		3	3	3	3	3				2
BEEL302:	CO5	Prepare and present an organized written engineering report on electronic testing of digital circuits.	3.0	2.0	2.8	1	1	1	1		3	3	3	3	3				2
								BE	EL3	02: N	Jeas	uren	nent	& In	stru	ment	atio	ı (LA	AB)
malvsis	CO1	State different AC and DC networks laws & theorems.	3.0	2.6	2.9	3	3	2	3	3			1	1	1		1	2	2
4		Apply the knowledge of basic circuital law and simplify the network using reduction techniques	2.9	2.6	2.8	3	3	3	3	3	1	2	1	1	1		1	2	2
3: Net	CO3	Solve the complicated network using theorems	3.0	2.5	2.9	3	3	3	3	3	1	2	1	1	1		1	2	2
BEEL303: Network	CO4	Infer and evaluate transient response, steady state response and network functions.	2.6	2.5	2.6	3	3	3	3	3	1		1	1	1		1	2	2

	CO5	Analyze the series resonant and parallel resonant circuit,	3.0	2.8	3.0	3	3	3	3	3			1	1	1		1		
	CO 6	Evaluate two-port network parameters.	3.0	1.8	2.8	3	3	2	3	3			1	1	1		1		
													I	BEEL	303:	Netw	vork	Anal	ysis
	CO1	Analyze the Thevenin's equivalent circuits and linear superposition and apply them to laboratory measurements.	3.0	2.2	2.8	1	1	1			3	3	3	3	3				2
ysis (LAB)	co2	Relate physical observations and measurements involving electrical circuits to theoretical principles	3.0	2.1	2.8				1		3	3	3	3	3				2
BEEL303: Network Analysis (LAB)	СОЗ	Predict and measure the transient and sinusoidal steady-state responses of simple RL, RC and RLC circuits.	3.0	2.0	2.8		1	1	1		3	3	3	3	3				2
BEEL303: Ne	CO4	Teamwork skills for working effectively in groups and develop analytical skills to compare experimental results with theoretical concepts	3.0	1.9	2.8						3	3	3	3	3				2
	CO5	Prepare and present an organized written engineering report on electronic testing of digital circuits.	3.0	1.9	2.8						3	3	3	3	3				2
												BI	EEL3	03: N	etwo	<mark>ork A</mark>	nalys	sis (L	AB)
g Electronics		Define working principles of electronic devices e.g. Diode, Zener Diode, LED, Rectifiers, Transistor, Power Amplifier, Oscillator and Op- Amp.	2.1	2.0	2.1	2	2	2	2		1			1				2	
BEEL304: Analoș	CO2	Categorize the different types of Diode, Power Amplifier, Oscillators and Op-Amp and transistor Biasing.	2.2	2.0	2.16	2	2	2	2		1			1				2	
BEEL3(СОЗ	Explain the different types of characteristic of Diode, Transistor, Power Amplifier and Op-amp.	2.6	2.1	2.5	2	2	2	2		1			2				2	

	CO4	Illustrate the various mathematical model of transistor eg. Hybrid model, re model.	2.3	1.9	2.2	2	2	2	2	1			2				2	
	CO5	Develop an ability and skill to design different types of diode rectifier, transistor biasing, oscillators and timer circuit.	2.3	2.0	2.2	2	2	2	2	1			2				2	
	CO6	Apply the various principles of electronics to design different types of Analog Electronics circuits for various applications.	1.8	1.9	1.8	2	2	2	2	1			2				2	
				1								В	EEL3	04: A	nalo	g Ele	ctro	nics
	CO1	Develop the understanding of diode biasing conditions.	3.0	2.2	2.8						3	2	2	2	2	2		2
nics (LAB)	co2	Investigate the operation of half- wave and full-wave rectifier, and find their performance curves.	3.0	2.1	2.8						3	2	2	2	2	2		2
g Electrol	СОЗ	Compare transistor configurations on the basis of input-output characteristics.	3.0	2.0	2.8						3	2	3	2	3	2		2
BEEL304: Analog Electronics (LAB)	CO4	Implement transistor based circuits (Darlington pair, differential amplifier and two- stage RC coupled amplifier).	3.0	2.1	2.8						2	2	2	2	3	2		2
BEE	CO5	Explain operation of operational amplifier (Op-amp), and design Op- amp based Wein bridge oscillator.	3.0	1.9	2.8						3	2	2	2	2	2		2
											BE	EL30	4: Ar	alog	Elec	troni	cs (L	AB)
: Electro	CO1	Write and interpret Maxwell's equations in differential and integral forms, both in time and frequency domains.	2.9	2.2	2.8	3	3	3					1				2	
BEEL305: Electi	CO2	Define complex permittivity, permeability, conductivity and perfect electric and perfect magnetic conductors.	2.7	2.1	2.6	3	3	3					1				2	

	CO3	Derive Poyntings theorem from Maxwells equations and interpret the terms in the theorem physically.	2.3	2.0	2.2	3	3	3						2				2	
	CO4	Apply vector calculus to understand the behavior of static electric fields in standard configurations	2.9	1.9	2.7	3	3	3						2				2	
	CO5	Identify, formulate, and solve engineering problems of Electromagnetic, Electrostatic and Magnetic to Static circuits using Basic relations	2.9	1.9	2.7	3	3	3						2				2	
	CO 6	Formulate and solve engineering problems of Electromagnetic.	2.3	1.9	2.2	3	3	3						2				2	
											BEE	L305:	: Elec	tro l	Magr	etic	Field	<mark>The</mark>	ory
	CO1	Design engineering problem and validate the results using MATLAB environment.	3.0	2.0	2.8	2	2		2	3				2	2	2		2	2
n Lab-I	CO2	Validate the concepts of network theorems by writing MATLAB codes	3.0	2.3	2.9	2			2	3				2	2	2		2	2
6: Simulation Lab-l	CO3	Analyze the waveforms on parameter variation of PV Array module using MATLAB Environment	3.0	2.5	2.9	2			2	3				2	2	2		2	2
BEEP306:	CO4	Compare the performance of basic converters using MATLAB environment	3.0	2.5	2.9	2			2	3				3	3	2		2	2
	CO5	Prepare and present an organized written engineering report on electronic testing of digital circuits.	3.0	2.1	2.8	2			2	3				3	3	2		2	2
														BEEI	306	Sim	ulati	on L	ab-I
: Idea	C01	Refer various technical recourses available from multiple field	3.0	2.2	2.8	2	2	2						3	2	2	2	2	1
BEEL307	CO2	Adhere to deadlines and commitment to complete the assignment	3.0	2.1	2.8	2	2	2						3	2	2	2	2	1

		СОЗ	Improve performance in self learning domain	3.0	2.0	2.8	2	2	2					2	2	2	2	2	1
		CO4	Acquire additional knowledge for competitive examinations	3.0	2.1	2.8	2	2	2					3	2	2	2	2	1
													E	BEEL	307 :	Idea	Gei	nerat	tion
	n Skills	CO1	Relate the theoretical aspects learned in classes into practical world	3.0	2.2	2.8	1	1	1					2	2	2		2	
	Communication	CO2	Apply the new skills and supplement knowledge other than curriculum	3.0	2.2	2.8	1	1	1					2	2	2		2	
	Comn	CO3	Practice communication and teamwork skills	3.0	1.5	2.7	1	1	1					2	2	2		2	
	BEEL308 :	CO4	Apply the knowledge for placement & higher education	3.0	1.8	2.8	1	1	1					2	2	2		2	
	BEE	CO5	Troubleshoot the problems related to particular experiment	3.0	2.0	2.8	1	1	1					2	2	2		2	
													BEELS	308 :	Com	mun	icati	on S	<mark>kills</mark>
		CO1	Retrieve the engineering application problems to related course content	2.1	2.0	2.09	2	2	3	2	2	2					2	2	2
t	natics-III	CO2	Describe the basic concept of Complex Variable , Linear Programming Problem and Numerical Methods	2.2	2.0	2.16	2	2	2	2	2	3					2	2	2
semester 4	EL401: Mathematics-III	CO3	Classify Complex Variable , Linear Programming Problem and Numerical Methods so as to apply the knowledge in solving routine problems	2.6	2.1	2.51	2	2	3	3	2						2	2	2
	BEEI	CO4	Inculcate analytical and computational skill to interpret the topics for engineering problems	2.3	1.9	2.23	2	2	3	3	2							2	2
		CO5	Analyze the Complex Variable, Linear Programming Problem and	2.3	2.0	2.24	2	2	2	2	2							2	2

		Numerical Methods to examine the real world problem																	
	CO6	Evaluate and Implement suitable techniques relevant for industries and contribute to the society	1.8	1.9	1.81	2	2	2	2	2								2	2
														BEE	L401	: Ma	then	natic	<mark>s-III</mark>
	CO1	Comprehend the principles and construction of different AC and DC machines.	2.7	1.9	2.5	3	3	2	3	3		1					2	2	1
chines-I	CO2	Demonstrate an understanding of the fundamental control practices such as starting, reversing, braking, plugging etc associated with AC and DC machines.	2.9	1.8	2.7	3	3	2	3	2		2	3	1	2				1
trical Ma	соз	Distinguish between the application and performance of AC and DC machines.	3.0	1.8	2.8	2	3	3	2	1	1		2	1	1	2	1		2
BEEL402: Electrical Machines-l	CO4	Develop the equivalent circuits and compute the induced emf, torque, efficiency, losses etc.	3.0	1.9	2.8	3	3	3	3					1				1	1
BEEL	CO5	Describe the different test conducted for testing the performance of different AC and DC machines.	3.0	1.9	2.8	3	3	2	3				1	1	1			1	2
	CO6	Formulate the various performance parameters of machines under different operating conditions.	2.9	2.1	2.7	3	3	3	2	1	1	1	2	1	1	2	1		1
													BEE	<mark>L402</mark>	: Ele	ctrica	al Ma	<mark>ichin</mark>	es-l
Electrical	CO1	Estimate which apparatus at what rating is required for a particular experiment	3.0	2.2	2.8							3		2	2	2			
02: Ele	CO2	Utilise a DC machine for a specific purpose, requirement	3.0	2.2	2.8							3	2	2	2	2		3	
BEEL402:	СОЗ	Predetermine the efficiency of any transformer, regulation of any transformer	3.0	1.5	2.7							2	3	2	2	2		3	

	CO4	Prepare and present an organized written engineering report on electronic testing of digital circuits.	3.0	1.8	2.8								2	3	3	2		3	
	CO5	Develop the ability to work is team and learns professional ethics.	2.0	2.5	2.1								2	З	3	2		3	
												BEEL4	402:	Elect	rical	Mac	hine	5-I (L	AB)
	CO1	Define Number systems and codes, Logic family, Digital circuits and Microprocessor.	3.0	1.9	2.8	3	3	3										2	
Microprocessor	CO2	Simplify the logic expressions using Boolean laws, map method and design them by using logic gates.	2.6	1.8	2.4	3	3	3										2	
& Micro	СОЗ	Explain the concept of different number system, logic Families and Microprocessor.	3.0	1.8	2.8	2	3	3										2	
BEEL403: Digital Electronics &	CO4	Illustrate different types of Number system, Combinational circuits, sequential circuits and Microprocessor.	3.0	1.9	2.8	2	3	3										2	
L403: Digita	CO5	Develop an ability to design combinational and sequential circuits using Logic gates for different applications	1.4	1.9	1.5	2	2	2										2	
BEE	CO6	Apply the various principle of digital electronics and programming skill to develop different Digital circuits.	1.4	2.1	1.5	2	2	2										2	
									E	BEEL4	103: I	Digita	al Ele	ctro	nics 8	& Mi	cropr	oces	sor
al	CO1	Develop skill to build, and troubleshoot digital circuits	3.0	2.0	2.8						3	2	2					1	
BEEL403: Digital	CO2	Correctly operate standard electronic test equipment such as oscilloscopes, signal analyzers, digital multi-meters, power supplies, frequency meters, and programmable memories	3.0	2.4	2.9						3	2	2					1	

		programmers to analyze, test, and implement digital circuits.																	
	CO3	Apply troubleshooting techniques to test digital circuits.	3.0	2.1	2.8						3	2	2					1	
	CO4	Prepare and present an organized written engineering report on electronic testing of digital circuits.	3.0	1.9	2.8						3	2	2					1	
	CO5	Develop the ability to work is team and learns professional ethics.	3.0	2.1	2.8						3	2	2					1	
								B	EL40)3: D	igital	Elec	tron	ics &	Mic	opro	ocess	or (L	AB)
	CO1	Develop mathematical models of mechanical system, electrical system and electromechanical system	3.0	2.3	2.9	3	3	3	3	3		1	1	1	2		2	3	3
ol Systems	CO2	Represent the complex system into standard canonical form by signal flow graph and block diagrams reduction rules	2.9	2.0	2.7	3	3	3	3	3		1	1	1			2	3	2
BEEL404 : Linear Control Systems	CO3	Compute the time and frequency- domain responses of first and second-order systems to standard inputs	2.3	2.1	2.3	3	3	3	2	2		1	1	1	2		2	3	1
404 : 1	CO4	Formulate control engineering problems in state-variable form	3.0	2.0	2.8	3	3	3	2	3	1	1	1	1	2		2	3	3
BEEL	CO5	Evaluate the stability of a closed- loop control system in time- domain as well as in frequency- domain.	3.0	1.9	2.8	3	3	3	3	3	2	1	1	1	1		2	3	3
	CO6	Predict the nature of response for the given input	1.1	2.0	1.3	3	3	3	3	3		1	1	1					
												BI	EEL4)4 : L	inea	r Con	trol	Syste	ems
BEEL404 :	CO1	Discuss the need of MATLAB to illustrate modeling and simulation of any system	3.0	2.2	2.8					2	3	3		2	2	3	2		2
BEE	CO2	Classify and evaluate the performance parameters of a	3.0	2.0	2.8					3	2	3		2	2	3	2		2

		system and then with simulation prepare an advance tool to modify the values of the parameter of the system in order to meet the desired need.																	
	соз	Prepare professionals in laboratory to compute or to predict the characteristics of a system by visualizing experimental data and its graphical representation	3.0	1.9	2.8					3	3	3		2	2	3	2		2
	CO4	Evaluate possible causes of discrepancy in practical experimental observations in comparison to theoratical concepts theory by introducing the concepts of different stability theorems	3.0	1.8	2.8					2	2	3		2	2	3	2	3	2
	CO5	Demonstrate the ability to interact via team workeffectively on a social and interpersonal level with fellow students, and will develop the ability todivide up and share task responsibilities to complete assignments	3.0	1.9	2.8					2	2	3		2	2	3	2		2
											BE	EL40	<mark>4 : Li</mark>	near	Cont	rol S	yste.	ms (l	.ab)
sma	CO1	Explain the process of sampling and the effects of under sampling	1.2	2.4	1.4	3	3	3	3	2	2	2	2	1	3	1		1	2
gnals & Systems	CO2	Classify systems based on their properties and determine the response of LSI system using convolution	1.6	2.1	1.7	3	3	3	2	2	2	3	3	1	2		2	1	1
BEEL405: Signals &	CO3	Apply the knowledge of linear algebra topics like vector space, basis, dimension, inner product, norm and orthogonal basis to signals	2.6	1.5	2.4	3	3	3	3	2	1		3		3		1	1	1

	CO4	Analyse the spectral characteristics of continuous-time periodic and a periodic signals using Fourier analysis	2.8	1.6	2.6	3	3	3	3	2	1		3		3		1	1	1
	CO5	analysis	2.1	2.0	2.1	3	3	3	3	2	2	1	2	1	2		2	1	2
	CO6	Describe the Laplace transform and Z- transform for analysis of continuous-time and discrete-time signals and systems	1.0	1.7	1.1	3	3	3	3	2	3		3		3		2	1	3
													B	BEEL4	05: 9	Signa	ls & :	Syste	ems
	CO1	Explain basic terminologies of cyber security.	1.6	2.2	1.7	3	3	3	1	2	3					0	3	,	
	CO2	Explain the basic concept of networking and internet.	2.3	2.3	2.3	3	3	3	1	2	2						3		2
GD/Seminar	CO3	Apply various method used to protect data in the internet environment in real world situation.	0.9	2.0	1.1	3	2	3	1	2	2				2		3		
BEES407	CO4	Discover the concept of IP security and architecture.	0.9	2.0	1.1	3				2	2	2		2			2		
BEE	CO5	Compare various type of cyber security threats and vulnerabilities.	1.6	2.1	1.7	3			2	2							2	2	2
	CO6	Develop the understanding of cyber crime investigation and IT ACT 2000.	0.9	2.1	1.1	2	2	2	1	1	2	2	2	2			2	2	2
					1										BEE	S407	GD/	Semi	nar
mulation	CO1	Simulate the performance of DC motor using MATLAB Simulink environment	3.0	2.2	2.8	2			2	3								2	
BEEP406: Simula	CO2	Validate the concepts of Induction motor by writing MATLAB codes.	3.0	2.3	2.9	2			2	3								2	
BEEP4	CO3	Analyze the waveforms on parameter variation of PV Array	3.0	2.0	2.8	2			2	3								2	

			module using MATLAB Environment																	
		CO4	Compare the performance of renewable energy sources using MATLAB environment	3.0	2.1	2.8	2			2	3								2	
		CO5	Design engineering problem and validate the results using MATLAB environment	3.0	2.1	2.8	2			2	3								2	
															BEEF	406 :	Sim	ulatio	on La	b-II
	Ethics &	CO1	Exposed to various NGO's/Hospitals/Industries and Social welfare agencies	3.0	2.3	2.9					3		2	2	2	3		2	2	2
	rated Eth	CO2	Gain practical knowledge in the field of social work based on the specialization	2.9	2.0	2.7					3	2	2	2	2	3	2	2	2	2
	BEES408:Integrated	CO3	Adopt professional values and ethics of the profession	2.3	2.1	2.3					2	3	2	2	2	2	3	2	2	2
	ES408	CO4	Apply the knowledge of social work practice	3.0	2.0	2.8						2	3	3	2		2	3	3	2
	BE	CO5	Work independently applying the knowledge of social work	3.0	1.9	2.8						2	3	3	2		2	3	3	2
												BE	ES40) <mark>8:In</mark> t	tegra	ted I	thic	s & A	pitit	ude
	Energy	CO1	Recognise the energy demand of world, nation and available resources to fulfill the demand	2.2	2.2	2.2	3	2		2		2	2	1		2		2		
er 5	conventional	CO2	Review about the conventional energy resources and their effective utilization	1.5	2.3	1.7	3	2		2						2		2		
semester .		CO3	Acquire the knowledge of modern energy conversion technologies	1.6	2.0	1.6	2	2	2	1						2		2		1
S	BEEL503: Non-	CO4	Perform the various characterization techniques of fuels	2.2	2.1	2.2	3	3	1	1			2			2		2		
	BEEL	CO5	Identify available nonconventional (renewable) energy resources and	1.5	2.1	1.6	3	3	2	1	2					2		2	1	2

		techniques to utilize them effectively.																	
	CO6	Find out domestic, rural and local solutions for energy crisis	1.5	2	1.6	2	2	1	1		2	2			2		2		
									I	BEEL!	503:	Non-	conv	entio	nal	Energ	gy Re	sour	ces
	CO1	Specify control system performance in the frequency- domain in terms of gain and phase margins, and design compensators to achieve the desired performance.	3.0	2.2	2.8	3	3	3	3	1								2	2
Design	CO2	Design Lead-Lag compensators based on frequency data for an open-loop linear system.	2.9	2.1	2.7	3	3	3	3	1								2	2
ystem	CO3	Express and solve system equations in state-variable form	3.0	2.0	2.8	3	3	3	3	1								2	2
itrol S	CO4	Propose state feedback controllers by using pole-placement technique	2.9	1.9	2.7	3	3	3	3	1								2	2
BEEL504: Control System Design	CO5	Demonstrate the effect on non linearity in control system by using phase plane technique and describing function method	2.9	1.9	2.7	3	3	3	3	1								2	2
8	CO6	Discuss the basic structure of a sampled-data system, applications of z-transform transform, compute discrete-time equivalents of continuous-time plants using zero- order hold and performance and stability in control design	0.9	1.9	1.1	3	3	3	3	1								2	2
							-	-	-	-		B	EEL5	<mark>04: (</mark>	Contr	ol Sy	vstem	n Des	sign
BEEL504: Control	CO1	Design different control law or algorithms like proportional control, proportional plus derivative(PD) control, proportional plus integration(PI) control, and proportional plus	3.0	2.2	2.8					2	3	3		2	2	3	2		2

		integration plus derivative (PID) control and different compensators like lag, lead, lag-lead																	
	CO2	Develop state space models of electrical, mechanical, thermal and fluid system and different control system components like servomotors etc	3.0	2.0	2.8					3	2	3		2	2	3	2		2
	CO3	Analyse stability of nonlinear systems	3.0	2.2	2.8					3	3	3		2	2	3	2		2
	CO4	Evaluate possible causes of discrepancy in practical experimental observations in comparison to theoratical concepts	3.0	2.3	2.9					2	2	3		2	2	3	2	3	2
	CO5	Demonstrate the ability to interact via team work	3.0	2.1	2.8					2	2	3		2	2	3	2		2
												BEEL	504:	Cont	rol S	yster	n De	sign	Lab
nsmission and Distribution	CO1	List difference between transmission and distribution and classify transmission and distribution systems with their advantages and disadvantages.	3.0	1.8	2.8	3	3	3	2	2	3	3		2	2	3	2	3	3
sion and	CO2	Compute voltage drop, power loss, economic limit of transmission voltage and conductor size.	1.4	1.2	1.4	3	3	3	2	2	2	3		2	2	3	2	3	3
	CO3	Recognise and analyze transmission line parameters.	0.9	1.2	1.0	3	3	3	2	2	3	3		2	2	3	2	3	3
)5: Tra	CO4	Clarify & implement need and use of per unit system.	2.3	1.8	2.2	3	3	3	2	2	2	3		2	2	3	2	3	3
BEEL505: Tra	CO5	classify and performance calculations of different models of transmission line,	3.0	1.2	2.6	3	3	3	2	2	2	3		2	2	3	2	3	3

	CO6	Enumerate need and types of insulators, line supports, cables & corona and related calculations.	2.2	1.2	2.0	3	3	3	2	2	2	3		2	2	3	2	3	3
											BEE	L505	: Tra	nsmi	ssior	and	Dist	<mark>ribut</mark>	ion
ution	CO1	Define different part of EHV transmission line simulation panel	3.0	2.4	3	2	2	3	2	2	2	2				2	3		2
BEEL505: Transmission and Distribution	CO2	Enumerate resistance, inductance, and capacitance of transmission line	2.9	2.1	3	2	2	3	3	2	2	2				2	3		2
ion an	CO3	Analyze different type of insulators, line supports.	3.0	1.5	3	3	2	3	2	2	2	2			2		3		2
Ismissi	CO4	Classify different types and applications of cables.	2.9	1.6	3	2		3		2	2	з		2	2		2		2
505: Tran	CO5	Prepare and present an organized written engineering report on electronic testing of digital circuits.	2.9	2.0	3	2		3	2	2		3		2	2		2		2
BEEL	CO6	Develop the ability to work is team and learns professional ethics.	2.9	1.7	3	2	2	3	2	2	2	2		2	2		2		2
						-		_		BEEL	505:	Tran	smis	sion	and I	Distri	buti	<mark>on (L</mark>	AB)
II-S:	CO1	Formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.	2.8	2.2	3	2	1	3	2	3			1	1	1	2		2	
Machine	CO2	Explain the working principle and different types of connections of three phase transformer	2.8	2.4	3	3	3	3	2	2			2	1	1	2	1		
06: Electrical Machines-II	CO3	Drive the relation between real and reactive power control with application to the equivalent circuit of a synchronous machine.	3.0	2.3	3	3	2	2	2	1	1		1	1	1			3	2
BEEL50	CO4	Demonstrate an understanding of the fundamental control practices associated with AC machines (starting, reversing, braking, plugging, etc.)	2.6	2.1	2	2	3	3	3					1				3	1

	CO5	Use accepted national and international standards (such as NEMA) to select appropriate electrical machines to meet specified performance requirements	3.0	2.2	3	3	3	3	2				1	1	1			1	2
	CO6	Conduct testing and experimental procedures on different types of electrical machines.	2.6	2.2	2	2	2	3	3	1	1	1	2	1	1	2	1		1
													BEEL	506:	Elec	trica	l Ma	chine	es-II
()	CO1	compare the different methods of starting and speed control of ac motors	3.0	2.2	2.8							3		2	2	2			
s-I(Lat	CO2	measure the regulation of alternator by different method	3.0	2.2	2.8							3	2	2	2	2		3	
Machine	соз	compare the performance characteristics of different electrical machin	3.0	1.5	2.7							2	3	2	2	2		3	
BEEL506: Electrical Machines-I(Lab)	CO4	distinguish the operational features of synchronous machines and induction machines	3.0	1.8	2.8								2	3	3	2		3	
BEEL50	CO5	Prepare and present an organized written engineering report on electronic testing of digital circuits.	2.9	2.0	3	2		3	2	2		3		2	2		2		2
	CO6	Develop the ability to work is team and learns professional ethics.	2.9	1.7	3	2	2	3	2	2	2	2		2	2		2		2
												BEE	L506	Elec	trica	l Ma	chine	es-I(L	.ab)
BEEL-501:PMME	CO1	Impart knowledge and awareness regarding internal and external environment of management	3.0	1.8	3						3		2	2					
BEEL-50	CO2	Develop spoken ability in a student so that he may acquire the ability to organise and express his ideas	1.4	1.2	1										3	3			

	CO3	Predict the situation and to be good decision maker through the case studies and role plays based on actual situation	1.9	1.2	2								2	2				2	2
	CO4	Develop a sound knowledge about economy and economics and to be able to understand how money and finance is to be handled	2.3	1.8	2						2					3			1
	CO5	Work out needs so as to develop a working knowledge about starting and managing an enterprise	3.0	1.2	3						2			2		3			
	CO6	Find out ways of solving / overcoming hurdles that crop up while establishing / managing his own enterprise	2.2	1.2	2						2			2					
																BEE	L-50	1:PN	IME
	CO1	Refer various technical recourses available from multiple field	3.0	2.2	2.8	2	2	2						2	2	2	2	2	1
BEES508/9 Self	CO2	Adhere to deadlines and commitment to complete the assignment	3.0	2.1	2.8	2	2	2						2	2	2	2	2	1
BEESS	CO3	Improve performance in self learning domain	3.0	2.0	2.8	2	2	2						2	2	2	2	2	1
	CO4	Acquire additional knowledge for competitive examinations	3.0	2.1	2.8	2	2	2						2	2	2	2	2	1
									BEES	508/	9 Sel	f Stu	dy,Se	emin	ar &	Grou	ıp Di	scus	sion
BEEP507: Simulation	CO1	Simulate the performance of DC motor using MATLAB Simulink environment	3.0	2.2	2.8	2			2	3				2	2	2		2	2
:07: Siı	CO2	Validate the concepts of Induction motor by writing MATLAB codes.	3.0	1.9	2.8	2			2	3				2	2	2		2	2
BEEPS	CO3	Analyze the waveforms on parameter variation of PV Array	3.0	1.8	2.8	2			2	З				2	2	2		2	2

			module using MATLAB Environment																
		CO4	Compare the performance of renewable energy sources using MATLAB environment	3.0	2.0	2.8	2			2	3			3	3	2		2	2
		CO5	Design engineering problem and validate the results using MATLAB environment	3.0	1.7	2.7	2			2	3			3	3	2		2	2
													E	BEEP!	507:	Simu	latio	n Lal	b-III
		CO1	Explain the concept and purpose of various electrical machine designs.	3.0	2.2	2.8	2			2									
	BEEL602: Electric Machine -II	CO2	Apply theoretical concepts in designing of magnetic circuits, transformers, dc machines, induction motors and synchronous motors	2.1	2.4	2.2		3	2		2							2	
	ric Ma	CO3	Analyze and interpret the design data.	2.6	2.3	2.5	2		3		2								2
5	: Elect	CO4	Identify, formulate and solve engineering machines problems.	1.0	2.1	1.2		2				2						2	
semester 6	EL602	CO5	List the steps of computer aided electrical machine design	2.4	2.2	2.4		2	3	2									2
sem	BE	CO6	Develop computer aided program pertaining to design of magnetic circuits, transformers, dc machines, induction motors and synchronous motors	2.4	2.2	2.4		2		2							2		2
													BE	EL60)2: El	ectri	c Ma	chin	e -ll
	BEEL603: Power	CO1	Name power electronics devices (i.e. Diode SCR, BJT, MOSFET and IGBT. etc) and explain their static/ dynamic characteristics.	3.0	2.2	2.8	3	3	3	3	3	1	1	1	2		2	1	1
	BEEL(CO2	Illustrate the configuration of different commutation methods.	3.0	2.2	2.8	3	3	3	3	3		1	2		2	2	1	1

	СОЗ	Illustrate the configuration of AC to DC converter, Dual converter, chopper, cyclo-converter.	2.3	2.1	2.3	3	3	3	3	3	2	1	1	1	2	2	2	3	2
	CO4	Classify converters and identify their applications.	3.0	2.2	2.8	3	3	3	3	3	2		1	2	2		2	3	3
	CO5	Develop different model of different converters to calculate their performance parameter	2.3	2.0	2.2	3	3	3	3	3	2		1	1	1	2	2	3	3
	CO6	Identify the problems/limitations of power electronics devices, converters and suggest solution.	2.3	2.1	2.2	3	3	3	3	3	2	1	1	1	2		1	1	2
													E	BEELE	503: I	Powe	er Ele	ctror	nics
ab)	C01	Demonstrate VI characteristics of Semiconductor Devices and Various Firing scheme of SCR.	2.4	2.2	2.4	3	3	3		2	2				2				
tronics (L	CO2	Demonstrate the performance of various converters AC to DC and DC to AC converter	3.0	2.2	2.8	2	2	3		2	2				2				
r Elect	CO3	Compare the performance of single and three phases VSI Inverter.	2.3	2.1	2.3	2	3	3		2	2				2				
BEEL603: Power Electronics (Lab)	CO4	Demonstrate the performance of converters in its different modes of operation.	3.0	2.2	2.8	2	3	3		2	2				2				
BEELG	CO5	Prepare an organized written report.	2.3	2.0	2.2	2	3	3		2	2				2				
	CO6	Develop the ability to work is team and learns professional ethics.	2.3	2.1	2.2	3	2	3		2	2				2				
												BI	EEL6	03: P	owei	Elec	tron	ics (L	.ab)
vanced	C01	Solve basic binary math operations using the microprocessor / microcontroller.	2.9	2.1	2.7	2	2	2								2		2	
BEEL604: Advan	CO2	Demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor / microcontroller.	2.5	2.2	2.4	2	2	3								2		2	

	СОЗ	Write program using the capabilities of the stack, the program counter, and the status register	1.6	2.2	1.7	2	3	2								2		1	
	CO4	Apply knowledge of the microprocessor's internal registers and operations by use of a PC based microprocessor simulator.	1.5	2.1	1.6	2	3	3								2		2	
	CO5	Apply the principles of Assembly Language Programming in developing microprocessor/ microcontroller based applications.	2.0	2.0	2.0	2	2	2								2		2	
	CO6	Work with standard microprocessor/ microcontroller interfaces like serial ports, digital- to-analog Converters and analog- to-digital converters etc.	2.9	2.0	2.7	2	2	2								2		1	
								В	EEL6	04: A	dvar	iced I	Micro	opro	cesso	or an	d Inte	erfac	ing
tion	CO1	Apply the knowledge of the instruments to use them more effectively	2.3	2.1	2.3	3		2											
-605: Applied Instrumentation	CO2	Suggest the kind of instrumentation scheme for measuring high voltage & current	2.3	2.2	2.3		2				2							2	
ed Inst	CO3	Balanced the bridge to find unknown values.	3.0	2.2	2.8		2	3											
Applie	CO4	Use Oscilloscope for measuring Frequency & Phase	2.3	2.1	2.3		2			3									
1605: .	CO5	Measure strain, displacement, temperature, pressure, vacuum etc	0.9	2.0	1.1		3	2										2	
BEEL	со6	Select method for measurement of high voltages & localization of cable faults	1.6	2.0	1.6														
												BEE	L605	<mark>i: Ap</mark>	plied	Inst	rume	ntat	ion
BEEL	CO1	Handle an instrument and perform basic calibration	3.0	2.1	2.8								2	2	3	2			1

	CO2	Deterine the characteristics of transducer	3.0	2.2	2.8								2	2	3	2			1
	CO3	Measure unknown resistance, inductance and capacitance	3.0	2.0	2.8								2	2	3	2			1
	CO4	Find fault in a cable	3.0	2.0	2.8								2	2	3	2	3		1
	CO5	Teamwork skills for working effectively in groups and develop analytical skills to compare experimental results with theoretical concepts	3.0	2.0	2.8								2	2	3	2			1
	CO6	Prepare and present an organized written engineering report on electronic testing of digital circuits.	3.0	2.1	2.8								2	2	2	2			1
											BEEL	605					rume	entat	_
		Examine long transmission line									0222				price				
ntrol	CO1	-	3.0	2.2	2.8	3	3	3	2	2	3	3		2	2	3	2	3	2
EL606: Power System Analysis and Control	CO2	Recognize characteristic impedance, surge impedance, flat line etc.	1.4	2.3	1.6	3	3	3	2	2	2	3		2	2	3	2		2
nalysi	CO3	Develop tandom and parallel connection of transmission lines.	1.6	2.1	1.7	3	3	3	2	2	3	3		2	2	3	2		2
stem A	CO4	Draw and analyze power circle diagram	2.3	2.1	2.3	3	3	3	2	2	2	3		2	2	3	2		2
ower Sys	CO5	Figure out problems and solution of load frequency control and voltage control.	2.6	2.2	2.5	3	3	3	2	2	2	3		2	2	3	2		2
BEEL606: P	CO6	Illustrate power system stability, faults, power system security, contingency, blackout occurring in power system and related calculations.	2.9	2.2	2.7	3	3	3	2	2	2	3		2	2	3	2		3
										BEEL	606:	Pow	er Sy	vsten	n Ana	alysis	and	Con	trol
BEEL606	CO1	Generalized circuit constants of short, medium and long transmission line	3.0	2.2	2.8					2	3	3		2	2	3	2		2

	CO2	Simulate LG, LLG, LLL and LLLG faults.	3.0	2.0	2.8					3	2	3		2	2	3	2		2
	CO3	Compute given problem of load frequency control.	3.0	1.9	2.8					3	3	3		2	2	3	2		2
	CO4	Calculate specified problem of voltage control.	3.0	1.8	2.8					2	2	3		2	2	3	2	3	2
	CO5	Teamwork skills for working effectively in groups and develop analytical skills to compare experimental results with theoretical concepts	3.0	2.0	2.8					2	2	2							2
	CO6	List out different component of a distribution substation and their necessarily	3.0	1.9	2.8					2	2	3		2	2	3	2		2
								B	BEEL6	06 (L	.AB):	Pow	ver Sy	vsten	n Ana	alysis	s and	Con	trol
oject	CO 1.	Formulate the real world problems.	3.0	2.2	2.8	2	2	2					3	3	3	3		3	3
or Pro	CO 2.	Express the technical ideas, strategies and methodologies.	3.0	2.1	2.8	2	2	2					3	3	3	3		3	3
BEEL 607: Minor Project	CO 3.	Utilize the new tools, algorithms, techniques to obtain solution of the project.	3.0	2.0	2.8	2	2	2					3	3	3	3		3	3
BEEL	CO 4.	Prepare oral demonstrations.	3.0	2.0	2.8								3	3	3	3		3	3
							_							B	EL 6	07: N	/ino	r <mark>Pro</mark>	ject
	CO 1.	Refer various technical recourses available from multiple field	3.0	2.2	2.8									3	3			3	3
8/9 Self	CO 2.	Adhere to deadlines and commitment to complete the assignment	3.0	2.3	2.9									3	3			3	3
BEES608	CO 3.	Improve his/her performance in self learning domain	3.0	2.0	2.8									3	3			3	3
B	CO 4.	Acquire additional knowledge helpful for competitive examinations	3.0	2.0	2.8									3	3			3	3
									BEES	5 <mark>08/</mark> 9	9 Sel	f Stu	dy,Se	emin	ar &	<mark>Groι</mark>	ıp Di	scuss	sion

		CO1	Describe various components of a drive system along with modes of operation, control needs and identify stable/unstable regions	3.0	2.1	2.8	3									3				
	es	CO2	Name the various controllers for AC/DC drives and draw their circuit diagrams	2.1	2.2	2.1	3	2				2				2				
	BEEL-701: Electric Drives	CO3	Classify, various drives & loads, their characteristics and control methods under various operating conditions	2.6	2.2	2.5		3			3	3			3	2		3		
	EL-701:	CO4	Develop mathematical models of various drives and compute various parameters	1.0	2.1	1.2	3			3	2					2		2		
	BE	CO5	Suggest the various static converters for speed control of different types of drives	2.4	2.0	2.3	3						2			2				
semester 7		CO6	Explain the functioning of solar, battery powered and traction drives and explain energy conservation methods.	2.4	2.0	2.3	2	3	2		2		3		2	3	3	2		
S															BE	EL-70)1: E	lectri	ic Dri	ives
	on	CO1	Operate the Over/Under voltage & over current relays and observe the performance for different settings	3.0	2.1	2.8	3	2	2	2		2		2	1	1		2	2	2
	: protection	CO2	Compare the performance and working of electromechanical and static relays	2.1	2.2	2.1	2	3	2	2		3		2	1	1		1	3	2
	chgear &	CO3	Simulate distance relays and plot their characteristics using MATLAB	2.6	2.2	2.5	2	2	2	3		3		3	1	1		1	2	2
	Swite	CO4	Explain the motor and feeder protection mechanism and their protection schemes	1.0	2.1	1.2	2	2	3	2	2	2		2	1	1		2	2	3
	BEEL-702:	CO5	Analyze the effect of time and current settings on the operating characteristics of an Inverse Definite Minimum Time (IDMT) relay	2.4	2.0	2.3	2	2	2	2	2	3		2	1	1		2	3	2

	CO6	Validate the characteristics of percentage biased differential relay for different bias settings	2.4	2.0	2.3	2	2	2	3		3		3	1	1		1	2	2
												BEE	L-702	2: Sw	/itch	gear	& pro	otect	ion
em	CO1	Describe the concept and purpose of Load Flow Studies and different load flow methods.	2.9	2.1	2.7	2	3			1								1	2
r Syste	CO2	Solve load flow problem using different load flow techniques	2.9	2.2	2.7		3		2									1	2
ed Powe	CO3	Explain the concepts of HVDC and EHVAC Transmission systems and their merits and demerits,	2.9	2.5	2.8		3	2		2								1	2
BEEL703: Computer Aided Power System	CO4	Illustrate the Parallel operation of AC-DC system and its advantage for improvement of transient stability of HVAC system,	2.7	2.2	2.6	2		2	1		2						2	1	2
EL703: Co	CO5	Demonstrate the theoretical and practical aspects of Voltage Stability, and its enhancement.	2.9	2.1	2.7	2	3		1		2							1	2
BE	CO6	Define Artificial Intelligence and discuss applications of ANN to solve power system problems.	2.9	2.1	2.7		2	2		2								1	2
						_		_		I	BEEL	703:	Com	pute	r Aid	ed Po	ower	Syst	em .
iomics	C01	Describe sources of energy and types of power plants and their Merit/Demerits.	3.0	2.4	2.8	2	3			1									2
wer System Economics	CO2	Describe the layout, principles of operations, components and applications of steam turbines, steam generators, condensers, feed water and circulating water systems.	3.0	2.4	2.9		3		2									2	
BEEL704: Power	CO3	Solve problem related to thermal hydrothermal system.	1.6	1.2	1.5		3	2		2								2	2
BEEL7	CO4	Define terms and factors associated with power plant economics	1.6	1.2	1.5	2		2	1		2						2		

	CO5	Compute the cost of producing power per kW	1.6	1.3	1.5	2	3		1		2								
	CO6	Calculate present worth depreciation and cost of different types of power plants	2.3	1.8	2.2		2	2		2									
												BEE	L704	: Pov	ver S	ystei	m Ecc	onon	nics
	C01	Explain the basic concepts of Energy Audit & its various terminologies, rules and regulations, policy and how to write reports.	2.2	2.2	2.2	2			2										
BEEL 705: Energy Audit & Management	CO2	Acquire fundamental knowledge on the science of energy and on both the conventional and non- conventional energy technologies	2.2	2.1	2.2		3			2								2	
Audit & N	СОЗ	Describe different energy auditing methods and the implementation procedures	2.3	2.0	2.2	2		3		2									2
05: Energy A	CO4	Identify present scenario of energy utilization, management and corresponding ACT of regulatory commission	2.2	1.9	2.1	2			2									2	
BEEL 7	CO5	Recognize process billing, energy tariff and power factor improvements to achieve energy efficient systems.	1.5	1.9	1.6		2			1									2
	CO6	Explain & Implement various management information system and its importance	1.5	1.9	1.6	2		1										2	
											BEE	L 70	5: En	ergy	Audi	t & N	Mana	gem	ent
BEEL706:	CO1	Integrate classroom theory with workplace practice	3.0	2.7	2.9	2			2										
BEI	CO2	Gain understanding of administrative functions and company culture	3.0	1.5	2.7		3			2								2	

	CO3	Appreciate the ethical basis of professional practice in in relevant industry	3.0	2.7	2.9	2		3		2									2
	CO4	Display a capacity for critical reasoning and independent learning	3.0	1.5	2.7	2			2									2	
	CO5	Exercise the role of the professional/specialist/manager/s upervisor confidently in the relevant industry	3.0	1.5	2.7		2			1									2
	CO6	Write formatted report explaining the work in industrial training and describing the experience	3.0	2.2	2.8	2		1										2	
										BI	EL7	06: Ir	ndust	rial 1	F rain	ning	& Int	terns	ship
	CO1	Formulate the real world problems.	3.0	2.4	2.9	2	2	2					3	3	3	3		3	
oject I	CO2	Express the technical ideas, strategies and methodologies.	3.0	2.4	2.9	2	2	2					3	3	3	3		3	
BEED707: Major Project I	СОЗ	Utilize the new tools, algorithms, techniques to obtain solution of the project.	3.0	1.9	2.8	2	2	2					3	3	3	3		3	2
D707:	CO4	Test & validate the developed prototype/results.	3.0	2.3	2.9	2	2	2					3	3	3	3		3	
3EE	CO5	Write a project report.	3.0	2.4	2.9								3	3	3	3		3	2
-	CO6	Prepare oral demonstrations.	3.0	2.5	2.9								3	3	3	3		3	
														BEI	ED70	7: M	ajor	Proje	ect I
ır &	CO 1.	Refer various technical recourses available from multiple field	3.0	2.2	2.8									3	3			3	3
lf Seminar &	CO 2.	Adhere to deadlines and commitment to complete the assignment	3.0	2.3	2.9									3	3			3	3
08 : Self	CO 3.	Improve his/her performance in self learning domain	3.0	2.0	2.8									3	3			3	3
BEES708	CO 4.	Acquire additional knowledge helpful for competitive examinations	3.0	2.0	2.8									3	3			3	3
										BE	ES70) <mark>8 : S</mark>	elf Se	emin	ar &	Grou	<mark>up Di</mark> s	scuss	sion

ą	CO1	Compare the performance of converters with and without modulation	3.0	2.2	2.8	2	2	3	3									2
BEEL 701: Electrical Drives Lab	CO2	Distinguish between the semi and full converter operations for resistive and reactive loads	3.0	2.3	2.9	2	2	3	3									2
ectrical E	CO3	Analyse and plot the characteristics of different motors with changing parameters using MATLAB code	3.0	2.0	2.8	2	2	3	3									2
701: El€	CO4	Simulate the performance of various converters under different operating conditions using MATLAB/Simulink	3.0	2.0	2.8	2	2	3	3									2
BEEL	CO5	Comment on the advantages &limitations of various static switches used to realize converters	3.0	2.1	2.8	2	2	3	3									2
	CO6	Write technical Report	3.0	2.1	2.8	2	2	3	3			3	3					2
									 			BEE	L 70	1: Ele	ectric	al Dri	ives	ab
	C01	Operate the Over/Under voltage & over current relays and observe the performance for different settings	3.0	1.9	2.8	2	2	3	3									2
702: Switchgear & Protection Lab	CO2	Compare the performance and working of electromechanical and static relays	3.0	1.8	2.8	2	2	3	3									2
r & Prote	CO3	Simulate distance relays and plot their characteristics using MATLAB	3.0	2.0	2.8	2	2	3	3									2
vitchgea	CO4	Explain the motor and feeder protection mechanism and their protection schemes	3.0	2.0	2.8	2	2	3	3									2
BEEL 702: Sv	CO5	Analyze the effect of time and current settings on the operating characteristics of an Inverse Definite Minimum Time (IDMT) relay	3.0	1.9	2.8	2	2	3	3									2
	CO6	Validate the characteristics of percentage biased differential relay for different bias settings	3.0	1.9	2.8	2	2	3	3									2
										BE	EL 70	<mark>2: S</mark> v	vitch	gear	& Pr	rotect	tion	Lab

	sər	C01	Define the concepts of soft computing techniques and their merits over conventional hard computing techniques	2.9	1.9	2.7			3	2	2			2		2	2		3
	Soft Computing Techniues	CO2	Compare various neural networks for pattern classification and regression problems	1.5	1.9	1.5			3					2		2	2		3
	nputin	CO3	Illustrate fuzzy logic and its importance to handle uncertainty	2.9	1.9	2.7	3		3					2		2	2		
	: Soft Con	CO4	Describe the concept of evolutionary computation and genetic algorithms	1.4	1.9	1.5	3		3					2		2	2		
	BEEL 801:	CO5	Develop Hybrid systems using GA, PSO and ACO and apply them to solve optimization problems	1.5	1.9	1.5	3		3					2		2	2		
semester 8		CO6	Solve engineering problems using various neural networks, fuzzy logic and GA	2.3	1.9	2.2	3		3					2		2	2		
est											1	BEEL	801: S	Soft	Com	putiı	ng Te	chni	ues
sem	ab)		Define the concepts of soft computing techniques and their																
	E E	CO1	merits over conventional hard computing techniques	2.9	1.9	2.7			3	2	2			2		2	2		3
	Fechniues (L	CO1	merits over conventional hard	2.9 1.5	1.9 1.9	2.7			3 3	2	2			2 2		2 2	2		3 3
	uting Techniues (I		merits over conventional hard computing techniques Compare various neural networks for pattern classification and				3			2	2								
	oft Computing Techniues (Lab)	CO2	merits over conventional hard computing techniques Compare various neural networks for pattern classification and regression problems Illustrate fuzzy logic and its	1.5	1.9	1.5	3		3	2	2			2		2	2		
	BEEL 801: Soft Computing Techniues (I	CO2 CO3	merits over conventional hard computing techniques Compare various neural networks for pattern classification and regression problems Illustrate fuzzy logic and its importance to handle uncertainty Describe the concept of evolutionary computation and genetic algorithms Develop Hybrid systems using GA, PSO and ACO and apply them to	1.5 2.9	1.9 1.9	1.5 2.7			3	2	2			2 2		2 2	2 2		

										В	EEL 8	801: 9	Soft	Comp	outin	g Te	chniu	les (L	.ab)
	CO1	Describe the various schemes of AC, DC drives, traction schemes and different braking systems.	3.0	2.2	2.8	3	2	2	2		2	2	2	1	1	1	2	2	2
I Energy	CO2	Explain the basics of lighting and illumination and its parameters and able to design Illumination systems for various applications.	2.7	2.2	2.6	2	3	2	2		3	3	2	1	1	1	1	3	2
of Electrical Energy	CO3	Gain knowledge of the various types of arc furnaces, electrical welding, various types of heating.	2.9	2.2	2.8	2	2	2	3		3	3	3	1	1	1	1	2	2
Utilization	CO4	Apply the electrical energy applications for traction and understand the power electronics technology in efficient utilization of electrical power	1.5	2.1	1.6	2	2	3	2	2	2	2	2	1	1	1	2	2	3
BEEL 802:	CO5	Design a suitable scheme of speed control for the traction system and electric drives used in industries.	1.5	1.6	1.5	2	2	2	2	2	3	3	2	1	1	1	2	3	2
	CO6	Identify the knowledge for research opportunities in field of electric traction & utilization of electric energy	2.2	1.6	2.0	2	2	2	3		3	3	3	1	1	1	1	2	2
											BEEI	802	: Uti	lizati	on o	f Eleo	trica	l Ene	ergy
Instrumentation	CO1	Describe the construction and working principle of various type of transducers/sensor to measure physical quantities.	3.0	2.2	2.8	2	2												1
	CO2	Recognize technical terms and nomenclature used in industrial measurement and industrial process control.	1.6	2.3	1.7	2	2												
EEL803A: Process	CO3	Design and tune process (PID) controllers	3.0	2.1	2.8	2	2	3	3									3	
EEL8(CO4	Demonstrate a working knowledge of control devices used in the	3.0	2.1	2.8	2	2	3	3									3	2

		measurement and control of industrial processes.																
	CO5	Analyze, formulate and select suitable sensor for the given applications.	3.0	2.1	2.8	2	2	3	3								3	1
	CO6	Design various measurement schemes that meet the desired specifications and requirements of real time processes	2.4	2.1	2.3	2	2	3	3								3	2
											EEL	.803/	A: Pro	ocess	Inst	rume	entat	ion
	CO1	Recognize the basics of high voltage and its application	2.9	2.4	2.8	2	2											
eering	CO2	Appreciate the design, working principles and critical elements of a high voltage system	2.2	2.2	2.2	2	2											
age Engin	CO3	Identify solutions for various engineering problems related to high voltage engineering.	2.7	2.2	2.6	2	2	3	3								3	3
BEEL804A: High Voltage Engineering	CO4	Enumerate the generation & measurement techniques for high ac, dc and impulse voltages & currents	1.4	2.4	1.6	2	2	3	3								3	2
BEEL804	CO5	Explain the behaviour of insulating materials under the stress of high electrical voltage.	1.8	2.4	1.9	2	2	3	3								3	2
	CO6	Justify the planning, operation, testing and maintenance of high voltage equipment and systems.	2.3	2.2	2.2	2	2	3	3								3	2
				1		-					BEEL	804A	: Hig	<mark>h Vo</mark>	ltage	Engi	neer	ing
ajor	CO 1.	Formulate the real world problems.	3.0	2.4	2.9	2	2	2				3	3	3	3		3	3
05: M	CO 2.	Express the technical ideas, strategies and methodologies.	3.0	2.4	2.9	2	2	2				3	3	3	3		3	3
BEEL 805: Major	CO 3.	Utilize the new tools, algorithms, techniques to obtain solution of the project.	3.0	1.9	2.8	2	2	2				3	3	3	3		3	3

	CO 4.	Test & validate the developed prototype/results.	3.0	2.3	2.9	2	2	2					3	3	3	3		3	3
	CO 5.	Write a project report.	3.0	2.4	2.9								3	3	3	3		3	3
	CO 6.	Prepare oral demonstrations.	3.0	2.5	2.9								3	3	3	3		3	3
														BE	EL 8	05: N	/lajoi	r Proj	ject
8		Utilise any special equipment, with proper safety and norms	3.0	2.4	2.9	2	2	2					3	3	3	3		3	3
806: Electrical Industrial Safetv	CO 2.	Innovate new society required technology, which would be cost competitive	3.0	2.1	2.8	2	2	2					3	3	3	3		3	3
al Industr	CO 3.	Participate in , make in India, theme and hence reduce the import dependency	3.0	1.5	2.7	2	2	2					3	3	3	3		3	3
ectrica	CO 4.	Develop team spirit among man machine and material	3.0	1.6	2.7	2	2	2					3	З	3	3		3	3
306: El	CO 5.	Reduce the chances of any accident, causality, damage	3.0	2.0	2.8								3	3	3	3		3	3
BEEL 8	CO 6.	Pioneer in industrial entrepreneurship/start- up/projects	3.0	1.7	2.7								3	3	3	3		3	3
								BE	EL 80	06: El	ectri	cal Ir	ndust	rial	Safet	y & I	Main	tena	nce