

KAVIKULGURU INSTITUTE OF TECHNOLOGY AND SCIENCE, RAMTEK

Sr. No.	Department of Science and Humanities		Pg. No.
	First Semester		
1	BES1-1T	Mathematics – I	1
2	BES1-2T	Applied Physics	1
3	BES1-2P	Applied Physics Lab	1
4	BES1-3T	Energy and Environment	2
5	BES1-3P	Energy and Environment Lab	2
6	BES1-4T	Communication Skills	2
	BES1-4P	Communication Skills Lab	2
7	BES1-5T	Engineering Graphics	2
	BES1-5P	Engineering Graphics Lab	2
8	BES1-6T	Basics of Civil and Mechanical Engineering	3
	Second Semester		
1	BES2-1T	Mathematics – II	4
2	BES2-2T	Advanced Engineering Materials	4
3	BES2-2P	Advanced Engineering Materials Lab	4
4	BES2-3T	Applied Chemistry	4
5	BES2-3P	Applied Chemistry Lab	4
6	BES2-4T	Computational Skills	5
7	BES2-4P	Computational Skills Lab	5
8	BES2-5P	Workshop Practices	5
9	BES2-6P	Basics of Electrical Engineering	5
10	BES2-7T	Engineering Mechanics	5
11	BES2-8T	Indian Culture and Constitution	5

Sr. No.	Department of Civil Engineering		Pg. No.
	Third Semester		
1	BECVE301T	Mathematics-III	6
2	BECVE302T	Fluid Mechanics	7
3	BECVE302P	Fluid Mechanics (Practical)	7
4	BECVE303T	Solid Mechanics	7
5	BECVE303P	Solid Mechanics (Practical)	7
6	BECVE304T	Geotechnical Engineering	7
7	BECVE304P	Geotechnical Engineering Lab(Practical)	7
8	BECVE305T	Building Construction and Elementary Building Drawing	8
9	BECVE305P	Building Construction and Elementary Building Drawing	8
10	BECVE306T	Effective Technical Communication	8
	Fourth Semester		
1	BECVE401T	Concrete Technology	9
2	BECVE402T	Structural Analysis	9
3	BECVE402P	Structural Analysis (Practical)	9
4	BECVE403T	Environmental Engineering	9
5	BECVE403P	Environmental Engineering (Practical)	10
6	BECVE404T	Transportation Engineering-I	10
7	BECVE404P	Transportation Engineering-I (Practical)	11
8	BECVE405T	Surveying & Geomatics	11
9	BECVE405P	Surveying & Geomatics (Practical)	11
10	BECVE406P	Mini Project (Practical)	11
	Fifth Semester		
1	BECVE501T	Structural Analysis – II	12
2	BECVE501P	Structural Analysis – II	12
3	BECVE502T	RCC Structures	12
4	BECVE502P	RCC Structures	13
5	BECVE503T	Fluid Mechanics-I	13
6	BECVE503P	Fluid Mechanics-I	13
7	BECVE504T	Geotechnical Engineering-II	13
8	BECVE 505 T	Hydrology and Water Resources	14
9	BECVE506P	Communication English & Technical Writing	14
	Sixth Semester		
1	BECVE601T	Steel Structures	14
2	BECVE601P	Steel Structures	15
3	BECVE602T	Surveying-II	15
4	BECVE602P	Surveying-II	15
5	BECVE603T	Fluid Mechanics-II	15
6	BECVE603P	Fluid Mechanics-II	16
7	BECVE604T	Building Design and drawing	16
8	BECVE 605T	Environmental Engineering-II	16
9	BECVE606P	Site Visit & Mini Project	16
	Seventh Semester		
1	BECVE701T	Advance Concrete Structures	17
2	BECVE701P	Advance Concrete Structures	17
3	BECVE702T	Estimating and Costing	17
4	BECVE702P	Estimating and Costing	18

5	BECVE703T	Earthquake Resistant Design (Elective-I)	18
6	BECVE704 T	Construction Management and Law	18
7	BECVE 705T	Transportation Engineering-II	19
8	BECVE706P	Industrial Case Study	19
	Eighth Semester		
1	BECVE801T	Irrigation Engineering	19
2	BECVE802T	Water Transmission and Distribution System Elective-II	20
3	BECVE803T	Applied Remote Sensing and GIS (Elective-III)	20
4	BECVE803P	Applied Remote Sensing And GIS (Elective-III)	20
5	BECVE804T	Construction Management and materials	20
6	BECVE805P	Project	21

Sr. No.	Department of Electronics Engineering		Pg. No.
	Seventh Semester		
1	BEENE701T	DSP Processor &Architecture	25
2	BEENE702T	Embedded System	25
3	BEENE703T	Optical Fiber Communication	26
4	BEENE704T	Advance Digital System Design	26
5	BEENE705T	Elective I-Digital Image Processing	26
	Eighth Semester		
1	BEENE801T	Micro Electro-Mechanical System	26
2	BEENE802T	Computer Communication Network	27
3	BEENE803T	CMOS VLSI Design	27
4	BEENE804T	Elective 2-Nanotechnology	27
5	BEENE805T	Robotics And Automation	27
6	BEENE805T	Data Compression And Encryption	27

Sr. No.	Department of Mechanical Engineering		Pg. No.
	Third Semester		
1	BEME301T	Applied Mathematics – III	28
2	BEME302T	Manufacturing Process	28
3	BEME302P	Manufacturing Process Lab	28
4	BEME303T	Engineering Thermodynamics	29
5	BEME304T	Kinematics of Machines	29
6	BEME305P	Machine Drawing & Solid Modelling	29
7	BEME306P	Computer Programming	30
8	BEME307P	Sports/Yoga/NSS/NCC	30
	Fourth Semester		
1	BEME401T	Machining Processes	31
2	BEME401P	Machining Processes Lab	31
3	BEME402T	Fluid Mechanics & Hydraulic Machines	31
4	BEME402T	Fluid Mechanics & Hydraulic Machines Lab	31
5	BEME403T	Material Science & Engineering	31
6	BEME404T	Mechanics of Materials	32
7	BEME404P	Material Testing Lab	32
8	BEME405T	Professional Ethics	32
9	BEME406P	Sports/Yoga/NSS/NCC	32
	Fifth Semester		
1	BEME501T	Heat Transfer	33
2	BEME501P	Heat Transfer Lab	34
3	BEME502T	Energy Conversion-I	34
4	BEME503T	Design of Machine Elements	34
5	BEME504T	Industrial Economics and Management	35
6	BEME505T	Mechanical Measurement & Metrology	
7	BEME505P	Mechanical Measurement &	
8	BEME506P	Industrial Visit*	
9	BEME507P	Performing Art	
	Sixth Semester		
1	BEME601T	Automation in	35
2	BEME601P	Automation in	35
3	BEME602T	Energy Conversion-II	36
4	BEME602P	Energy Conversion Lab	36
5	BEME603T	Dynamics of Machines	36
6	BEME603P	Dynamics of Machines Lab	37
7	BEME604T	Elective - I	
8	BEME605T	Elective - II	
9	BEME606T	Open Elective - I	
10	BEME607T	Environment Science	
	Seventh Semester		
1	BEME701T	Industrial Engineering	37
2	BEME702T	Automobile Engineering	37
3	BEME702T	Power plant engineering	37
4	BEME703T	Computer Aided Design	38
5	BEME704T	Energy Conversion - II	38
6	BEME705T	Design of Mechanical Drives	38
	Eighth Semester		

1	BEME801T	Industrial Management	39
2	BEME802T2	Computer Integrated Manufacturing (Elective II)	39
3	BEME802T	Refrigeration and Air Conditioning (Elective – II)	39
4	BEME803T5	Advance Internal Combustion (IC) Engine (Elective III)	40
5	BEME803T	Advanced Manufacturing Techniques (Elective III)	40
6	BEME803T3	Renewable Energy Systems (Elective III)	40
7	BEME804T	Automation in Production	41
8	BEME805T	Energy Conversion – III	41

Sr. No.	Department of Electronics and Communication Engineering		Pg. No.
	Third Semester		
1	BEETC301T	Applied Mathematics-III	42
2	BEETC302T	Component for Electronic Circuit Design	42
3	BEETC302P	Component for Electronic Circuit Design Lab	43
4	BEETC303T	Digital System Design	43
5	BEETC303P	Digital System Design Lab	43
6	BEETC304P	Network Theory	43
7	BEETC305T	Signal & System	43
8	BEETC306T	Measurement & Instrumentation	44
9	BEETC307P	Electronics Workshop - I Lab	44
10	BEETC308T	Consumer Affairs (Audit)	44
	Fourth Semester		
1	BEETC401T	Microcontroller & Application	45
2	BEETC401P	Microcontroller & Application Lab	45
3	BEETC402T	Analog & Digital Communication	45
4	BEETC403P	Analog & Digital Electronics Lab	45
5	BEETC404T	Analog System Design	45
6	BEETC405T	Data Structure and Algorithm	46
7	BEETC406T	HSC:Numerical Mathematics and Probability using	46
8	BEETC407T	Programming for Problem Solving	46
9	BEETC407P	Programming for Problem Solving Lab	46
10	BEETC408I	Internship	
11	BEETC409A	Universal Human Values	47
	Fifth Semester		
1	BEETC501T	Embedded System Design	47
2	BEETC501P	Embedded System Design Lab	47
3	BEETC502T	Electromagnetic Wave	48
4	BEETC503T	Digital Signal Processing	48
5	BEETC503P	Digital Signal Processing Lab	48
6	BEETC504OT	HSC: IEED(Economics)	48
7	BEETC505PE	PEC-I	48
8	BEETC506P	Electronic Workshop II	49
9	BEETC507A	Audit Course	
	Sixth Semester		
1	BEETC601T	Computer Communication Network	49
2	BEETC601P	Computer Communication Network Lab	49
3	BEETC602T	Internet of Things (IOT)	50
4	BEETC602P	IOTLab	50
5	BEETC603T	Wireless Sensor Network	50
6	BEETC603P	Wireless Sensor Network Lab	50
7	BEETC604PE	PEC-II	50
8	BEETC605OE	OE-I	50
9	BEETC606T	HSC: Effective Technical Communication	
10	BEETC607I	Mini Project(Internship)	
11	BEETC608A	Audit Course	
	Seventh Semester		

1	BEECE701T	DSP Processor & Architecture	51
2	BEECE701P	DSP Processor & Architecture	51
3	BEECE702T	Television & Video Engineering	51
4	BEECE702P	Television & Video Engineering	51
5	BEECE703T	Optical communication	51
6	BEETE704T	Advanced Digital System Design	52
7	BEETE704P	Advanced Digital System Design	52
8	BEECE705T	VLSI Signal Processing	52
	Eighth Semester		
1	BEECE801T	Microwave and Radar Engineering	52
2	BEECE801P	Microwave and Radar Engineering	52
3	BEECE802T	Computer Communication Network	52
4	BEECE802P	Computer Communication Network	53
5	BEECE803T	Wireless and Mobile Communication	53
6	BEECE804T	Embedded System Elective - II	53
7	BEECE804T	Digital Image Processing Elective – II	53
8	BEECE805T	Satellite Communication Elective –III	54
9	BEECE805T	CMOS VLSI Design Elective –III	54

Sr. No.	Department of Computer Technology		Pg. No.
	Third Semester		
1	BECT301T	Mathematics - III	55
2	BECT302T	Problem Solving Using Python	55
3	BECT302P	Problem Solving Using Python	55
4	BECT303T	Digital Design and Fundamentals of Microprocessor	55
5	BECT303P	Digital Design and Fundamentals of Microprocessor	55
6	BECT304T	Computer Architecture and Organization	56
7	BECT305T	Theoretical Foundations of Computer Science	56
8	BECT306T	Universal Human Values	56
9	BECT307P	Computer Workshop-I (Web Technologies)	
10	BECT308T	Consumer Affairs (Audit)	56
	Fourth Semester		
1	BECT401T	Discrete Mathematics and Graph Theory	57
2	BECT402T	Social Ethics in Information Technology	57
3	BECT403T	Object Oriented Programming Using Java	57
4	BECT403P	Object Oriented Programming Using Java	57
5	BECT404T	Data Structure and Program Design	57
6	BECT404P	Data Structure and Program Design	
7	BECT405T	Computer Network	58
8	BECT406T	Operating Systems	58
9	BECT407P	Computer Workshop - II Lab	
10	BECT408T	Environmental Science	58
11	BECT409P	Internship	
	Fifth Semester		
1	BTCT501T	Design and Analysis of Algorithms	59
2	BTCT501P	Design and Analysis of Algorithms	59
3	BTCT502T	Database Management System	59
4	BTCT502P	Database Management System	60
5	BTCT503T	Software Engineering and Project Management	60
6	BTCT504T	Effective Technical Communication	60
7	BTCT505T	Artificial Intelligence	60
8	BTCT506T	Elective -1	60
	Sixth Semester		
1	BTCT601T	Compiler Design	61
2	BTCT601P	Compiler Design	61
3	BTCT602T	Data Warehousing and Mining	61
4	BTCT602P	Data Warehousing and Mining	62
5	BTCT603T	Elective – II	62
6	BTCT604T	Elective –III	62
7	BTCT605T	Open Elective -1	62
8	BTCT606T	Economics of IT Industry	62
9	BTCT607P	Mini Project	63
10	BTCT608T	Organization Behaviour (Audit)*	
	Seventh Semester		
1	BECT401T	Compilers	63
2	BECT401P	Compilers Practical	63

3	BECT402T	Artificial Intelligence	63
4	BECT402P	Artificial Intelligence Practical	64
5	BECT403T	Advance Database Systems Elective-I	64
6	BECT404T	Advance Operating System Elective-II	64
7	BECT405P	Project and Seminar	64
	Eighth Semester		
1	BECT406T	Data Warehousing and Mining	65
2	BECT406P	Data Warehousing and Mining Practical	65
3	BECT407T	Cyber and Information Security	65
4	BECT407P	Cyber and Information Security	65
5	BECT408T	Parallel Computing Elective -III	65
6	BECT409T	Cloud Computing Elective-IV	66
7	BECT410P	Project	66

Sr. No.	Department of Information Technology		Pg. No.
	Third Semester		
1	BEIT301T	Applied Mathematics - III	67
2	BEIT302T	Programming Logic and Design using 'C'	67
3	BEIT302P	Programming Logic and Design using 'C'	67
4	BEIT303T	Digital Electronics and Fundamentals of Microprocessor	67
5	BEIT303P	Digital Electronics and Fundamentals of Microprocessor	68
6	BEIT304T	Emerging Trends in Information Technology	68
7	BEIT305T	System Programming	68
8	BEIT306P	Software Lab - 1	68
9	BEIT307T	Universal Human Values	68
10	BEIT308T	Environmental Science (Audit)	68
	Fourth Semester		
1	BEIT401T	Discrete Mathematics and Graph Theory	69
2	BEIT402T	Data Structure and Program Design	69
3	BEIT402P	Data Structure and Program Design	69
4	BEIT403T	Object Oriented Programming System	69
5	BEIT403P	Object Oriented Programming System	69
5	BEIT404T	Computer Architecture and Organization	69
6	BEIT405T	Introduction to Computer Network	70
7	BEIT406T	Operating Systems	70
8	BEIT407P	Software Lab - 2	70
9	BEIT408T	Consumer Affairs (Audit)	70
10	BEIT409P	Internship	
	Fifth Semester		
1	BEIT501T	Software Engineering and Project Management	71
2	BEIT501P	Software Engineering and Project Management	71
3	BEIT502T	Design Analysis & Algorithm	71
4	BEIT503T	Java Programming	72
5	BEIT503P	Java Programming	72
6	BEIT504T	Theory of Computation	72
7	BEIT505T.1	Elective-1 : Gaming Architecture and Programming	72
8	BEIT506P	Software Lab(Basics of AR & VR/Web Technology)	72
9	BEIT507T	Effective Technical Communication	72
10	BEIT508T	Yoga and Meditation	
	Sixth Semester		
1	BEIT601T	Database Management Systems	73
2	BEIT601P	Database Management Systems	73
3	BEIT602T	Artificial Intelligence & Machine Learning	73
4	BEIT602P	Artificial Intelligence & Machine Learning	74
5	BEIT603T.3	Elective - II - Advances in Computer Networks	74
6	BEIT604T.1	Elective - III - Cloud Computing	74
7	BEIT605T.1	Open Elective - I - Data Science	74
8	BEIT606P	Mini Project & Industrial Visit	74
9	BEIT607T	Economics of IT Industries	
10	BEIT608T	Organizational Behaviour	
	Seventh Semester		

1	BEIT701T	Data Warehousing and Mining	75
2	BEIT701P	Data Warehousing and Mining	75
3	BEIT702T	Computer System Security	75
4	BEIT702P	Computer System Security	75
5	BEIT703T	Artificial Intelligence	75
6	BEIT704T2	Elective-I Multimedia Systems	76
7	BEIT704T4	Elective-I Compiler Design	76
8	BEIT705T2	Elective-II Cluster and Grid Computing	76
9	BEIT706P	Seminar on Project	77
	Eighth Semester		
1	BEIT801T	Distributed Systems	77
2	BEIT801P	Distributed Systems	77
3	BEIT802T	Gaming Architecture and Programming	77
4	BEIT802P	Gaming Architecture and Programming	77
5	BEI803T3	Elective-III Pattern Recognition	78
6	BEIT804T4	Elective-IV Wireless Sensor Networks	78
7	BEIT805P	Project	78

Sr. No.	Department of Electrical Engineering		Pg. No.
	Third Semester		
1	BTCHEE301T	Electrical Engineering Mathematics	79
2	BTCHEE302T	Network Analysis	79
3	BTCHEE302P	Network Analysis Lab	79
4	BTCHEE303T	Electrical Measurement and Instrumentation	79
5	BTCHEE303P	Electrical Measurement and Instrumentation Lab	79
6	BTCHEE304T	Analog Devices & Circuit	79
7	BTCHEE304P	Analog Devices & Circuit Lab	79
8	BTCHEE305T	Renewable Energy Studies	80
9	BTCHEE306T	Introduction to Python Programming	80
10	BTCHEE306P	Introduction to Python Programming Lab	80
11	BTCHEE307T	Environmental Studies	80
	Fourth Semester		
1	BTCHEE401T	Signals & Systems	80
2	BTCHEE402T	Digital Electronics	80
3	BTCHEE402P	Digital Electronics Lab	80
4	BTCHEE403T	Electrical Machines-I	80
5	BTCHEE403P	Electrical Machines-I Lab	80
6	BTCHEE404T	Power System	81
7	BTCHEE405T	Electromagnetic Fields	81
8	BTCHEE406T	Simulation & Programming Techniques	81
9	BTCHEE406P	Simulation & Programming Techniques Lab	81
	Fifth Semester		
1	BTCHEE501T	Microprocessor and Microcontrollers	82
2	BTCHEE502T	Control Systems	82
3	BTCHEE503T	Power Electronics	82
4	BTCHEE504T	Advanced Electrical Power System	82
5	BTCHEE505T	Professional Elective-I	82
6	BTCHEE501P	Microprocessor and Microcontrollers	
7	BTCHEE502P	Control Systems	
8	BTCHEE503P	Power Electronics	
	Sixth Semester		
1	BTCHEE601T	Engineering Economics and Industrial Management	83
2	BTCHEE602T	Computer Application in Power System	83
3	BTCHEE603T	Switchgear and Protection	84
4	BTCHEE604T	Open Elective-I	84
5	BTCHEE605T	Professional Elective-II	84
6	BTCHEE606T	Yoga & Meditation	84
7	BTCHEE602P	Computer Application in Power System	
8	BTCHEE603P	Switchgear and Protection	
9	BTCHEE607P	Internship / Mini Project	
	Seventh Semester		
1	BEELE701T	Control System-II	
2	BEELE702T	Electrical Power System-II	85
3	BEELE703T	Flexible AC Transmission System	85
4	BEELE704T	High Voltage Engineering	85

5	BEELE705T	Electrical Installation and Design	85
	Eighth Semester		
1	BEELE801T	Power Quality (EL-II)	85
2	BEELE802T	Electrical Distribution System (EL-III)	86
3	BEELE803T	Switchgear and Protection	86
4	BEELE804T	Computer Application in Power System	86

Sr. No.	Department of Architecture		Pg. No.
	First Semester		
1	1S-A-1	Basic Design and Visual Arts	87
2	1S-A-2	Construction Technology And Materials – I	87
3	1S-A-3	Structural Design And Systems – I	88
4	1S-A-4	History of Art and Architecture –I	88
5	1S-A-5	Architectural Graphics –I	88
6	1S-A-6	Workshop Practice- I	88
7	1S-A-7	Computer Application(NG)	89
8	1S-AA-1	Presentation skills	89
9	1S-AA-2	Numerical Abilities	89
	Second Semester		
1	2S-A-1	Architectural Design-I	89
2	2S-A-2	Construction Technology and Materials –II	89
3	2S-A-3	Structural Design and Systems- II	90
5	2S-A-4	History of Art and Architecture –II	90
6	2S-A-5	Architectural Graphics II	90
7	2S-A-6	Workshop Practice – II	90
8	2S-AA-1	Elective A - Presentation Skills II	90
9	2S-AA-2	Elective B -Fundamentals of Drawing Techniques	90
	Third Semester		
1	3S-A-1	Architectural Design II	90
2	3S-A-2	Construction Technology And Material – III	91
3	3S-A-3	Structural Design And System III	91
4	3S-A-4	History of Art and Architecture-III	91
5	3S-A-5	Architectural Graphics III	91
6	3S-A-6	Surveying and Levelling	91
7	3S-A-7	Climate and Architecture	92
8	3S-AA-1	Vernacular Architecture (Elective A)	92
9	3S-AA-2	Architectural Documentation	92
	Fourth Semester		
1	4S-A-1	Architectural Design II	92
2	4S-A-2	Construction Technology and Material III	92
3	4S-A-3	Structural Design and System-IV	92
4	4S-A-4	Building Services –I	93
5	4S-A-5	Architectural Graphics IV	93
6	4S-A-6	Theory of architecture-I	93
7	4S-A-7	Theory of Landscape Architecture	93
8	4S-AA-1	Elective A Computer Application	94
9	4S-AA-2	Elective B Product Design	94
	Fifth Semester		
1	5S-A-1	Architectural Design-IV	94
2	5S-A-2	Construction Technology and Materials –V	94
3	5S-A-3	Structural Design and System-V	94
4	5S-A-4	Building Services –II	94
5	5S-A-5	Architectural Graphics-V	95

6	5S-A-6	Theory of Design-II	95
7	5S-A-7	Specifications	95
8	5S-AA-1	Computer Application II Elective A	95
9	5S-AA-2	Appropriate Technology Elective B	96
	Sixth Semester		
1	6S-A-1	Architectural Design V	96
2	6S-A-2	Construction Technology and Materials –VI	96
3	6S-A-3	Structural Design and Systems- VI	96
4	6S-A-4	Building Services -II	97
5	6S-A-5	Architectural Graphics VI	97
6	6S-A-6	Design of Human and Settlements	97
7	6S-A-7	Estimating and Costing	977
8	6S-AA-1	Project Management	97
9	6S-AA-2	Advanced Spatial Analysis	98
	Seventh Semester		
1	7S-A-1	Architectural Design-VII	98
2	7S-A-2	Construction Technology and Materials –VII	98
3	7S-A-3	Building Services-IV	98
4	7S-A-4	Structural Design and System-VII	99
5	7S-A-5	Research Skills and Project Introduction	99
6	7S-A-6	Acoustics and Illumination	99
7	7S-AA-1	Interior Design	99
8	7S-AA-2	Valuation	99
	Eighth Semester		
1	8S-A-1	Practical Training	100
	Ninth Semester		
1	9S-A-1	Practical Training	100
	Tenth Semester		
1	10S-A-1	Project	100
2	10S-A-2	Construction Technology and Materials – VIII	100
3	10S-A-3	Professional Practice	100
4	10S-A-4	Elective- A - Housing	100

Department of Science and Humanities

The department of Science and Humanities has framed the following Course Outcomes in consultation with concerned stakeholder and corresponding committees.

B.Tech. First Semester	
	Mathematics – I (BES1-1T)
CO101.1	Analyze real world scenarios to recognize when derivatives or integrals are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.
CO101.2	Appreciate ODE and system of ODEs concepts that are encountered in the real world, understand and be able to communicate the underlying mathematics involved to help another person gain insight into the situation.
CO101.3	Apply knowledge of mathematics, physics and modern computing tools to scientific and engineering problems.
CO101.4	Develop an ability to identify, formulate and/or solve real world problems.
CO101.5	Understand the impact of scientific and engineering solutions in a global and societal context.
	Applied Physics (BES1-2T)
CO102.1	Apply concepts in interface and diffraction to solve relevant numerical problems and to relate to relevant engineering applications.
CO102.2	Learn the basic concept of dual nature of matter and wave packet and apply them to analyze various relevant phenomena and to solve related numerical.
CO102.3	Recall the basic concept of crystal structure and apply them in solving numerical problems based on them and in relating to applications for determination of crystal structure.
CO102.4	Relate the basic idea of total internal reflection to the propagation of light in an optical fibre and make use of the fibre concepts to solve numerical problems and relate to applications in engineering.
CO102.5	Find how to extend the basic concepts of motion of charged particles in electric magnetic fields to solve numerical problems and to relate to applications in electron optic devices and CRO.
	Applied Physics Practical (BES1-2P)
CO102.1	Data interpretation by using graphs, estimation of % error to arrive at the desired outcome of the experiment.
CO102.2	Determine band gap energy value by various methods to gain an insight into the electrical properties of the semiconductors.
CO102.3	To study electrical behavior of the p-n junction diode and BJT to understand their application.
CO102.4	To study Hall effect in semiconductor to understand its significance.

	Energy and Environment (BES1-3T)
CO103.1	Solid fuels, CV, numericals
CO103.2	Liquid and gaseous fuels, analysis of coal ICE
CO103.3	Bio-energy, photolysis , nuclear fuels
CO103.4	Industrial pollution and impacts, control
CO103.5	Advanced materials, conducting polymers, adhesives etc
	Energy and Environment Lab (BES1-3P)
CO103.1	The practical knowledge of handling chemicals.
CO103.2	Analyzing a broad foundation in energy and environment that stresses scientific reasoning and analytical problem solving with a molecular perspective .
CO103.3	Experimental techniques using modern instrumentation.
	Communication Skills (BES1-4T)
CO104.1	Recollect various programming constructs and to develop C programs.
CO104.2	Understand the fundamentals of C programming.
CO104.3	Choose the right data representation formats based on the requirements of the
CO104.4	Implement different Operations on arrays, functions, pointers, structures.
	Communication Skills Lab (BES1-4P)
CO104.1	Student will be able to overcome listening barriers of communication.
CO104.2	Student will be able to enhance their comprehending skills and speaking skills.
CO104.3	Students will be able to give effective presentations and handle group situation professionally.
CO104.4	Student will be able to use figurative language in their formal as well as informal communication.
	Engineering Graphics (BES1-5T)
CO105.1	Draw the fundamental engineering objects using basic rules and able to construct the lines, simple geometries. Construct the various engineering curves using the drawing instruments.
CO105.2	Draw two dimensional and three dimensional objects, precisely using drawing equipment.
CO105.3	Draw the development of lateral surfaces for cut section of geometrical solids precisely using drawing equipment.
CO105.4	Draw a simple isometric projection from given orthographic views precisely using drawing equipment.
	Engineering Graphics Lab (BES1-5P)
CO105.1	The learner will able to understand the basic knowledge of engineering graphics such as instruments, lines, dimensioning techniques, scales, sheet layout. Construct the
CO105.2	The learner will able to understand projections of different types planes (2D) and solids (3D) and will be able to draw different views of plane and solids.
CO105.3	The learner will able to understand concept of sectioning and development of lateral surfaces of solid and will able to represent it.

CO105.4	Apply the visualization skill to draw a simple isometric projection/view from given orthographic views precisely using drawing equipment.
	Basics of Civil & Mechanical Engineering (BES1-6T)
CO105.1	Introduction to what constitutes Civil Engineering. Identifying the various areas available to peruse and specialize within the overall field of CivilEngineering. Highlighting the depth of engagement possible within each of the areas.
CO105.2	Exploration of the various possibilities of a career in this field. Understanding the vast interfaces this field has with the society at large. Providing inspiration for doing creative and innovative work.
CO105.3	Showcasing the many monuments, heritage structures, nationally important infrastructure and impressive projects to serve as source of inspiration. Highlighting possibilities for taking up entrepreneur activities in this field. Providing foundation for the students launch off upon an inspired academic pursuit into this branch of engineering.

B.Tech. Second Semester	
	Mathematics – II (BES2-1T)
CO201.1	Analyze real world scenarios to recognize when integrals are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.
CO201.2	Define and understand the geometry of vector differential operators and line and surface integrals.
CO201.3	Explain and apply principles of study design and data collection.
CO201.4	Develop an ability to identify, formulate and/or solve real world problems.
CO201.5	Understand the impact of scientific and engineering solutions in a global and societal context.
	Advanced Engineering Materials (BES2-2T)
CO202.1	Apply the basic concepts of electrical conductivity and band theory to classify solids into conductors, semiconductors and insulator.
CO202.2	Recall the basic ideas of semiconductor physics and relate them to devices such as diodes and transistors and their applications in engineering.
CO202.3	Recall the basic concepts in magnetism and make use of them to classify magnetic materials in different types and to relate to their engineering
CO202.4	Relate basic ideas of electrical conduction and magnetism to superconductors and apply them to classify superconductors in different types.
CO202.5	Find how to extend the basic concepts of quantum transitions to explain the characteristics, working and applications of different lasers and to solve relevant numerical problems.
CO202.6	Make use of quantum concepts to explain the properties and applications of different nanomaterials.
	Applied Chemistry (BES2-3T)
CO203.1	Rationalize the periodic properties and analyze the Microscopic chemistry in terms of atomic and molecular orbital.
CO203.2	Rationalize bulk properties and processes using thermodynamic processes.
CO203.3	Understand the causes of corrosion, its consequences and method to minimize corrosion.
CO203.4	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
CO203.5	Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation.
CO203.6	Know about treatment of water and its applications in industry.

	Applied Chemistry Lab (BES2-3P)
CO203.1	Measure molecular /system properties like, concentrations, surface tension, Conductance of Solutions etc.
CO203.2	Estimate the soluble impurities present in the given water sample.
CO203.3	Handle the different instruments used in chemistry laboratory.
	Computational Skills (BES2-4T)
CO204.1	Recollect various programming constructs and to develop C programs.
CO204.2	Understand the fundamentals of C programming.
CO204.3	Choose the right data representation formats based on the requirements of the problem.
CO204.4	Implement different Operations on arrays, functions, pointers, structures.
	Workshop Practices (BES2-5P)
CO205.1	Read and interpret job drawing and plan operations.
CO205.2	Identify and select proper material, tools, equipments, machines and proper operational parameter.
CO205.3	Set tools, work piece, and machines for desired operations.
CO205.4	Complete job of Carpentry, Fitting, Welding and Smithy as per job drawing in allotted time.
CO205.5	Use safety equipment and follow safety produces during operations.
CO205.6	Inspect the job for confirming desired dimensions and shape.
	Basic Electrical Engineering (BES2-6T)
CO206.1	Understand the basic knowledge of electrical quantities such as current, voltage, power, resistance, ideal/practical sources and its application.
CO206.2	Understand the basic properties of magnetic material and its application to magnetic circuit.
CO206.3	Understand AC fundamental, three phase circuit and its application in global world.
CO206.4	To understand the principle, operation and testing of single phase transformer.
	Engineering Mechanics (BES2-7T)
CO207.1	An ability to analyze 2D and 3D force system to determine resultant force, moment and couple of various force system.
CO207.2	An ability to construct free-body diagrams and to calculate the reactions, forces in the member of trusses and in spatial force system .
CO207.3	An ability to calculate centroid and M.I of various Laminas. Also analyze beam and frame by virtual work method.
CO207.4	An ability to carry out the Dynamic analysis of various bodies using kinetic analysis, work energy method and method of momentum.

	Indian Culture and Constitution (BES2-8T)
CO208.1	Student will become aware of Indian Culture and civilization and their role in development of Society.
CO208.2	Student will understand Industrial work-culture.
CO208.3	Student will sensitized towards professional ethics.
CO208.4	Student will understand Indian Constitution and governance of country.
CO208.5	Student will be able to understand the structure and system of work organizations.

Department of Civil Engineering

The Civil Engineering program subscribes to the following Program Specific Outcomes (PSOS):

PSO1	To Apply the basic knowledge of construction aspect in civil engineering for planning, analysis, design, estimate, laboratory and site investigation.
PSO2	To Design a system in Civil Engineering considering safety, economy, sustainability and social need of the community.
PSO3	To Understand the basic concept of economics and leadership through consultancy services.
PSO4	To Develop entrepreneurship for the services to the community and to pursue higher education and various career enhancing courses.

B Civil Engineering Third Semester	
	Mathematics-III (BTCVE301T)
CO301.1	Apply Fourier series in the analysis of periodic functions not in terms of sine and cosine encountered in engineering problems
CO301.2	Solve Partial differential equations of first, higher and second order using elementary techniques; formulate mathematical models to simple problems of vibration of strings and beams in terms of Partial differential equations and solving with elementary solution techniques.
CO301.3	Learn the concept of finding maxima and minima of definite integral involving unknown function and its derivatives.
CO301.4	Learn Eigen value problem and its applications.
CO301.5	Learn to find an approximate solution of algebraic and transcendental equations, system of linear equations and first order ordinary differential equations by various Numerical Methods
CO301.6	Formulate simple optimization problem and learn to solve it by Graphical method and Simplex method.
	Fluid Mechanics (BTCVE302T)
CO302.1	Understand the importance and practical significance of various fluid properties.
CO302.2	Comprehend and estimate various forces acting on partially and fully submerged bodies.
CO302.3	Evaluate the importance of various parameters on the fluid motion.
CO302.4	Know various flow measuring devices with their practical applications.
CO302.5	Illustrate the concept of impulse momentum principle, dimensional analysis and model analysis of a fluid phenomenon.

	Fluid Mechanics (BTCVE302P)
CO302.1	Understand the importance and practical significance of various fluid properties.
CO302.2	Comprehend and estimate various forces acting on partially and fully submerged bodies.
CO302.3	Evaluate the importance of various parameters on the fluid motion.
CO302.4	Know various flow measuring devices with their practical applications.
CO302.5	Illustrate the concept of impulse momentum principle, dimensional analysis and model analysis of a fluid phenomenon.
	Solid Mechanics (BTCVE303T)
CO303.1	To determine the Mechanical behavior of the body by determining the stresses, strains produced by the application of load and to apply the fundamentals of simple stresses and strains.
CO303.2	To determine the Shear Force and Bending Moment at a section for different condition.
CO303.3	To facilitate the concept of bending and its theoretical analysis in a beam To determine the Bending and shear stress in a given beam.
CO303.4	To develop slope and Deflection equations for beams subjected to various loads.
CO303.5	To determine the torsion in circular section, Direct and Bending Stresses.
	Solid Mechanics Lab (BTCVE303T)
CO303.1	To determine the Mechanical behavior of the body by determining the stresses, strains produced by the application of load and to apply the fundamentals of simple stresses and strains.
CO303.2	To determine the Shear Force and Bending Moment at a section for different condition.
CO303.3	To facilitate the concept of bending and its theoretical analysis in a beam To determine the Bending and shear stress in a given beam.
CO303.4	To develop slope and Deflection equations for beams subjected to various loads.
CO303.5	To determine the torsion in circular section, Direct and Bending Stresses.
	Geotechnical Engineering (BTCVE304T)
CO304.1	Find the index and engineering properties of the soil.
CO304.2	Determine properties & demonstrate interaction between water and soil.
CO304.3	Analyze and compute principles of compaction and consolidation settlements of soil.
CO304.4	Ability to analyze to calculate bearing capacity, earth pressure and foundation settlement.
CO304.5	Study and identify different type's natural materials like rocks & minerals and soil.

	Geotechnical Engineering Lab (BTCVE304P)
CO304.1	Find the index and engineering properties of the soil.
CO304.2	Determine properties & demonstrate interaction between water and soil.
CO304.3	Analyze and compute principles of compaction and consolidation settlements of soil.
CO304.4	Ability to analyze to calculate bearing capacity, earth pressure and foundation settlement.
CO304.5	Study and identify different type's natural materials like rocks & minerals and soil.
	Building Construction & Elementary Building Drawing (BTCVE305T)
CO305.1	Identify components of a building.
CO305.2	Differentiate and identify types of building materials.
CO305.3	Select appropriate material for building construction.
CO305.4	Plan various construction related activities and their quality control.
CO305.5	Know & identify the latest techniques and materials used.
	Building Construction & Elementary Building Drawing (BTCVE305P)
CO305.1	Identify components of a building.
CO305.2	Differentiate and identify types of building materials.
CO305.3	Select appropriate material for building construction.
CO305.4	Plan various construction related activities and their quality control.
CO305.5	Know & identify the latest techniques and materials used.
	Effective Technical Communication (BTCVE306T)
CO306.1	Participate effectively in groups with emphasis on listening and meta cognitive thinking.
CO306.2	Prepare memorandum and report.
CO306.3	Deliver an effective oral presentation.
CO306.4	Acquire public speaking skills handling the audience professionally.
CO306.5	Analyze causes of deterioration of concrete components

BE Civil Engineering Fourth Semester	
	Concrete Technology (BTCVE401T)
CO401.1	Think logically for development Concrete technology application in field of Civil Engineering.
CO401.2	Gain an experience in the implementation of Concrete Materials on Engineering concepts which are applied on Construction Fields
CO401.3	Understand the process of mix design of concrete.
CO401.4	Differentiate special concrete from conventional concrete.
CO401.5	Analyze causes of deterioration of concrete components.
	Structural Analysis (BTCVE402T)
CO402.1	Apply knowledge to analyse determinate and indeterminate structures.
CO402.2	Apply knowledge to perform analysis of beams and frames using Slope Deflection Method and Moment Distribution Method.
CO402.3	Apply knowledge of Influence Line Diagram to analyse structural members for rolling loads.
CO402.4	Apply knowledge of Direct Stiffness Method to analyse Beams and Plane Frames.
CO402.5	Apply knowledge of Direct Stiffness Method to formulate Stiffness Matrix, Transformation Matrix, Load Matrix to analyse Plane
	Structural Analysis (BTCVE402P)
CO402.1	Apply knowledge to analyse determinate and indeterminate structures.
CO402.2	Apply knowledge to perform analysis of beams and frames using Slope Deflection Method and Moment Distribution Method.
CO402.3	Apply knowledge of Influence Line Diagram to analyse structural members for rolling loads.
CO402.3	Apply knowledge of Direct Stiffness Method to analyse Beams and Plane Frames.
CO402.3	Apply knowledge of Direct Stiffness Method to formulate Stiffness Matrix, Transformation Matrix, Load Matrix to analyse Plane
	Environmental Engineering-I (BTCVE403T)
CO403.1	Have knowledge of characteristics of water, drinking water standards and necessity of treatment.
CO403.2	Design various units of conventional water treatment plant.
CO403.3	Understand the characteristics of waste water, necessity of treatment, types of treatment processes.
CO403.4	Equip with the basic knowledge related to design of waste water treatment
CO403.5	Understand of significance of air pollution, solid waste, climate change, geo environment etc.

	Environmental Engineering-I (BTCVE403P)
CO403.1	Have knowledge of characteristics of water, drinking water standards and necessity of treatment.
CO403.2	Design various units of conventional water treatment plant.
CO403.3	Understand the characteristics of waste water, necessity of treatment, types of treatment processes.
CO403.4	Equip with the basic knowledge related to design of waste water treatment
CO403.5	Understand of significance of air pollution, solid waste, climate change, geo environment etc.
	Transportation Engineering-I (BTCVE404T)
CO404.1	Define and describe different objectives and requirements of Highway Development and Planning, Alignments.
CO404.2	Explain, Discriminate and Design various Geometric Features of Highways & Pavement Design
CO404.3	Understand, analyze, apply and evaluate the parameters of Traffic Engineering.
CO404.4	Explain and describe various terms in railway engineering and should be able to explain, discriminate and design various geometric features of railway track.
CO404.5	Understand the aircraft characteristics and terminal area functions, analyze, and evaluate the basic runway length, orientation of runway.
	Transportation Engineering-I (BECVE404P)
CO404.1	The student will be able to understand the importance of shape (length, width, thickness) of aggregate as per the I.S. code.
CO404.2	The student will be able to know as per I.S. code, impact test, crushing value test, abrasion and attrition of aggregate.
CO404.3	The student will be able to know the bitumen properties as per I.S. code and case study of road failures and road signs. (warning, informatory, mandatory)
	Surveying and Geomatics (BECVE405T)
CO404.1	Measure length and bearing of lines using various instruments and calculate area of given field.
CO404.2	Use the theodolite to measure angle and distances for traverse single so identify and correct the errors in traverse. Design and layout the various types of curves.
CO404.3	To carry out levelling and contouring also able to determine volume of earthwork.
CO404.4	Use modern instrument like Total workstation, GPS, DGPS for surveying and able to Prepare map in CAD
CO404.5	Use Remote Sensing and Geographical Information System (GIS), UAV drone and LiDAR.
CO404.1	Measure length and bearing of lines using various instruments and calculate area of given field.

CO404.2	Use the theodolite to measure angle and distances for traverse and identify and correct the errors in traverse. Design and lay-out the various types of curves.
CO404.3	To carry out levelling and contouring also able to determine volume of earthwork.
CO404.4	Use modern instrument like Total station, GPS, DGPS for surveying and able to Prepare map in CAD
CO404.5	Use Remote Sensing and Geographical Information System (GIS), UAV Drone and LiDAR.
BE Civil Engineering Fifth Semester	
Hydraulic Engineering (BTCVE501T)	
CO501.1	Understand the concepts related to boundary layer theory and determination of drag and lift forces
CO501.2	Apply the knowledge of theories and equations of pipe flow in analyzing and designing the pipe network systems and to discuss effects of water hammer pressures.
CO501.3	Use the concepts of uniform and critical flow through open channels, design of efficient channel sections and application of specific energy concept.
CO501.4	Understand gradually varied flow analysis and its computation, and its application in open channel flow.
CO501.5	Understand and apply basic principles related to turbines & Pumps in water Resources planning
Reinforced Cement Concrete Designs (BTCVE502T)	
CO202.1	Understand the fundamental concepts of working stress method as per IS 456-2000 and Pre-stressed concrete method.
CO202.2	Apply the fundamental concepts of limit state method on limit state of serviceability
CO202.3	Analyze the fundamental concepts of limit state of collapse in flexure, Shear & Bond as per IS 456-2000.
CO202.4	Evaluate the fundamental concepts of limit state of collapse in compression and design of footing as per IS 456-2000.
CO202.5	Design of Simply supported Two-way slab
Civil Engineering Materials, Testing and Evaluation (BTCVE503T)	
CO503.1	Evaluate the role of materials in Civil Engineering
CO503.2	Know the mechanical behaviour and properties of steel and concrete by standard testing procedures for identifying their performance
CO503.3	Explain special materials, composite materials and use of new techniques in constructions for satisfying the future needs of industry.
CO503.4	Exposure to a variety of established material testing procedures/techniques and the relevant codes of practice
CO503.5	Evaluate and write a technical laboratory report.

	Professional Practice, Law & Ethics (BTCVE504T)
CO504.1	Understand basic purpose of profession, professional ethics and various moral and social issues.
CO504.2	Analyse various moral issues and theories of moral development
CO504.3	Realize their roles of applying ethical principles at various professional levels
CO504.4	Identify their responsibilities for safety and risk benefit analysis.
CO504.5	understand their constructive roles in dealing various global issues
	Advanced Structural Analysis (BTCVE505T) (Elective-I)
CO505.1	Compute deflections in two dimensional structures using Strain energy method
CO505.2	Understand response of long columns
CO505.3	Use the approximate method for analysis of multi-storied frame structures
CO505.4	Understand Flexibility matrix method and application of column analogy
CO505.5	Understand the concepts related to structural dynamics & finite element method
	Advanced Concrete Structure (BTCVE506T) (Elective-II)
CO506.1	Understand the behaviour and failure modes of different RC structural members
CO506.2	Analyze and apply the results in designing various RC structural members.
CO506.3	Apply the knowledge and skills in practical problems
CO506.4	Understand the relevant software and use the same in the analysis and design of RC members.
BE Civil Engineering Sixth Semester	
	Estimating and Costing (BTCVE601T)
CO601.1	Prepare the preliminary estimate for administrative approval & technical sanction for a civil engineering project.
CO601.2	Write the specification of the works to be undertaken, prepare the tender documents, fill the contracts and make use of knowledge of different contract submission & opening in awarding the work to the contractor.
CO601.3	Use the concept of SD, EMD, MAS, Running Bill, Final Bill during the entire project
CO601.4	Use the technique of Rate analysis in estimating the exact cost of material & manpower and hence the entire project.

CO601.5	Estimate the bill of quantities using different techniques of preliminary & detailed estimation of buildings & roads & Arrive the exact value of the asset (movable & immovable) using different Valuation techniques
	Construction Engineering and Management (BTCVE602T)
CO602.1	Get themselves acquainted with various economic and managerial aspects of construction industry
CO602.2	Understand the tools and techniques of economic analysis for improving their decision making skills
CO602.3	Analyze the structure of market and effects of inflation with special reference to construction industry.
CO602.4	Understand the importance of marketing management and its effect on construction industry.
CO602.5	Acquire financial acumen for construction business.
	Water Resource Engineering (BTCVE603T)
CO603.1	Understand occurrence, movement and distribution of water and estimate water abstractions, runoff and hydrographs
CO603.2	Illustrate different systems and methods of irrigation and estimate the quantity of water required by crops and estimate the quantity of water required by crops.
CO603.3	Estimate reservoir capacity and analyse and design earth dams
CO603.4	Design and analyse gravity dams and illustrate types of Spillways and energy dissipators
CO603.5	Design unlined and lined channels and illustrate concepts of other irrigation structures
	Water Transmission and Distribution Systems (BTCVE604T) (Elective-III)
CO604.1	Understanding the various head loss formula used for water distribution design and also know the methodology of optimal diameter of pumping main
CO604.2	Estimation of storage capacity of a distribution reservoir and also to understand the utility of various appurtenance used in WDN
CO604.3	Understand the concepts of various methods of analysis of WDN
CO604.4	Understanding various techniques of the optimal planning of water distribution
CO604.5	Implementation of various methods of optimal water distribution network design
	Environmental Engineering (BTCVE605T) (Open Elective-I)
CO605.1	Explore the components of biosphere and impact of human activity on environment.
CO605.2	Summarize the causes and sources of pollutants, and their impact on global environment.
CO605.3	Develop ethics and scientific awareness about waste generation and treatment.
CO605.4	Identify sources and types of wastes and its management.

CO605.5	Understand noise, noise pollution and control.
BE Civil Engineering Seventh Semester	
	Advance Concrete Structures (BECVE701T)
CO701.1	Students will able to apply the basic knowledge of mathematic, engineering and IS code recommendations for planning, analysis and design of safe and economical water tanks resting on ground
CO701.2	Students would able to understand the structural behavior of structural members and carry the analysis and design of beams by using modern techniques
CO701.3	Student will able to understand the effect of backfill and select suitable type of retaining wall for the safety and convenience of society and carry out analysis, design and detailing of retaining wall as per IS Code provisions.
CO701.4	Students will be able to plan the building and design the structural elements such as building frame and staircase as per the requirement of society.
CO701.5	Students will able to interpret the soil - structural interaction and design suitable type of combined foundation using modern tools and techniques for the benefit of society.
CO701.6	Students will able to interpret the soil - structural interaction and design suitable type of combined foundation using modern tools and techniques for the benefit of society.
	Advance Concrete Structures (BECVE701P)
CO701.1	Students would able to understand the design concept of various RCC members.
CO701.2	Students will able to apply the theoretical knowledge to design the RCC member for various structures.
CO701.3	Students will able to use advance software for design of building
	Estimating and Costing (BECVE702T)
CO702.1	To understand basic fundamentals of Estimates. Also to prepare preliminary estimates using different methods without much mathematical computations. Also to understand various approvals to be taken for the execution of project to understand their practical utility.
CO702.2	To compute the quantities of various items of work of building using mathematical approach with formulation for detailed estimate.
CO702.3	To know the basic principles and importance of earthwork in road estimate and to compute the quantities of earthwork in roads and canals and to discuss their practical utility for Engineers, designers and road users.
CO702.4	To have detailed knowledge about execution process of carrying out works in Govt. Departments for its practical utility. Also to know types of tenders, contracts, legal aspects, etc. for Engineers and others in society.
CO702.5	To know an importance and necessity of specification and draft detailed specification of items which are useful for Engineers on site and others. Also to calculate rate per unit item through mathematical computation and to include them in CSR which is useful to Engineers as well as owners in the society
CO702.6	To discuss the various methods of valuation through mathematical representation so that it would be beneficial to the people in the society. Also to calculate the standard rent of building by formulation and mathematical expression and to know the various types of cost and cost accounting useful for the community.

	Estimating and Costing (BECVE702P)
CO702.1	To prepare preliminary estimates without much computations the quantities of various items of work using mathematical approach and formulations for detailed estimate.
CO702.2	To compute the quantities of earthwork in roads and canals for the practical utility of engineers and others in society.
CO702.3	To have detailed knowledge about execution process in Govt. departments for its practical utility and to calculate rate per unit item valuation and cost accounting through mathematical computations.
	Earthquake Resistant Design (Elective-I) (BECVE703T)
CO703.1	Idea on Engineering Seismology , Response Spectra, Strong Ground motion Characteristics, Earthquake Effects on RC Frame building
CO703.2	Earthquake Analysis of Multistoried Building by Equivalent Lateral Load Procedure, Response Spectrum Method. Idea on Seismic Methods of Design
CO703.3	Meaning of Single Degree of Freedom and Multi-degree of Freedom. What is Mathematical Modeling. Modeling of 2D and 3D frame and with effect of shear wall.
CO703.4	Idea on soil structure interaction. Winkler Model. What is Soft Storey? Shear Wall Concept. What is Capacity based design.
CO703.5	Idea on Ductility. Types of ductility. What is beam to beam connection and beam to column connection? How to design beam for ductile detailing as per IS 13920
CO703.6	Introduction to Retrofitting. Methods of Retrofitting. Need of Retrofitting. Introduction to base isolation. Types of base isolation. Working principle. IS code Provisions.
	Construction Management and Law (BECVE704T)
CO704.1	Demonstrate the understanding of various types of projects, Modern Construction Techniques, project analysis and feasibility, project financing.
CO704.2	To analyze network analysis CPM and PERT, resource allocation leveling and resource smoothing construction planning. Crashing and time cost optimization to make project economic.
CO704.3	To achieve the knowledge of various types of equipments used in the construction and to apply the principle of management for various types organization, organizational charts, duties and responsibilities of personal manager. To know various modern techniques used for material management quality checks, inventory control etc.
CO704.4	To know the quality control aspects in quality management, safety provisions as per NBC. MIS in construction management and project management systems.
CO704.5	To know the town planning requirements and knowledge of acts and codes of regional town planning, housing development act, highway act, and local rules will be understand legal importance.
CO804.6	To know different laws, environmental (protection) act, forest conservation act water and air pollution act, transfer of property act, understand the social and environmental requirements and organizational welfare measures.

	Transportation Engineering-II (BECVE705T)
CO705.1	To understand the classification of railways, traction and tractive resistances, tractive efforts of locomotives, high speed track to apply the knowledge of Engineering for economical transportation system (mass transportation system)
CO705.2	To conduct studies on rail functions, different rail fixtures, to design geometric design of railway track, super elevation.
CO705.3	Planning and designing of points and crossing, turnouts modern technology used for track, signaling and controlling of railway.
CO705.4	To know airport planning, zoning laws, imaginary surfaces, analyze wind direction runway orientation geometric design of runway taxiway, design standards of runway, taxiway, etc.
CO705.5	To plan and design terminal area, aircrafts parking hangers, and to study international airport layouts, visual aids, airport markings and air traffic control modernization of landing by instrumental landing systems.
CO705.6	To plan and design tunnels, ventilation economic transport by using tunnels. To know the classification of harbors, types of break waters, wharves, quays modern usage of water transportation systems.
	Industrial Case Study (BECVE706P)
CO706.1	An ability to design and conduct experiments, as well as to analyze and interpret data
CO706.2	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
CO706.3	An ability to function on multidisciplinary teams.
CO706.4	An ability to identify, formulates, and solves engineering problems
CO706.5	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
CO706.6	An understanding of the elements of Project Management, Construction and asset Management.
BE Civil Engineering Eighth Semester	
	Irrigation Engineering (BECVE801T)
CO801.1	Understanding the methods, efficiency and application of Irrigation as an Engineering concept for the proper growth of crops to enhance the socio economic standard of farmers.
CO801.2	Complete knowledge of planning, design and operational approach of storage reservoirs, computation of their capacity and life.
CO801.3	Understanding of philosophy of large and small dams and engineering concept for analysis and design of such structures with consideration of economic and social aspects.
CO801.4	Use of mathematical approach to check the stability, analysis and design of spillways with their engineering approaches to be adopted for energy dissipation below the spillways.
CO801.5	Allocation of analysis and design approaches for various hydraulic structures with their engineering function, practical utility and socio economic considerations.
CO801.6	Understanding design methodology for unlined and lined canal, selection of lining with engineering and economic consideration, methods and operation for efficient use of water for the benefit of water user communities.

	Water Transmission and Distribution System Elective-II (BECVE802T)
CO802.1	To know the purpose of various appurtenances used in distribution system and analysis, design consideration, working mechanics and engineering applications of such appurtenances.
CO802.2	To do the planning of various distribution system and to analyze and design of such system by using various mathematical technique by formulating various equations.
CO802.3	To know the concept and fundamentals of node flow analysis and design the network by mathematical approach
CO802.4	Use of concepts of distribution reservoir to use of mathematical approach to calculate the capacity of reservoir by analytical and graphical solution and to understand design of rising main by the minimizing the total cost.
CO802.5	To understand the design of single source balancing network using CPM, number of branching configuration of loop network using graph theory principle.
CO802.6	To understand linear programming technique, non linear programming technique and also cost head loss criteria.
	Applied Remote Sensing and GIS (Elective-III) (BECVE803T)
CO803.1	To know the fundamentals of remote sensing as a modern technique for surveying.
CO803.2	To understand fundamental knowledge of Aerial photography which may solve engineering problems up to certain extent?
CO803.3	To understand the appropriate techniques of interpretation of satellite images and aerial photographs.
CO803.4	The knowledge of remote sensing and GIS for mapping and monitoring land cover and land use changes as a modern technique in environmental context.
CO803.5	To apply knowledge of remote sensing and GIS in environmental studies.
CO803.6	Use of satellite images as a new technique for site selection for civil engineering projects to overcome the complex civil engineering problems in environmental context.
	Applied Remote Sensing and GIS (Elective-III) (BECVE803P)
CO803.1	Students will understand the basic concepts of stereoscopes to create three-D vision.
CO803.2	Students will be able to interpret the aerial photographs and satellite images.
CO803.3	Students will be able to interpret the digital satellite images on software.
	Construction Management and materials (BECVE804T)
CO804.1	Acquaint with various economic and financial aspects of construction industry
CO804.2	Understand the tools and techniques of economic analysis for improving their decision making skills.
CO804.3	Understand the knowledge of economic analysis for improving their decision making skills
CO804.4	Understand the Concept of IRR, Turnkey Construction Projects.
CO804.5	Apply Knowledge of Inflation , Recession , Financial Ratios
CO804.6	Idea on Working Capital. Structure of Working capital. Economic Analysis.

	Project (BECVE805P)
CO805.1	Engaged in professional practices, such as construction, environmental, geotechnical, structural, transportation, or water resources engineering by using technical, communication and management skills.
CO805.2	Overseen the design and/or construction of a civil engineering project.
CO805.3	Registered as a professional engineer or developed a strong ability leading to professional licensure.
CO805.4	Demonstrated a commitment to continuing professional development by pursuing formal education in an advanced degree program or by maintaining technical currency through documented CPD activities.
CO805.5	Served in a leadership position in any professional or community organization, or local/state engineering board.
CO805.6	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

Department of Electronics Engineering

The Electronics Engineering program subscribes to the following Program Specific Outcomes (PSOS):

PSO1	Core and Design Competence- To comprehend the technological advancements in the design of circuits leading to higher education and research inclination with the ability to associate the high impact learning from the courses related to Nanotechnology , Signal processing, Image processing, Embedded Systems, VLSI, Robotics and MEMS to arrive at solutions to real world problems with great finesse.
PSO2	Career Prospects with Collaborative Endeavour- To appreciate an academic culture that ignites the spirit of excellence and passion by grafting the entrepreneurial paradigm onto the learning methodologies through projects with Government organizations inculcating the professional etiquettes, ownership, responsibility, accountability with impressive eloquence.
BE Electronics Engineering Seventh Semester	
	DSP Processor and Architecture (BEENE701T)
CO701.1	Understand the fundamentals of programmable Digital Signal Processors (P-DSPs).
CO701.2	Understand the architecture of TMS and Motorola processors.
CO701.3	Understand the assembly language instructions and write simple assembly language programs for different processors.
CO701.4	Write and execute the application programs for processing of real time signals.
CO701.5	Interface DSP processors hardware to a software Integrated Development Environment (IDE) for execution of programs written in high level language.
CO701.6	Implement different Digital Signal processing algorithms on DSP processors.
	Embedded System (BEENE702T)
CO702.1	To give sufficient background for understanding embedded systems design and describe the difference between the general computing system and embedded system.
CO702.2	Describe the hardware and software architecture of embedded system and different interrupt servicing mechanism.
CO702.3	Describe the architecture of ARM processor and its programming aspects and to give knowledge of RISC processor.
CO702.4	Describe the different communication protocols and buses required for an embedded system and to understand connections of various peripherals with microcontroller based system
CO702.5	Describe the real time operating system concepts and different scheduling algorithms.
CO702.6	Describe the detail contextual analysis of a limited number of events and their relationship through different case studies.
	Optical Fiber Communication (BEENE703T)
CO703.1	Understand the basic operating principles of physics, optical fiber communication system, optical fiber and its types.
CO703.2	Understand the mechanism of optical fiber drawing apparatus, optical fiber manufacturing methods, signal degradation in optical fibers

CO703.3	Classify various optical source materials, LED structures and LASER diodes. Splices and connectors
CO703.4	Learn the fiber optic receivers, their operation and performances.
CO703.5	understand the concept of analog and digital link,
CO703.6	Learn optical network SONET/SDH, WDM, high speed optical network Such as GPON, FTTX, and High speed optical links.
	Advance Digital System Design (BEENE704T)
CO704.1	Learn the VHDL development flow
CO704.2	Explore the basic language constructs of VHDL
CO704.3	Develop a formal test bench from informal system requirement
CO704.4	Design the FSM and ASM using VHDL
CO704.5	Understand the synthesis concepts in digital design
CO704.6	Learn the basics of the programmable logic devices
	Elective I-Digital Image Processing (BEENE705T)
CO705.1	Understand the fundamental of Digital image processing
CO705.2	Define image transforms and filtering
CO705.3	Understand the image compression techniques
CO705.4	Explore advanced topics of color image processing
CO705.5	Acquire the knowledge on segmentation methods
CO705.6	Analyse different restoration techniques
BE Electronics Engineering Eighth Semester	
	Micro-Electromechanical System (BEENE801T)
CO801.1	To understand Major classes, components, and applications of MEMS devices/systems and to demonstrate an understanding of the fundamental principles behind the operation of these devices/systems such as optical mems, bio mems, RF-mems.
CO801.2	To understand Standard micro fabrication techniques and the issues surrounding them such as bulk, surface LIGA and different etching methods.
CO801.3	To understand Major classes, components, and applications of MEMS devices/systems and to demonstrate an understanding of the fundamental principles behind the operation of these devices/systems like different types of sensors and transducers such as chemical sensor, molecule based bio-sensor, optical transducer, and thermal transducer.
CO801.4	To understand micro fabrication techniques and applications to the design and Manufacturing of an MEMS device or a Microsystems like RF MEMS devices such as capacitor, inductor, switches, and its actuation mechanism.
CO801.5	Describe different packaging methods for microelectronics and Microsystems.
CO801.6	Describe Microsystems technology and core architecture for digital media.
	Computer Communication Network (BEENE802T)
CO802.1	To learn the design issues of various layers and architecture of networks
CO802.2	Able to understand physical medias and switching concept
CO802.3	Study of data link protocols and characteristic of different methods
CO802.4	To understand various routing algorithms and data formats.
CO802.5	Explain majority of application along with their working principle ,advantages and disadvantages
CO802.6	study the concept to provide security and administration to the network

	CMOS VLSI Design (BEENE803T)
CO804.1	To be aware about the trend in semiconductor technology ,MOS transistor
CO803.2	To understand MOS (Metal Oxide Semiconductor) Transistor
CO803.3	To design Combinational Logic Circuits using CMOS logic
CO803.4	Analyze the switching characteristic and power dissipation of MOS inverter
CO803.5	Able to draw layout , stick diagram
CO803.6	Learn the fault coverage and design for testability
	Elective 2-Nanotechnology(BEENE804T)
CO804.1	Understand the fundamental of nanotechnology
CO804.2	Apply different tools for the measurements of nanotechnology
CO804.3	Apply specific methodology for fabrication of nano devices for specific application
CO804.4	Learn different nano materials and its applications
CO804.5	Understand nano electronics for advanced computation
CO804.6	Apply nanotechnology concepts in electronics engineering field
	Robotics And Automation (BEENE805T)
CO805.1	Will get overview of robot technology, sensory perception categories and Artificial intelligence (AI). Students will be able to compare human brain and computer, represent and solve problems in AI
CO805.2	Able to know and compare the different techniques used for knowledge representation. Also they will get idea about expert systems.
CO805.3	Will get idea about different techniques used for speech synthesis and speech recognition.
CO805.5	Will be able to find range of the object for the robot using different techniques. Also will get idea about robot operation using tactile sensing (touch).
CO805.6	Explore various robot programming language, their characteristics and comparison
	Data Compression And Encryption (BEENE805T)
CO805.1	Understand various text compression techniques and compare their performances.
CO805.2	Understand various audio compression techniques and audio coding formats
CO805.3	Understand various image and video compression techniques and image compression formats
CO805.4	Understand various types of attacks on secret messages and encryption measures to prevent the attacks.
CO805.5	Gain knowledge of various public key encryption techniques.
CO805.6	Gain knowledge of system security from intruders, viruses and worms

Department of Mechanical Engineering

The department of Mechanical Engineering has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

PSO1	Graduates will be able to apply technical skills and modern engineering tools to design and develop the mechanical systems.
PSO2	Graduates will be capable of developing Research Skills in utilization of unconventional Energy sources, IC engines and design.

BE Mechanical Engineering Third Semester	
	Applied Mathematics – III (BEME301T)
CO301.1	Apply Laplace Transform to solve ordinary differential equations, Integral equations and Integro-differential Equations.
CO301.2	Apply Fourier series in the analysis of periodic functions in terms sine and cosine encountered in engineering problems and Fourier Transform to solve integral equations.
CO301.3	Learn the concept of differentiating, integrating and expanding of analytic functions in complex numbers and their applications such as evaluation of integrals of complex functions
CO301.4	Solve partial differential equations of first order, higher order with constant coefficients and of second order using method of separation of variables.
CO301.5	Analyze real world scenarios to recognize when matrices are appropriate, formulate problems about the scenarios, creatively model these scenarios in order to solve the problems using multiple approaches.
	Manufacturing Processes (BEME302T)
CO302.1	Understand the importance of manufacturing processes, techniques of pattern making and moulding with their properties. Design gating system along with selection of different types of melting furnaces and special casting process.
CO302.2	Get acquainted with the basic concept of joining process, welding process and its types, defects and application.
CO302.3	Get acquainted with the forming process for metal, mechanics of forming process along with different types of rolling machine.
CO302.4	Understand and define press working process along with its classification, types and terminology, different types of dies and introduction to shaping operation.
CO302.5	Understand introduction to plastics, ceramics and glasses, its properties, application, forming and its shaping.
	Manufacturing Processes (BEME302P)
CO302.1	Think in core concept of their engineering application by studying various topics involved in branch specific applications.
CO302.2	Understand the relevance and importance of the Different manufacturing techniques and real life application in industry.
CO302.3	Design the gating and riser system needed for casting and requirements to achieve defect free casting.

CO302.4	Analyze the welding process behavior and requirements to achieve sound welded joint while welding different similar and dissimilar engineering material.
CO302.5	Understand the plastic, glass and ceramic Processing
	Engineering Thermodynamics (BEME303T)
CO303.1	Explain thermodynamics concepts, relate laws of the ideal gas, identify various thermodynamic processes and apply the laws to determine the energy transfer in terms of heat and work.
CO303.2	Explain the first law of thermodynamics and apply the law to evaluate open, closed systems, thermal components and devices.
CO303.3	Interpret the second law of thermodynamics, entropy, and apply the law to evaluate heat engine, heat pump, and refrigerator performance.
CO303.4	Relate various steam properties, and analyze the different types of processes using steam as working fluid to determine the energy transfer in terms of heat and work.
CO303.5	Compare various power cycles and analyze the cycles to determine the energy transfer in terms of heat, work and efficiency.
	Kinematics of Machines (BEME304T)
CO304.1	Perform kinematic and dynamic analysis (Displacement, Velocity, acceleration, Inertia forces) of a given mechanism using analytical and graphical method.
CO304.2	Understand the concept of compliant mechanisms.
CO304.3	Contrive or synthesize new mechanisms for specific requirements and Perform computeraided analysis of simple mechanisms.
CO304.4	Construct cam profiles and analyse the follower motion.
CO304.5	Understand Geometry of gear, its types, analysis of forces and motions of gear teeth. Study of gear trains and governors.
	Machine Drawing and Solid Modeling (BEME305T)
CO305.1	Interpret and describe basic elements of standard machine drawing like lines, dimensions, tolerances, symbols etc.
CO305.2	Create 2-D detailing, sectional views of machine elements from given isometric view.
CO305.3	Understand and apply concepts of GD&T for creating part and assembly drawing.
	Machine Drawing and Solid Modeling (BEME305P)
CO305.1	Create 2-D orthographic manual drawings as well as digital drawing using CAD software package of standard machine components
CO305.2	Apply standard practices for creation of 2-D orthographic manual drawings as well as digital drawing using CAD software package of assembly with
CO305.3	Create 3-D solid model and 2-D detailing of simple parts using CAD software package and perform 2-D detailing.
CO305.4	Create production drawing and process sheet for standard machine components.
CO305.5	Get hands on experience of reverse engineering process and concepts.

	Computer Applications/Programming (BEME306P)
CO306.1	Understand and explore concepts in basic programming like data types, input/output functions, operators, programming constructs and user defined functions.
CO306.2	Develop capabilities of writing „C“ programs in optimized, robust and reusable code.
CO306.3	Apply appropriate concepts of data structures like arrays, structures implement programs for various applications.
	Sports (BEME307P)
CO307.1	Through sports, students should be able to build a wide range of abilities and skills such as leadership, confidence, teamwork, patience, self-reliance, trust, and many more which facilitate the overall development of an individual.
CO307.2	Students should learn to manage time between their lectures, sports, and personal life.
	Yoga (BEME307P)
CO307.1	To introduce basic wellness principles and practices of Yoga to students.
CO307.2	To bring awareness of the fundamentals of Yoga for wellness in their daily lives.
CO307.3	To bring peace and harmony in the society at large by introducing the Yogic way of life.
	NSS (BEME307P)
CO307.1	1. Understand the community in which they work. 2. Understand themselves in relation to their community. 3. Identify the needs and problems of the community and involve them in problem-solving. 4. Develop among them a sense of social and civic responsibility. 5. Utilize their knowledge in finding practical solutions to individual and community problems. 6. Develop competence required for group-living and sharing of responsibilities. 7. Gain skills in mobilizing community participation. 8. Acquire leadership qualities and democratic attitudes 9. Develop capacity to meet emergencies and natural disasters. 10. Practice national integration and social harmony
	NCC (BEME307P)
CO306.1	During the training of NCC, candidates should get the basic military training. This training should be conducted to develop the interest of young students in all three forces; the army, the navy and the air force of India. Students should be able to check their abilities to join the Indian Defence Services.

BE Mechanical Engineering Fourth Semester	
	Machining Processes (BEME401T)
CO401.1	Understand fundamentals of metal cutting
CO401.2	Understand basic construction and operations of lathe shaping, planning
CO401.3	Understand basics of milling and milling cutters. slotting
CO401.4	To know about the surface finishing processes.
CO401.5	Understand the basic of drilling, boring, reaming and broaching.
	Fluid Mechanics & Hydraulic Machines (BEME402T)
CO402.1	Classify and explain fluid their properties, fluid in rest condition, types of flow & flow measuring devices and mathematical application of equations on hydraulic components.
CO402.2	Explain behavior of fluid in motion condition and application of Bernoulli's equation to fluid flow measuring devices.
CO402.3	Apply dimensional analysis to design hydraulic machines and different losses of fluid flow through pipes.
CO402.4	(i) classify different layout of hydro-electric power plant and (ii) analyze design characteristics of hydraulic machines i.e. turbines (impulse and reaction), Pelton turbine, Francis turbine, propeller turbine and Kaplan turbine
CO402.5	Explain the working principle & design of Centrifugal and reciprocating pump & practical application of similitude & model testing.
	Fluid Mechanics & Hydraulic Machines (BEME402P)
CO402.1	Explain what is Stability condition of floating bodies, Law of conservation of Energy.
CO402.2	Apply Frictional losses and Hydraulic co-efficient in the pipe flow.
CO402.3	Estimate the Performance characteristics of Pelton Turbine
CO402.4	Estimate the Performance characteristics of Francis Turbine & Kaplan Turbine.
CO402.5	Estimate the Performance characteristics of Centrifugal Pump & Reciprocating Pump.
	Material Science & Engineering (BEME403T)
CO403.1	Student will be capable to distinguish microstructure and analyze the effect of Crystalline nature of metals, construct and analyze Iron-Iron carbide equilibrium diagram.
CO403.2	Student will be able to study the commercial steels.
CO403.3	Student will be able to analyze and implement suitable heat treatment processes.
CO403.4	Student will be able to analyze the Cast Iron.
CO403.5	Student will be able to perceive the basics of powder Metallurgy for powder metallurgical

	Mechanics of Materials (BEME404T)
CO404.1	Demonstrate fundamental knowledge about various types of loading and stresses induced
CO404.2	Draw the SFD and BMD for different types of loads and support conditions.
CO404.3	Estimate the strain energy in mechanical elements. And analyse the deflection in beams.
CO404.4	Can design shaft for various loading conditions.
CO404.5	Understand theory of failure and effective designing of column and struct.
	Material Testing Lab (BEME404P)
CO404.1	Analyze the Microstructure and investigate various properties of ferrous and Non ferrous Materials . Analyse the stress strain behaviour of materials
CO404.2	Analyse the effect of tensile, shearing force and can utilized the gained while tackling real life engineering problems for different types of Materials
CO404.3	Understand Microstructures and their Applications for various uses
CO404.4	Measure torsional strength , hardness of material
CO404.5	Incorporate the various important concepts learnt while designing components
	Professional Ethics (BEME405T)
CO405.1	Understand basic purpose of profession, professional ethics and various moral and social
CO405.2	Analyze various moral issues and theories of moral development
CO405.3	Realize their roles of applying ethical principles at various professional levels
CO405.4	Identify their responsibilities for safety and risk benefit analysis.
CO405.5	Understand their roles in dealing various global issues
	Sports (BEME406P)
CO406.1	Through sports, students should able to build a wide range of abilities and skills such as leadership, confidence, teamwork, patience, self-reliance, trust, and many more which facilitate the overall development of an individual.
CO406.2	Students should learn to manage time between their lectures, sports, and personal life.
	Yoga (BEME406P)
CO406.1	To introduce basic wellness principles and practices of Yoga to students.
CO406.2	To bring awareness of the fundamentals of Yoga for wellness in their daily lives.
CO406.3	To bring peace and harmony in the society at large by introducing the Yogic way of life.

	NSS (BEME406P)
CO406.1	1. Understand the community in which they work. 2. Understand themselves in relation to their community. 3. Identify the needs and problems of the community and involve them in problem-solving. 4. Develop among them a sense of social and civic responsibility. 5. Utilize their knowledge in finding practice solutions to individual and community problems. 6. Develop competence required for group-living and sharing of responsibilities. 7. Gain skills in mobilizing community participation. 8. Acquire leadership qualities and democratic attitudes 9. Develop capacity to meet emergencies and natural disasters. 10. Practice national integration and social harmony
	NCC (BEME406P)
CO406.1	During the training of NCC, candidates should get the basic military training. This training should be conducted to develop the interest of young students in all three forces; the army, the navy and the air force of India. Students should be able to check their abilities to join the Indian Defence Services.
B.Tech. Mechanical Engineering Fifth Semester	
	Heat Transfer (BEME501T)
CO501.1	Students will be able to define and compare the different modes of heat transfer and calculation of thermal resistance and heat transfer through plane and composite wall, cylinder and sphere with and without thermal contact resistances.
CO501.2	Students will be able to apply the concept of internal heat generation for the calculation of heat transfer for plane wall, cylinder and sphere and also learn about various types of fins and their significance in steady state conduction heat transfer
CO501.3	Students will be able to select and apply appropriate empirical correlations to estimate forced convection and free convection heat transfer, for internal and external flows.
CO501.4	Students will be able to evaluate heat transfer rate by radiation from ideal and actual Surfaces and enclosures of different geometries.
CO501.5	Students will be able to evaluate heat exchanger performance for the given geometry and boundary conditions and design suitable heat exchanger geometry to deliver desired Heat transfer rate.
	Energy Conversion-I (BEME502T)
CO502.1	Explain, classify, analyze layout of power plant, cogeneration principle of steam generators (i.e. Boilers), boiler mountings & accessories and evaluate performance parameters of boiler.
CO502.2	Explain the concepts of fluidized bed boilers and various draught system and evaluate performance parameters of natural draught system (i.e. chimney)

CO502.3	Explain the importance of steam nozzle and determine its throat area, exit area, exit velocity. Also compare impulse and reaction steam turbines and explain the concept of governing of steam turbine
CO502.4	Explain the methods of compounding of steam turbine, various energy losses in steam turbine and able to draw velocity diagrams of steam turbine blades to analyze the angles of the blades, work done, thrust, power, efficiencies of turbine.
CO502.5	Explain, classify steam condensers, cooling towers and evaluate performance parameters of surface condenser.
	Design of Machine Elements –(BEME503T)
CO503.1	Apply principals of static loading for design of Cotter joint, Knuckle joint
CO503.2	Design bolted, welded joints, power screws & pressure vessels
CO503.3	Design the power transmission shaft & coupling
CO503.4	Design components subjected to fatigue or fluctuating stresses. Also, will be able to apply principles for determining bending stresses for desing of curved beams e.g. crane hook,
CO503.5	Design clutches, brakes and springs
	Industrial Economics & Management (BEME504T)
CO504.1	Understand the concept of demand and supply and its relationship with the price
CO504.2	Relate various factors of production with reference to different economic sectors
CO504.3	Analyze the causes and effects of inflation and understand the market structure
CO504.4	Acquire knowledge of various functions of management and marketing management
CO504.5	Perceive the concept of financial management for the growth of business
	Organizational Behaviour and Entrepreneurship Development – (BEME505T)
CO505.1	Understand the concept and importance of organizational behavior
CO505.2	Acquire the knowledge of interpersonal behaviour and transaction analysis
CO505.3	Know different traits and theories of personality
CO505.4	Acquire a know-how on entrepreneurship development and its ecosystem
CO505.5	Get the knowledge of various sources of finance

	Automobile Engineering -I (BEME505T) (OE –I)
CO505.1	Demonstrate the vehicle construction, chassis, fuel supply system, lubrication system and cooling system in automobile.
CO505.2	Illustrate the principle and working of Transmission system and clutch, gear box, rear axle drives, fluid flywheel, torque converter.
CO505.3	Identify the steering, suspension system and brake system.
CO505.4	Understand the applications of electrical/electronic system of automobile and wheels, tyres.
CO505.5	Explain the concept of electric vehicles, Hybrid vehicles, fuel cell vehicles and vehicle pollution norms. Appraise the automobile safety system and recent development in automobiles
BE Mechanical Engineering Sixth Semester	
	Automation In Production (BEME601T)
CO601.1	Get Acquainted With Automation, Its Type's, Strategies, Assembly Line Balancing And Its Analysis, Methods Of Work Part Transport
CO601.2	Recognize fundamentals and constructional features of N.C, CNC and D.N.C machines And prepare a CNC program for given part.
CO601.3	Get Acquainted With The Robotic Configuration, Types Of Links ,Joints , Grippers, Industrial Robotics And Robot Applications.
CO601.4	Cultivate Information About Automated Material Handling Systems, Automated Storage And Retrieval System(AGVS,AS/RS)Its Analysis
CO601.5	Get Acquainted With Automated Inspection (CAPP,CAQC,CMM) And Group Technology.
CO601.6	Recognize CAD/CAM, CIM, FMS, Understand The Concepts Of Shop Floor Control
	Energy Conversion-II (BEME602T)
CO602.1	Classify various types of I.C.Engines and explain the working of its various components And systems.
CO602.2	Analyze the effect of various operating variables on engine performance
CO602.3	Understand the working of Gas Turbine and Jet propulsion system
CO602.4	Analyze the vapour compression refrigeration system and psychometric process.
CO602.5	Understand the working of various types of compressors

	Dynamics of Machines – (BEME603T)
CO603.1	Comprehend the machine dynamics through basic principles to interpret their application and examine near to life problems due to gyroscopic effects and determine the conditions for stability of ships, airplanes and automobiles.
CO603.2	Analyze dynamic force conditions in planar linkages and cams to determine required driving torque condition (graphically/ analytically).
CO603.3	Estimate the unbalanced forces due to rotating and reciprocating masses in a mechanical system and calculate (graphically/ analytically) the balancing masses
CO603.4	Identify the requirement of flywheel, brakes, and dynamometers in a mechanical system and calculate inertia of flywheel and braking condition to be incorporated in engines and machines.
CO603.5	Recognize and interpret the concept of vibration in various mechanical systems and distinguish vibration characteristics for 1 & 2 DOF systems to evaluate the conditions for its control/ use.
	Mechanical Vibrations-(BEME604T) (Elective- I)
CO604.1	Establish mathematical model and determine natural frequencies of single and two DOF systems
CO604.2	Apply different methods to design vibration absorbers.
CO604.3	Understand vibrations in multi degree of freedom system and able to prepare vibration models
CO604.4	Analyse vibrations in continuous systems
CO604.5	Use finite element method in vibration analysis.
CO604.6	To measure and analyse vibrations using vibration monitoring devices
	Production Planning and Control - (BEME604T) (Elective- I)
CO604.1	Understand need of various functions in production planning and control for better management of manufacturing and/or service systems.
CO604.2	Use qualitative and quantitative forecasting techniques for short, medium, and long range forecasting.
CO604.3	Develop material requirements plans (MRP) as part of resource requirements planning systems.
CO604.4	Use heuristic decision rules to make lot-sizing decisions.
CO604.5	Develop capacity requirements plans as part of resource requirements planning systems.
	Power Plant Engineering-(BEME604T) (Elective- I)
CO604.1	Student will be able to understand the components, fuel and its associated terminologies and complete working of steam power plant. Also will be able to learn about advantages, drawbacks and environmental impact.

CO604.2	Students will get acquainted with working of Gas Turbine power plant and Diesel electric power plant, their comparison with other power plants and also Introduce to captive power plant.
CO604.3	Student will be able to understand the complete working of hydroelectric power plant ,its advantages and comparison with other power plants.
CO604.4	Student will be able to understand the importance of Nuclear power generation in India,working of various nuclear reactors and complete working of nuclear power plant, waste disposal and its impact on environment and also its comparison with other power plants.
CO604.5	Student will be able to understand the concept of combined power plant and gets acquainted with the emerging power generation technologies. Also will able to undertake the power load analysis and economic analysis of power generation system.
	Convective Heat Transfer-(BEME604T) (Elective- I)
CO604.1	Explain the fundamental and advanced principles of forced and natural convection heat
CO604.2	Apply the principles of natural convective to estimate the heat dissipation from external
CO604.3	Solve the problem of internal flow natural convection.
CO604.4	Relate to the current challenges and opportunities in the field of turbulent convective heat
CO604.5	Formulate and solve problems related to external wall flows and convection heat transfer.
	Tribology –(BEME605T) Elective-II
CO605.1	Select materials and lubricants to suggest a tribological solution to a particular situation.
CO605.2	Understand the concept of thermal equilibrium and heat balance
CO605.3	Apply the basic knowledge to design simple journal bearings
CO605.4	Design thrust and step bearings
CO605.5	Design and selection of antifriction bearings
	Advanced Manufacturing Techniques-(BEME605T) (Elective II)
CO605.1	Understand and compare the different Non-Traditional machining process with their need, economics and application as well as historical development. Understand the basics of High speed grinding, Hot and Cold machining.
CO605.2	Understand the basics of Abrasive Jet Machining (AJM), Ultrasonic Machining process and Water Jet Machining.
CO605.3	Get acquainted with the Electro-Chemical Machining, Electrochemical Grinding, Electric Discharge Machining. Get acquainted with the Electron Beam, Laser Beam and Plasma Arc Machining.

CO605.4	Know the basics of unconventional welding techniques and Solid Phase welding techniques.
CO605.5	Get acquainted with the basics of advance casting processes.
	CNC & Robotics –(BEME605T) (Elective-II)
CO605.1	Understand fundamentals of NC, CNC and DNC.
CO605.2	Understand basic drives and work holding devices used in CNC
CO605.3	Understand NC programming.
CO605.4	Understand history and classification of robots
CO605.5	Understand Robot end effectors, motion control, programming languages and Applications
	Advanced I.C. Engines– (BEME605T) -(Elective-II)
CO605.1	Understand basics of IC Engine, types of IC Engine, working cycle, cooling and lubrication system
CO605.2	Understand basic fuel, Alternate fuels and fuel supply system in IC engine
CO605.3	Understand combustion phenomenon in SI and CI engine.
CO605.4	Understand the various performance parameters of an engine, testing procedure and its analysis.
CO605.5	Illustrate emission norms its emission control for engine. Comprehend the different technological advances in engines.
BE Mechanical Engineering Seventh Semester	
	Industrial Engineering (BEME701T)
CO701.1	Define and recognize the concept of Productivity, Work study and Method study
CO701.2	Various techniques of work measurement and calculate the standard time
CO701.3	Human factor in engineering in the context of man machine system.
CO701.4	Types of plant layouts and know the principles of material handling.
CO701.5	The concept of value engineering and be aware of other productivity improvement techniques.
CO701.6	Various types of maintenance and the concept of reliability and maintainability.
	Automobile Engineering (BEME702T)
CO702.1	Student will be able to understand concept of Automobile Engineering and IC engine.
CO702.2	Student will be able to understand concept of clutches and requirement and operation of clutches.
CO702.3	Student will be able to understand concept of how transmission works and how it is designed also they will understand the concept of braking.
CO702.4	Student will be able to understand concept of and need of steering and suspension system in automobile and its futuristic design.
CO702.5	Student will be able to understand electrical system in automobile.
CO702.6	Student will be able to understand concept of advances in automobile purpose.

	Power Plant Engineering (BEME702T)
CO702.1	Students will be able to understand the Indian energy scenario and economics of power generation.
CO702.2	Students will be able to understand thermal power plant operations, analyze steam cycle and will have ability to understand combined power generation and its advantages.
CO702.3	Students will be able to understand basic combustion reactions, combustion equipment used in thermal power plant, component of steam generator, ash handling system, and cooling tower.
CO702.4	Students will be able to understand electricity production from hydro power plant, component of hydro power plant, types, site selection and advantages of hydro power plant over thermal power plant.
CO702.5	Students will be able to understand binding energy, fission reactions, components and types of nuclear and environment safety aspects.
CO702.6	Able to describe basic principle of gas turbine and diesel engine power plant and provides basic knowledge of non conventional power plant like solar, thermal, wind, and ocean.
	Computer Aided Design (BEME703T)
CO703.1	Students will be able to understand to develop a framework where the designers works with the computer to develop an engineering system and use of computer in design and drafting and use of algorithm to generate line, circle.
CO703.2	Students will be able to understand concept of computer graphics, windowing, clipping, viewport and analyze transformation routine of 2D and 3D.
CO703.3	Students will be able to understand and create 2D,3D,assembly modeling with the help of computer aided design software, student have knowledge of graphics standards, various types of geometric modeling and curves used in CAD application
CO703.4	Students will be able to understand and analyze the one dimensional finite element analysis and properties of stiffness matrix, assembly global stiffness matrix, and load matrix.
CO703.5	Students will be able to understand and analyze the two dimensional finite element analysis such as truss and CST
CO703.6	Students will be able to understand and analyze optimization in design by using Johnson's method of optimum design for simple machine elements like bar, shaft, beam.
	Energy Conversion - II (BEME704T)
CO704.1	Students will be able to understand the working principle of single and multistage reciprocating compressor, minimum work required to drive multistage compressor, applications and analyze the performance of reciprocating compressor.
CO704.2	Students will be able to understand the working principle of blowers, rotary compressors and analyze the performance of rotary compressors.
CO704.3	Students will be able to understand working principle of SI, CI, 2-S and 4-S Internal Combustion Engines, Combustion phenomenon, parameters affecting abnormal combustion, carburetion and fuel injection systems.
CO704.4	Students will be able to calculate the performance parameters, preparation of heat balance sheet and interpret the performance curves of Internal Combustion Engines.

CO704.5	Students will be able to analyze vapor compression refrigeration system, understand the working of VARS, air refrigeration systems, refrigerants, properties and nomenclature.
CO704.6	Students will be able to find the psychrometric properties of air, analyze the psychrometric processes and its application to condition the air.
	Design of Mechanical Drives (BEME705T)
CO705.1	Students will be able to understand Types of shaft coupling, Design of rigid coupling (Protective type), Bush pin type Flexible coupling, Flywheel rim and arms, Sliding and rolling contact bearings for various applications.
CO705.2	Students will be able to design Flat belt, V-belt, wire ropes, and chain drives for examples in practice.
CO705.3	Students will be able to design Spur, helical and bevel gears for industrial applications.
CO705.4	Students will be able to design worm and worm wheel and I.C. Engine parts like piston, cylinder, piston rings, cylinder head etc.
BE Mechanical Engineering Eighth Semester	
	Industrial Management (BEME801T)
CO801.1	Students will get knowledge about evolution of management thoughts and the principles of scientific management.
CO801.2	Students will understand the functions of personnel management and the related legislations.
CO801.3	Students will know the different types of production system and the concept of production planning and control.
CO801.4	Students will get knowledge about entrepreneurship, traits and competencies for the same and the factors affecting entrepreneurial growth.
CO801.5	Students will get knowledge about the steps involved in setting up a business.
CO801.6	Students will get overview of the marketing function and the various sources of finance.
	Computer Integrated Manufacturing (BEME802T2) (Elective II)
CO802.1	Students will acquaint with data bases related to CIM. Its evolution and basic concept, also students will cultivate understanding about automation and CIM.
CO802.2	Students will understand Computer Aided Manufacturing (CAM). The basic components, of NC Technology and operational features of NC, CNC and DNC.
CO802.3	Students will explore and trained to understand part families and generating part codes. They will also understand concept of cellular manufacturing and Group Technology.
CO802.4	Students will understand the concept of Flexible Manufacturing System, Its basic components and need. Further explore to basic components of FMS and types of layouts.
CO802.5	Students will understand the algorithm and relevance of Computer Aided Process Planning (CAPP). They will also understand the details of Manufacturing Planning.
CO802.6	Students will understand Manufacturing System Control, Computerized statistical process control, including Shop Floor Control. Further they will understand the concept of automated Inspection i.e. CMM.
	Refrigeration and Air Conditioning (BEME802T) (Elective – II)

CO802.1	Illustrate the basic concepts of vapor compression and vapor absorption refrigeration systems. Analyze the performance of vapor compression refrigeration system and interpret the usage of refrigerants.
CO802.2	Understand the components, controls and defrosting methods of vapor compression refrigeration system. Analyze the performance of multiple compressors and multiple evaporator refrigeration system.
CO802.3	Understand air refrigeration system and can perform the analysis. Understand the concepts of non-conventional refrigeration systems.
CO802.4	Understand the concept of cryogenics and its applications. Methods of liquefaction of air and its analysis.
CO802.5	Find the psychrometric properties of air; analyze the psychrometric processes and its application to condition the air. Understand the heat load calculations of an air conditioned space.
CO802.6	Understand the principle of air transmission and distribution. Different components used for distribution of conditioned air. Understand the analysis of duct design and use of air conditioning controls.
	Advance Internal Combustion (IC) Engine (BEME803T5) (Elective III)
CO803.1	Students will be able to differentiate between among different IC engine and will demonstrate the ability to perform a thermodynamic analysis of Otto, Diesel and Dual cycle models.
CO803.2	Students will be able to understand the basic components of IC engine and role of lubrication and cooling in reducing friction and wear. Students will be able to understand the characteristics of different fuels. Students will be able to understand/demonstrate fuel supply management in SI and CI engine.
CO803.3	Students will be able to understand combustion phenomenon and combustion chambers in SI engine. Students will be able to understand ignition systems used in SI engine.
CO803.4	Students will be able to understand combustion and combustion chambers design of CI engine and the types and applications of supercharging/turbo charging.
CO803.5	Students will be able to understand the generation of undesirable exhaust emissions and methods used to reduce them.
CO803.6	Students will demonstrate the ability to analyze engine performance through various practical problems.
	Advanced Manufacturing Techniques (BEME803T) (Elective-III)
CO803.1	In this unit is designed to provide students with an overview of a wide variety of nontraditional machining process for processing of Engineering Materials.
CO803.2	Student will learn principles operations capability process parameters economics and applications of various mechanical machining processes and parameters which will control or affect the mechanical machining processes.
CO803.3	In this unit student will learn principles, operation, capabilities, process parameter, economics and applications of electrochemical machining and thermal machining.
CO803.4	In this unit student will learn various unconventional welding techniques, control parameter of all unconventional welding techniques factors govern the process.
CO803.5	In this unit is designed to understand the solid phase welding techniques such as ultrasonic friction welding with recent developments and economics and application of nontraditional process for welding.

CO803.6	In this unit student will understand the advanced casting processes such as metal casting continuous squeeze / Centrifugal and ceramic shell casting on completion of this unit student Shall understand the importance of advance advanced casting process for unconventional foreign conventional machining and be able and will be able to select and apply suitable process for an Engineering Product.
	Renewable Energy Systems (BEME803T3) (Elective III)
CO803.1	Students will be able to understand spectral distribution of solar radiation, solar radiation geometry and its measurement.
CO803.2	Students will be able to understand solar flat plate collector and its performance.
CO803.3	Students will be able to understand concentrating collector and application of solar energy.
CO803.4	Students will be able to understand biomass, biogas, its generation and application.
CO803.5	Students will be able to understand wind energy, ocean energy, tidal energy its generation and application.
CO803.6	Students will be able to understand geothermal energy, magneto hydrodynamic generation.
	Automation in Production (BEME804T)
CO804.1	Students will be able to understand arguments for and against automation, Types of production, Automation principles and strategies. Workpart transfer mechanisms, buffer storage, and analysis of flow line: general terminology and analysis of transfer line without storage and with buffer storage. Line balancing and related problems, Part delivery system.
CO804.2	Types of NC system, Machine control unit, tape and tape readers. DNC, CNC, Adaptive control and their applications. APT (computer assisted part programming) NC Part programming and should able to make part programmes.
CO804.3	Robot anatomy, work volume, joint notation system, robot control system. Characteristics of robot, robot programming, End effectors. Accuracy, repeatability of robot and Robot applications, work cell layout use of robots in material handling, processing, assembly and inspection.
CO804.4	Automated material handling and storage-conveyor system Types of conveyors, Automated guided vehicle system, vehicle guidance technology, Analysis of AGVs and their applications to practical examples.
CO804.5	Automated Inspection, sensor technology, radio frequency identification, Coordinate measuring machine, machine vision, image acquisition, digitization, image processing, analysis and interpretation. Concepts of Group Technology, production flow analysis.
CO804.6	Computer aided manufacturing, Flexible manufacturing system, Computer aided process planning (CAPP) and their types e.g. Retrieval and generative. Basics of CIM.
	Energy Conversion – III (BEME805T)
CO805.1	Students will be able to understand the basics, components, working principle, classification, applications of a gas turbine power plant and its analysis.
CO805.2	Students will be able to understand the basics and analysis of jet propulsion systems; components and different types of nuclear power plant.
CO805.3	Students will be able to understand the importance of renewable energy sources, solar energy collection systems, and wind energy conversion system.
CO805.4	Students will be able to understand the role of energy conservation and its management in an industry; methods, procedure and instruments to conduct an energy audit.

CO805.5	Students will be able to understand basic structure, working principle, various controlling components of hydraulic systems and industrial hydraulic circuits.
CO805.6	Students will be able to understand basic structure, working principle, components of pneumatic systems, formation of different pneumatic circuits.

Department of Electronics and Communication Engineering

The department of ECE Engineering has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

PSO1	Apply the basic knowledge acquired in Electronic Devices and Circuits, Electromagnetic fields, signal processing, communication engineering, VLSI circuits and Embedded Systems to provide efficient solutions to engineering problems.
PSO2	Should acquire the skills to communicate and document the ideas with necessary road maps and demonstrating the practices of professional ethics for societal and environmental wellbeing.

BE Electronics and Communication Engineering Third Semester	
	Applied Mathematics III (BEETC301T)
CO301.1	Apply Laplace Transform to solve ordinary differential equations, Integral equations and Integro-differential Equations.
CO301.2	Apply Fourier series in the analysis of periodic functions in terms sine and cosine encountered in engineering problems and Fourier Transform to solve integral equations.
CO301.3	Learn the concept of differentiating, integrating and expanding of analytic functions in complex numbers and their applications such as evaluation of <u>integrals of complex</u>
CO301.4	Solve partial differential equations of first order, higher order with constant coefficients and of second order using method of separation of variables
CO301.5	Analyze real world scenarios to recognize when matrices are appropriate, formulate problems about the scenarios, creatively model these scenarios in order to solve the problems using multiple approaches.
CO301.6	Understand the impact of scientific and engineering solutions in a global and societal context.
CO301.7	Create the groundwork for post-graduate courses, specialized study, and <u>research in mathematics</u> .
	Components for Electronics Circuit Design (BEETC302T)
CO302.1	Understand the principles of semiconductor physics
CO302.2	Understand the principles of semiconductor diode.
CO302.3	Understand and analyze the mathematical model of transistors.
CO302.4	Understand and analyze the mathematical model of unipolar transistors
CO302.5	Understand the process of Integrated Circuit Fabrication.
	Components for Electronics Circuit Design Lab (BEETC302P)
CO302.1	Explain the basic concepts of different semiconductor components.
CO302.2	Understand the use of semiconductor devices in different electronic circuits.
CO302.3	Calculate different performance parameters of transistors.

CO302.4	Plot and study the characteristics of semiconductor devices
	Digital System Design (BEETC303T)
CO303.1	Demonstrate the knowledge of: Logic gates, Boolean algebra including algebraic manipulation/simplification and Application of DeMorgan's Theorem, Karnaugh map reduction.
CO303.2	Construct basic combinational circuits and verify their functionalities.
CO303.3	Illustrate and apply the knowledge of different flip flops to build sequential digital circuits.
CO303.4	Apply the fundamental knowledge about digital electronics so as to construct and analyze digital circuits like counters and sequence generators.
CO303.5	Demonstrate and apply programming proficiency using the various addressing modes and instructions of the target microprocessor.
	Digital System Design Lab (BEETC303P)
CO303.1	Demonstrate the different Boolean Laws & basics of K-map to realize combinational & sequential circuits. method.
CO303.2	Identify the various digital ICs & understand their operation.
CO303.3	Describe the operation & timing constraints for latches, registers, different sequential circuits.
CO303.4	Solve basic binary math operations using microprocessor & explain the internal architecture & its operation within the area of manufacturing & performance.
CO303.5	Select programming strategies & proper mnemonics & run their program on the training boards.
	Network Theory (BEETC304T)
CO304.1	Apply mesh and node voltage method to model and analyze electrical circuits.
CO304.2	Apply network theorems for the analysis of networks.
CO304.3	Obtain the transient and steady-state response of electrical circuits
CO304.4	Synthesize waveforms and apply Laplace transforms to analyze networks.
CO304.5	Evaluate different Network Functions and Analyze two port network
	Signal & Systems (BEETC305T)
CO305.1	Classify different types of signals and systems.
CO305.2	Illustrate the concept of Linear Time Invariant (LTI) system and its properties.
CO305.3	Analyze continuous time periodic and aperiodic signals.
CO305.4	Analyze continuous time systems using Laplace Transform.
CO305.5	Analyze DT signals and systems in frequency domain using Fourier Transform.
	Measurements and Instrumentation (BEETC306T)

CO306.1	Select and use precise/accurate instrument for measurement of various electrical Parameters and to understand its technical specifications.
CO306.2	Identify and minimize errors in electrical/electronic measurement.
CO306.3	Understand analog and digital measurement.
CO306.4	Measure power and frequency with the help of function generators and different analyzers.
CO306.5	Understand modern trends in telemetry systems.
	Object oriented programming and data structure (BEETC307P)
CO307.1	Explain the Basic Concepts of Different Semiconductor Components with Their Usage Physically As Per Their Types
CO307.2	Use Semiconductor Devices in Different Electronic Circuits and Projects.
CO307.3	Calculate Different Performance Parameters of Active and Passive Devices and their Datasheets.
CO307.4	Plot and Study the Characteristics of Semiconductor Devices.
BE Electronics and Communication Engineering Fourth Semester	
	Microcontroller and Applications (BEETC401T)
CO401.1	Demonstrate the programming model of various microcontrollers.
CO401.2	Design and implement 8051 microcontroller-based systems for various applications.
CO401.3	Illustrate & program AVR / RISC microcontrollers in Integrated Development environment.
CO401.4	Design and implement advanced processor/controllers-based systems for various applications.
CO401.5	Design and develop Arduino based embedded system applications.
	Microcontroller and Applications Lab (BEETC401P)
CO401.1	Demonstrate the concept of Assembly languages and higher level language programming.
CO401.2	Interface various peripherals with 8051,Atmega 32, MSP 430 and Arduino.
CO401.3	Simulate the programs on different software platforms.
	Analog and Digital Communication (BEETC402T)
CO402.1	Demonstrate a basic need of modulation and various types of amplitude and angle modulation techniques required for analog communication.
CO402.2	Understand working principles, symbols and characteristics of power devices and its application in electronic circuit
CO402.3	Explain the designing of digital communication systems by applying knowledge of the various pulse modulation techniques.
CO402.4	Describe various digital modulation techniques and various parameters associated withit.
CO402.5	Identify different types of channel coding techniques and analyze the different spread spectrum methods.
	Analog and Digital Electronics Lab (BEETC403P)

CO403.1	Explain the practical aspects of linear and non-linear applications of OP-AMP.
CO403.2	Design the various wave-shaping circuits, oscillators, signal conditioners and various application based circuits using OP-AMP and Transistors.
CO403.3	Demonstrate various concepts of analog communication.
CO403.4	Explain various concepts of digital communication.
CO403.5	Develop an application based project using industry based OPAMP.
	Analog System Design (BEETC404T)
CO404.1	Describe and explain the basic concepts of OPAMP.
CO404.2	Demonstrate and analyze various linear applications of OPAMP.
CO404.3	Demonstrate and analyze various non-linear applications of OPAMP
CO404.4	Examine and design DC Power Supply.
CO403.5	Examine and design various types of oscillators and filters.
	Data Structure and Algorithms (BEETC405T)
CO405.1	Student will be able to choose appropriate data structure based on the specified problem definition and analysis the algorithm.
CO405.2	Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures
CO405.3	Students will be able to apply concepts learned in various domains like Operating Systems, DBMS etc.
CO405.4	Students will be able to use linear and non-linear data structures like stacks, queues, linked list, trees etc.
	Numerical Mathematics and Probability using MATLAB (BEETC406T)
CO406.1	Learn and use MATLAB effectively in various applications as a simulation tool.
CO406.2	Find an approximate solution of algebraic and transcendental equations, system of linear equations and first order ordinary differential equations by various numerical methods and MATLAB commands.
CO406.3	Apply Z- transform to solve difference equations with constant coefficients.
CO406.4	Analyze real world scenarios to recognize when probability is appropriate, formulate problems about the scenarios; creatively model these in order to solve the problems using multiple approaches.
CO406.5	Understand the impact of scientific and engineering solutions in a global and societal context.
CO406.6	Create the groundwork for post-graduate courses, specialized study, and research in mathematics.
	Programming for Problem Solving (BEETC407T)
CO407.1	Student will be able to understand the basic concepts of Object Oriented Programming and design simple java programs.

CO407.2	Student will be able to apply the knowledge of Inheritance in program development.
CO407.3	Student will able to develop programs using polymorphism and interfaces.
CO407.4	Student will be able to handle various exceptions using concepts of exception handling.
CO407.5	Student will able to use multithreading concepts to develop inter process communication.
CO407.6	Student will be able to understand and implement concepts on file streams and operations in java programming for a given application programs.
	Programming for Problem Solving Lab (BEETC407P)
CO407.1	Able to choose appropriate data structure based on the specified problem definition and analysis the algorithm.
CO407.2	Able to handle operations like searching, insertion, deletion and traversing mechanism etc. on various data structures.
CO407.3	Apply the knowledge of Inheritance in program development.
CO407.4	Develop programs using polymorphism and interfaces.
CO407.5	Handle various exceptions using concepts of exception handling.
	Universal Human Values (BEETC408T)
CO408.1	Students are expected to become more aware of themselves, <u>and their surroundings (family, society, nature)</u>
CO408.2	Students would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO408.3	Students would understand values in relationship.
CO408.4	Students would understand the role of a human being in ensuring harmony in society and nature.
CO405.5	Students would distinguish between ethical and unethical practices at work place and would contribute for making a value based society.
	BE Electronics and Communication Engineering Fifth Semester
	Embedded System Design (BEETC -501T)
CO501.1	To Describe and analyse the Requirements & Design issues of embedded systems design.
CO501.2	To apply the knowledge of architecture and Programming of for development of
CO501.3	To Describe and Demonstrate the interfacing of various peripherals with ARM Processor.
CO501.4	To explain the concept of Real Time Operating System for embedded system design.
	Electromagnetic Wave (BEETC -502T)
CO502.1	Understand the different coordinate system & analyze theorem's of electric Field.
CO502.2	Understand magnetic fields, Apply the Maxwell's equations to solve problems in electromagnetic field theory.

CO502.3	Analyze the propagation of wave in different transmission media.
CO502.4	Understand and analyze various parameters and characteristics of the rectangular waveguide.
CO502.5	Understand principle of radiation and radiation characteristics of an antenna.
	Digital Signal Processing (BEETC -503T)
CO503.1	Analyze discrete time signals and system.
CO503.2	Process the signal in z domain for various discrete time systems.
CO503.3	Draw the structures of various discrete time systems in DFI, DFII, cascade and parallel form.
CO503.4	Apply discrete Fourier transform, its properties & Analyze the discrete time systems in frequency domain.
CO502.5	Understand the filter design techniques for IIR and FIR digital filters and will be able to determine parameters affecting its response.
	HSC: IEED(Economics) (BEETC -504T)
CO504.1	Understand different types of business structure.
CO504.2	Acquire the knowledge of different market structures and New economic policy
CO504.3	Grasp the functions of banks, taxations system and implications of Inflation.
CO504.4	Identify various sources of finance
CO504.5	Analyse the problems of Small Scale Industries and government's policies for them.
	PEC-I Operating system (BEETC -505PE) (Elective-I)
CO505T.1	Explain basic concepts of operating system
CO505T.2	Understand the process management policies and scheduling algorithms
CO505T.3	Design various memory management techniques
CO505T.4	Analyze process synchronization techniques.
CO505T.5	Evaluate deadlock detection and prevention mechanism
	PEC-I Sensors and Systems (BEETC -505PE) (Elective-I)
CO505T.1	Explain fundamental physical and technical base of sensors and actuators.
CO505T.2	Describe basic laws and phenomena that define behaviour of sensors and actuators.
CO505T.3	Analyze various approaches, procedures and results related to sensors and actuators.
CO505T.4	Create analytical design and development solutions for sensors and actuators.
CO505T.5	Interpret the acquired data and measured results

	PEC-I Theory and Error Correcting Codes(BEETC -505PE) (Elective-I)
CO505T.1	Interpret and summarize the role of information theory and linear algebra in source coding and channel coding
CO505T.2	Make use of various error control encoding and decoding techniques
CO505T.3	Implement various error control techniques
CO505T.4	Analyze the performance of error control codes.
CO505T.5	Implement various error control techniques
	PEC-I Electronic Design Techniques with HDL(BEETC -505PE) (Elective-I)
CO505T.1	Design digital systems through HDL language
CO505T.2	Simulate, synthesise, and implement HDL code
CO505T.3	Implement code on FPGA/CPLD
BE Electronics and Communication Engineering Sixth Semester	
	Computer Communication Network (BEETC -601T)
CO601.1	Describe the basics of Computer Network, Data Communication, Network topologies, transmission media and switching techniques.
CO601.2	Analyze the services and features of various protocols of Data Link Layer and MAC sub-layer.
CO601.3	Apply the concept of IP Addressing techniques and its various protocols of Network Layer.
CO601.4	Describe the transport layer, Application Layer services and its protocol Headers and analyze the congestion control protocols.
CO601.5	Explain the function of Application Layer and Presentation layer paradigm and protocols.
	Internet of Things (IOT) (BEETC -602T)
CO602.1	Analyze different design levels of IoT
CO602.2	Analyse IOT Architecture
CO602.3	Understand network and communication aspects
CO602.4	Design a portable IoT using Rasperry Pi and Aurdino
CO602.5	Analyze applications of IoT in real time scenarioλ
	Wireless Sensor Network (BEETC -603T)
CO603.1	Demonstrate advanced knowledge and understanding of the engineering principle of sensor design, signal processing, established digital communications techniques, embedded hardware and software, sensor network architecture, sensor networking principles and protocols.

CO603.2	Demonstrate a computing science approach, in terms of software techniques, for wireless sensor networking with emphasis on tiny sensors, sensor specific programming languages, RFID technology, embedded architectures, software program design and associated hardware, data fusion.
CO603.3	Demonstrate knowledge of the associated business, legislative, safety and commercial issues; future technological advances and the way these will impact on the engineering product enterprise process.
	PEC-II Computer Architecture(BEETC -604PE) (Elective-II)
CO604.1	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os.
CO604.2	To develop logic for assembly language programming using arithmetic and logical operations.
CO604.3	Distinguish the organization of various parts of a system memory hierarchy
CO604.4	Describe fundamentals concepts of pipeline and vector processing.
CO604.5	Analyze the performance of commercially available computers.
	PEC-II Data Base Management System(BEETC -604PE) (Elective-II)
CO604.1	Understands basic database concepts and data modeling techniques used in data base design
CO604.2	Study the concept of functional dependency and perform the calculus with design database by using different normalization techniques
CO604.3	Study query processing and perform optimization on query processing
CO604.4	Understand the concept of transaction processing and different recovery techniques used in RDBMS
CO604.5	Study and Implement advanced database which are used in real time system
	PEC-II Control System Engineering(BEETC -604PE) (Elective-II)
CO604.1	Understand the basic linear feedback principles and find out the transfer function using various methods.
CO604.2	Sketch the root locus and determine the location of the closed loop poles.
CO604.3	Analysis of Time response
CO604.4	Understand the different types of controller
CO604.5	Analysis of State space model
	PEC-II Antenna and Wave Propagation (BEETC -604PE) (Elective-II)
CO604.1	Describe transmission line characteristics.
CO604.2	Calculate antenna parameters (radiation pattern, beam width, lobes, directivity, gain, impedance, efficiency, polarization)
CO604.3	Analyze wire antennas (monopoles, dipoles, and loops).
CO604.4	Analyze and design antenna arrays.

CO604.5	Describe the operation of broadband and traveling wave antennas.
	OE-I Consumer Electronics(BEETC -605OE) (Open Elective-I)
CO605.1	Describe various audio gadgets used in domestic and commercial applications
CO605.2	Describe various video gadgets used in domestic and commercial applications
CO605.3	Explain satellite communication technology along with DTH for day to day application
CO605.4	Describe various types of home appliances used in domestic life like washing machine, oven RO plant, Mixer, grinder, vaccume cleaner etc
CO605.5	Understand various types of home appliances used in domestic life like printers, food processors, Induction devices, scanner and fax machines etc.
	HSC: Effective Technical Communication (BEETC -606T)
CO606.1	Acquire knowledge of structure of language.
CO606.2	Build vocabulary and face interview process and can become employable.
CO606.3	Develop business writing skills.
CO606.4	Understand technical and scientific writing skills
BE Electronics and Communication Engineering Seventh Semester	
	DSP Processor and Architecture (BEECE701T)
CO701.1	Understand the fundamentals of programmable Digital Signal Processors (P-DSPs).
CO701.2	Understand the architecture of TMS and Motorola processors.
CO701.3	Understand the assembly language instructions and write simple assembly language programs for different processors.
CO701.4	Write and execute the application programs for processing of real time signals.
CO701.5	Interface DSP processors hardware to a software Integrated Development Environment (IDE) for execution of programs written in high level language.
CO701.6	Implement different Digital Signal processing algorithms on DSP processors.
	DSP Processor and Architecture (BEECE701P)
CO701.1	Understand the architecture of TMS and Motorola Processors.
CO701.2	Implement different processing algorithms on DSP processors.
CO701.3	Design different types of filters and study their characteristics.
	Television and Video Engineering (BEECE702T)
CO702.1	Analyze and understand monochrome and color T.V. Systems.
CO702.2	Understand fundamental techniques of different color T.V. standards.
CO702.3	Understand Advance TV Technology – Digital T.V. and Video Compression techniques.
CO702.4	Understand HDTV standards and Digital TV systems – CCTV, CATV, and DTH.
CO702.5	Understand IPTV system, mobile TV and video transmission in 3G mobile system, video recording systems and video projectors.

CO702.6	Understand different types of digital cameras, LED and LCD display systems CD/DVD players.
	Television and Video Engineering (BEECE702P)
CO702.1	Analyze and synthesize TV Pictures, Composite Video Signal, and TV Receiver Picture Tubes.
CO702.2	Develop an understanding of electronics, mechanical and environmental factors involved in maintaining television equipment.
CO702.3	Study and classify the concept of troubleshoot and repair.
	Optical communication (BEECE703T)
CO703.1	Able to understand the basic operating principles of physics, optical fiber, and its types, transmission characteristics of optical fibers.
CO703.2	Able to understand the transmission characteristics of optical fibers.
CO703.3	Able to learn the optical receiver fiber couplers and connectors
CO703.4	Able to learn the optical source and detectors, optical receiver
CO703.5	Able to understand the concept of analog and digital link, WDM concept and components
CO703.6	Able to learn optical network SONET/SDH, WDM, high speed optical network
	Such as GPON, FTTX, and High speed optical links.
	Advanced Digital System Design (BEETE704T)
CO704.1	Understand the development flow of VLSI system.
CO704.2	Design the combinational and sequential circuit using VHDL. Understand the HDL.
CO704.3	Test the system with test benches
CO704.4	Design finite state machines and asynchronous state machine.
CO704.5	Understand the synthesis process.
CO704.6	Understand the architecture of programmable logic devices and its working.
	Advanced Digital System Design (BEETE704P)
CO704.1	To model, simulate and verify the digital model with hardware description language.
CO704.2	To design and prototype with programmable logic devices.
CO704.3	To learn the modular design style to create large digital logic.
	VLSI Signal Processing (BEECE705T) Elective –II
CO705.1	Various methodologies to optimize power delay and area of VLSI design.
CO705.2	Transformation techniques used to generalize pipelining approach.
CO705.3	Transformation techniques used to design parallel architectures.
CO705.4	Build Real Time processing systems for area reduction.
CO705.5	Design of algorithm structure for DSP algorithms based on algorithm transformation.
CO705.6	Design of fast short length convolution algorithms.
BE Electronics and Communication Engineering Eighth Semester	
	Microwave and Radar Engineering (BEECE801T)
CO801.1	Understand the use of active and passive microwave devices.
CO801.2	Analyze Different UHF components with the help of scattering parameter.
CO801.3	Understand and analyze different O-type and M-type microwave components: Klystrons, Magnetrons and TWT etc.

CO801.4	Understand the working of Solid State Microwave Devices like PIN diode, Gunn diode, IMPATT, TRAPATT diodes, parametric amplifier etc.
CO801.5	Acquire technical competence in specialized areas of Radar engineering.
CO801.6	Able to identify, formulate and model problems and find Radar engineering solutions based on a system approach.
	Microwave and Radar Engineering (BEECE801P)
CO801.1	Describe working of microwave bench.
CO801.2	Measure power and VSWR of microwave component.
CO801.3	Measure different losses like insertion loss, isolation loss of different passive microwave components.
	Computer Communication Network (BEECE802T)
CO802.1	Understand the requirement of theoretical and practical aspect of computer network. Students will be able to define and describe the services and features of the various layers of data network.
CO802.2	Understand the network traffic in computer network.
CO802.3	Describe various protocols used in network.
CO802.4	Describe the concept of computer network security.
CO802.5	Understand the different wired and wireless LAN Standards. and Routers.
CO802.6	Understand the Basics of Security Requirements/Services/Dimensions, Security attacks , Basics of Security mechanisms
	Computer Communication Network (BEECE802P)
CO802.1	Understand various types of protocols working on various layers of OSI reference model
CO802.2	Establish peer to peer computers as well as Local Area Network connectivity
CO802.3	Effectively use available networking tools like NS2 in Computer Communication Network in UNIX environment
	Wireless and Mobile Communication (BEECE803T)
CO803.1	Describe the evolution and history of wireless technology and improving capacity in cellular system.
CO803.2	Understand mobile radio environment, causes and effects of path loss and signal fading on received signal characteristics.
CO803.3	Define fundamentals of Equalization, Diversity and channel coding.
CO803.4	To construct and analyze the GSM system.
CO803.5	Understand difference between wireless and fixed telephone networks and fundamentals of various wireless protocols.
CO803.6	Understand difference between wired LAN and wireless LAN technology and describe IEEE802.11 wireless LAN architecture.
	Embedded System (BEECE804T) Elective - II
CO804.1	To understand embedded systems design and describe the difference between the general computing and embedded system, optimization and design metrics, its Applications and recent trends.
CO804.2	Describe the hardware and software architecture of embedded system, memory architecture and interrupt service mechanism.
CO804.3	Understand the concepts of RISC, CISC processors, ARM processor organization, programming modes, operating modes and programming methods along with detailed instruction set.

CO804.4	Describe the different communication protocols and buses required for an embedded system like IEEE802.11, IEEE802.16, GPRS MODBUS CAN, I2C and USB.
CO804.5	Understand the concepts of Real time operating system, Kernel architecture, different scheduling algorithms and Memory management.
CO804.6	Describe the detail contextual analysis as a case study in different fields like Communication, Automation, security, Automobile.
	Digital Image Processing (BEECE804T) Elective – II
CO804.1	Learn and understand the fundamental of digital image processing
CO804.2	To learn and understand various image enhancement technique used in digital image processing
CO804.3	To learn and understand various image transform used in digital image processing
CO804.4	To learn and understand various image coding and compression used in digital image processing
CO804.5	To learn and understand various image analysis and segmentation used in digital image processing
CO804.6	To learn and understand various image restoration technique and methods used in digital image processing
	Satellite Communication (BEECE805T) Elective –III
CO806.1	To understand the basic concepts and working principle of satellite communication system
CO806.2	To understand the orbital aspects and components of a satellite communication system.
CO806.3	To analyze the link budget of a satellite communication system and study of satellite orbits and launching Mechanism
CO806.4	To understand the Propagation effects and Signal attenuation
CO806.5	To understand the concept and basics of Encoding and decoding on satellite links
CO806.6	To get knowledge and relate different components in satellite communication and use them in projects.
	CMOS VLSI Design (BEECE805T) Elective –III
CO805.1	Design of PMOS and NMOS transistor.
CO805.2	Various types of CMOS Inverters.
CO805.3	Implementation of different combinational logic circuits.
CO805.4	Characterization and Performance estimation for CMOS transistor.
CO805.5	To design layout for various circuits.
CO805.6	To Detect and correct errors in VLSI Design.

Department of Computer Technology

The department of Computer Technology has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

PSO1	Graduates should be able to demonstrate the understanding of the conceptual foundation in the core area of theoretical computer science.
PSO2	Graduates should be able to develop and manage complex application and system software.

PSO3	Graduates should be able to adapt current and new developments in the field of computer technology.
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B.Tech. Computer Technology Third Semester	
	Mathematics-III (BECT301T)
CO301.1	Understand the basics of Laplace, Fourier and Z-transforms and apply them for solving differential equations, integral equations and difference equations.
CO301.2	Analyze real world scenarios to recognize when matrices and probability are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches.
CO301.3	Organize, manage and present data in a clear and concise manner.
CO301.4	Develop an ability to identify, formulate, and/or solve real world problems.
CO301.5	Understand the impact of scientific and engineering solutions in a global and societal context.
CO301.6	Create the groundwork for post-graduate courses, specialized study. and research in computational mathematics.
	Problem Solving using Python (BECT302T)
CO302.1	Understand and implement the basic concept of python programming language.
CO302.2	Develop Code and test conditional statement of moderate size using the python language.
CO302.3	Implement the concept of Function and modules in programming language
CO302.4	Understand and Implement the concept of object oriented programming in python programming language.
CO302.5	Know and demonstrate the working of files for good program design using python language.
	Digital Design and Fundamentals of Microprocessor(BECT303T)
CO303.1	Describe and compare various number systems, inter conversion of number systems, obtain and uptimes Boolean equations for variety of problems.
CO303.2	Describe, design various combinational circuits such as Code Converters, Comparators. Multiplexers, Demultiplexer, Encoder, Decoder, Adders, etc. and analyses their performance.
CO303.3	Describe, design various sequential circuits such as Latches, Flip flops, counters, registers, and analyses their performance.
CO303.4	To explain architectural components of a microprocessor 8085, issues involved memory related operations, intricacies of execution of various instructions.
CO303.5	To explain various 8085 instructions, addressing modes, interrupt mechanism and their application to develop 8085 programs.
	Computer Architecture and Organization (BECT304T)
CO304.1	Explain and illustrate basic functional units, operational concepts of a computer system and apply assembly language programming.

CO304.2	Illustrate various instruction formats and interpret execution of complete instruction in the processing unit, control unit and sequencing.
CO304.3	Analyze and apply logic circuits for implementing arithmetic operation.
CO304.4	Compare and analyze various memory system including semiconductors, ROM, RAM. Cache and virtual memory
CO304.5	Explain computer peripherals, classify advance processor and Processors Families system.
	Theoretical Foundation of Computer Science (BECT305T)
CO204.1	Classify and design finite automata without output and with output to recognize regular languages.
CO204.2	Compare and contrast regular grammar and context free grammar.
CO204.3	Understand and design push down automata to recognize context free languages.
CO204.4	Discriminate linear bounded automata and turing machine and design it to recognize unrestricted languages.
CO204.5	Understand the basic concepts of Computability, Decidability, Solvability, Post
	Universal Human Values (BECT306T)
CO306.1	Students are expected to become more aware of themselves. and their surroundings (family. society, nature).
CO306.2	Students would become more responsible in life. and in handling problems with sustainable solutions. while keeping human relationships and bwnannah1re in mind.
CO306.3	They would have better critical ability.
CO306.4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	Consumer Affairs (BECT308T)
CO306.1	Understand the basic concept and importance of Consumer Education.
CO306.2	Grasp the concepts related to Consumer Education and Protection.
CO306.3	Analyze the regulations and redressal mechanism system.
CO306.4	Aware of consumer movements.
B.Tech. Computer Technology Fourth Semester	
	Discrete Mathematics and Graph Theory (BECT40JT)
CO40J.1	Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction.
CO40J.2	Gain an introduction into how mathematical models for engineering are designed, analyzed and implemented in industry and organizations.
CO40J.3	Reason mathematically about basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems; distinguish rigorous definitions and conclusions from merely plausible ones.

CO40J.4	Analyze real world scenarios to recognize when Logic, sets, functions are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches.
CO40J.5	Apply knowledge of mathematics, physics and modern computing tools to scientific and engineering problems. Apply their knowledge in life-long learning.
	Social Ethics in Information Technology (BECT402T)
CO402.1	Define and explain the concepts of ethics in business world as well apply in IT community.
CO402.2	Discuss the cyber crimes and privacy laws.
CO402.3	Define and understand the freedom of Expression.
CO402.4	Interpret and classify the intellectual property issues, understand the impact of IT on productivity, health care, social networking issues as well as determine the concept of contingent workers, outsourcing.
	Object Oriented Programming using JAVA (BECT403T)
CO403.1	Explain various data types, operators, control flow statements, iterative statements and apply it to develop a Java program.
CO403.2	Describe concepts of objects, classes, interface and apply it to develop an object-oriented Java program.
CO403.3	Describe scope rules, storage classes, intricacies of constructors and apply it to develop a Java program.
CO403.4	Describe polymorphism, inheritance, method overloading, function overloading and apply it to develop a Java program.
CO403.5	Describe exception handling. input-output streams and apply it to develop Java program.
	Data Structure and Program Design (BECT404T)
CO404.1	Describe abstract data types. types of data structures, characteristics of an algorithm, time and space complexity.
CO404.2	Explain and carry out Time and space complexity of various sorting, searching, hashing techniques.
CO404.3	Describe linear data structures, application of linear data structures to develop a program and their analysis.
CO404.4	Describe nonlinear data structures, application of nonlinear data structures to develop a program and their analysis.
CO404.5	Explain graphs as data structure, representation of graphs, graph traversal algorithms, applications of graph and analysis of these algorithms.
	Computer Networks (BECT405T)
CO405.1	Define and illustrate the fundamentals of networks, different network models and various data transmission methods.
CO405.2	Explain different techniques for error detection and correction during data transmission and apply various protocols.
CO405.3	Summarize the inter-network layer with its protocols and apply various protocols in routing and congestion control.

CO405.4	Recall and demonstrate the working of Transport layer protocols such as TCP and UDP.
CO405.5	Recall and demonstrate application layer protocols such as HTTP, FTP, SMTP etc.
	Operating Systems (BECT406T)
CO406.1	Describe different types of operating systems, structure of an operating systems, basic concepts of process, process scheduling and multithreading.
CO406.2	Describe various process scheduling algorithms, performance analysis, selection of suitable algorithm To explain concepts of inter-process synchronization, inter-process communication and develop suitable solution.
CO406.3	Describe deadlocks, deadlock prevention, detection, resolution techniques and explain need and mechanism of protection.
CO406.4	Describe primary memory management issues, primary memory allocation methods, page replacement policies and performance analysis of various allocation methods, page replacement algorithms.
CO406.5	Explain secondary memory management issues, secondary memory allocation methods and input- output systems.
	Environmental Science (BECT408T)
CO408.1	Identify different types of air pollution's as well as explain their causes, detrimental effects on environment and effective control measures.
CO408.2	Recognize various sources of water pollutants and interpret their causes and design its effective control measure
CO408.3	Illustrate various types of pollutants and waste management.
CO408.4	Analyze various social issues related to environment and challenges in implementation of environmental laws.
BE Computer Technology Fifth Semester	
	Design and Analysis of Algorithms (BTCT501T)
CO301.1	Argue the correctness of algorithms using inductive proofs and Analyze worst-case running times of algorithms using asymptotic analysis.
CO301.2	Explain and apply Divide-and-Conquer and Greedy algorithmic design paradigms
CO301.3	Explain and apply Dynamic-Programming algorithmic design paradigms
CO301.4	Explain and apply Backtracking Database Management System(PR)algorithmic design paradigms
CO301.5	Describe the classes P, NP, and NP Complete and prove NP-Completeness of certain problem
	Database Management System (BTCT502T)
CO302.1	Explain the basic concepts of Database management system and database architecture and illustrate the concepts of Relational algebra.
CO302.2	functional dependencies , apply concepts of normalization and construct ER Diagrams.
CO302.3	Compare various indexing techniques and to illustrate the concepts of PL/SQL programming.
CO302.4	Select Query Optimization techniques and to evaluate the performance of Query and transaction Processing.

CO302.5	Define and illustrate the concepts of advanced database techniques
	Software Engineering and Project Management (BTCT503T)
CO303.1	Explain evolution and impact of Software Engineering and to demonstrate and compare different software development process models.
CO303.2	Explain Agile process model, System Engineering and to list and explain different steps in Requirement Engineering Process.
CO303.3	Understand, analyze and apply different analysis and design models in software development process.
CO303.4	To explain and compare different software testing strategies, types and their significance and to understand and apply the concept of Software Quality Assurance and estimation.
CO303.5	To estimate the quality metrics for process and product and to list and analyze different software risk management strategies, software quality management process and to understand Software Configuration Management
	Effective Technical Communication (BTCT504T)
CO304.1	Acquire knowledge of structure of language.
CO304.2	Able to face competitive exams and the interview process and can become employable.
CO304.3	Develop business writing skills.
CO304.4	Become familiar with technology enabled communication and can develop technical and scientific writing skills.
	Artificial Intelligence (BTCT505T)
CO305.1	Explain the basics of the theory of AI and different informed and uninformed search algorithms.
CO305.2	Formulate and solve given problem using Propositional and First order logic.
CO305.3	Describe various knowledge representation techniques and to apply reasoning for non-monotonic AI problems.
CO305.4	Describe various application domains of AI such as Expert system, Game Playing, Natural Language Processing.
CO305.5	Apply neural network learning for solving AI problems.
	Elective -1 (BTCT506T.1) TCP/IP
CO506.1	Identify protocols and standards in the Internet.
CO506.2	Concept of basic addressing and setup, connectivity and communications, name resolution, and fundamental network services.
CO506.3	Learn real-time IP-based protocols and services including Voice over IP (VoIP) and Instant Messaging (IM) applications,
CO506.4	Basic concept of Network configuration with other services like mail services.
CO506.5	Basic Concept of Network Management Protocols and internet security.
	Elective -1 (BTCT506T.2) Computer Graphics
CO506.1	Explain the basic concepts of computer graphics, identify the importance of computer graphics and its wide spread applications.

CO506.2	Categorize and apply basic raster graphics algorithms for drawing 2D primitives and various polygon filling algorithms.
CO506.3	Categorize and apply 2D Clipping algorithms for regular and irregular windows; Compare various types of curves.
CO506.4	Compare, contrast and apply various 2D Transformations.
CO506.5	Explain 3D System Basics, compare and contrast various 3D Transformations and various hidden surface removal algorithms.
Elective -1(BTCT506T.3) System Software & Device Drivers	
CO506.1	Explain the basics concept of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
CO506.2	Design and describe the various concepts of assemblers, the various phases of compiler and compare its working with assembler.
CO506.3	Explain and describe the various concepts of macro -processors.
CO506.4	Explain the basic concepts of linker and loader, create an executable program from an object Unit created by assembler and compiler.
CO506.5	Explain various Device drivers, its types and installation
Professional Ethics*(Audit Course) (BTCT507T)	
CO507.1	Realize their roles of applying ethical principles and morals at professional levels
CO507.2	Understand their constructive roles in understanding corporate culture and maintaining work-life balance.
CO507.3	Become responsible and contributing members of society
CO507.4	Acquire knowledge of Intellectual property rights.
BE Computer Technology Sixth Semester	
Compiler Design (BTCT601T)	
CO601.1	Explain basic fundamentals of the translators and role of the lexical analysis.
CO601.2	Describe principles of Parsing and will be able design various Top-Down and Bottom-Up Parsers
CO601.3	Explain various forms of intermediate code and will be able to demonstrate use of SDTS to translate elementary programming constructs.
CO601.4	Describe various optimization techniques and will be able to develop simple code generators.
CO601.5	Explain storage allocation methods, error recovery techniques and will be able to apply various error recovery techniques in parsers
Data Warehousing and Mining (BTCT602T)	
CO602.1	Understand the data warehousing components and design a data warehouse for any organization.
CO602.2	Learn data mining concepts and working.
CO602.3	Explore functionality of the various data mining techniques.
CO602.4	Discuss the data-mining tasks like classification, clustering, association mining and extract knowledge using data mining techniques.
CO602.5	Apply data mining techniques in trending domain such as web mining and Solve real-world problems in business and scientific information using data mining

	Elective – II High Performance Computer Architecture (BTCT603T-1)
CO603.1	Compare Multi vector and SIMD Computers, PRAM and VLSI Models
CO603.2	Explain Basic concepts, instruction and arithmetic pipelines, and hazards in a pipeline:
CO603.3	Illustrate Concepts and Challenges, Basic Compiler Techniques for Exposing ILP
CO603.4	Explain Virtual memory organization, mapping and management
CO603.5	Compare Parallel and Scalable Architecture, Multiprocessors and Multicomputer
	Elective – II Software Testing & Quality Assurance (BTCT603T-2)
CO603.1	Explain test cases, Verification, Validation, Bugs and TQM.
CO603.2	Design and apply test cases suitable for a software development.
CO603.3	Explain and apply different levels of testing.
CO603.4	Explain and apply automation testing.
CO603.5	Explain and apply object oriented testing
	Elective – II Advanced Microprocessor (BTCT603T-3)
CO603.1	Describe internal organization of 8086/8088 microprocessors. Demonstrate the concept of interrupts and its use
CO603.2	Understand assembly language programming using concepts like assembler directives, procedures, macros, software interrupts. Describe the concept of addressing modes
CO603.3	Demonstrate interfacing of 8086 with Keyboard/ Display, ADC/DAC, 8255 PPI, Programmable Keyboard/Display controller 8279.
CO603.4	Demonstrate Interfacing of 8086 with Programmable interval timer/counter 8254, 8259 PIC. Demonstrate the concept of Serial data communication using USART 8251
CO603.5	Describe 8087 Numeric coprocessor & its use in practical application. Describe the concept of DMA & Pentium
	Elective –III Embeded System (BTCT604T-1)
CO604.1	.Define and explain the basic fundamental, problems and challenges and application areas in embedded system.
CO604.2	Illustrate the fundamental of 8051 Microcontroller
CO604.3	Illustrate the communication with 8051 Microcontroller and analyze through programming.
CO604.4	Illustrate the basic concepts with working environment of Real Time Operating System
CO604.5	Design embedded system and apply in case study .
	Elective –III Mobile Application & Development (BTCT604T-2)
CO604.1	Identify various concepts of mobile programming that make it unique from programming for other platforms.
CO604.2	Critique mobile applications on their design pros and cons.

CO604.3	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
CO604.4	Program mobile applications for the Android operating system that use basic and advanced phone features.
CO604.5	Deploy applications to the Android marketplace for distribution.
	Elective –III Cloud Computing (BTCT604T-3)
CO604.1	The concepts, characteristics, delivery models and benefits of cloud computing.
CO604.2	Illustrate and explain in detail the cloud computing architecture and classify various types of clouds.
CO604.3	Explain big data analysis, Hadoop and Map Reduce and introduction to tools.
CO604.4	Illustrate various security concepts in cloud computing and need of security measures.
CO604.5	Discuss and implement Cloud based Application using C# and windows azure
	Open Elective -1 Digital Image Processing (BTCT605T-1)
CO605.1	Explain the basic fundamentals of Image and compare different 2 D transforms.
CO605.2	Design and implement various image enhancement techniques.
CO605.3	Design and implement various image restoration techniques.
CO605.4	Design and implement various image segmentation techniques.
CO605.5	Design and implement various image compression techniques
	Open Elective -1 Advanced Web Technology (BTCT605T-2)
CO605.1	Gain knowledge of client-side scripting, validation of forms and AJAX programming
CO605.2	Understand server-side scripting with PHP language
CO605.3	Understand what is XML and how to parse and use XML Data with Java
CO605.4	Introduce Server-side programming with Java Servlets and JSP
CO605.5	. Introduce Scripting Language PHP
	Open Elective -1 Multimedia & Animation (BTCT605T-3)
CO605.1	To acquire fundamentals principles of multimedia, including digitization and data compression for non-textual information
CO605.2	To understand issues in representing, processing, and transmitting multimedia data
CO605.3	To understand core multimedia technologies and standards
CO605.4	To gain hands-on experience in image, sound and video editing and in some aspects of multimedia authoring (incorporating images, sound, video, and animation)
CO605.5	To design, capture, store and integrate sound, images and video to deliver multimodal information
	Economics of IT Industry (BTCT606T)
CO606.1	Distinguish between Micro and Macro economics
CO606.2	Relate economics concept with IT industry

CO606.3	Identify key trends in IT industry
CO606.4	Understand the key economic drivers of IT industry
	Mini project (BTCT607P)
CO607.1	To develop an ability to identify, formulate, and design creative solution to real life engineering problems.
CO607.2	To demonstrate the knowledge of standard software project management practices.
CO607.3	To be able to demonstrate interpersonal skill.
CO607.4	To develop an ability to work as an individual and in multidisciplinary teams in professional work environment.
CO607.5	To develop recognition of the need for, and an ability to engage in life-long learning.
CO607.6	To be able to effectively demonstrate technical communication skills.
	Organization Behaviour (Audit)* (BTCT608T)
CO608.1	Understand the concept and importance of organizational behaviour.
CO608.2	acquire the knowledge of interpersonal behaviour and transaction analysis
CO608.3	know different traits and theories of personality
CO608.4	analyze the importance of motivation in organization and types of leadership
BE Computer Technology Seventh Semester	
	Compilers (BECT401T)
CO401.1	To understand different phases of a compiler and justify their relevance as well as their interdependencies.
CO401.2	To learn the top-down and bottom-up parsers and also understand the design of parsers for context free languages
CO401.3	To comprehend Syntax Directed Translation Schemes and different intermediate code generation techniques.
CO401.4	To realize the importance of code optimization phase and the study of various code optimization techniques.
CO401.5	To apprehend code generation algorithms and its implementation for the generation of object code.
CO401.6	To learn different table management techniques and its usage in various phases of compiler.
	Compilers Lab (BECT401P)
CO401.1	To implement lexical analyzer using LEX tool.
CO401.2	To implement top-down and bottom-up parsing techniques.
CO401.3	To implement intermediate code and object code generator using YACC tool
	Artificial Intelligence (BECT402T)
CO402.1	To learn basic concept of AI and various AI search algorithms (Uninformed, Informed, Heuristic and Constraints Satisfaction).
CO402.2	To be able to represent the knowledge into the knowledge base using different methods (Logic, Semantic Nets, Frames and Scripts).
CO402.3	To understand the advanced Artificial Intelligence techniques (Artificial Neural Network and Genetic Algorithm).

CO402.4	To be able to understand the learning strategies of the system and the processing of natural languages using Semantic and Syntactic processing method.
CO402.5	To understand the working of basic working of Game Playing search programs (MINMAX procedure, Alpha-Beta cutoffs).
CO402.6	To be able to analyze probability and fuzzy logic concept to solve a problem.
	Artificial Intelligence Practical (BECT402P)
CO402.1	To implement various AI search algorithms (Uninformed, Informed, Heuristic and Constraints Satisfaction).
CO402.2	To implement medical diagnosis system using logic form to create knowledge base.
CO402.3	To study basic concept of computational intelligence and robotics.
	Advance Database Systems Elective-I (BECT403T)
CO403.1	To understand the concepts of Distributed Databases, types, and protocols to ensure atomicity and concurrency.
CO403.2	To understand the need of Parallel Databases, various architectures, and query processing with parallelism.
CO403.3	To be able to understand Object Oriented Databases, concepts of objects, and applications in complex problem solving with persistence.
CO403.4	To be able to understand XML Databases as industry standard, data exchange using XML, query processing for XML using APIs in programming languages.
CO403.5	To understand the evolution of Data Warehouses, concepts of schemas and data modeling, architecture and typical operations.
CO403.6	To understand the need of security in Databases, types of threats, permissions, security in Statistical Databases, SQL
	Advance Operating System Elective-II (BECT404T)
CO404.1	To understand the basic functions and fundamental concerns in design of distributed operating systems.
CO404.2	To understand and analysis of different mutual exclusion algorithm and their comparative analysis.
CO404.3	To study of various deadlock detection and handling techniques and agreement protocols and devising solution to agreement protocol.
CO404.4	To understand architecture of distributed file system and shared memory and comparative study of coherence protocol
CO404.5	To analyze the distributed scheduling algorithm for load balancing and load distribution in distributed system.
CO404.6	To understand basic concepts of synchronous and asynchronous check pointing and their comparative study of fault tolerance protocols.
	Project and Seminar (BECT405P)
CO405.1	To develop an ability to identify, formulate, and design creative solution to real life engineering problems.
CO405.2	To demonstrate the knowledge of standard software project management practices.
CO405.3	To be able to demonstrate interpersonal skill.
CO405.4	To develop an ability to work as an individual and in multidisciplinary teams in professional work environment.
CO405.5	To develop recognition of the need for, and an ability to engage in life-long learning.
CO405.6	To be able to effectively demonstrate technical communication skills.

BE Computer Technology Eighth Semester	
	Data Warehousing and Mining (BECT406T)
CO406.1	To understand architecture and design related issues of data warehouse.
CO406.2	To identify the data mining related common functionality and issues.
CO406.3	To describe and use various classification and clustering algorithms to solve real life data mining problems.
CO406.4	To understand and apply various Association rule mining techniques.
CO406.5	To study the web data mining and analyze recent advances in web mining techniques.
CO406.6	To demonstrate basic understanding of recent trend of big data technology and issues involved in it.
	Data Warehousing and Mining Practical (BECT406P)
CO406.1	To understand the concept of different programming construct and data structures in python.
CO406.2	To design various data warehouse schemas and implement different data mining algorithms.
CO406.3	To study basics of big data technology recent trends and issues.
	Cyber and Information Security (BECT407T)
CO407.1	To understand need of security in information world, legal and ethical issues, and basic techniques providing security to information.
CO407.2	To demonstrate concepts of Secret Key cryptography, design principles, types of ciphers and their applications.
CO407.3	To comprehend Public Key cryptographic architecture, prime number theory, theorems and modular arithmetic concepts in design of cipher systems, concepts of key management.
CO407.4	To understand concept of message integrity and authentication, hash function design and applications, key distribution protocols. Digital certificates.
CO407.5	To demonstrate concept of firewalls and types, systems to prevent or detect intrusion, techniques to detect malicious threats.
CO407.6	To understand different types of software vulnerabilities, remedies, card transaction threats, email security
	Cyber and Information Security (BECT407P)
CO407.1	To be able to design and implement encryption algorithms.
CO407.2	To be able to design and implement message digest and key management techniques.
CO407.3	To design and implement the software vulnerabilities and to be able to make use of modern tools
	Parallel Computing Elective -III (BECT408T)
CO408.1	To understand parallel computing models, tools and its components.
CO408.2	To understand various types of dependencies in parallel processing environment and investigate parallel algorithm for dependencies and the study of shared memory programming under UNIX.
CO408.3	To understand and analysis of different parallel computing algorithms.
CO408.4	To understand message passing technique and to develop ability to design message passing programs under parallel programming architecture.

CO408.5	To understand various debugging techniques for message passing and shared memory parallel programs.
CO408.6	To understand the different techniques for memory and I/O subsystem and evaluation of parallel programming architecture and performance of parallel processors.
	Cloud Computing Elective-IV (BECT409T)
CO409.1	To understand basic concepts of cloud computing technologies, architecture and different cloud models: IaaS, PaaS, and SaaS.
CO409.2	To evaluate the key trade-offs between multiple approaches to cloud system design and identify appropriate design choices when solving real-world cloud computing problems.
CO409.3	To perceive big data analysis and its application using Hadoop.
CO409.4	To comprehend security in cloud, challenges in cloud computing and different cloud contracting Model
CO409.5	To apprehend object oriented concepts in C#.NET, and application development using C#.
CO409.6	To develop small cloud applications and understand deployment issues.
	Project (BECT410P)
CO410.1	To develop an ability to identify, formulate, and design creative solution to real life engineering problems.
CO410.2	To demonstrate the knowledge of standard software project management practices.
CO410.3	To be able to demonstrate interpersonal skill.
CO410.4	To develop an ability to work as an individual and in multidisciplinary teams in professional work environment.
CO410.5	To develop recognition of the need for, and an ability to engage in life-long learning.
CO410.6	To be able to effectively demonstrate technical communication skills.

Department of Information Technology

The department of Information Technology has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

PSO1	An ability to define a problem, design an algorithm for it, identify input and output and implement using programming language to analyze it.
PSO2	Able to implement computer skills in the even related to software engineering, data communication and networking, web technologies and operating systems.

BE Information Technology Third Semester	
	Applied Mathematics-III (BEIT301T)
CO301.1	Understand the basics of Laplace and Fourier transform and apply them for solving differential equations and integral equations.
CO301.2	Understand the basics of Z- transform and apply them for solving difference equations.
CO301.3	Analyze real world scenarios to recognize when matrices are appropriate, formulate problems about scenarios.
CO301.4	Develop an ability to identify, formulate and solve real world problems.
CO301.5	Create the groundwork for post graduate courses, specialized study and research in computational mathematics.
	Programming Logic and Design using 'C' (BEIT302T)
CO302.1	Acquire fundamental knowledge of C programming.
CO302.2	Apply Array, Function and Pointer technique in program development.
CO302.3	Able to implement program on sub routine/function, structure, union.
CO302.4	Apply knowledge of console programming for file handling and real time applications.
CO302.5	Apply knowledge of memory management related research and graphics for business application and area.
	Programming Logic and Design using 'C' (BEIT302P)
CO302.1	Able to implement basic operations using operators and control structures.
CO302.2	Able to implement the concept of functions and arrays on various scenarios.
CO302.3	Able to develop basic file and graphic operations.
	Digital Electronics and Fundamental of Microprocessor (BEIT303T)
CO303.1	The students would be able to understand the importance and necessity of logic gates and also determine and solve the Boolean expression.
CO303.2	The students would be able to solve various types of K-map in SOP and POS form.
CO303.3	The students would be equipped with the basic knowledge related to design of Combinational Circuits.
CO303.4	The students would be equipped with the basic knowledge related to design of Sequential Circuits, Flip-flop and counters.
CO303.5	The students should be able to understand of necessity of Instructions, types of addressing modes and instruction sets and programming for microprocessor.

	Emerging Trends in Information Technology (BEIT304T)
CO304.1	Create a business case for an emerging information technology
CO304.2	Identify factors affecting the successful adoption of new information technologies.
CO304.3	Identify the key attributes, business benefits, risks and cost factors of a new technology.
CO304.4	Know how to effectively use advanced search and selection metrics for identifying and selecting new technology.
CO304.5	Describe technology trends that presently drive or are expected to drive the selection of new technologies over the next decade.
	System Programming (BEIT305T)
CO305.1	To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and MACRO.
CO305.2	To understand & Design of object code generation through translator(assembler).
CO305.3	To understand the interlinking functions in program with MACRO and it's processing.
CO305.4	To understand how linker and loader create an executable program from an object module created by assembler and compiler.
CO305.5	To understand the various phases of compiler and various drivers in UNIX and difference between Unix and Windows operating system.
CO305.6	Able to get various hardware devices used in networking along with different types of networks.
	Software Lab – I (BEIT306P)
CO306.1	Understand the Basic Organization, Working and applications of personal computers.
CO306.2	Apply the different tools and utilities of the operating system.
CO306.3	Student can demonstrate the working of computer system & its peripheral.
CO306.4	Student can design the networking.
CO306.5	Student should be able to assembled Computer System.
CO306.6	To understand the different types Viruses, Spyware and Malware.
	Universal Human Values (BEIT307T)
CO307.1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
CO307.2	Students would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO307.3	They would have better critical ability.
CO307.4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship, human society).
	Environmental Science (Audit) (BEIT308T)
CO308.1	Identify different types of air pollutions as well as explain their causes, detrimental effects on environment and effective control measures.
CO308.2	Recognize various sources of water pollutants and interpret their causes and design its effective control measures.
CO308.3	Illustrate various types of pollutants and waste management.

CO308.4	Analyze various social issues related to environment and challenges in implementation of Environmental laws.
BE Information Technology Fourth Semester	
Discrete Mathematics and Graph Theory (BEIT401T)	
CO401.1	Apply graph theory models of the data structures and state machines to solve problems of connectivity and constraint satisfaction.
CO401.2	Gain an introduction into how mathematical models for engineering are designed, analyzed and implemented in industry and organizations.
CO401.3	Reason mathematically about basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems; distinguish rigorous definitions and conclusions from merely plausible ones.
CO401.4	Analyze real world scenarios to recognize when Logic, sets, functions are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches.
CO401.5	Apply knowledge of mathematics, physics and modern computing tools to scientific and engineering problems.
Data Structures and Program Design (BEIT402T)	
CO402.1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation and various sorting algorithms.
CO402.2	Understand basic data structures such linked lists, stacks and queues.
CO402.3	Implement stacks and queues using linked list.
CO402.4	Solve problem involving graphs, trees and heaps.
CO402.5	Describe the hash function and concepts of collision and its resolution methods.
Object Oriented Programming System (BEIT403T)	
CO403.1	Understand the basic concept & properties /features of OOP
CO403.2	Understand and implement concept of constructor & destructor in C++
CO403.3	Implement concept Inheritance using C++
CO403.4	Understand & Implement concept polymorphism using C++
CO403.5	Implement file handling in C++
CO403.6	Understand concept of Exception handling & STL
Computer Architecture and Organization (BEIT404T)	
CO404.1	Identify the basic functional units, various buses and addressing modes
CO404.2	Apply fundamental concept for executions and sequencing of control signals
CO404.3	Compare Hardwired and Micro programmed Control unit and write the control steps/ sequence of microprogramming.
CO404.4	Apply the knowledge of computer arithmetic algorithm and solve the problems.
CO404.5	Design and implement various memory IC's, evaluate the main memory address
Introduction to Computer Network (BEIT405T)	
CO405.1	Understand the fundamental of computer network.
CO405.2	Comparison of the OSI and the TCP/IP Reference Models

CO405.3	Student will be able to distinguish between the different types of bit errors and can explain the concept of bit redundancy and how it is generally achieved in the facilitation of error detection and the main methods of error correction.
CO405.4	Understand routing principal and algorithms, such as distance vector and link state and inter-networking principles and how the Internet protocols IP, IPv6 and ICMP operate.
CO405.5	Demonstrate an understanding of the significance and purpose of protocols and standards and their key elements and use in networking and Transport layer protocol.
	Operating System (BEIT406T)
CO406.1	Describe the important computer system resources and the role of operating system in their management policies and algorithms.
CO406.2	Understand the process management policies and scheduling of processes by CPU.
CO406.3	Evaluate the requirement for process synchronization and coordination handled by operating system.
CO406.4	Describe and analyze memory management and its allocation policies
CO406.5	Identify use and evaluate the storage management policies with respect to different storage management technologies
	Software Lab-II (BEIT407P)
CO407.1	Able to apply the principles python programming.
CO407.2	Write clear and effective python code.
CO407.3	Create applications using python programming.
CO407.4	Implementing database using SQLite.
CO407.5	Access database using python programming.
CO407.6	Develop web applications using python programming.
	Consumer Affairs (Audit) (BEIT408T)
CO408.1	Understand the basic concept and importance of Consumer Education.
CO408.2	Grasp the concepts related to Consumer Education and Protection.
CO408.3	Analyze the regulations and redressal mechanism system.
CO408.4	Aware of consumer moments.
B. Tech. Information Technology Fifth Semester	
	Software Engineering and Project Management (BEIT501T)
CO501.1	Acquire Knowledge of software engineering methods, practices, process models and application
CO501.2	Understand measure, metrics and indicators and learn various Modeling Approach.
CO501.3	Analyze and extract requirements for the product and translate these into a documented design using different modeling techniques.
CO501.4	Learn software testing methods and types, And to understand debugging concept with various testing methods.
CO501.5	Understand project management, and to know software risks and principles of quality management, further the concept of re-engineering and reverse engineering.

	Design Analysis and Algorithms (BEIT502T)
CO502.1	Illustrate different approaches for analysis and design of efficient algorithms and Analyse various algorithms using asymptotic analysis.
CO502.2	Determine and apply various divide-and-conquer strategies and greedy approaches for solving a given computational problem.
CO502.3	Demonstrate and solve various real time problems using concept of dynamic programming.
CO502.4	Make use of back tracking and graph traversal techniques for solving real-world problems.
CO502.5	Recall and classify the NP-hard and NP-complete problems.
	Java Programming (BEIT503T)
CO503.1	Understand the basic data types and control flow construct using J2SE.
CO503.2	Make use of Object Oriented Concept like inheritance, data hiding, and exception handling etc, to implement various programs in java.
CO503.3	Understand the concept of Multi threading and Multi- programming.
CO503.4	Implementation of string class, date class, Time class and Calendar class in various micro project.
CO503.5	Understand the concept of Collection of Framework.
	Theory of Computation (BEIT504T)
CO504.1	Define what a regular language is and construct a finite state machine for it.
CO504.2	Construct equivalent representations among regular languages, regular Expressions and Regular Grammars.
CO504.3	Formulate the equations for push down automaton.
CO504.4	Identify the characteristics of problems for which no computational solution exists
CO504.5	Understand the concepts of P Vs. NP Vs. NP-Complete.
	Gaming Architecture and Programming (BEIT505T)
CO505.1	Illustrate different approaches for analysis and design of efficient algorithms and Analyse various algorithms using asymptotic analysis.
CO505.2	Determine and apply various divide-and-conquer strategies and greedy approaches for solving a given computational problem.
CO505.3	Demonstrate and solve various real time problems using concept of dynamic programming.
CO505.4	Make use of back tracking and graph traversal techniques for solving real-world problems.
CO505.5	Recall and classify the NP-hard and NP-complete problems.

	Software Lab(Basics of AR & VR/Web Technology) (BEIT506P)
	Effective Technical Communication (BEIT507T)
CO506.1	Acquire knowledge of structure of language
CO506.2	Be able to face competitive exams and the interview process and can become employable.
CO506.3	Develop Business writing skills.
CO506.4	Become familiar with technology enabled communication and can develop technical and scientific writing skills.
B. Tech. Information Technology Sixth Semester	
	Database Management Systems (BEIT601T)
CO601.1	Analyse and design Database Management System Using ER model.
CO601.2	Apply Indexing concepts in database languages.
CO601.3	Apply database queries in database languages.
CO601.4	Create normalized Database design using normal forms.
CO601.5	Apply Transaction Management concepts in real-time situations
	Artificial Intelligence & Machine Learning (BEIT602T)
CO602.1	Understand the concept of Artificial Intelligence.
CO602.2	Familiarize with knowledge based AI systems and approaches.
CO602.3	Apply the aspect of probabilistic approach to AI
CO602.4	Identify the neural Networks and NLP in designing AI models.
CO602.5	Recognize the concepts of Machine Learning and its deterministic tools.
	Advances in Computer Networks (BEIT603T)
CO603.1	Develop an understanding of advances in computer networking.
CO603.2	Learn various fast access technologies.
CO603.3	Comprehend the features of IPv6.
CO603.4	Demonstrate various security protocols.
CO603.5	Interpret advances in computer network authentication.
	Cloud Computing (BEIT604T.1)
CO604.1	To study fundamental concepts of cloud computing.
CO604.2	To understand the implementation of Virtualization in Cloud Computing.

CO604.3	To learn the application and security on cloud computing.
CO604.4	Apply security in cloud application.
CO604.5	Use advance technique in cloudcomputing.
	Data Science (BEIT605T.1)
CO605.1	Apply quantitative modeling and analysis techniques to the solution of real world business problems, communicate findings, and effectively present result using data science tools.
CO605.2	Apply principles of Data Science to the analysis of business problems.
CO605.3	Apply ethical practices in everyday business activities and make well reasoned ethical business and data management decisions.
CO605.4	Demonstrate knowledge of statistical data analysis techniques utilized in business decision making.
CO605.5	Apply algorithms to build machine intelligence.
	Economics of IT Industries (BEIT607T)
CO607.1	Distinguish between Micro and Macro economics
CO607.2	Related economics concept with IT Industry
CO607.3	Identify key trends in IT Industry.
CO607.4	Understand the key economic drivers of IT Industry

	Organizational Behaviour (BEIT608T)
CO608.1	Understand the concept and importance of organization behaviour
CO608.2	Acquire the knowledge of interpersonal behaviour and transaction analysis
CO608.3	Know different traits and theories of personality
CO608.4	Analyze the importance of motivation in organization and types of leadership
BE Information Technology Seventh Semester	
	Data Warehousing and Mining(BEIT701T)
CO701.1	Students should get the knowledge of data preprocessing for data warehouse and data mining.
CO701.2	Students will be able to understanding of the fundamental theories and concepts of data warehouse.
CO701.3	Students can understand online analytic processing (OLAP) is used for business analysis.
CO701.4	Students should get the knowledge of data mining functionalities and applications.
CO701.5	Students can be able to work on association rule mining for market basket analysis.
CO701.6	Students should get the knowledge of business intelligence used in business from the past data and they can understand big data and Hadoop technologies.
	Data Warehousing and Mining (BEIT701P)
CO701.1	Students can able to design and perform data warehouse schemas and online analytical processing operations.
CO701.2	Students can able to perform data mining techniques such as classification, clustering and association rule mining using WEKA and PYTHON.
CO701.3	Students can able to install Hadoop single node cluster and its commands.
	Computer System Security (BEIT702T)
CO702.1	Students can understand security concepts, Ethics in Network Security.
CO702.2	Students can understand security services and mechanisms and can implement the security algorithms like DES, IDEA etc.
CO702.3	Students can comprehend and apply relevant cryptographic techniques like RSA algorithm, Diffie-Hellman key exchange etc.
CO702.4	Students can comprehend various authentication services and mechanisms like digital signature, Kerberos etc.
CO702.5	Students can understand email security services and mechanisms like PGP, S/MIME.
CO702.6	Students can understand meaning of virus, worms, and firewalls and different web security services and mechanisms.
	Computer System Security (BEIT702P)
CO702.1	Able to implement the concept of encryption and decryption using various symmetric key algorithms.

CO702.2	Able to implement the concept of encryption and decryption using various asymmetric key algorithms.
CO702.3	Able to implement the concept of various authentication and digital signature algorithms as well as password protection mechanism.
	Artificial Intelligence (BEIT703T)
CO703.1	To understand the basic concepts of Artificial Intelligence, AI techniques and AI Problems to analyze and formalize (as a state space, graph etc.)
CO703.2	To understand concept of Informed and Uninformed search strategies.
CO703.3	To understand issues, approaches of knowledge representation and logical form of knowledge.
CO703.4	To understand different representations scheme of knowledge in knowledge base.
CO703.5	To understand the different development phases of expert system and rule based expert system.
CO703.6	To understand concepts of certainty, uncertainty factors and fuzzy logic.
	Elective-I Multimedia Systems (BEIT704T2)
CO704.1	Students will gain the knowledge on different technologies and architecture of Multimedia Systems.
CO704.2	Students will understand the concepts of multimedia tools
CO704.3	Students able to know various elements of multimedia
CO704.4	Students will able to apply image and video compression in mini real-time applications
CO704.5	Students will get the concepts of Storage models and Access Techniques of Multimedia devices
CO704.6	Students will get the concepts of developing multimedia applications and delivering the multimedia products.
	Elective-I Compiler Design (BEIT704T4)
CO704.1	To acquire the knowledge of modern compiler and its features.
CO704.2	To learn and use the new tools and technologies used for designing a compiler
CO704.3	Demonstrate the phases of the compilation process and be able to describe the purpose and implementation approach of each phase.
CO704.4	Proficiently explain the aspects of theoretical computer science including Languages, Grammars, and Machines.
CO704.5	Providing the student with skills and knowledge (such as lexical analysis and parsing) which are applicable to a broad range of computer science application areas (such as text editors, information retrieval, etc
CO704.6	To learn new code optimization techniques to improve the performance of program in terms of memory space and speed.
	Elective-II Cluster and Grid Computing (BEIT705T2)
CO705.1	Understanding the basic requirement of evolution of Grid from a Cluster.
CO705.2	Be familiar with the fundamental components of Grid environments, such as authentication, authorization, resource access, and resource discovery.
CO705.3	Be able to design and implement Grid computing applications using Globus or similar toolkits.
CO705.4	Be able to justify the applicability, or non-applicability of Grid technologies for a specific application.
CO705.5	Understand the suitable topology and design to set up an initial grid for research and data processing.

CO705.6	Know what a grid is and what it can do for whom uses it is essential when planning to use this technology to tackle the most demanding computational problems.
	Seminar on Project (BEIT706P)
CO706.1	Able to improve oral and presentation skills in their project domain.
CO706.2	Able to apply mathematics and scientific method in computational problems
CO706.3	Able to use latest tools and methods in the computing practice
CO706.4	Gains knowledge on the process involved in team work of computing environment
CO706.5	Able to design and implement systems on the various social needs.
CO706.6	Understand the importance of various process models of the project
BE Information Technology Eighth Semester	
	Distributed Systems (BEIT801T)
CO801.1	Students will gain the models of distributed systems which help in developing client server applications.
CO801.2	Students will understand the concepts of Inter process communication using RPC models.
CO801.3	Students will know how the processes are synchronized in distributed systems.
CO801.4	Students will know how the deadlocks are occurred, detected and resolved in distributed systems.
CO801.5	Students will gain the knowledge about how the data is shared in distributed systems.
CO801.6	Students will know the structure of file systems in distributed systems.
	Distributed Systems (BEIT801P)
CO801.1	Students will able to create communication between systems.
CO801.2	Students will able to migrate the code from one system to another.
CO801.3	Students can implement synchronization between the systems with respect to sharing resources.
	Gaming Architecture and Programming (BEIT802T)
CO802.1	Design, analyze, implement and evaluate computer games.
CO802.2	Appreciate computer games designs and complexities.
CO802.3	Demonstrate understanding of game production process through developing a computer game in a team starting from ideas.
CO802.4	Demonstrate understanding of technical components in realizing a 2D and 3D game Category.
CO802.5	Collaborate, organize and communicate with others in effective team work.
CO802.6	Realize the interdisciplinary nature in computer games development and appreciate importance of collaboration, be creative and critical to game and play design.
	Gaming Architecture and Programming (BEIT802P)
CO802.1	Students are able to design and implement the basic concept of game using unity tool.
CO802.2	Students are able to implement the animation concept of game.
CO803.3	Students are able to implement, integrate and test the game with animation, scenes and scripts for 2D and 3D games.

	Elective-III Pattern Recognition (BEI803T3)
CO803.1	Students can understand pattern, pattern classifier and pattern recognition with parametric estimation.
CO803.2	Students should get the knowledge of Bayes theorem and usefulness in pattern classification.
CO803.3	Students can understand clustering and different clustering techniques.
CO803.4	Students can understand feature extraction process with KL transform in pattern recognition.
CO803.5	Students able to use hidden markov model and support vector machine in pattern recognition.
CO803.6	Students can understand the concepts of fuzzy logic and genetic algorithm in pattern recognition.
	Elective-IV Wireless Sensor Networks (BEIT804T4)
CO804.1	Introduce students to the characteristics, challenges, standards and applications of wireless sensor networks.
CO804.2	To provide the knowledge of architecture and structure of wireless sensor network. To understand various layers of protocol stack of WSN.
CO804.3	Provide the depth knowledge of contention based and contention free MAC protocols and how it is different from fundamental MAC protocols.
CO804.4	To understand the general principles of routing and its challenges. To make them aware of specific routing protocols used for wireless sensor networks.
CO804.5	To understand security concepts in WSN using Message authentication code, Signature. To provide knowledge of transport protocol design issues.
CO804.6	Make the students aware of network management design issues, operating system design issues and OS used specifically for wireless sensor network.
	Project (BEIT805P)
CO805.1	Able to develop applications in real life.
CO805.2	Able to identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach.
CO805.3	They can acquire practical knowledge within the chosen area of technology for project development.
CO805.4	They can learn new tools, algorithms, and/or techniques that contribute to the software solution of the project.
CO805.5	Able to test the functionalities of the project by different testing methodologies. And they can improve effective communication skills for presentation of project related activities.
CO805.6	They can express technical ideas, strategies and methodologies in written form.

Department of Electrical Engineering

The department of Information Technology has framed the following Program Specific Outcomes in consultation with concerned stakeholder and corresponding committees.

PSO1	Identify, analyze, design lay out and provide engineering solution in the area related to electrical power system, power electronics and drives.
PSO2	To gain the skills of utilization and maintenance of electrical systems and develop the confidence to achieve position in the career path ethically.

BE Electrical Engineering Third Semester	
	Electrical Engineering Mathematics (BTCHEE301T)
CO301.1	Analysis of variation using different method, solution of partial differential equation of first order first degree, numerical solution to ordinary differential equations.
CO301.2	Formulation and solving the system using complex variables.
CO301.3	Applications of differential equation and Laplace transform for mathematical model formulation of physical system, understanding the concept of transfer function.
CO301.4	Understanding of linear and orthogonal transformation, solution to second order differential equation.
CO301.5	Understanding the concept of Stochastic analysis and its applications.
	Network Analysis (BTCHEE302T)
CO302.1	Apply mesh current and node voltage method to analyze electrical circuits.
CO302.2	Apply network theorem for the analysis of networks.
CO302.3	Obtain transient and steady state responses of electrical circuits.
CO302.4	Synthesize wave form and apply laplace transforms to analyze networks.
CO302.5	Evaluate different network functions and understand two port network behavior.
	Electrical Measurement and Instrumentation (BTCHEE303T)
CO303.1	Various aspects of measurement and Instrumentation.
CO303.2	Different active and passive component measurement methods.
CO303.3	Power and energy measurement.
CO303.4	Instrument transformer
CO303.5	Aspects and size of transducers
	Analog Devices & Circuits (BTCHEE304T)
CO304.1	Design and analyze rectifier circuits.
CO304.2	Understand the characteristics and the use of transistor as amplifiers.

CO304.3	Apply the knowledge of transistor for the analysis of power amplifier and oscillators.
CO304.4	Understand OP-AMPs.
CO304.5	Analyze and utilize OP-AMPs.
	Renewable Energy Studies (BTCHEE305T)
CO305.1	Memorize the fundamental of solar radiation geometry.
CO305.2	Identify and analyze the process of power generation through solar photovoltaic.
CO305.3	Highlighting the various applications of solar energy.
CO305.4	Outline the site requirement criteria for wind farm and compare different types of wind generator.
CO305.5	Identifying Non-conventional energy sources such as Geothermal, MHD, Biomass, Fuel cell, Tidal, Ocean for generating Electricity.
	Introduction to Python Programming (BTCHEE306T)
CO306.1	Identify Different operators and Execute different programs using loops.
CO306.2	Analyze strings, lists, Tuples, Dictionary and Sets.
CO306.3	Illustrate functions and utilize date time in programming language.
B.Tech. Electrical Engineering Fourth Semester	
	Signal and Systems (BTCHEE401T)
CO401.1	Understanding the basic of signal space theory.
CO401.2	Understanding the concept of state space representation.
CO401.3	Understand convolution sum of two signals.
CO401.4	Apply Fourier and Laplace transforms, understand the duality. Apply DFT, DTFT and z-transform.
CO401.5	Understand the concept of sampling and reconstruction.
	Digital Electronics (BTCHEE402T)
CO402.1	Understand number system, logic gates and logic families.
CO402.2	Design and implement, combinational digital circuits.
CO402.3	Design and implement sequential logic circuits.
CO402.4	Understand the process of analog to digital conversion and digital to analog conversion.
CO402.5	Understand memories and PLDs to implement given logic.
	Electrical Machines-I (BTCHEE403T)
CO403.1	Determine Equivalent circuit parameter, Efficiency and Regulation of Single Phase Transformer and to Explain the Phasor groups of Three Phase Transformer.
CO403.2	Analyze different Characteristics of D.C. Motor and Speed Control of D.C. Motor.
CO403.3	Explain Different types of Three Phase Induction Motor and Analyze the Characteristics at different value of Slip.

CO403.4	Know Voltage Regulation of Three Phase Synchronous Generator and Behaviour of Synchronous Motor with Different Excitations.
CO403.5	Understand Single Phase Machines and Special Machines.
	Power System (BTCHEE404T)
CO404.1	Understand the basic structure of power system, smart grid and microgrid.
CO404.2	Model and represent the power system components in its per unit value.
CO404.3	Learn the parameters of transmission lines and cables.
CO404.4	Evaluate the performance of transmission lines.
CO404.5	Acquaint with the method of load flow analysis and the concept of voltage stability.
	Electromagnetic Fields (BTCHEE405T)
CO405.1	Recognize and apply the knowledge of different co-ordinate systems.
CO405.2	Evaluate the physical quantities of electromagnetic fields in different media and apply Gauss Law.
CO405.3	Describe static electric fields boundary conditions, nature of dielectric materials and evaluate potential fields.
CO405.4	Explain steady magnetic fields, their behavior in different media, associated laws and inductance.
CO405.5	Understand Maxwell's equations in different forms and different media.
	Programming Techniques & Simulation (BTCHEE406T)
CO406.1	Learn the basics of C programming and apply the knowledge for developing small programs including Function.
CO406.2	Apply the knowledge of C language for developing simple programs using variables, arrays, structures etc. for applications like searching and sorting, use of pointers & File handling functions.
CO406.3	Understand the basics of C++.
CO406.4	Study the basic of MATLAB and apply fundamental knowledge for analysis of basic engineering problems.
CO406.5	Apply knowledge of MATLAB, Toolboxes and Simulink to solve matrix equations, plot graphs, build and analyze simple electrical circuits.
BE Electrical Engineering Fifth Semester	
	Microprocessor and Microcontrollers (BTCHEE501T)
CO501.1	Describe internal organization of 8085 and 8086 microprocessors and 8051 microcontrollers.
CO501.2	Describe the concept of addressing modes and timing diagram of Microprocessor.
CO501.3	Interface 8085 & 8051 with Keyboard/Display, ADC/DAC, Stepper motor etc.
CO501.4	Demonstrate the concept of interrupts and its use.
CO501.5	Demonstrate the concept of Serial & parallel data communication

CO501.6	Describe Hand shaking concept and interfacing with peripheral devices.
CO501.7	Interface various hardware with microprocessor and microcontroller.
	Control Systems (BTCHEE502T)
CO502.1	Model the linear systems and study the control system components specifications through classical approach.
CO502.2	Understand the time response and time response specifications and different controllers.
CO502.3	Analyse the absolute stability and analyse the relative stability through root-locus method.
CO502.4	Frequency response tools like bode-plot and Nyquist-plot.
CO502.5	Understand the concepts of state variable approach.
	Power Electronics (BTCHEE503T)
CO503.1	Knowledge of different types of semiconductor switches and their characteristics.
CO503.2	Knowledge of different types of power conversion system with their operation.
CO503.3	Knowledge of various rectifier circuits at loading conditions.
CO503.4	Knowledge of various operating modes of inverter and control circuits.
CO503.5	Knowledge of different DC–DC conversion circuit & four-quadrant operation.
	Advanced Electrical Power System (BTCHEE504T)
CO504.1	Apply symmetrical components concepts in fault analysis
CO504.2	Evaluate fault currents for different types of faults
CO504.3	Appreciate concepts of power system stability.
CO504.4	Understand methods to control the voltage, frequency and power flow
CO504.5	Understand economic operation of power system.
	Elective-I Power Station Practice (BTCHEE505T)
CO505.1	Understand various sources of electrical energy and different factors related to generating
CO505.2	Study general layout, major equipment's and auxiliaries in thermal power station.
CO505.3	Understand the basic principle of hydropower station.
CO505.4	Learn basics of nuclear power generation.
CO505.5	Understand the different excitation systems, captive and cogeneration.
	Elective-I Electrical Machines-II (BTCHEE505T)

CO505.1	To explain speed control & electric braking in AC&DC machines
CO505.2	To analyses & compare Voltage regulation method & parallel operation of alternator.
CO505.3	To explain two reaction theory of salient pole synchronous machine & slip test.
CO505.4	To analyses power flow in synchronous machine, comparison, applications and working of reluctance motor & PM AC motors.
CO505.5	To describe Transient behaviour of synchronous machine under the sudden short circuit, determination of reactance's.
	Elective-I Electrical Power Utilization (BTCHEE505T)
CO505.1	Understand use of electric energy for industrial heating.
CO505.2	Study the use of electrical energy in electric welding
CO505.3	Learn basics of Illumination and design of lighting schemes for Various applications
CO505.4	Understand pumps and DG systems and evaluate their performance.
CO505.5	Understand Electric Traction system with its power supply structure.
BE Electrical Engineering Sixth Semester	
	Engineering Economics and Industrial Management (BTCHEE601T)
CO601.1	Understand the concept of demand and supply and its relationship with the price.
CO601.2	Relate various factors of production with reference to different economic sectors.
CO601.3	Analyse the causes and effects of inflation and understand the market structure.
CO601.4	Acquire knowledge of various functions of managements and marketing managements.
CO601.5	Perceive the concept of financial management for growth of business.
	Computer Application in Power System (BTCHEE602T)
CO602.1	Students will be able to determine bus impedance & Admittance matrix by singular transformation for power system.
CO602.2	Determine busimpedance & admittance matrix by inspection and building algorithm and able to accommodate changes in power system.
CO602.3	Do the short circuit calculation for symmetrical and unsymmetrical fault using bus impedance and admittance matrix.
CO602.4	Do the load flow analysis by N-R method and Transient stability analysis by Modified Eulers method.
	Switchgear and Protection (BTCHEE603T)
CO603.1	Understand basic technology of protective Relaying, different types of faults and components used in Power System Protection.
CO603.2	Apply over current protection schemes for medium voltage line.

CO603.3	Apply various distance protection schemes for high voltage lines.
CO603.4	Understand differential and other protections used for generator, Transformer and motors.
CO603.5	Comprehend switching phenomenon and working of various types of circuit breakers.
	Open Elective-I: PLC and SCADA System (BTCHEE604T)
CO604.1	Identify and understand components of PLCs for Automation.
CO604.2	Select appropriate module as per application.
CO604.3	Develop PLC Programming for given application.
CO604.4	Understand SCADA System.
CO604.5	Develop SCADA system for various applications.
	Open Elective-I: Solar PV System (BTCHEE604T)
CO604.1	Review Solar Tracking, tracking control and find heat radiation related queries.
CO604.2	Analyse the simple model of PV cell and PV modules.
CO604.3	Analysis the balance of solar PV systems having battery and inverter.
CO604.4	Demonstrate various Photovoltaic system configuration.
CO604.5	Apply Solar PV to various Distributed Generation and Smart Consumption.
	Open Elective-I: Organizational Behaviour (BTCHEE604T)
CO604.1	Understand the concept and importance of organizational behaviour.
CO604.2	Acquire the knowledge of interpersonal behaviour and transaction analysis.
CO604.3	Know different traits and theories of personality.
CO604.4	Analyse the importance of motivation in organization and types of leadership.
CO604.5	Relate personal life with professional life and their management.
	Open Elective-I: Numerical Mathematics and Probability Using MATLAB (BTCHEE604T)
CO604.1	Learn and use the MATLAB effectively in various applications as a simulation tool.
CO604.2	Find an approximate solution of algebraic and transcendental equations, system of linear equations and first order ordinary differential equations by various numerical methods and MATLAB commands.
CO604.3	Apply z-transform to solve difference equations with constant coefficients.
CO604.4	Analyse real world scenarios to recognize when probability is appropriate, formulate problems about the scenarios; creatively model these in order to solve the problems using multiple approaches.
CO604.5	Understand the impact of scientific and engineering solutions in a global and societal context.
CO604.6	Create the ground work for post-graduate course, specialized study, and research in mathematics.

	Professional Elective-II: Advanced Control System (BTCHEE605T)
CO605.1	Determine the state transition matrix and solution of state equation for the given system.
CO605.2	Evaluate controllability, observability and design suitable state feedback vector for the given control system.
CO605.3	Evaluate Optimal Control Problem.
CO605.4	Describe different types of non-linearities in control system.
CO605.5	Solve stability problems of discrete time digital control system.
	Professional Elective-II: Optimization Techniques (BTCHEE605T)
CO605.1	Formulate optimization problems as mathematical programming problems.
CO605.2	Select proper method to solve a given optimization problem.
CO605.3	Apply classical optimization techniques to solve linear optimization problems.
CO605.4	Apply classical optimization techniques to solve non-linear optimization problem.
CO605.5	Apply appropriate optimization techniques to solve the engineering optimization problems.
	Professional Elective-II: Electrical Drives & Their Control (BTCHEE605T)
CO605.1	Understand the concept of Electrical characteristics like starting, speed control and braking along with numerical.
CO605.2	Relate various factors of industries with reference to PLC, its programming and Digital Control.
CO605.3	Analyse the causes and effects of motor control used in Electric vehicle.
CO605.4	Acquire Knowledge of various electrical drives used in industrials, AC & DC contactors and work on drives used in industries.
CO605.5	Perceive the concept of Electric Traction and their control strategies used in practice
BE Electrical Engineering Seventh Semester	
	Control System-II (BEELE701T)
CO701.1	To know the different compensation technique of single input single output system linear time invariant control system.
CO701.2	To analyze the practical system for desired specification through the variable approach and concept of Eigen values and vectors with the diagonalization technique. Solution of state equation with the determination of STM by different method.
CO701.3	To Controllability and observability and test on the design of control system in state space and design and effect of state feedback.
CO701.4	To design the optimal control with and without constraints.
CO701.5	To function of non linear system and analysis the nonlinear system with phase plane and describing function method.

CO701.6	To analyze the linear time invariant discrete time system with the help of Z-transform and analyze of stability of discrete time systems.
	Electrical Power System-II (BEELE702T)
CO702.1	Understand and analyze symmetrical component and sequence network.
CO702.2	Analyze the system with symmetrical fault and select circuit breakers.
CO702.3	Analyze the system with unsymmetrical faults.
CO702.4	Study power system stability.
CO702.5	Study economics operation and distributions of load between units.
CO702.6	Understand importance and types of grounding and compensation.
	Flexible AC Transmission System (BEELE703T)
CO703.1	To understand the constraints offered by transmission line related with transient stability, dynamic stability, voltage stability, thermal limit, frequency stability, etc.
CO703.2	To understand the importance of FACTS controller devices to improve the stability limit and maximize the power transfer capability.
CO703.3	Ability to understand and indentify the problem associated with large interconnected system like voltage instability, power oscillation, transient instability, power flow.
CO703.4	Based on the problem, students are able understand to apply suitable controller (series, shunt, shunt-series, series-series) to overcome the problem in the interconnected system.
CO703.5	Ability to understand different types of converter regulator and compensator.
CO703.6	To understand harmonic reduction and voltage control technique and its analysis.
	High Voltage Engineering (BEELE704T)
CO704.1	Students will understand about breakdown mechanism in gaseous, liquids and solid dielectric materials.
CO704.2	Learn about lightening and switching over-voltages and its protection.
CO704.3	Study about insulation coordination, BIL, reduced BIL, SIL and Travelling waves.
CO704.4	Study different methods of generation high voltage and currents.
CO704.5	Study different methods measurement of high voltage and currents in laboratory.
CO704.6	Learn different methods of non destructive and High Voltage testing of apparatus.
	Electrical Installation and Design (BEELE705T)
CO705.1	Concept of load forecasting, solve problems based load assessment.
CO705.2	Draw single line diagram with specification distribution network, motor and power control centers for industrial installation.
CO705.3	Construction, installation, types and selection of PVC/XLPE cables and overhead conductors.
CO705.4	Design 11 KV and 33 KV substation layouts.
CO705.5	Determine fault level at various locations in power system and understand complete transformer testing.
CO705.6	IE rule for low, medium and .high voltage installation and understand provision for system and equipment earthing as per IS 3043

BE Electrical Engineering Eighth Semester	
	Power Quality (EL-II) (BEELE801T)
CO801.1	Knowledge of various power quality phenomenon.
CO801.2	Impact of poor power quality on various equipment of power system and domestic appliances.
CO801.3	Various causes and origin of power quality problem.
CO801.4	Controlling of various power quality phenomenon to improve performance of overall power system.
CO801.5	Monitoring of power quality phenomenon in order to protect and minimize damage caused by them.
CO801.6	Assessment of power quality problem and phenomenon on line as well as offline assessment. Mitigation techniques to minimize power quality problem.
	Electrical Distribution System (EL-III) (BEELE802T)
CO802.1	To understand the different load factor, classification of load.
CO802.2	To understand different feeders, engineering consideration for voltage level and loading.
CO802.3	To understand calculation of power loss and voltage drop. Method of solution of different network and load flow study.
CO802.4	To understand equipment for voltage control, effect of different equipment like series capacitor, reactive power requirement and its compensation.
CO802.5	To understand the automation in distribution system, data acquisition control and protection of control panel.
CO802.6	To understand layout, equipment of the substation.
	Switchgear and Protection (BEELE803T)
CO803.1	Classify the faults in power system.
CO803.2	Design the operating time of over current relays including backup protection.
CO803.3	Understand necessity of protection in power system.
CO803.4	Choose the proper protection system for various equipment like transformer, alternators, busbar, feeders, transmission line.
CO803.5	Select circuit breakers for different voltage application.
CO803.6	Plot the characteristics of various distance relays and relay classification.
	Computer Application in Power System (BEELE804T)
CO801.1	Understand the fundamental concepts of graph theory. Determine Admittance matrix (required for Load flow) by graphically, Inspection and building algorithm without mutual coupling.
CO804.2	Bus Impedance matrices(required for Short circuit Studies) for system without mutual coupling
CO804.3	Three phase balance network elements with balanced and unbalanced excitation, incidence and network matrices for three phase element.
CO804.4	Load flow study of a power system by Newton-Raphson and Gauss-Seidal Iterative Method and fast decoupled methods with and without voltages buses.
CO804.5	Three phase Short circuit studies for balanced and unbalanced faults.
CO804.6	Transient stability by using Euler's, Modified Euler's and RK-4th order differential method.

Department of Architecture

The objectives of the Bachelor of Architecture program are translated into a number of learning outcomes. These outcomes are directly related to the profession of architecture, the way in which it is practiced, and the knowledge components necessary for such a practice. The following list of outcomes represents the minimum learning outputs expected and therefore they are not exclusive. Specific exercises and individual and group projects may achieve additional learning outcomes:

1. An ability to conceptualize and coordinate designs, addressing social, cultural, environmental and technological aspects of architecture
2. An ability to recognize the dialectic relationship between people and the built environment
3. An ability to apply and integrate computer technology in design processes and products. An ability to utilize cutting edge building technology in design.
4. An ability to apply visual and verbal communication skills at various stages of architectural design and project delivery processes.
5. An ability to critically analyze building designs and conduct post occupancy evaluation studies.
6. An ability to employ architectural research methods including data collection and analysis to assess and propose improvements in existing built environments.
7. An ability to work collaboratively with teams of architects and various interdisciplinary design teams involved in the building industry.
8. An ability to recognize diversity of needs, values, behavioral norms, social patterns as they relate to the creation of the built environment.

Bachelor of Architecture First Semester	
	Basic Design and Visual Arts (1S-A-1)
1S-A-1.1	To have basic knowledge about historical review of development of fine arts and visual arts. As well as the basic knowledge of architectural design.
1S-A-1.2	Students got to know about basic elements of design and composition out of it which is showing expression of design
1S-A-1.3	Students got to know about Principles of Design and its role in architecture through different composition and its expression
1S-A-1.4	Students learned about representation of form in a various ways.
1S-A-1.5	Students get comfortable in outdoor free hand sketching of natural and manmade things with different mediums
1S-A-1.6	Students got to know about detailed knowledge of artists colour theory.
	Construction technology and materials – I(1S-A-2)
1S-A-2.1	Students got to know about various elements of building from foundation to roof. And also learned about basic building materials such as stone, wood, concrete, steel etc.
1S-A-2.2	Students got to know about basic about “construction” as a subject and its relevance to architectural design. E.g.-concept of span , etc
1S-A-2.3	Students understood the basic construction principles with respect to structural stability and its applications/ extensions /manifestations in terms structural systems and then building elements

1S-A-2.4	Students got the knowledge about general conditions at site level such as site topography, climatic conditions and soil conditions and its implications on construction techniques, building materials, building elements, construction systems to be adopted.
1S-A-2.5	Students got to know about basic structural systems such as load bearing and frame structure through drafting exercise of it.
	Structural design and systems – I (1S-A-3)
1S-A-3.1	Students got to know types of coplanar and non- coplanar forces.
1S-A-3.2	Students understood about co-planer forces – resolution and resultants – lami's theorem – application
1S-A-3.3	Students understood about equilibrium of 2d elements: basic principles, condition of equilibrium, free body diagram
1S-A-3.4	Students understood about equilibrium of 3d elements, understanding of basic principles of resolution and equilibrium of 3d force system no mathematical calculation.
1S-A-3.5	Students learned about types of structural supports and support reactions, theoretical and practical study of reactions of simple support, hinge support, roller support and fixed support, study of types of beams and types of loads.
1S-A-3.6	Students learned about static friction: basic principles: application for elements on horizontal plane, inclined planes and ladders.
1S-A-3.7	Students understood the properties of plane sections A) centre of gravity B) Moment of inertia (second moment of area) – section modulus, radius of gyration, polar moment of inertia.
1S-A-3.8	Students learned application for C) Perfect frames (method of joints, method of sections and graphical methods.) D) simply supported beams – analytical and graphical E) weight less cables / strings
	History of Art and Architecture –I (1S-A-4)
1S-A-4.1	Students learned basic about Art, Culture, Society, Civilization and Architecture.
1S-A-4.2	Earlier attempts of man for shelter during the prehistoric period
1S-A-4.3	Students learned about Indian Art and Architecture.
1S-A-4.4	Students learned about Western Art and Architecture.
1S-A-4.5	Students got to know the Elements of Art and Principles of Design studied from historic examples.
	Architectural Graphics –I (1S-A-5)
1S-A-5.1	Students learned basic understanding in object drawing, light and shade of simple, natural and geometric forms. Outdoor sketches of simple bldg. forms. Through simple exercises.
1S-A-5.2	Basic understanding of an Architectural symbols like trees, hedges, foliage, human figure in different postures, vehicles, furniture etc. their integration to presentation drawings.
1S-A-5.3	Students learned scales, their use in practice and construction of Plain and Diagonal scale.
	Workshop Practice- I (1S-A-6)
1S-A-6.1	Students got knowledge about various basic tools used for carpentry joinery and fabrication.

1S-A-6.2	Students got to know workshop rules, safety norms and care in handling various manually operated and motorized tools.
1S-A-6.3	Students got to know basic understanding of wooden joints, evolution of joints, needs of joints, making simple wooden joinery parts.
1S-A-6.4	Students got knowledge of various building materials and their tools used for cutting, joining and extension. Handling materials like wood, marble, steel, MS, plywood, POP, Aluminum etc.
1S-A-6.5	Students understood about nailing, screwing, riveting and their various conditions and types of applications.
	Computer Application(NG) (1S-A-7)
1S-A-7.1	Students got to know about various basic software used in a 5 year architecture course e.g.- power point presentation, Microsoft word and Microsoft excel.
	Presentation Skills (ELE A) (1S-AA-1)
1S-AA-1.1	To develop the presentation of the submissions through software like Microsoft Word and PowerPoint.
	Numerical Abilities (ELE B) (1S-AA-2)
1S-AA-2.1	After successful completion of course students built their mathematical knowledge and develop the ability to use it in architecture design.
Bachelor of Architecture Second Semester	
	Architectural Design-I (2S-A-1)
2S-A-1.1	Students understood about anthropometry in that they studied human dimensions, concept of percentile in Indian standards, space required for various simple activities, circulation spaces.
2S-A-1.2	Students understood about form and space : Volumes, enclosure of space, semi enclosed spaces, defining space by elements, light as a factor of shape, color, texture and form, view, visual relationship. Properties of forms and their impact on spatial experience.
2S-A-1.3	Students understood about elements of built form through some exercise of making plan and all.
2S-A-1.4	Students understood about principles of design : Through exercises spatial organization, symbiosis of form and function concept generation convergent and divergent thinking in design
2S-A-1.5	Students understood about furniture and facilitation placement.
2S-A-1.6	Students understood about integration of climatic factors in design.
	Construction Technology and Materials –II (2S-A-2)
2S-A-2.1	Students got to know about understanding of basic building materials, such as brick, stone, cement, lime, concrete, glass with respect to classification, composition and general idea about their chemical, physical properties
2S-A-2.2	Students got to know about different type of masonry
2S-A-2.3	Students studied about lintel and arches.
2S-A-2.4	Students studied about basic types of joints and its applications in various building elements such as timber doors, windows and timber roofs.

	Structural Design and Systems- II (2S-A-3)
2S-A-3.1	Students understood about stability of masonry structural elements
2S-A-3.2	Students understood about simple stresses and strains : concept and application Relationship.
2S-A-3.3	Students understood about thermal stresses and strains: simple and composite section, concept and application.
2S-A-3.4	Students understood about elastic constants: definitions, Poisson's ratio, bulk modulus, modulus of elasticity, modulus of rigidity.
2S-A-3.5	Students understood about bending stresses – circular bending: concept and application
2S-A-3.6	Students understood about Torsional stresses concept and application
	History of Art and Architecture –II (2S-A-4)
2S-A-4.1	Students got to know Progression of art and architecture of the River valley Civilizations.
2S-A-4.2	Students understood about Study of visual art principles, scale and proportions of various period like Greek and all
2S-A-4.3	Students got to know Role of culture and art on architecture in Indian context
	Architectural Graphics II (2S-A-5)
2S-A-5.1	Students understood orthographic projections in detail through exercises
2S-A-5.2	Students understood complex projections in detail through exercises
2S-A-5.3	Development of drafting skills for architectural drawings.
	Workshop Practice – II (2S-A-6)
2S-A-6	Developing understanding of various material and efficiency in technique in students. Through various exercises like model making, product designing, etc.
	Elective A - Presentation Skills – II (2S-AA-1)
2S-AA-1.1	Development of communication and public speaking skills in students.
	Elective B -Fundamentals of Drawing Techniques (2S-AA-2)
2S-AA-2.1	Students got to know about correct drawing techniques and its fundamentals through exercises
Bachelor of Architecture Third Semester	
	Architectural Design – II (3S-A-1)
3S-A-1.1	To understand Complexity in circulation- and pattern of horizontals as well as vertical movement.
3S-A-1.2	To understand Integration in terms of facilitation, planform, volume, concept and space organization.
3S-A-1.3	To know the Application of basic building materials to evolve a design with their aesthetic appeal, functional quality and elementary structural concepts to evolve specific form.
3S-A-1.4	To understand Climatic consideration for the design, orientation of building on site, simple concepts of sun shading devices, their application in elevations as functional / aesthetic solutions.

	Construction Technology And Material – III (3S-A-2)
3S-A-2.1	To understand about the use of materials i.e Tiles, Steel, Aggregate, Reinforcement Bars.
3S-A-2.2	To know Concept of vertical connector – Study of staircases.
3S-A-2.3	To understand the Concept of spanning and its extension in formation of roofs and floors.
3S-A-2.4	To understand Principle of framed structure: R.C.C. as a building material and all R.C.C. elements, steel framed structures.
	Structural Design And System III (3S-A-3)
3S-A-3.1	To understand stress strain curve for concrete and steel.
3S-A-3.2	To know Euler's and Rankin's theory and its concept and applications.
3S-A-3.3	To understand concept and applications of direct and bending stress.
3S-A-3.4	To draw shear force and bending moment diagram of simply supported beam, cantilever and overhanging beam.
3S-A-3.5	To understand stress at base, minimum base width of retaining wall.
3S-A-3.6	To know principle stresses and strains, applications of Mohr's circle, study of concept by analytical method.
	History of Art and Architecture-III (3S-A-4)
3S-A-4.1	The student shall be able to understand the Islamic Architecture and Architectural forms conceived by Qutub Dynasties at Delhi.
3S-A-4.2	The student shall be able to understand the Islamic Architecture of Provinces such as Bengal, Jaunpur, Gujrat and Central India.
3S-A-4.3	The student shall be able to understand about Architecture under Mughals - Humayun, Akbar, and Shahjahan.
3S-A-4.4	The student shall be able to learn about the Contemporary Architecture
3S-A-4.5	The student shall be able to understand the city planning of Chandigarh, Delhi and study of its important Administrative buildings.
3S-A-4.6	The student shall be able to understand various schools of thoughts and philosophies of modern architects
3S-A-4.7	The student shall be able to understand Industrial revolution in Europe
	Architectural Graphics III (3S-A-5)
3S-A-5.1	To understand the Perception and registration of an object when viewed.
3S-A-5.2	To know the Types perspective views such as one point, two point, three point, worm's eye view, Bird's eye view, normal view, etc.
3S-A-5.3	To know how to draw the Measured Drawing and Measurement techniques of existing object (such as building, plot, etc.) Chain survey, methods and compass and instruments used, plotting and adjustment of closing error.
3S-A-5.4	To understand Levelling, methods of levelling -dumpy level and its uses. Contour survey Contours, use of theodolite. Planimeter and its use.
	Surveying and Levelling (3S-A-6)
3S-A-6.1	To surveying and levelling, types of surveying methods and application.
3S-A-6.2	To know how to use survey instruments for Chain survey, methods and compass and instruments used, plotting and adjustment of closing error.

3S-A-6.3	To understand how to do Plane table survey, method and instruments used, Levelling, methods of levelling -dumpy level and its uses, contour survey Contours, use of theodolite, Planimeter and its use.
	Climate and Architecture (3S-A-7)
3S-A-7.1	The student shall be able to learn Study of traditional / vernacular architecture
3S-A-7.2	The student shall be able to understand the climate data, its analysis and method of presentation..
3S-A-7.3	The student shall be able to learn the passive cooling techniques, techniques of solar radiation control and heat transfer and insulation.
3S-A-7.4	The student shall be able to understand effect of orientation, topography, vegetation, form, building materials and surfaces on the building design in response to the climate
3S-A-7.5	The student shall be able to learn Approach to climate responsive built environment.
	Vernacular Architecture (ELE A) (3S-AA-1)
3S-AA-1.1	Students got to know about various styles of veracular architecture among the world.
	Architectural Documentation (3S-AA-2)
3S-AA-2.1	To know how to document an as built structures and make presentation drawings
Bachelor of Architecture Fourth Semester	
	Architectural Design II (4S-A-1)
4S-A-1.1	To understand Complexity in circulation- and pattern of horizontals as well as vertical movement.
4S-A-1.2	To understand Integration in terms of facilitation, planform, volume, concept and space organization.
4S-A-1.3	To know the Application of basic building materials to evolve a design with their aesthetic appeal, functional quality and elementary structural concepts to evolve specific form.
4S-A-1.4	To understand Climatic consideration for the design, orientation of building on site, simple concepts of sun shading devices, their application in elevations as functional / aesthetic solutions.
	Construction Technology And Material - III (4S-A-2)
4S-A-2.1	To understand about the use of materials i.e. Metals: Aluminium, copper, steel, titanium etc.
4S-A-2.2	To know about the types of Doors Windows – Steel, aluminium and sliding doors, sliding and folding doors, revolving doors, revolving shutters, collapsible gates and its construction details.
4S-A-2.3	To understand and design different types of Partitions – Aluminium, timber, steel.
4S-A-2.4	To know and understand how Timbering to trenches, formwork, centering, shoring and underpinning. Is done with Temporary Structures and temporary supports
	Structural Design and System-IV (4S-A-3)
4S-A-3.1	Analysis and draw bending moment and shear force diagrams for fixed beam under different loading condition.

4S-A-3.2	Apply the concept of three moment theorem for analysis and to drawing bending moment and shear force diagrams for continuous beam under different loading condition.
4S-A-3.3	Apply the concept of moment distribution for analysis and to drawing bending moment and shear force diagrams for continuous beam and portal frame under different loading condition.
4S-A-3.4	Apply the Macaulay's method for determination of deflection for simply supported and cantilever beam under different loading condition.
4S-A-3.5	Have the knowledge about determinate and indeterminate structure.
4S-A-3.6	Have the knowledge about the arches and apply the knowledge to analysis the three hinged arches.
4S-A-3.7	Have the knowledge about loading conditions and unit weights of various material used in construction work.
4S-A-3.8	Have the concept of load distribution system in suspension cable system, one-two way slab and arches
	Building Services – I (4S-A-4)
4S-A-4.1	The students will know about importance, installation and working of essential services in buildings, and a way building services help in generating a cleaner and healthier built environment. The students should also be made familiar with I.S. codes related to services. To understand the basic aspects of water supply, sewage disposal, refuse and storm water disposal in buildings.
	Architectural Graphics IV (4S-A-5)
4S-A-5.1	To understand the effect of combination of shades and shadows using Complex problems on-buildings, building projections, louvers, chajjas, canopies etc. rendered in appropriate medium
4S-A-5.2	To know the effect of shades and shadows cast by artificial light on built forms.
4S-A-5.3	To know how to make Perspective of interior of buildings rendered suitably ,Parallel and angular exterior perspective views of objects of buildings
4S-A-5.4	To know how to make Bird's eye view showing a building or any object with surrounding landscape, buildings etc. rendered
	Theory of Architecture-I (4S-A-6)
4S-A-6.1	To understand the definition of Architecture; Elements of Architecture backed by need and followed by fulfillment of need.
4S-A-6.2	To know about Architectural Design and the Integration of aesthetic and function
4S-A-6.3	To know about Mass and space, Visual and emotional effects of geometric forms and their derivate
4S-A-6.4	To know about Aesthetic Components of Design
4S-A-6.5	To know about effect in of colour architecture
	Theory of Landscape Architecture (4S-A-7)
4S-A-7.1	Through this subject the students shall be aware of architecture beyond buildings, in the outdoor environment and spaces, and, the role and importance of landscaping and site planning in enhancing and improving the quality of building

	environs, functionally and aesthetically
	Elective A Computer Application I (4S-AA-1)
4S-AA-1.1	The student shall be able to understand Auto cad 2D Implementation .
	Elective B Product Design (4S-AA-2)
4S-AA-2.1	Through this subject the students shall be aware of architecture beyond buildings, in the outdoor environment and spaces, and, the role and importance of landscaping and site planning in enhancing and improving the quality of building environs, functionally and aesthetically
Bachelor of Architecture Fifth Semester	
	Architectural Design-IV (5S-A-1)
5S-A-1.1	The student shall be able to understand the Effect of sun, rain and wind on buildings.
5S-A-1.2	The student shall be able to understand the Functional organization of activities with respect to site, its topography and surroundings.
5S-A-1.3	The student shall be able to learn about the Development control rules, building byelaws and standard codes
5S-A-1.4	The student shall be able to learn about the Functioning of building services like drainage, water supply and electricity
5S-A-1.5	The student shall be able to learn about the Form to suit the purpose of building.
	Construction Technology and Materials –V (5S-A-2)
5S-A-2.1	The student shall be able to understand the Cement, paints, various types of plasters, paints, varnishes and finishes.
5S-A-2.2	The student shall be able to understand the Plasters and finishes. .
5S-A-2.3	The student shall be able to learn about the Expansion Joints, Water-Proofing, earthquake resistant structures.
5S-A-2.4	The student shall be able to learn about the False Ceiling, Suspended ceilings, roofs.
5S-A-2.5	The student shall be able to understand the Foundations, footings and all advanced foundations.
	Structural Design and System-V (5S-A-3)
5S-A-3.1	The student would be able to apply knowledge of Design component of Building using Indian Standard code
5S-A-3.2	The student would be able to apply Design of Beam using Various component of Building.
5S-A-3.3	The student would be able to apply knowledge of IS code for various Component of Building.
5S-A-3.4	The student would be able to apply the concept of T and L Beam using various method
5S-A-3.5	The student would be able to apply knowledge to analyze concept of Beam for various method
5S-A-3.6	The student would be able to apply knowledge to Design component.
	Building Services –II (5S-A-4)
5S-A-4.1	The student shall be able to understand the Electrical services, various wiring

	systems detailed layout of electrical services in a residence.
5S-A-4.2	The student shall be able to understand the Schematic water distribution system from treatment plants to town, group housing etc.
5S-A-4.3	The student shall be able to learn about the Hot water supply in high-rise buildings, boilers, furnaces, solar water heaters, computing a special demands of water for swimming pools, air conditioning plants, fire fighting, street washing, fountains and gardens etc. and their systematic layouts.
5S-A-4.4	The student shall be able to learn about the sewage collection and disposal for large campuses, complexes.
5S-A-4.5	The student shall be able to understand the Rain water harvesting.
	Architectural Graphics-V (5S-A-5)
5S-A-5.1	The student shall be able to learn Submission drawing as per the local building bye laws.
5S-A-5.2	The student shall be able to understand the Working drawings required for carrying out actual construction work.
5S-A-5.3	The student shall be able to learn the graphics of the drawings will be with specific reference to the code of practice for Architectural and Structural drawings as laid down in B.I.S. No.962 of 1960.
	Theory of Design-II (5S-A-6)
5S-A-6.1	The student shall be able to understand Organization of Forms and Spaces a) Spacial relationships b) Spacial Organization c) Articulation of Forms and Space
5S-A-6.2	The student shall be able to understand the Character and Style in Building
5S-A-6.3	The student shall be able to learn about the Principles of Composition
5S-A-6.4	The student shall be able to learn about the Harmony and specific qualities of design
5S-A-6.5	The student shall be able to Study of circulation pattern
	Specifications (5S-A-7)
5S-A-7.1	The student shall be able to understand importance of specifications building construction activity.
5S-A-7.2	The student shall be able to understand Specifications of basic building materials such as bricks, stones, aggregate, cement, steel, timber etc.
5S-A-7.3	The student shall be able to learn about the Specifications of works for a residential building of load bearing type or R.C.C. framed type.
5S-A-7.4	The student shall be able to learn about the Specifications for items of services such as drainage, wafer supply, electrical installation.
5S-A-7.5	The student shall be able to study Specifications for demolition-work, temporary construction like sheds, exhibition stalls, gateways.
	Computer Application II Elective A (5S-AA-1)
5S-AA-1.1	The student shall be able to understand AutoCAD 2D Implementation.
5S-AA-1.2	The student shall be able to understand AutoCAD 3D
5S-AA-1.3	The student shall be able to learn 3D model.

	Appropriate Technology Elective B (5S-AA-2)
5S-AA-2.1	The student shall be able to understand the concept of appropriate technology, its relevance in present day context , scope etc
5S-AA-2.2	The student shall be able to understand. Study of soil and its composition and properties
5S-AA-2.3	The student shall be able to learn about the Specifications of works for a residential building of load bearing type or R.C.C. framed type.
5S-AA-2.4	The student shall be able to learn about Wattle and daub walls, Rammed earth walls and adobe walls.
5S-AA-2.5	The student shall be able to study. Walls, vaults, Domes using soil cement blocks, compressed mud blocks, Nubian arch roof.
5S-AA-2.6	The student shall be able to understand Use of bamboo as building material
5S-AA-2.7	The student shall be able to understand Burnt clay tile roofing, Ferro cement roofing units, Doubly curved tile roofing, precast joists etc
Bachelor of Architecture Sixth Semester	
	Architectural Design V (6S-A-1)
6S-A-1.2	The student shall be able to understand the Functional organization of activities with respect to site, its topography and surroundings.
6S-A-1.3	The student shall be able to learn about the Development control rules, building byelaws and standard codes
6S-A-1.4	The student shall be able to learn about the Functioning of building services like drainage, water supply and electricity
6S-A-1.5	The student shall be able to learn about the Form to suit the purpose of building.
	Construction Technology and Materials –VI (6S-A-2)
6S-A-2.1	The student shall be able to understand the Cladding Materials
6S-A-2.2	The student shall be able to understand Bamboo, mud, Ferro-cement, vault domes, flat slabs etc.
6S-A-2.3	The student shall be able to learn High rise construction
6S-A-2.4	The student shall be able to learn Advanced R.C.C. Structures
	Structural Design and Systems- VI (6S-A-3)
6S-A-3.1	The students would have the knowledge of the earthquake resistant structure.
6S-A-3.2	The students would be able to design the one way slab, two way slab and continuous slab.
6S-A-3.3	The students would be able to understand the design of different types of columns.
6S-A-3.4	The students would be able to design the independent column footing.
6S-A-3.5	The students can apply the knowledge to design the RCC Grid Structure.
6S-A-3.6	The students would have the knowledge of the RCC building frame and its structural behavior.
6S-A-3.7	The students would be able to design the RCC section of retaining wall by considering different support conditions.
6S-A-3.8	The students would be able to understand the structural behavior of large span RCC system like portal frame, arches, open web sections, shell roofs etc.

	Building Services -II (6S-A-4)
6S-A-4.1	The student shall be able to understand the Communication systems in buildings
6S-A-4.2	The student shall be able to understand the building automation systems, components and application of BAS, Architectural implications.
6S-A-4.3	The student shall be able to learn about the Causes of fire in buildings, Fire safety and preventive measures.
6S-A-4.4	The student shall be able to learn Fire fighting regulations with reference to National Building code etc.
6S-A-4.5	The student shall be able to learn about of Fire detection systems
6S-A-4.6	The student shall be able to learn Ventilation of buildings
	Architectural Graphics VI (6S-A-5)
5S-A-5.1	The student shall be able to learn Submission drawing as per the local building bye laws.
5S-A-5.2	The student shall be able to understand the Working drawings required for carrying out actual construction work.
5S-A-5.3	The student shall be able to learn the graphics of the drawings will be with specific reference to the code of practice for Architectural and Structural drawings as laid down in B.I.S. No.962 of 1960.
	Design of Humanities and Settlement (6S-A-6)
6S-A-6.1	The study aims at introducing students to the development of planning thought from that of historic to present age. It also gives emphasis on stressing broad principles of settlement in such period. The study of this subject continues with emphasis on planning philosophies and the student to carry out the further studies in the specialized field of Urban Planning
	Estimating and Costing (6S-A-7)
6S-A-7.1	The student shall be able to understand the Purpose of Estimating, types of estimates
6S-A-7.2	The student shall be able to understand the Bill of quantities for single story structures
6S-A-7.3	The student shall be able to study about the IS-1200.
6S-A-7.5	The student shall be able to learn Estimation of quantities for R.C.C. structural members.
6S-A-7.6	The student shall be able to learn Estimation for electrification, water supply and sanitation.
6S-A-7.7	The student shall be able to learn rate analysis.
6S-A-7.8	The student shall be able to learn brief specifications and schedule of rates.
	Project Management (6S-AA-1)
6S-AA-1.1	Students shall be able to understand the need of project management in architecture professional practices.
6S-AA-1.2	Students shall be able to work out the project planning, scheduling and implementation management.

	Advanced Spatial Analysis (6S-AA-2)
6S-AA-2.1	Students shall be able to understand the spatial grid and density of activity spaces in an urban area.
6S-AA-2.2	Students shall be able to analyse the requirements of development through surveys and analytical study under urban area development.
Bachelor of Architecture Seventh Semester	
	Architectural Design-VII (7S-A-1)
7S-A-1.1	The student shall be able to understand the Design orientation of advance and specialized buildings and environmental services, climate and acoustical system oriented buildings, their appropriate structural buildings and construction techniques.
7S-A-1.2	The student shall be able to understand the Orientation on development control rules
7S-A-1.3	The student shall be able to learn about the study of urban environment, complex building forms, their design including positive and negative space relationship, Parking Provision, Precincts concept and pedestrian movement.
	Construction Technology and Materials –VII (7S-A-2)
7S-A-2.1	The student shall be able to understand the space structures, types of space structures
7S-A-2.2	The student shall be able to understand the Grid structures and Skeletal structures, space frames, domes etc.
7S-A-2.3	The student shall be able to learn about the Pre-cast concrete, Design considerations and constraints, advantages over cast-in-situ construction.
7S-A-2.4	The student shall be able to learn about the methods of pre-stressing, advantages and disadvantages and applications.
7S-A-2.5	The student shall be able to understand the Temporary structures design and detailing problems on small temporary structures.
7S-A-2.6	The student shall be able to understand the various external cladding materials and systems, curtain walling in various materials.
	Building Services-IV (7S-A-3)
7S-A-3.1	The student shall be able to understand the Principles of Psychometrics and heat transfer, Study of Air conditioning systems
7S-A-3.2	The student shall be able to understand the Components of A.C. systems. Calculation of A.C. loads and Air distribution systems, ducts and ducting layouts, space requirement, Water demand for A.C
7S-A-3.3	The student shall be able to learn about the Electric supply and distribution for group housing projects, urban complexes, high-rise building etc.
7S-A-3.4	The student shall be able to learn about the Importance and functions of bus bar, set up, step up and step down transformers, electrical substation, lightning conductors, stand by generators, automatic relays, invertors, circuit breakers etc.
7S-A-3.5	The student shall be able to understand the Electromechanical means of vertical transportation in buildings.
7S-A-3.6	The student shall be able to understand the Escalators and Trav-o-lators

	Structural Design and System-VII (7S-A-4)
7S-A-4.1	To know about the steel connections, types of welds, concentric section, eccentric section, section in bending and section in torsion.
7S-A-4.2	To have complete knowledge about IS 800-2007 Design considerations.
7S-A-4.3	To understand the Design of Tension members.
7S-A-4.4	To understand the Design of Compression members like Struts or Independent.
7S-A-4.5	To know about the Design in columns
7S-A-4.6	To know about the Design of section in bending
7S-A-4.7	To know about the Design of section subjected to biaxial bending
7S-A-4.8	To study and understand about the structural behaviours of types of large span steel structure like arches, open web section, bow string girders, suspension structure, geodesic dome and space structure.
	Research Skills and Project Introduction (7S-A-5)
7S-A-5.1	The student shall be able to learn about the investigation to be done in research, methodology in sequence to achieve to Acquire desired results.
7S-A-5.2	The student shall be able to understand the Assessment of data to be used in formation of the total thesis profile.
7S-A-5.3	The student shall be able to learn the Data collection
7S-A-5.4	The student shall be able to understand the Concluding part of research comprising of the data
	Acoustics and Illumination (7S-A-6)
7S-A-6.1	The student shall be able to understand about the sounds.
7S-A-6.2	The student shall be able to understand the Components of A.C. systems. Calculation of A.C. loads and Air distribution systems, ducts and ducting layouts, space requirement, Water demand for A.C
7S-A-6.3	The student shall be able to learn about the Electric supply and distribution for group housing projects, urban complexes, high-rise building etc.
7S-A-6.4	The student shall be able to learn about the Importance and functions of bus bar, set up, step up and step down transformers, electrical substation, lightning conductors, stand by generators, automatic relays, invertors, circuit breakers etc.
7S-A-6.5	The student shall be able to understand the Electromechanical means of vertical transportation in buildings.
7S-A-6.6	The student shall be able to understand the Escalators and Trav-o-lators.
	Interior Design (7S-AA-1)
7S-AA-1.1	To how to make presentation drawings, working drawings details and 3d views of various interior projects ranging from industrial to commercial to residential Projects.
7S-AA-1.2	An understanding of interior design as an interdisciplinary as well as allied field related to Architecture.
	Valuation (7S-AA-2)
7S-AA-2.1	To understand the Different methods of valuation for land and building Application of valuation and consideration of valuables in Town Planning regarding the plots and development.
7S-AA-2.2	To know the Application of valuation, tables Valuation

Bachelor of Architecture Eighth Semester	
	Practical Training (8S-A-1)
8S-A-1.1	To receive hands on Office experience in respect of preparation of working drawing, detailing drawings of perspective, preparation of architectural models, study of filing systems of documents, drawings, ammonia prints and preparation of tender document. To have on Site experience, in respect of supervision of the construction activity, Observation, layout on site, study of the staking methods of various building, materials, taking the measurement and recording.
Bachelor of Architecture Ninth Semester	
	Practical Training (9S-A-1)
9S-A-1.1	To receive hands on Office experience in respect of preparation of working drawing, detailing drawings of perspective, preparation of architectural models, study of filing systems of documents, drawings, ammonia prints and preparation of tender document. To have on Site experience, in respect of supervision of the construction activity, Observation, layout on site, study of the staking methods of various building, materials, taking the measurement and recording.
Bachelor of Architecture Tenth Semester	
	Practical Training (10S-A-1)
10S-A-1	To design a research project based on the synthesis of total experience and knowledge gained from the core and allied subjects with an effective design solution/s.
	Construction Technology and Materials - VIII (10S-A-2)
10S-A-2	To understand the advanced construction Techniques for long span structure by using various materials. Students shall be able to understand the design and construction requirements for high rise and critical building designs
	Professional Practice (10S-A-3)
10S-A-3.1	Students shall be able to understand the process of contract and tender bidding.
10S-A-3.2	Students shall be able to understand the legislation pertaining to arbitration, easement rights, land acquisition and urban ceiling
	Elective – A – Housing (10S-AA-1)
10S-AA-1.1	To know about the housing programmes/Schemes by Government of India.
10S-AA-1.2	To know about the status of housing in India and housing mission.